ADAMCZEWSKI
Elektronische Messtechnik GmbH

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Isolation Amplifier

AD-TV 1 GX

Description

The isolation amplifier AD-TV 1 GX, with a construction width of only 6.2 mm, serves the galvanic separation of DC voltage signals. The output signal follows linear the input variable and is, up to a limiting value, independent of the connected burden (0-10 VDC, 1:1 input/output). Due to the narrow design, a high packing density is achieved. In combination with a DIN rail connector, the wiring is considerably reduced.

Application

Burden amplification and galvanic disconnection of impressed DC voltage signals.

Specific characteristics

- narrow 6.2mm construction
- Supply via DIN rail connector

Business data

Order number

AD-TV 1 GX

Accessory

DIN-rail connector	AD-GX Connector

Technical specifications

Input voltage

Measuring range	0 ... 10 V
Input resistance	100 kOhm

Output voltage

Output range	0 ... 10 V
Min. burden	500 Ohm
Residual ripple	< 0,1 %
Current limit	< 28 mA

Transmission behaviour

Response time	< 50 ms (10-90 %)
Linearity error	< 0,1 %
Temperature influence	< 70 ppm/K

Supply

Voltage range	18 ... 30 V DC
Nominal voltage	24 V DC
Power consumption	< 850 mW

Housing

Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Manner of fastening	DIN rail 35mm EN 50022
Type of protection	IP 20
Connection method	screw clamp (2,5 mm² flex wire / 4 mm² one wire)
Bolting torque terminals	0,5 Nm
Weight	~ 70 g

Environmental conditions

Ambient temperature	-10 ... +50 °C
Storage and transport	-10 ... +70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emission [2)]	EN 55011, CISPR11 Cl. A, Gr. 1

[1)] During electromagnetic disturbance minor changes in output signal are possible.

[2)] Warning:
This device is not intended to be used in residential areas and can not ensure adequate protection of radio reception in such environments.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	1,5 kV, 1 min
Signal/auxiliary voltage	1,5 kV, 1 min

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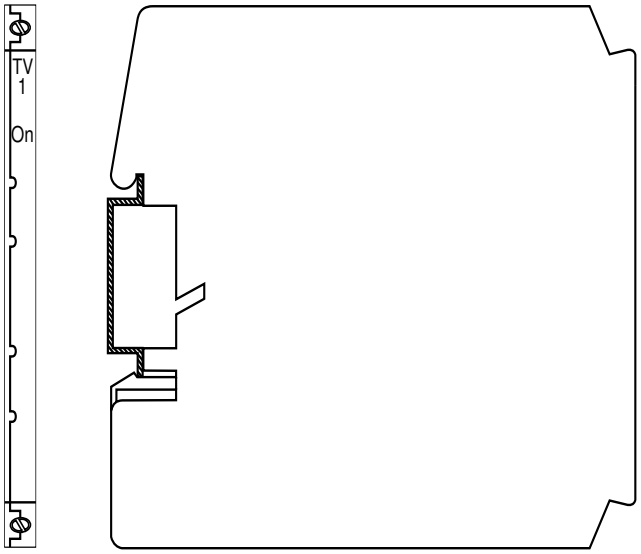
Isolation Amplifier

AD-TV 1 GX

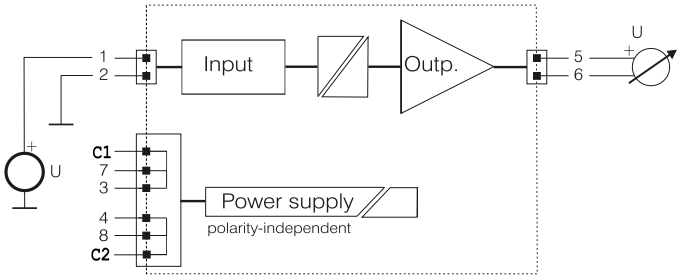
Display and operating elements

Front

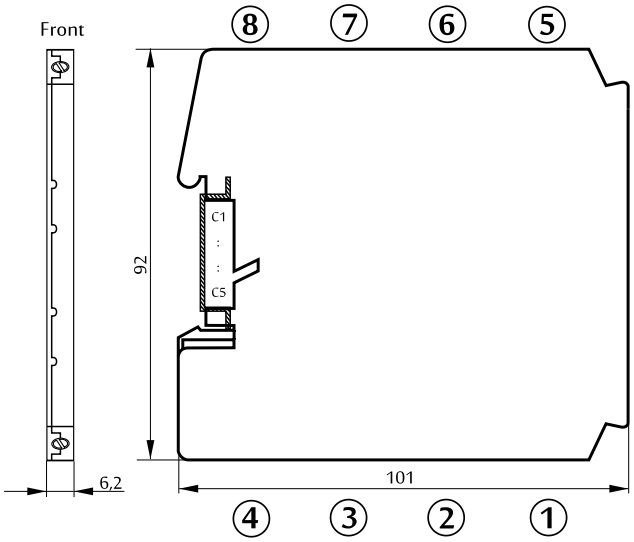


Designation	LED	Meaning
On	green	Power supply

Block and wiring diagram



Dimensions



Isolation Amplifier

AD-TV 2 GX

Description

The isolation amplifier AD-TV 2 GX, with a construction width of only 6.2 mm, serves the galvanic separation of DC current signals. The output signal follows linear the input variable and is, up to a limiting value, independent of the connected burden (0/4-20 mA, 1:1 input/output). Due to the narrow design, a high packing density is achieved. In combination with a DIN rail connector, the wiring is considerably reduced.

Application

Burden amplification and galvanic disconnection of impressed DC current signals.

Specific characteristics

- narrow 6.2mm construction
- Supply via DIN rail connector

Business data

Order number

AD-TV 2 GX

Accessory

DIN-rail connector	AD-GX Connector

Technical specifications

Input current

Measuring range	0 ... 20 mA
Input resistance	50 Ohm

Output current

Output range	0 ... 20 mA
Max. burden	400 Ohm
Residual ripple	< 0,1 %
Open-circuit voltage	< 13V

Transmission behaviour

Response time	< 50 ms (10-90 %)
Linearity error	< 0,1 %
Temperature influence	< 70 ppm/K

Supply

Voltage range	18 ... 30 V DC
Nominal voltage	24 V DC
Power consumption	< 850 mW

Housing

Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Manner of fastening	DIN rail 35mm EN 50022
Type of protection	IP 20
Connection method	screw clamp (2,5 mm² flex wire / 4 mm² one wire)
Bolting torque terminals	0,5 Nm
Weight	~ 70 g

Environmental conditions

Ambient temperature	-10 ... +50 °C
Storage and transport	-10 ... +70 °C (no condensation)

EMC

Product family standard	EN 61326-1

During electromagnetic disturbance minor changes in output signal are possible.

Emitted interference	EN 55011, CISPR11 Cl. A, Gr. 1

Warning:
This device is not intended to be used in residential areas and can not ensure adequate protection of radio reception in such environments.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	1,5 kV, 1 min
Signal/auxiliary voltage	1,5 kV, 1 min

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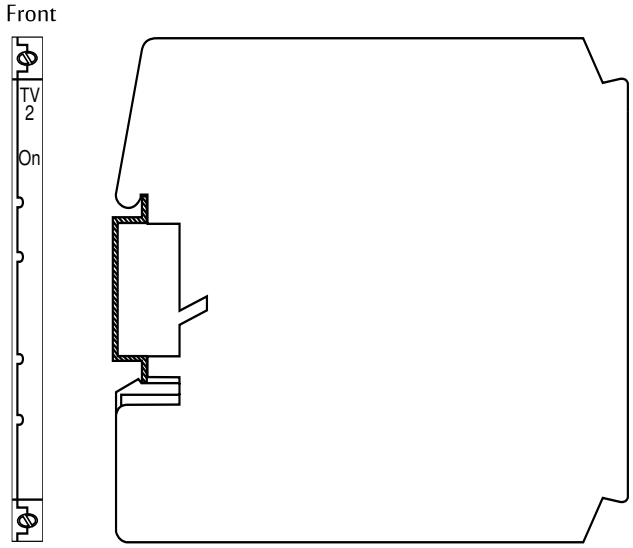
Isolation Amplifier

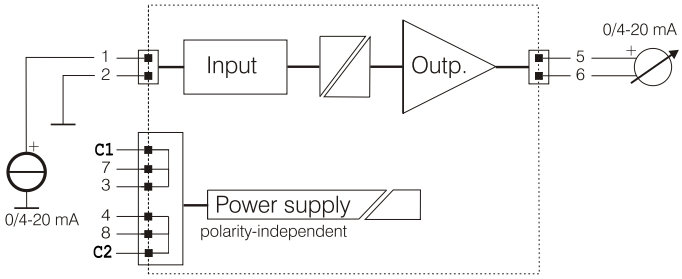
AD-TV 2 GX

Display and operating elements

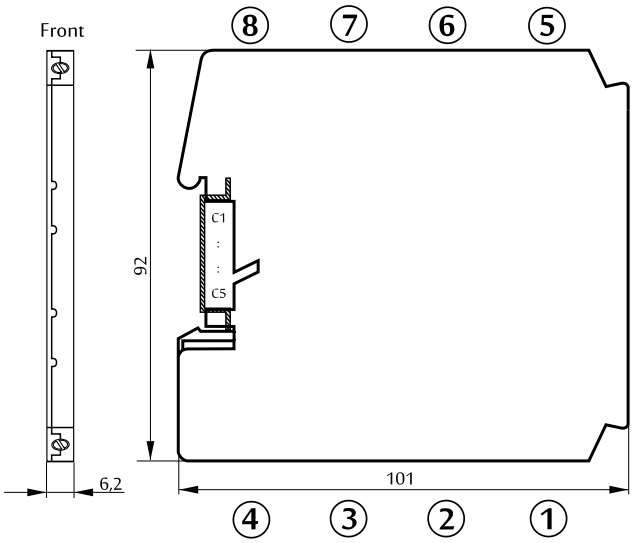
Designation	LED	Meaning
On	green	Power supply



Block and wiring diagram



Dimensions



Isolation Amplifier

Vario-Isolation-Amplifier

AD-TV 3 GX

Description

The VARIO isolation amplifier AD-TV 3 GX, with a construction width of only 6.2 mm, serves the galvanic separation, conversion and amplification of DC current signals and voltage signals (0/4-20 mA and 0/2-10 V). The signal magnitudes can be selected with DIP switches. For range changing, manual adjustment is required, the initial values and final values can be adjusted via a trimmer. The output signal follows linear the input variable and is, up to a limiting value, independent of the connected burden. Due to the narrow design, a high packing density is achieved. In combination with a DIN rail connector for bridging the supply voltage, the wiring is considerably reduced.

Application

Conversion, burden amplification and galvanic disconnection of impressed DC current signals and voltage signals.

Specific characteristics

- narrow 6.2mm construction
- Supply via DIN rail connector

Business data

Order number

	AD-TV 3 GX

Accessory

DIN-rail connector	AD-GX Connector

Technical specifications

Input current

Measuring range	0 ... 20 mA
Input resistance	50 Ohm

Input voltage

Measuring range	0 ... 5 V; 0 ... 10 V
Input resistance	10 kOhm / V

Output current

Output range	0 ... 20 mA
Max. burden	500 Ohm
Open-circuit voltage	< 13 V

Output voltage

Output range	0 ... 10 V
Min. burden	500 Ohm
Current limit	< 28 mA

Transmission behaviour

Response time	< 50 ms (10-90 %)
Linearity error	< 0,1 %
Residual ripple	< 0,1 %
Temperature influence	< 70 ppm/K
Adjust begin	+/- 22%
Adjust end	+/- 5%

Supply

Voltage range	18 ... 30 V DC
Nominal voltage	24 V DC
Power consumption	< 850 mW

Housing

Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Manner of fastening	DIN rail 35mm EN 50022
Type of protection	IP 20
Connection method	screw clamp (2,5 mm² flex wire / 4 mm² one wire)
Bolting torque terminals	0,5 Nm
Weight	~ 70 g

Environmental conditions

Ambient temperature	-10 ... +50 °C
Storage and transport	-10 ... +70 °C (no condensation)

EMC

Product family standard	EN 61326-1

During electromagnetic disturbance minor changes in output signal are possible.

Emitted interference	EN 55011, CISPR11 Cl. A, Gr. 1

Warning:
This device is not intended to be used in residential areas and can not ensure adequate protection of radio reception in such environments.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	1,5 kV, 1 min
Signal/auxiliary voltage	1,5 kV, 1 min

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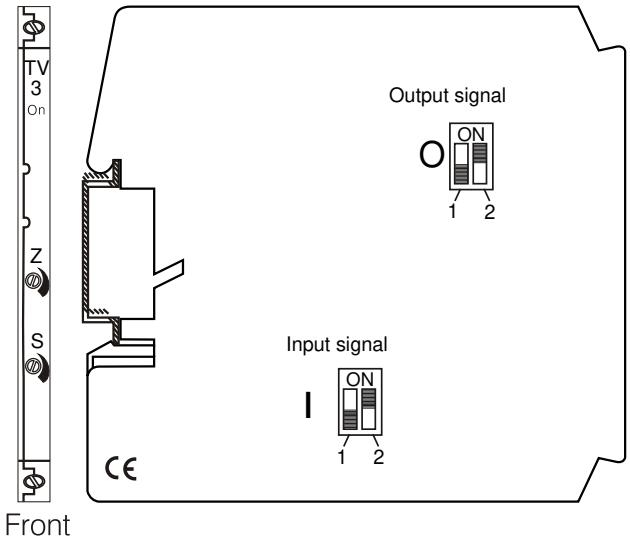
Isolation Amplifier

Vario-Isolation-Amplifier

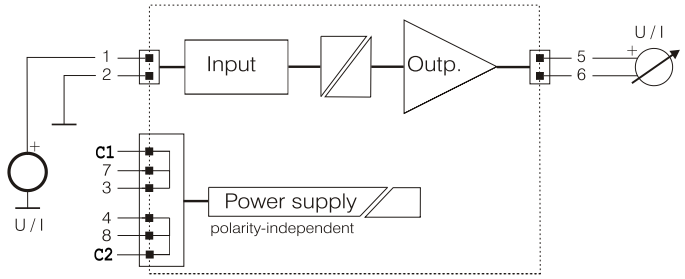
AD-TV 3 GX

Display and operating elements

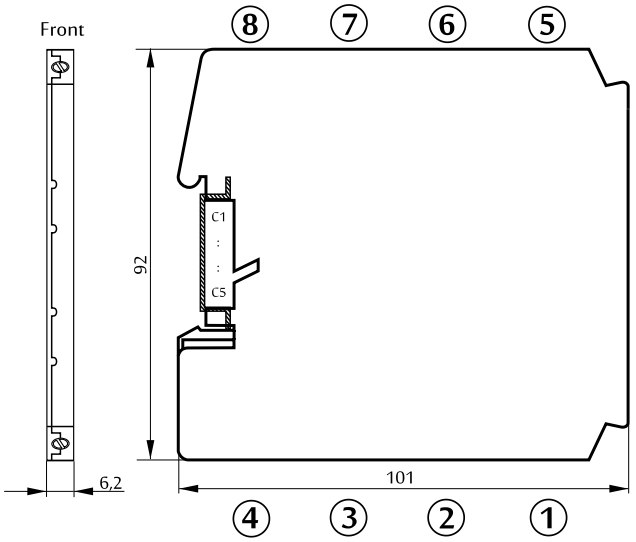


Designation	Value	Meaning
On	LED green	Power supply
Z	+/- 22 %	Adjust begin value
S	+/- 5 %	Adjust end value
Input signal		
I1 / I2	ON / OFF	Input: 0 ... 5 V
I1 / I2	OFF / OFF	Input: 0 ... 10 V
I1 / I2	OFF / ON	Input: 0 ... 20 mA
Output signal		
O1 / O2	OFF / ON	Output: 0 ... 10 V
O1 / O2	ON / OFF	Output: 0 ... 20 mA

Block and wiring diagram



Dimensions



Isolation Amplifier

Multiplier Isolation Amplifier

AD-TV 12 GX

Description

The multiplier separation amplifier AD-TV 12 GX in the narrow 6.2 mm housing serves the galvanic separation, amplification and conversion or adaption of analogue measuring signals and, at the same time, the multiplication of the input signal. The compact housing contains two synchronous output channels. All output channels are galvanic separated from each other, from the input and from the supply voltage. The type of signal can be freely selected at the input and the signal is multiplied onto the two current outputs. The standard signal combinations can be selected via the DIP switches at the side of the unit. Additionally, the separation amplifier has a highly efficient electronic power pack, which admits high loads at the two current outputs and causes low heat development. The unit can also be supplied via a hat rail connector, available as option; therefore several units in the GX series can sit side by side on the hat rail and the supply voltage must only be laid on once.

Application

Galvanic separation or conversion of analogue standard signals with simultaneous multiplication.

Specific characteristics

- narrow 6.2mm type of construction
- two galvanic separated, synchronous current outputs
- current and voltage input (switchable)
- easy configuration through DIP switch at the side of the unit
- supply via hat rail connector

Business data

Order number

AD-TV 12 GX

Accessory

DIN-rail connector	AD-GX Connector

Technical specifications

Input

Range current input	0 ... 20 mA; 4 ... 20 mA
Range voltage input	0 ... 10 V
Input resistance current	50 Ohm
Input resistance voltage	100 kOhm

Output

2 current outputs	0 ... 20 mA; 4 ... 20 mA
Max. load	400 Ohm per channel
Max. residual ripple	50 mVss
Signal clamping	20 mA

Supply

Voltage range	18 ... 30 V DC
Nominal voltage	24 V DC
Power consumption	< 1,5 W

Accuracy

Accuracy	< 0,2 %
Linearity error	< 0,2 %
Temperature influence	70 ppm/K
Response time	~ 10 ms

Housing

Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Type of protection	IP 20
Connection method	screw clamp (2,5 mm² flex wire / 4 mm² one wire)
Bolting torque terminals	0,5 Nm
Weight	~ 70 g
Manner of fastening	35 mm DIN rail

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... +70 °C (no condensation)

EMC

Product family standard [1]	EN 61326-1
Emission [2]	EN 55011, CISPR11 Cl. A, Gr. 1

[1] During checking, slight signal deviations are possible.

[2] Warning:
This device is not intended to be used in residential areas and can not ensure adequate protection of radio reception in such environments.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input / output	1,5 kV (1 min.)
Signal / supply unit	1,5 kV (1 min.)

Protection circuits

Input	electrical surge protection
Output	electrical surge protection
Power supply	electrical surge and reverse current protection

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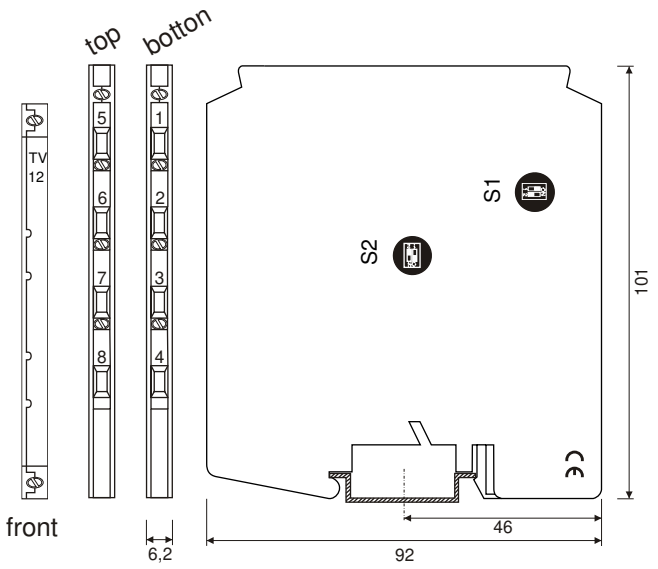
Isolation Amplifier

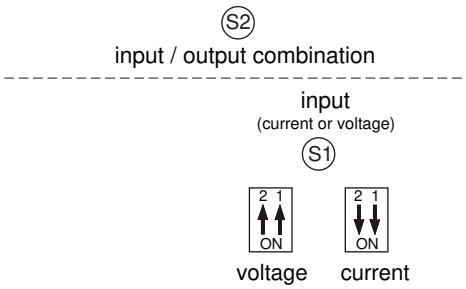
Multiplier Isolation Amplifier

AD-TV 12 GX

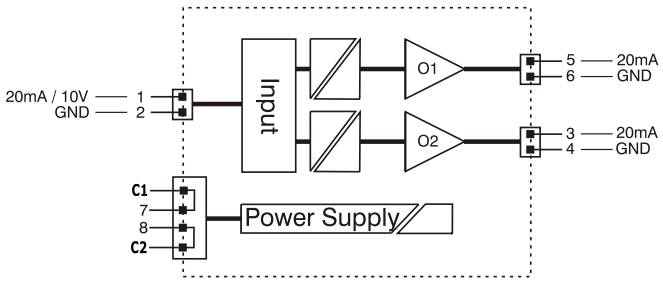
Display and operating elements



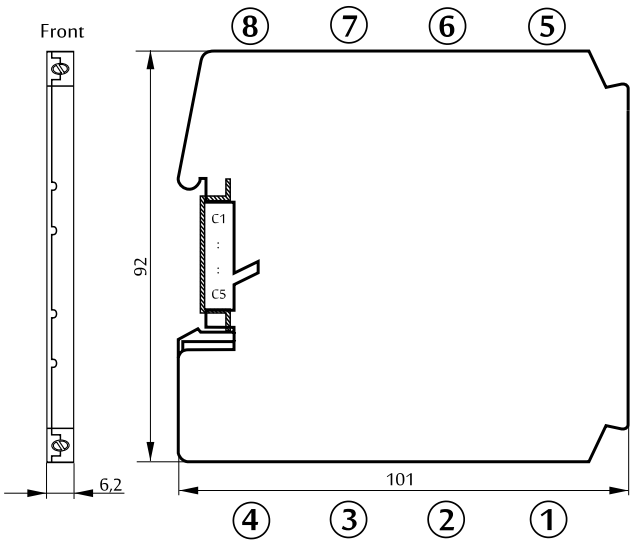
input	0-20 mA oder 0-10 V	4-20 mA oder 0-10 V	0-20 mA oder 0-10 V	4-20 mA
output	0-20 mA	0-20 mA	4-20 mA	4-20 mA
	ON 1 2	ON 1 2	ON 1 2	ON 1 2



Block and wiring diagram



Dimensions



Isolation Amplifier

Isolation Amplifier For Voltage Signals

AD-TV 10 GVB

Description

The isolation amplifier AD-TV 10 GVB serves the galvanic separation and amplification of DC voltage signals (0/2-10V). The output signal follows the input variable linear and is independent of the connected burden up to a limiting value. Additionally, the separation amplifier has a special voltage input, which can be realised according to customer data, up to a maximum of 300 VDC. Input, output and supply voltage are separated from each other with high insulation. An internal electronic power pack with high efficiency and a voltage range of 11 to 30 VDC prevents a strong temperature rise and allows high output burdens. Therefore, the separation amplifier is also optimally suitable for battery operation. High packaging density and working ergonomics are achieved in combination with detachable terminal clamps and a construction width of 13 mm.

Application

Burden amplification and galvanic decoupling of DC voltage signals in the lower supply voltage range.

Specific characteristics

- supply voltage range: 11 ... 30 V DC
- special voltage input up to 300 V DC

Business data

Order number	AD-TV 10 GVB

Technical specifications

Input	
Input voltage	0 ... 10 V (Rin: 100 kOhm)
Special voltage input	max. 0 ... 300 V (customer data)
Output	
Output voltage	0 ... 10 V
Minimum load	min. 5 kOhm
Residual ripple	max. 50 mVss
Supply	
Voltage range	11 ... 30 V DC
Nominal voltage	12 V DC / 24 V DC
Power consumption	max. 0,4 W
Accuracy	
Accuracy	< 0,2 %
Temperature influence	50 ppm/K
Response time	max. 2 ms
Housing	
Dimensions (WxHxD)	13x110x134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp (2,5 mm² flex wire / 4 mm² one wire)
Bolting torque terminals	0,5 Nm
Weight	ca. 98 g
Manner of fastening	DIN rail 35mm (EN 50022)
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Galvanic isolation, test voltages, overvoltage category II	
Input / output	3,75 kV (1 min.)
Signal / supply unit	4 kV (1 min.)
Protection circuits	
Input	electrical surge protection
Output	electrical surge protection
Power supply	electrical surge and reverse current protection

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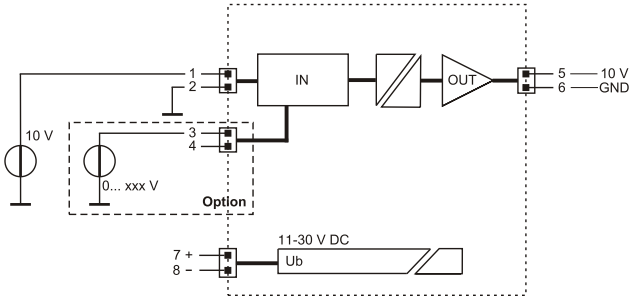
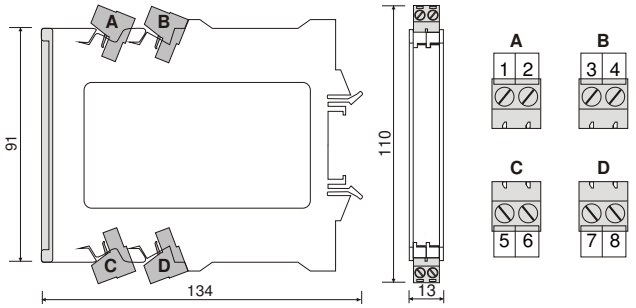
Isolation Amplifier For Voltage Signals

AD-TV 10 GVB

Block and wiring diagram



Dimensions



Isolation Amplifier

AD-TV 24 GL

Description

The separation amplifier AD-TV 24 GL serves the galvanic separation and amplification of DC-current signals (0/4-20 mA). The output signal follows linear the input dimension and is independent of the connected burden up to a limiting value. Input, output and supply voltage are galvanically separate from each other with high insulation. An integral electronic power pack with a high degree of effectiveness prevents strong heating and allows high output loads. A high packing density is achieved in combination with a narrow type of construction.

Application

Burden amplification and galvanic decoupling of active DC-current signals in a cost-effective build-up.

Specific characteristics

- Supply buffer amplifier for 3-way separation of 0/4-20 mA signals (output follows input 1:1)
- 18 mm narrow housing

Business data

Order number	AD-TV 24 GL

Technical specifications

Input current

Measuring range	0 ... 20 mA; 4 ... 20 mA
Input resistance	50 Ohm

Output current

Output range	0 ... 20 mA; 4 ... 20 mA 1:1 to the input signal
Max. burden	400 Ohm
Residual ripple	<25 µAss

Transmission behaviour

Basic accuracy	< 0,2 %
Temperature influence	< 100 ppm/K

Supply

Supply voltage	20 ... 30 V DC
Nominal voltage	24 V DC
Power consumption	0,9 W

Housing

Dimensions (WxHxD)	18x81x103mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Manner of fastening	DIN rail 35mm (EN 50022)
Weight	ca. 100 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)] During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	3,75 kV RMS (1 min.)
Signal/auxiliary voltage	3 kV RMS (1 min.)

Protective systems

Input/output	electrical surge protection
Power supply	electrical surge and reverse current protection

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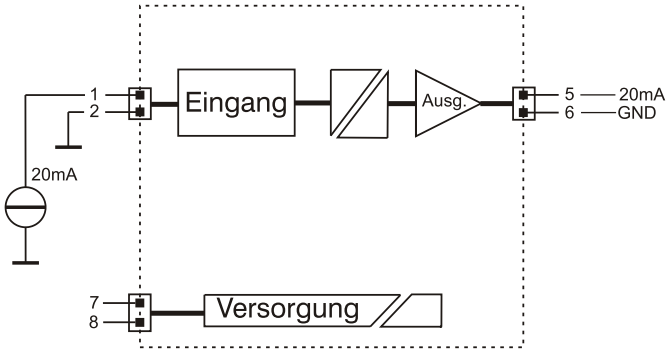
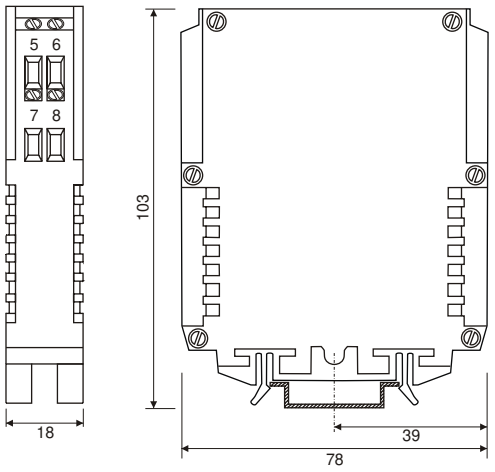
Isolation Amplifier

AD-TV 24 GL

Block and wiring diagram



Dimensions



Isolation Amplifier

AD-TV 24 GVB

Description

The separation amplifier AD-TV 24 GVB serves the galvanic separation and amplification of DC-current signals (0/4-20 mA). The output signal follows linear the input dimension and is independent of the connected burden up to a limiting value. Input, output and supply voltage are galvanically separate from each other with high insulation. An integral electronic power pack with a high degree of effectiveness prevents strong heating and allows high output loads. A high packing density is achieved in combination with a narrow type of construction.

Application

Burden amplification and galvanic decoupling of active DC-current signals in a cost-effective build-up.

Specific characteristics

- Supply buffer amplifier for 3-way separation of 0/4-20 mA signals (output follows input 1:1)
- 13 mm narrow housing

Business data

Order number	AD-TV 24 GVB

Technical specifications

Input current	
Measuring range	0 ... 20 mA; 4 ... 20 mA
Input resistance	50 Ohm
Output current	
Output range	0 ... 20 mA; 4 ... 20 mA 1:1 to the input signal
Max. burden	400 Ohm
Residual ripple	<25 µAss
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	< 100 ppm/K
Supply	
Supply voltage	11 ... 30 V DC
Nominal voltage	12 V DC und 24 V DC
Power consumption	0,9 W
Housing	
Dimensions (WxHxD)	13x110x134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² Litze / 4 mm² Draht
Bolting torque terminals	0,5 Nm
Manner of fastening	DIN rail 35mm (EN 50022)
Weight	ca. 100 g
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)] During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Input/output	3,75 kV RMS (1 min.)
Signal/auxiliary voltage	3 kV RMS (1 min.)
Protective systems	
Input/output	electrical surge protection
Power supply	electrical surge and reverse current protection

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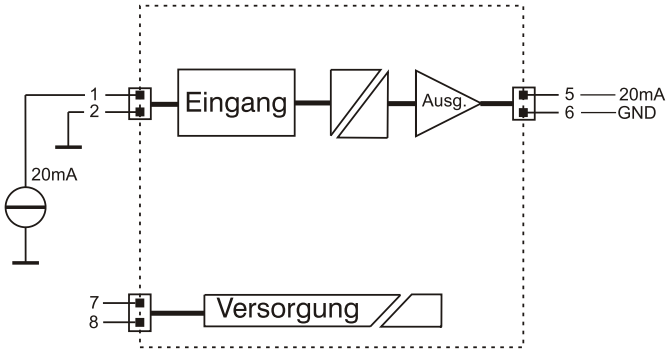
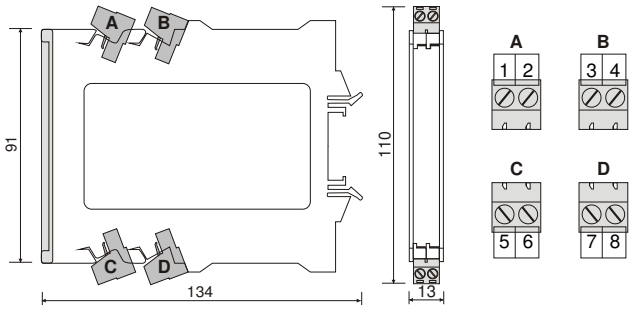
Isolation Amplifier

AD-TV 24 GVB

Block and wiring diagram



Dimensions



Isolation Amplifier

AD-TV 22 GL

Description

The separation amplifier AD-TV 22 GL serves the galvanic separation and amplification of DC-current signals (0/4-20 mA). The output signal follows linear the input dimension and is independent of the connected burden up to a limiting value. Input, output and supply voltage are galvanically separate from each other with high insulation. An integral electronic power pack with a high degree of effectiveness prevents strong heating and allows high output loads. A high packing density is achieved in combination with a narrow type of construction.

Application

Burden amplification and galvanic decoupling of active DC-current signals in a cost-effective build-up.

Specific characteristics

- Supply buffer amplifier for 3-way separation of 0/4-20 mA signals (output follows input 1:1)
- 18 mm narrow housing

Business data

Order number	AD-TV 22 GL

Technical specifications

Input current

Measuring range	0 ... 20 mA; 4 ... 20 mA
Input resistance	50 Ohm

Output current

Output range	0 ... 20 mA; 4 ... 20 mA 1:1 to the input signal
Max. burden	400 Ohm
Residual ripple	<25 µAss

Transmission behaviour

Basic accuracy	< 0,2 %
Temperature influence	< 100 ppm/K

Supply

Supply voltage	20 ... 253 V DC / 50 ... 253 V AC
Nominal voltage	24 V DC / 230 V AC
Power consumption	0,9 W / 2 VA

Housing

Dimensions (WxHxD)	18x81x103mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Manner of fastening	DIN rail 35mm (EN 50022)
Weight	ca. 100 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Functional safety

Safety integrity level	SIL 2 (IEC 61508)

Galvanic isolation, test voltages

Input/output	3,75 kV RMS (1 min.)
Signal/auxiliary voltage	3 kV RMS (1 min.)

Protective systems

Input/output	electrical surge protection
Power supply	electrical surge and reverse current protection

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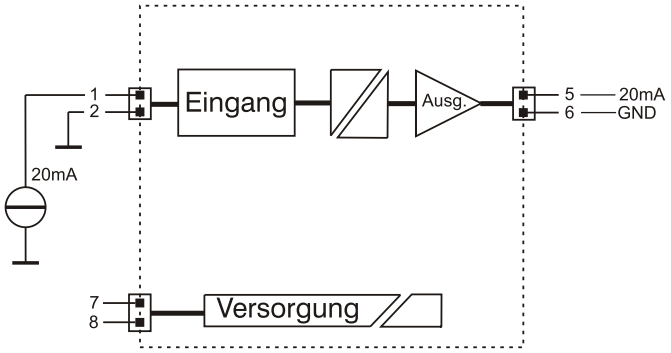
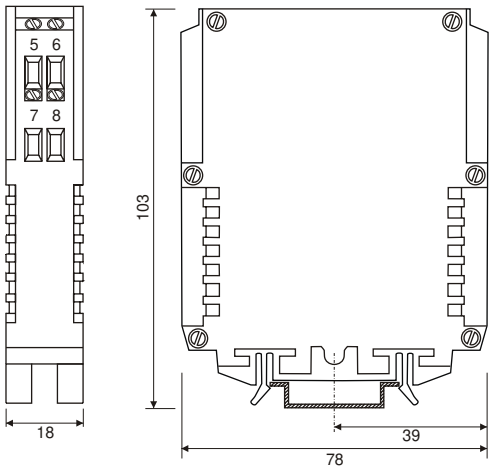
Isolation Amplifier

AD-TV 22 GL

Block and wiring diagram



Dimensions



Isolation Amplifier

AD-TV 22 GVB

Description

The separation amplifier AD-TV 22 GVB serves the galvanic separation and amplification of DC-current signals (0/4-20 mA). The output signal follows linear the input dimension and is independent of the connected burden up to a limiting value. Input, output and supply voltage are galvanically separate from each other with high insulation. An integral electronic power pack with a high degree of effectiveness prevents strong heating and allows high output loads. A high packing density is achieved in combination with a narrow type of construction.

Application

Burden amplification and galvanic decoupling of active DC-current signals in a cost-effective build-up.

Specific characteristics

- Supply buffer amplifier for 3-way separation of 0/4-20 mA signals (output follows input 1:1)
- 13 mm narrow housing

Business data

Order number	AD-TV 22 GVB

Technical specifications

Input current	
Measuring range	0 ... 20 mA; 4 ... 20 mA
Input resistance	50 Ohm
Output current	
Output range	0 ... 20 mA; 4 ... 20 mA 1:1 to the input signal
Max. burden	400 Ohm
Residual ripple	<25 µAss
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	< 100 ppm/K
Supply	
Supply voltage	20 ... 253 V DC / 50 ... 253 V AC
Nominal voltage	24 V DC / 230 V AC
Power consumption	0,9 W / 2 VA
Housing	
Dimensions (WxHxD)	13x110x134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp (2,5 mm² flex wire / 4 mm² one wire)
Bolting torque terminals	0,5 Nm
Manner of fastening	DIN rail 35mm (EN 50022)
Weight	ca. 100 g
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)] During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Input/output	3,75 kV RMS (1 min.)
Signal/auxiliary voltage	3 kV RMS (1 min.)
Protective systems	
Input/output	electrical surge protection
Power supply	electrical surge and reverse current protection

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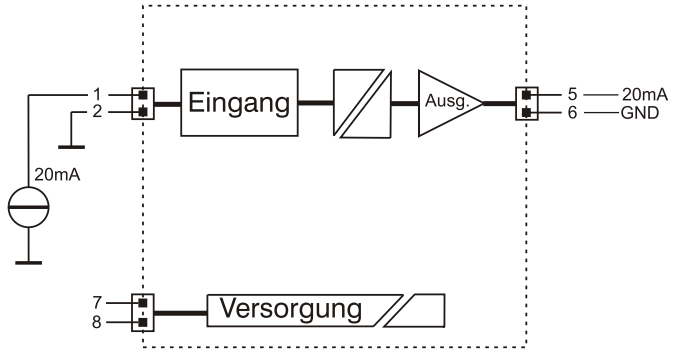
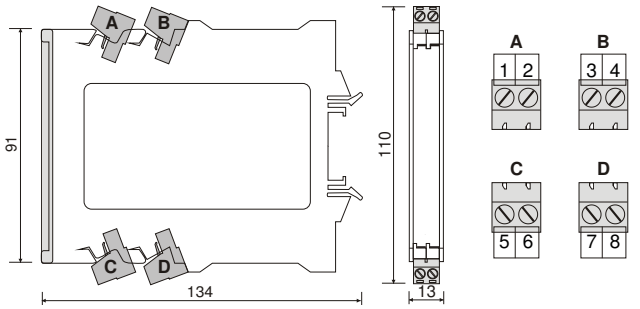
Isolation Amplifier

AD-TV 22 GVB

Block and wiring diagram



Dimensions



Isolation Amplifier

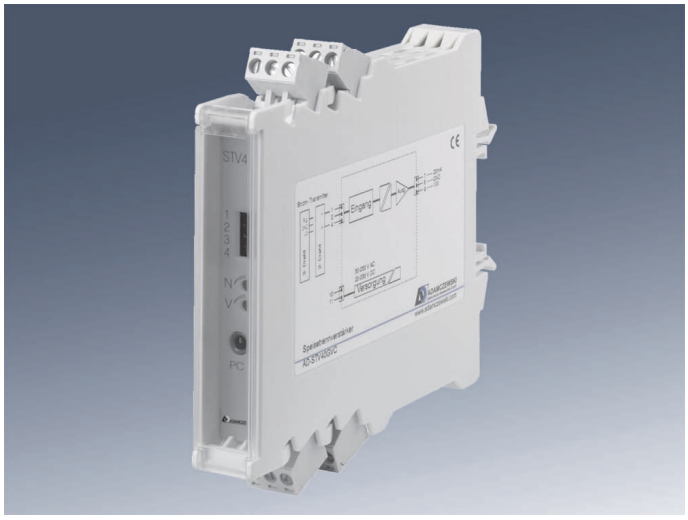
AD-TV 40 GVC

Description

The isolation amplifier AD-TV 40 GVC is designed for the galvanic isolation and amplification of standard analog signals (0/4-20 mA and 0/2-10VDC). The standard signals 0/4-20 mA and 0/2-10 V are freely selectable via switch or terminal on both the input and at the output. All ranges are calibrated fixed, but can be adjusted via front-trimmer. In addition, this device comes standard with a configuration interface AD-PC, with which the input and output measurement signal with the optional AD-Studio programming software in the range of max. 20 mA or 10 VDC can be freely programmed. The selected linear output signal follows the input size up to a limit independent of the connected load. Input, output and power supply voltage are galvanically isolated from each other with high insulation. An integral electronic wide range power supply with high efficiency prevents strong heating and allows high output loads.

Application

Galvanic isolation of standard signals with simultaneous amplification or conversion of the analog standard signal.



Specific characteristics

- All standard signals at the input and output are freely selectable
- Switchable zero and span trimmer
- Special signals can be parameterized via interface
- Weitbereichsnetzteil

Business data

Order number	AD-TV 40 GVC

Technical specifications

Input current

Measuring range	0 ... 20 mA; 4 ... 20 mA
Resolution	10 Bit
Input resistance	50 Ohm

Input voltage

Measuring range	0 ... 10 V; 2 ... 10 V
Resolution	10 Bit
Input resistance	> 700 kOhm

Input filter (optional programmable with VarioConfig)

Filter	10 ms/filter value (0 ... 30.000)

Output current

Output range	0 ... 20 mA; 4 ... 20 mA
Resolution	11 Bit
Max. burden	400 Ohm
Residual ripple	<50 µAss

Output voltage

Output range	0 ... 10 V, 2 ... 10 V
Resolution	11 Bit
Min. burden	10 kOhm
Residual ripple	<20 µAss
Linearity error	

Accuracy

Basic accuracy	0,3 %
Temperature influence	<100 ppm / K
Response time	approx. 70 ms

Trimmer function

Trim range	approx. +/-20 %

Configuration interface

AD-PC -> USB
(optional programmable with VarioConfig software)

Supply

Supply voltage	20 ... 253 V DC / 50 ... 253 V AC
Max. power consumption	1,2 W/2,8 VA

Housing

Dimensions (WxHxD)	18x110x128 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Bolting torque terminals	0,5 Nm
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Manner of fastening	DIN rail 35mm 35 mm
Weight	ca. 130 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Isolation Amplifier

AD-TV 40 GVC

Technical specifications

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11

During checking, slight signal deviations are possible

Electrical safety requirements

Product family standard	EN 61010-1

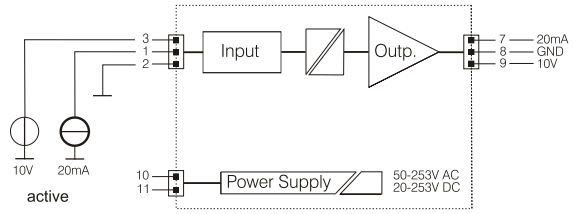
Galvanic isolation, test voltages

Input/output	2,5 kV RMS (1 min.)
Signal/auxiliary voltage	3 kV RMS (1 min.)

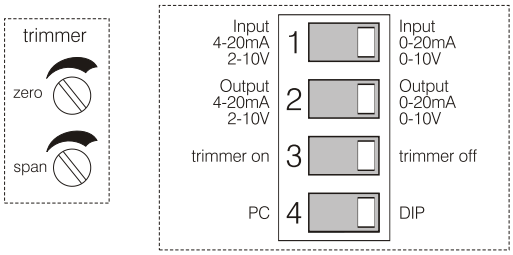
Protective systems

Input/output	over voltage and over current
Power supply	over voltage, over current and over temperature

Block and wiring diagram



Function DIP-switch



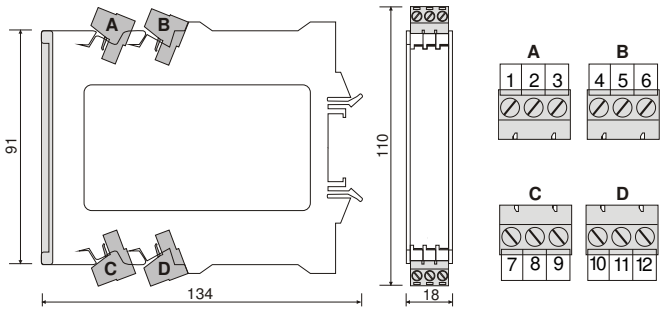
Trimmer on
Factory setting, according to standard signals switches 1 and 2

Trimmer off
Activates the front trimmer for Offset (zero) and span
Adjustment range: + / -20%

DIP Factory settings, input and output signals such as switches 1-3

PC AD-studio setup position, Switches 1-3 functionless

Dimensions



Isolation Amplifier

AD-TV 400 GVD

Description

The isolation amplifier AD-TV 400 GVD serves the galvanic separation of analogue signals and of transmitter signals. When a 2-wire transmitter is connected, this will be supplied directly via a galvanically separated and current-limited supply voltage. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating panel AD-VarioControl or via the programming software AD-Studio. The wide bipolar input measuring range makes this buffer amplifier into the universal type for almost all applications in the area of standard signals and beyond. Due to its current-sinking output, transmitter signals can also be separated or converted. All supply ranges are covered with the wide range power pack.

Application

Amplification, transformation and electrical isolation of current or voltage signals

Specific characteristics

- bipolar current input (+/- 0,5 mA bis +/- 50 mA)
- bipolar voltage input (+/- 1 V bis +/- 100 V)
- Power supply for 2- / 3-wire transmitters
- bipolar current or voltage output
- current sink output
- Operating module as an accessory
- 23 mm narrow housing with detachable terminal clamp

Business data

Order number	
Isolation amplifier	AD-TV 400 GVD
Accessory (optional)	
Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current	
Measuring range	-50 ... + 50 mA DC
Input resistance	40 Ohm
Input voltage	
Measuring range	-100 ... + 100 V DC
Input resistance	1 MOhm
Transmitter supply	
Off-load voltage	24,5 V
Voltage at 20mA	19,5 V
Current limit	~ 25 mA
Output current	
Max. output range	-21,5 ... 21,5 mA DC
Max. burden	400 Ohm
Residual ripple	40 µAss
Output voltage	
Max. output range	-10,5 ... 10,5 V DC
Min. burden	10 kOhm
Residual ripple	30 mVss
Current sink output	
Current sink	0/4 ... 20 mA DC
Max. voltage to be applied	35 V DC
Resolution	
Input	16 bit
Output	12 bit
Transmission behaviour	
Linearity error	0,2 % of full scale
Rise time	200 ms (output auf 90 %)
Temperature influence	+/- 100 ppm/K of full scale
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	4 VA / 2,4 W
Housing	
Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

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Isolation Amplifier

AD-TV 400 GVD

Technical specifications

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

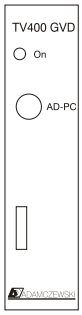
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	3,75 kV (1 min)
Signal/auxiliary voltage	4 kV (1 min)

Display and operating elements

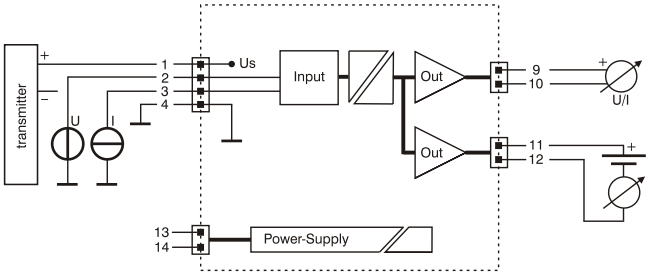


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits

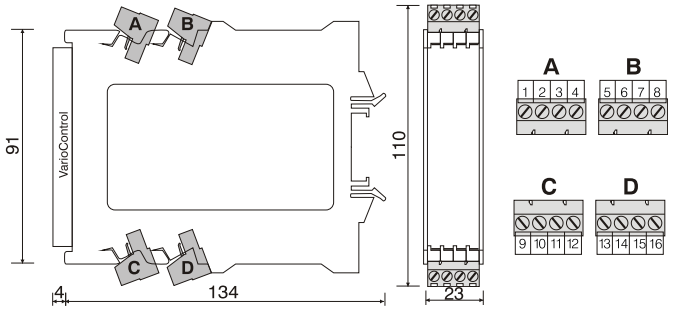
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-TV 400 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40805	2	Scaled input		7	1	0
40809	2	Input signal	mA / V	7	1	0
40909	2	Output signal 1	mA / V	7	1	1
40911	2	Output signal 2	mA / V	7	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Isolation Amplifier

AD-TV 420 GVD

Description

The isolation amplifier AD-TV 420 GVD serves the galvanic separation of analogue signals and of transmitter signals. When a 2-wire transmitter is connected, this will be supplied directly via a galvanically separated and current-limited supply voltage. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating panel AD-VarioControl or via the programming software AD-Studio. The wide bipolar input measuring range makes this buffer amplifier into the universal type for almost all applications in the area of standard signals and beyond. All supply ranges are covered with the wide range power pack.

Application

Amplification, transformation and electrical isolation of current or voltage signals

Specific characteristics

- bipolar current input (+/- 0,5 mA bis +/- 50 mA)
- bipolar voltage input (+/- 1 V bis +/- 100 V)
- Power supply for 2- / 3-wire transmitters
- 2 bipolar current or voltage output
- Operating module as an accessory
- 23 mm narrow housing with detachable terminal clamp

Business data

Order number	
Isolation amplifier	AD-TV 420 GVD
Accessory (optional)	
Operating module	AD-VarioControl / AD-VarioConnect
USB programming adapter	AD-Variopass
Configuration software	70|AD-Studio
Test	
Modbus Protokoll	http://www.modbus.org/specs.php|Protokoll-Spezifikation der Modbus Organisation
GTC	agb.pdf|Adamczewski AGB

Technical specifications

Input current	
Measuring range	-50 ... + 50 mA DC
Input resistance	40 Ohm
Input voltage	
Measuring range	-100 ... + 100 V DC
Input resistance	1 MOhm
Transmitter supply	
Off-load voltage	24,5 V
Voltage at 20mA	19,5 V
Current limit	~ 25 mA
Current outputs	
Max. output range	-21,5 ... 21,5 mA DC
Max. burden	400 Ohm
Residual ripple	40 µAss
Voltage outputs	
Max. output range	-10,5 ... 10,5 V DC
Min. burden	10 kOhm
Residual ripple	30 mVss
Resolution	
Input	16 bit
Output	12 bit
Transmission behaviour	
Linearity error	0,2 % of full scale
Rise time	200 ms (output auf 90 %)
Temperature influence	+/- 100 ppm/K of full scale
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	4,4 VA / 2,8 W
Housing	
Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

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Isolation Amplifier

AD-TV 420 GVD

Technical specifications

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

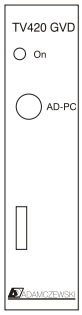
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	3,51 kV (1 min)
Signal/auxiliary voltage	3,75 kV (1 min)

Display and operating elements

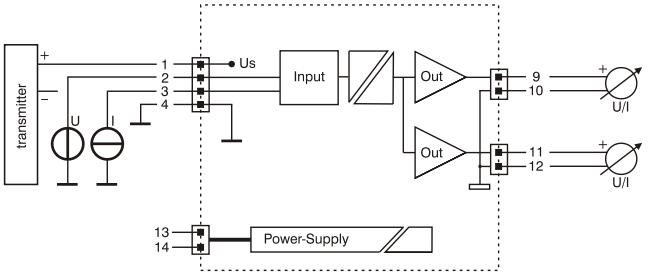


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits

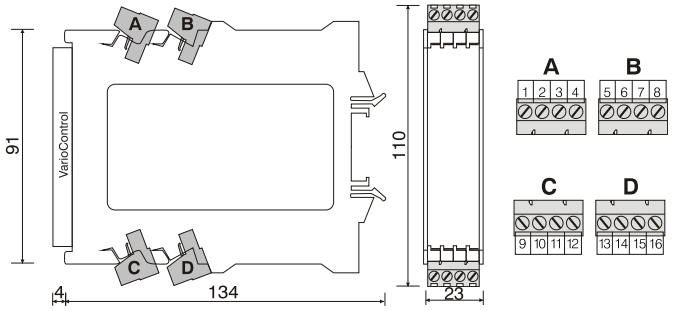
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-TV 420 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40805	2	Scaled input		7	1	0
40809	2	Input signal	mA / V	7	1	0
40909	2	Output signal 1	mA / V	7	1	1
40911	2	Output signal 2	mA / V	7	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Isolation Amplifier

Vario-Isolation-Amplifier

AD-TV 30 GL

Description

The VARIO isolation amplifier AD-TV 30 GL serves to galvanically separate, convert and amplify DC current signals and voltage signals (0/4...20 mA and 0/2...10V DC). The signal sizes are adjustable at the front. The output signal follows the input size linear and is independent of the connected load up to a limiting value. Input, output and the supply voltage are galvanically separated from each other with a high degree of insulation. A highly efficient, integrated electronic wide-range power pack enables operation with 20...253 V DC or 50...253 V AC. There is no possibility of cross polarity of the connection voltage. A high packing density is achieved due to its narrow build.

Application

Conversion, load amplification and galvanic decoupling of impressed DC current signals and voltage signals.

Business data

Order number	AD-TV 30 GL

Technical specifications

Input current	
Measuring range	0/4 ... 20 mA
Input resistance	85 Ohm
Input voltage	
Measuring range	0/2 ... 10 V
Input resistance	> 100 kOhm
Output current	
Output range	0/4 ... 20 mA
Max. burden	500 Ohm
Residual ripple	50 µAss
Output voltage	
Output range	0/2 ... 10 V
Min. burden	> 10 kOhm
Residual ripple	50 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	2,3 VA / 1W
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	100 ppm/K
Response time	~ 20 ms
Housing	
Dimensions (WxHxD)	18x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Input / output	3,75 kV, 50 Hz (1 min.)
Signal / supply unit	4 kV, 50 Hz (1 min.)
Protection circuits	
Input	electrical surge protection
Output	electrical surge protection
Power supply	electrical surge and reverse current protection

[1] During checking, slight signal deviations are possible.

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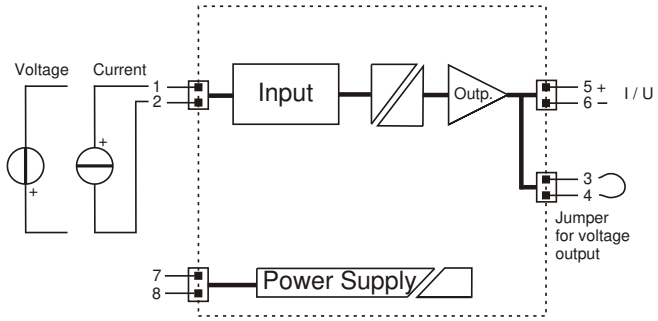
Isolation Amplifier

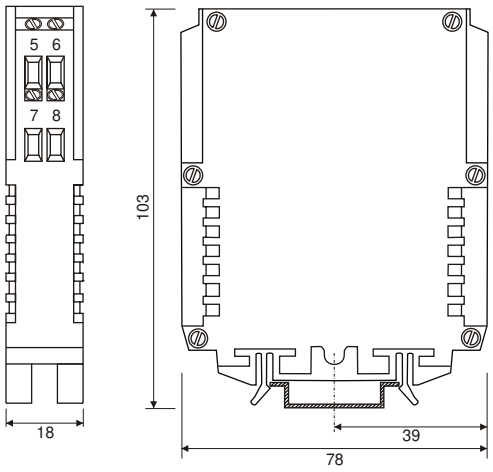
Vario-Isolation-Amplifier

AD-TV 30 GL

Block and wiring diagram



Dimensions



Isolation Amplifier

Vario-Isolation-Amplifier

AD-TV 33 GL

Description

The vario-separation amplifier AD-TV 33 GL serves the galvanic separation and amplification of standard DC analogue signals.The standard signals 0-20 mA, 4-20 mA and 0-10 V are freely selectable at the front via switches at the input as well as at the output. All measuring ranges are permanent calibrated, however, they can still be adjusted via potentiometer at the front, which can be switched on. The selected output signal follows linear the input magnitude and is independent from the connected load up to a limiting value. Input, output and the supply voltage are galvanically separated from each other with a high insulation. An integral electronic wide range power pack with high efficiency prevents strong increases in temperature and allows high output loads. A high pack density is achieved in combination with the narrow type of construction. The universality saves storage costs, a diversity of types is therefore eliminated.

Application

For load amplification, galvanic decoupling and conversion of impressed standard signal measuring magnitudes.

Specific characteristics

- all standard signals at input and output are freely selectable
- switchable zero point trimmer and final value trimmer
- high output load
- 18 mm narrow housing
- wide range power supply

Business data

Order number	AD-TV 33 GL

Technical specifications

Input current	
Measuring range	0 ... 20 mA
Input resistance	50 Ohm
Input voltage	
Measuring range	0 ... 10 V
Input resistance	200 kOhm
Output current	
Output range	0 ... 20 mA
Max. burden	500 Ohm
Residual ripple	20 µAss
Output voltage	
Output range	0 ... 10 V
Min. burden	500 Ohm
Residual ripple	10 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	2,8 VA / 1,5 W
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	100 ppm/K
Response time	~ 40 ms (10...90 % output signal)
Housing	
Dimensions (WxHxD)	18x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 140 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Input / output	2,5 kV, 50 Hz (1 min.)
Input / output	2,5 kV, 50 Hz (1 min.)
Signal / supply unit	4 kV, 50 Hz (1 min.)
Protection circuits	
Input	electrical surge protection
Output	electrical surge protection
Power supply	electrical surge and reverse current protection

[1] During checking, slight signal deviations are possible.

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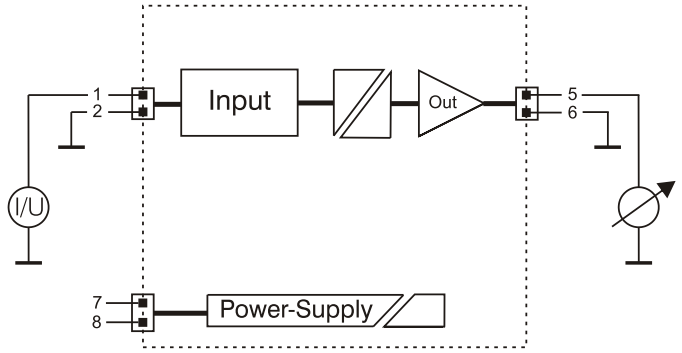
Isolation Amplifier

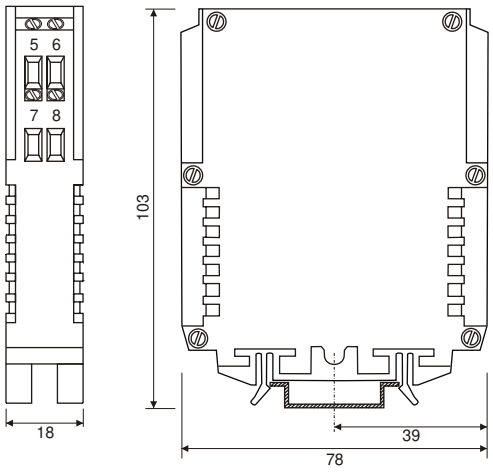
Vario-Isolation-Amplifier

AD-TV 33 GL

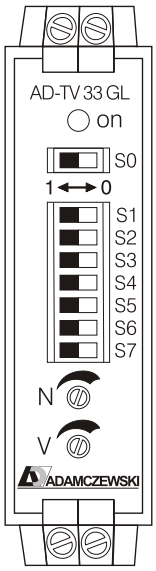
Block and wiring diagram

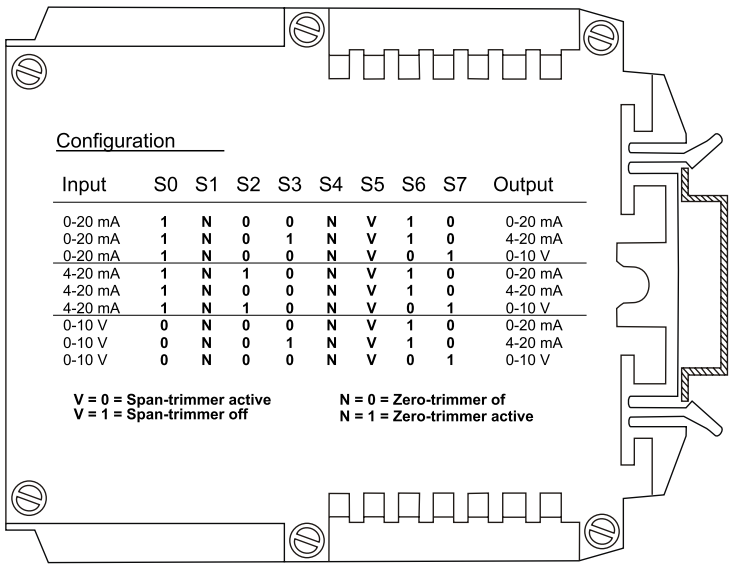


Dimensions



Circuit examples





Configuration

Input	S0	S1	S2	S3	S4	S5	S6	S7	Output
0-20 mA	1	N	0	0	N	V	1	0	0-20 mA
0-20 mA	1	N	0	1	N	V	1	0	4-20 mA
0-20 mA	1	N	0	0	N	V	0	1	0-10 V
4-20 mA	1	N	1	0	N	V	1	0	0-20 mA
4-20 mA	1	N	0	0	N	V	1	0	4-20 mA
4-20 mA	1	N	1	0	N	V	0	1	0-10 V
0-10 V	0	N	0	0	N	V	1	0	0-20 mA
0-10 V	0	N	0	1	N	V	1	0	4-20 mA
0-10 V	0	N	0	0	N	V	0	1	0-10 V

V = 0 = Span-trimmer active
V = 1 = Span-trimmer off

N = 0 = Zero-trimmer of
N = 1 = Zero-trimmer active

Switch Operation:

S0: Input signal current or voltage
S1: Activation zero-trimmer
S2: Input signal 4...20 mA
S3: Output signal 4...20 mA
S4: Activation zero-trimmer
S5: Activation span-trimmer
S6: Output signal current
S7: Output signal voltage

After activation of the trimmer the calibrated values can be adjusted. If activation is restored, the device has the default values.

Isolation Amplifier

Multiplier Isolation Amplifier

AD-TV 452 GVC

AD-TV 454 GVF

Description

The multiplier isolation amplifiers AD-TV 452 GVC and AD-TV 454 GVF are used for galvanic isolation, amplification and transformation, or adjustment of analog measurement signals with simultaneous multiplication of the input signal. The compact housing contains 2 or 4 completely independent output channels, which are galvanically isolated from the input, the supply voltage and the other outputs. The signal types at the input and the output can be selected via clamps. At the front side there are spindle trimmers (Zero Z1..2/4 / Span S1..2/4) for direct adjustment. The efficient wide range power supply allows operation in a wide supply voltage range with low heat generation.

Application

Galvanic isolation, transformation, amplification and conversion of an analog measurement signal and additional multiplication into 2 or 4 independent output channels.

Specific characteristics

- 2 galvanically isolated outputs (AD-TV 452 GVC)
- 4 galvanically isolated outputs (AD-TV 454 GVF)
- Wide range power supply
- Signal type selectable via terminals
- Start and end of measuring range adjustable via trimmer

Business data

Order number

AD-TV 452 GVC	two galvanically isolated outputs
AD-TV 454 GVF	four galvanically isolated outputs

Technical specifications

Input current	
Measuring range	0 ... 20 mA, 4 ... 20 mA
Input resistance	50 Ohm
Input voltage	
Measuring range	0 ... 10 V, 2 ... 10 V
Input resistance	100 kOhm
Output current	
Output range	0 ... 20 mA, 4 ... 20 mA
Max. burden	400 Ohm
Residual ripple	40 µAss
Output voltage	
Output range	0 ... 10 V, 2 ... 10 V
Min. burden	10 kOhm
Residual ripple	20 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	21 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC TV 452 GVC	max 3 VA / 2 W
Power consumption AC / DC TV 454 GVF	max 5 VA / 4 W
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	max 50 ppm/K
Response time	~ 20 ms
Housing	
Outlines TV 452 GVC (bxhxt)	18x110x134 mm
Outlines TV 454 GVF (bxhxt)	33x110x134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight TV 452 GVC	~ 130 g
Weight TV 454 GVF	~ 210 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Isolation Amplifier

Multiplier Isolation Amplifier

AD-TV 452 GVC

AD-TV 454 GVF

Technical specifications

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Elevation	max. 2000 m
Pollution degree	2

Galvanic isolation, test voltages

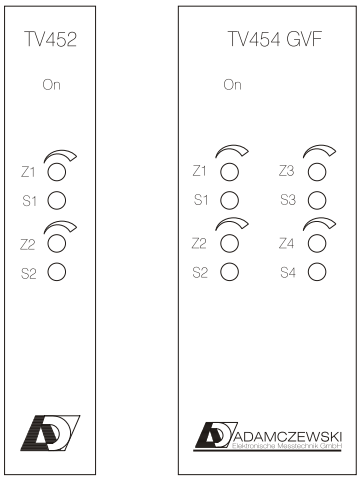
Input / output	2,5 kV, 50 Hz (1 min.)
Output to output	2,5 kV, 50 Hz (1 min.)
Signal / supply unit	3 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Output	electrical surge protection
Power supply	electrical surge and reverse current protection

[1] During checking, slight signal deviations are possible.

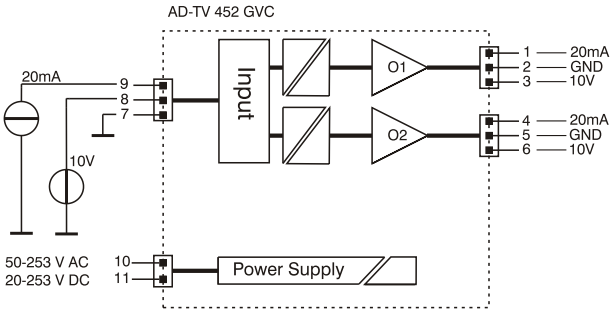
Display and operating elements

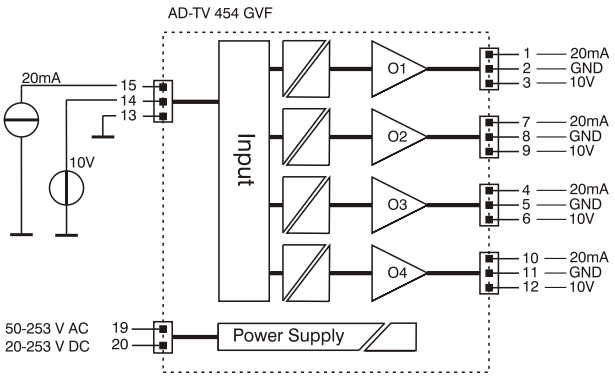


Zx = Zero trimmer - begin of measuring range
Sx = Span trimmer - end of measuring range

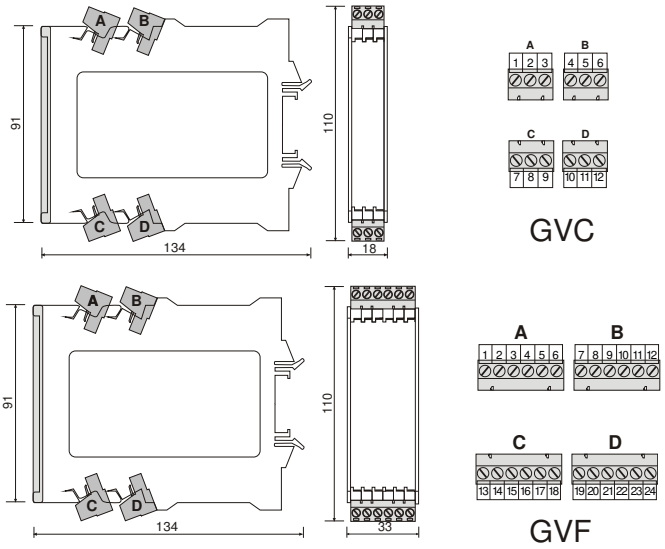
x = Output

Block and wiring diagram





Dimensions



Isolation Amplifier

AD-TV 200 GS

Description

The isolation amplifier AD-TV 200 GS is used for galvanic isolation, amplification and conversion or adaptation of analog measurement signals. Two front-side spindle trimmers can be used to additional adjust the offset (zero) and full scale (span). The integrated wide-range power supply allows operation in a wide supply voltage range with low self-heating.

Application

Galvanic isolation, adapt, amplify and transform analog measurement signals.

Business data

Order code

	input / output
ADTV200GS223	0...20 mA / 0...20 mA
ADTV200GS243	0...20 mA / 4...20 mA
ADTV200GS213	0...20 mA / 0...10 V
ADTV200GS423	4...20 mA / 0...20 mA
ADTV200GS443	4...20 mA / 4...20 mA
ADTV200GS413	4...20 mA / 0...10 V
ADTV200GS124	0...10 V / 0...20 mA
ADTV200GS143	0...10 V / 4...20 mA
ADTV200GS113	0...10 V / 0...10 V

Technical specifications

Input

Measuring range current	0 ...20 mA; 4 ... 20 mA[1)]
Input resistance	50 Ohm
Measuring range voltage	0 ... 10 V, 2 ... 10 V[1)]
Input resistance	100 kOhm

Output

Output range current	0 ... 20 mA; 4 ... 20 mA[1)]
Max. burden	500 Ohm
Output range voltage	0 ... 10 V; 2 ... 10 V[1)]
Min. burden	1 kOhm
Residual ripple	< 50 mVss

[1)] adjustable; others on request

Housing ST

Dimensions (WxHxD)	23 x 78 x 103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 120 g
Manner of fastening	35 mm DIN rail 35mm

Transmission behaviour

Basic accuracy	< 0,3 %
Temperature influence	< 100 ppm/K

Supply

Supply voltage	20...250 V DC / 50...250 V AC
Nominal voltage	24 V DC / 230 V AC
Power consumption	max 2 W / 3 VA

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [2)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[2)] During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	3,75 kV RMS (1 min.)
Signal/auxiliary voltage	3 kV RMS (1 min.)

Protective systems

Input/output	electrical surge protection
Power supply	electrical surge and reverse current protection

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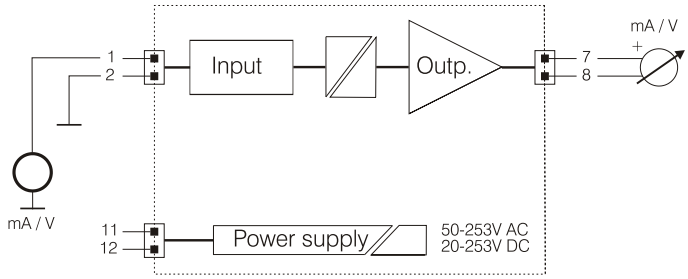
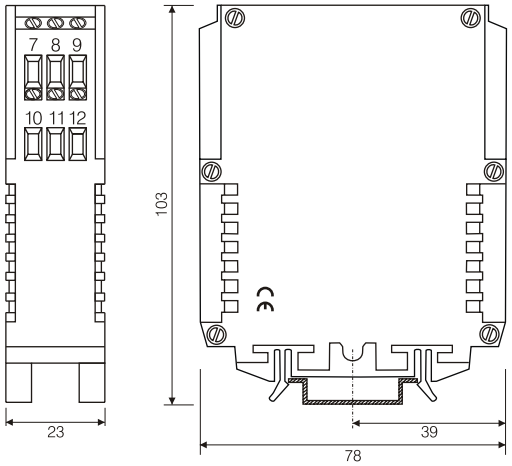
Isolation Amplifier

AD-TV 200 GS

Block and wiring diagram



Dimensions



Isolation Amplifier

AD-TV 200 ST

Description

The isolation amplifier AD-TV 200 ST is used for galvanic isolation, amplification and conversion or adaptation of analog measurement signals. Two front-side spindle trimmers can be used to additional adjust the offset (zero) and full scale (span). The device type consists of a terminal block and a plug-in isolating amplifier. The user-friendly and easy-to-install plug-in module technology (type ST) enables fast and trouble-free commissioning or exchange device processing.

Application

Galvanic isolation, adapt, amplify and transform analog measurement signals.

Business data

Order code

	input / output
ADTV200ST225	0...20 mA / 0...20 mA
ADTV200ST245	0...20 mA / 4...20 mA
ADTV200ST215	0...20 mA / 0...10 V
ADTV200ST425	4...20 mA / 0...20 mA
ADTV200ST445	4...20 mA / 4...20 mA
ADTV200ST415	4...20 mA / 0...10 V
ADTV200ST125	0...10 V / 0...20 mA
ADTV200ST145	0...10 V / 4...20 mA
ADTV200ST115	0...10 V / 0...10 V

Technical specifications

Input

Measuring range current	0 ...20 mA; 4 ... 20 mA[1)]
Input resistance	50 Ohm
Measuring range voltage	0 ... 10 V, 2 ... 10 V[1)]
Input resistance	100 kOhm

Output

Output range current	0 ... 20 mA; 4 ... 20 mA[1)]
Max. burden	500 Ohm
Output range voltage	0 ... 10 V; 2 ... 10 V[1)]
Min. burden	500 Ohm
Residual ripple	< 50 mVss

[1)] adjustable; others on request

Housing ST

Dimensions (WxHxD)	21 x 42 x 102 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 80 g
Manner of fastening	35 mm DIN rail 35mm

Transmission behaviour

Basic accuracy	< 0,3 %
Temperature influence	< 100 ppm/K

Supply

Supply voltage	20 ... 30 V DC
Nominal voltage	24 V DC
Power consumption	1 W

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [2)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[2)] During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	0,5 kV RMS (1 min.)
Signal/auxiliary voltage	1 kV RMS (1 min.)

Protective systems

Input/output	electrical surge protection
Power supply	electrical surge and reverse current protection

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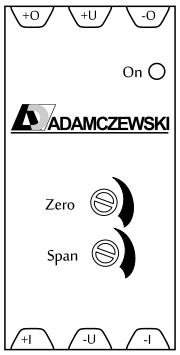
Isolation Amplifier

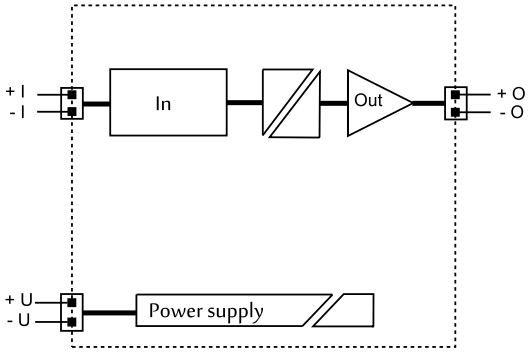
AD-TV 200 ST

Display and operating elements

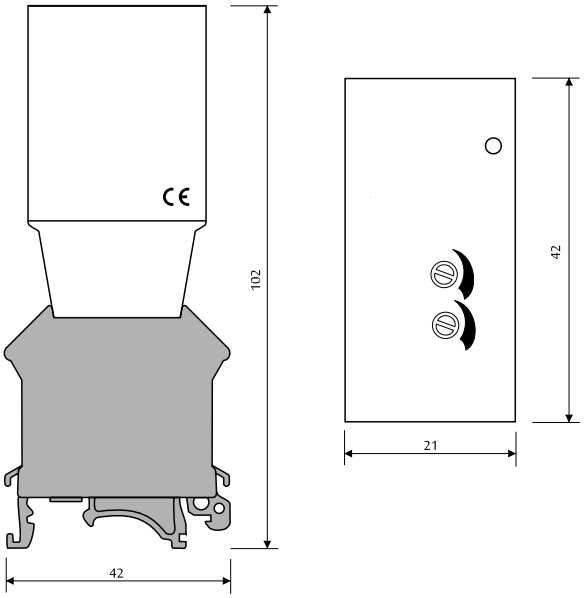


Designation	LED	Meaning
On	green	Power supply
Zero		adjust zero
Span		adjust span

Block and wiring diagram



Dimensions



Isolation Amplifier

AD-TV 300 GS

Description

The universal isolating amplifier AD-TV 300 GS converts the three standard industrial signals 0...20 mA, 4...20 mA and 0...10 V, amplifies them and separates them galvanically. The three signals are also available at the output. All combinations are possible. A switchover is not necessary. The signal combination from input to output is selected via the terminals.

Application

Amplification and adaptation of standard signals with easy conversion to a freely selectable output signal.

Specific characteristics

- Three standard signals freely selectable at the input and output
- Galvanic isolation and amplification
- No mechanical switches necessary
- Input / output combination by clamping the desired signals
- No subsequent adjustment necessary
- Suppression of live zero signal (4mA)
- Price / performance ratio allows for warehousing

Business data

Order number	AD-TV 300 GS

Technical specifications

Current inputs

Measuring range 1	0 ... 20 mA
Measuring range 2	4 ... 20 mA
Input resistance 1/2	50 Ohm

Input voltage

Measuring range	0 ... 10 V
Input resistance	750 kOhm

Current outputs

Output range 1	0 ... 20 mA
Output range 2	4 ... 20 mA
Maximum burden 1/2	500 Ohm
Simultaneous use	Nein

Output voltage

Output range	0 ... 10 V
Min. burden	1000 Ohm

Supply

Voltage range	50 ... 253 V AC (50 Hz), 20 ... 253 V DC
Nominal voltage	230 V AC (50 Hz), 24 V DC
Power consumption	4 VA, 2 W

Transmission behaviour

Basic accuracy	< 0,2 %
Temperature influence	100 ppm/K
Response time	~ 50 ms (10...90 % output signal)

Housing

Dimensions (WxHxD)	18x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 140 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input to output	3,75 kV, 50 Hz (1 min.)
Input, output to supply	3 kV, 50 Hz (1 min.)

[1] During checking, slight signal deviations are possible.

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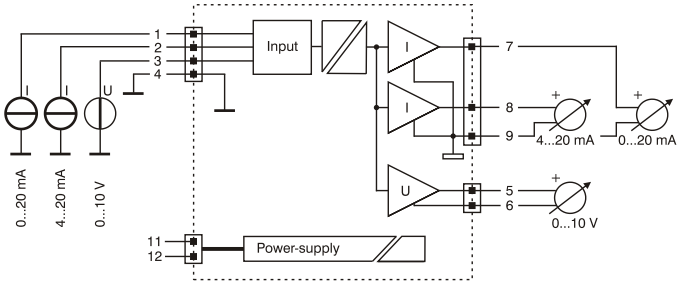
Isolation Amplifier

AD-TV 300 GS

Block and wiring diagram



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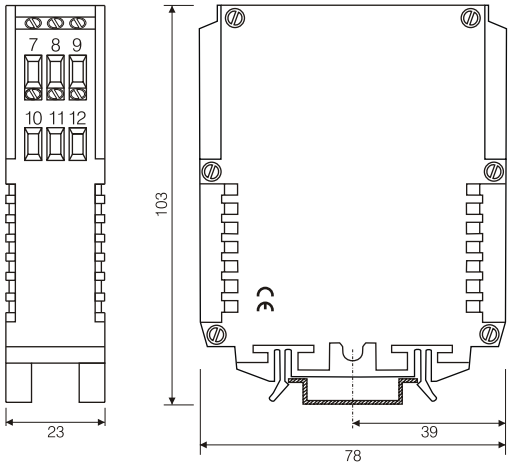

Isolation Amplifier

Current Isolation Amplifier

AD-TV 411 GS

AD-TV 412 GS

Description

The single or dual channel isolation amplifier of the series AD-TV 411 GS and AD-TV 412 GS 2 is being used for the galvanical isolation and amplification of impressed currents of 0-20 mA or 4-20 mA. The output current is unaffected from the connected load. The output follows the input 1:1. Input, output and supply current are separated galvanically. All channels are isolated from each other galvanically. Through its efficient wide-range power supply unit of the isolation amplifier can be operated over a wide supply voltage range with low level of intrinsic heating.

Application

Single or dual channel burden amplification and galvanic decoupling of impressed DC current signals.

Specific characteristics

- Single or dual channel version available
- Electrical 3-way isolation
- Wide range power supply
- Narrow width housing

Business data

Order number

AD-TV 411 GS	single-channel version
AD-TV 412 GS	dual-channel version

Technical specifications

Input current

Measuring range	0 ... 20 mA or 4 ... 20 mA
Required input voltage	ca. 0,8 V

Output current

Output range	0 ... 20 mA or 4 ... 20 mA
Max. burden	500 Ohm
Residual ripple	40 µAss

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC (AD-TV 411 GS)	4 VA / 1,5 W
Power consumption AC / DC (AD-TV 412 GS)	5 VA, 2,5 W

Transmission behaviour

Basic accuracy	< 0,2 %
Temperature influence	15 ppm/K
Response time	0,2 ms
Load influence	0,02 % / 100 Ohm

Housing

Dimensions (WxHxD)	23x78x103 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 160 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input / output	0,5 kV, 50 Hz (1 min.)
Signal / supply unit	3 kV, 50 Hz (1 min.)
Channel 1 / Channel 2 (TV 412 GS)	0,5 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Output	electrical surge protection
Power supply	Protection against overvoltage, reverse polarity, over temperature and over current

[1] During checking, slight signal deviations are possible.

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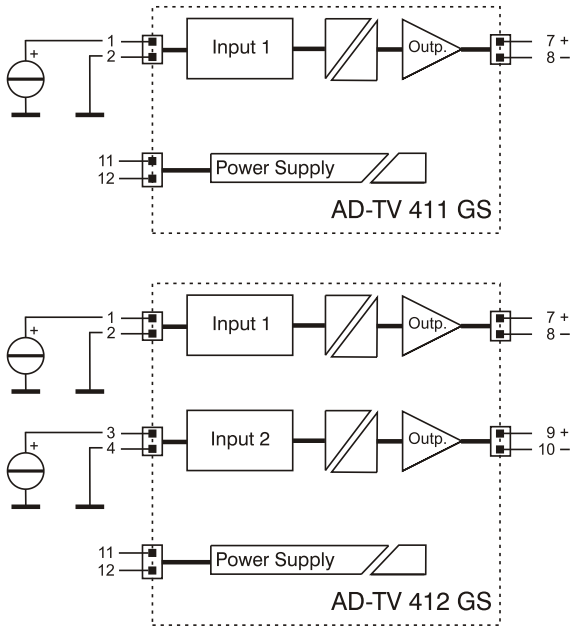
Isolation Amplifier

Current Isolation Amplifier

AD-TV 411 GS

AD-TV 412 GS

Block and wiring diagram



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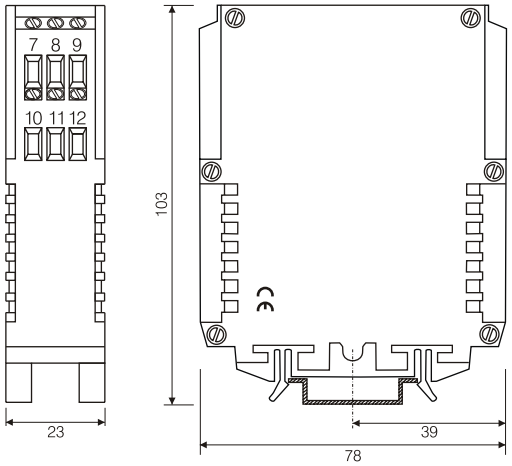

Isolation Amplifier

Isolation Amplifier With Nominal Value Selector

AD-TV 32 GL

Description

The VARIO-isolation amplifier AD-TV 32 GL serves the galvanic separation, conversion and amplification of DC current and voltage signals (0/4-20 mA and 0/2-10 V DC). The signal dimensions are adjustable at the front. The starting and end values can here be adjusted independent of each other. Input, output and the supply voltage are separate from each other with high insulation. An integral electronic wide range power pack with a high degree of effectiveness allows operation in a supply range of 20...253 V DC or 50...253 V AC. Additionally, a nominal value can be specified via switch at the front at the output. The input measuring signal is decoupled and without influence during this. The nominal value at the output, which can be activated and adjusted via a potentiometer at the front.

Application

Conversion, burden amplification and galvanic decoupling of active DC-current and voltage signals with additional manual / automatic operation via a nominal value specification, which can be activated.

Specific characteristics

- Front panel switch for switching between manual and automatic operation
- Value setting for manual operation by front-face potentiometer

Business data

Order number	AD-TV 32 GL

Technical specifications

Input current	
Measuring range	0/4 ... 20 mA
Input resistance	85 Ohm
Input voltage	
Measuring range	0/2 ... 10 V
Input resistance	> 100 kOhm
Output current	
Output range	0/4 ... 20 mA
Max. burden	500 Ohm
Residual ripple	50 µAss
Output voltage	
Output range	0/2 ... 10 V
Min. burden	> 10 kOhm
Residual ripple	50 mVss
Setpoint setting	
Front mounted potentiometer	0 ... 100 %
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Voltage range DC	20 ... 253 V DC
Nominal voltage AC / DC	230 V AC / 24 V DC
Power consumption AC / DC	2,3 VA / 1W
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	100 ppm/K
Response time	~ 20 ms
Housing	
Dimensions (WxHxD)	18x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Input / output	3,75 kV, 50 Hz (1 min.)
Signal / supply unit	4 kV, 50 Hz (1 min.)
Protection circuits	
Input	electrical surge protection
Output	electrical surge protection
Power supply	electrical surge and reverse current protection

[1] During checking, slight signal deviations are possible.

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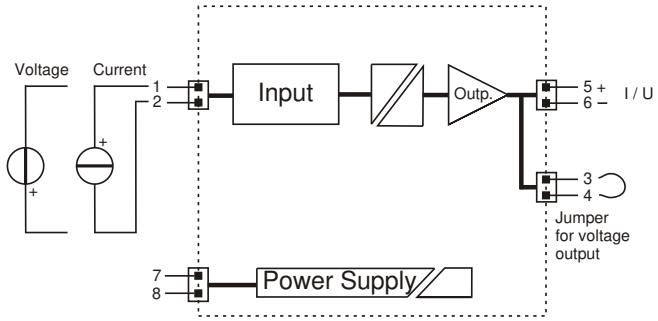
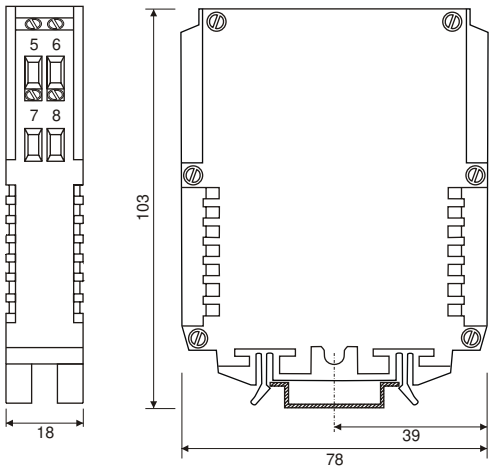
Isolation Amplifier With Nominal Value Selector

AD-TV 32 GL

Block and wiring diagram



Dimensions



Supply Isolation Amplifier

Isolation Amplifier With Reference Function

AD-TV 320 GS

Description

The set value buffer amplifier AD-TV 320 GS serves the galvanic separation, transformation and amplification of DC current and voltage signals (0/4-20mA or 0/2-10V).The device has additionally a transmitter supply and a set value function, which can be switched on. The activation of the set value function is carried out selectable with a brief depression of the key at the front or with a control signal (24V active or contact) at the remote control input. Any output set value is set with the potentiometer at the front. Activation of zero trimmers and full trimmers is possible with longer depression of the set value key. With this, the signal magnitudes are adjustable in the range of ±25%. An integral electronic wide range power pack allows operation in a wide supply area.

Application

Transformation, burden amplification and galvanic disconnection of impressed transmitter signals, current signals and voltage signals with additional simulation function via set value specification, which can be activated.

Specific characteristics

- Restoration of the last device condition on supply connection (i.e. after power cut).
- Setting of a set value is carried out undamped and independent of the trimmer positions between 0...100% of the specified output range.
- Check back contact in set value condition (closer).
- The output signal remains even with missing input signal at the output start (i.e. 4 mA).
- Configurable via AD-STUDIO.

Business data

Order number	AD-TV 320 GS

Technical specifications

Transmitter supply	
Feeding voltage	26 ... 19 V (4 ... 20 mA)
Current limit	~ 25 mA
Input current	
Measuring range	0 ... 20 mA [1]
Input resistance	50 Ohm
Input voltage	
Measuring range	0 ... 10 V [1]
Input resistance	100 kOhm (10 kOhm / Volt)
Output current	
Output range	0 ... 20 mA [1]
Max. burden	500 Ohm
Max. residual ripple	40 µAss
Output voltage	
Output range	0 ... 10 V [1]
Min. burden	1 kOhm
Max. residual ripple	20 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Input power AC/DC	3,5 VA / 2,0 W
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	100 ppm/K
Response time	50 ms
Damping (optional)	0,1 %/s (linear max. ~950 s)
Trimmer function	+/- 25%
Linearization (optional)	24 x/y, interpoliert
Setpoint encoder	0 ... 270° = 0 ... 100 %
Remote control	
Input	Optokoppler
Voltage	10 ... 30 V DC
Pulse controlled	200 ... 1000 ms
Static	> 1000 ms
Front button	~ 200 ms
Housing	
Dimensions (WxHxD)	23x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Supply Isolation Amplifier

Isolation Amplifier With Reference Function

AD-TV 320 GS

Technical specifications

EMC

Product family standard	EN 61326-1 [2]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

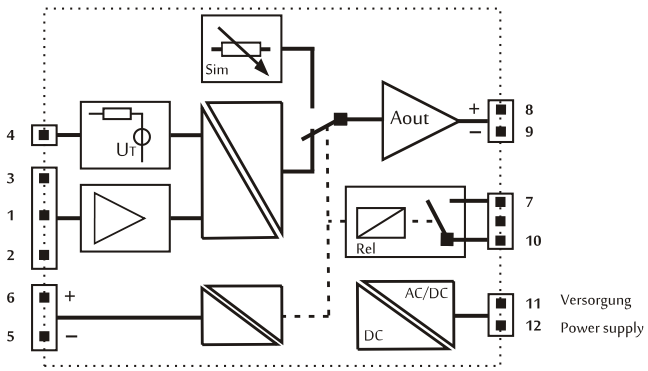
Input / output	1,5 kV, 50 Hz (1 min.)
Signal / supply unit	3 kV, 50 Hz (1 min.)

Protection circuits

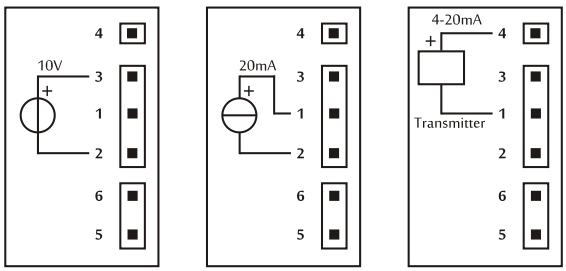
Input	electrical surge protection
Output	electrical surge protection
Power supply	Protection against overvoltage reverse polarity

1) Values must be adviced by order.
2) During checking, slight signal deviations are possible.

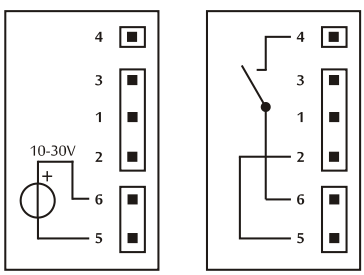
Block and wiring diagram



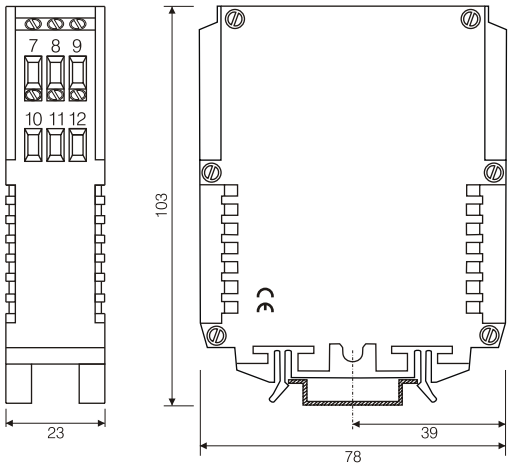
Eingangsbeschaltung / input wiring



Simulationsbeschaltung / simulation wiring



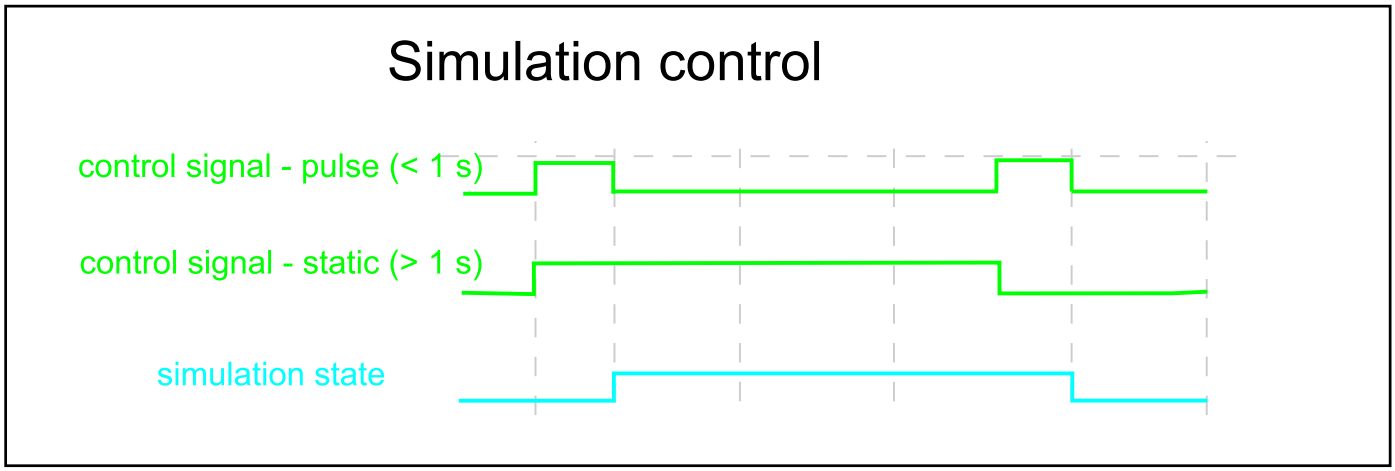
Dimensions



Isolation Amplifier With Reference Function

AD-TV 320 GS

Circuit examples



Isolation Amplifier

Bipolar High-current Isolation Amplifier

AD-TV 350 GVF

Description

The bipolar high-current isolation amplifier AD-TV 350 GVF is used for the galvanic isolation, transformation and amplification of bipolar current or voltage signals. The device allows the transmission of direct as well as alternating current signals up to a high frequency range. The high-current output can supply currents up to 200 mA. Thanks to the integrated 3-way isolation, the input, output and supply voltage are high electrically isolated from each other. The efficient wide-range power supply of the AD-TV 350 GVF allows operation in a wide supply voltage range.

Application

Detection, transformation and amplification of fast changing bipolar signals (current or voltage). Directly controlling e.g. Control valves through the high current output.

Specific characteristics

- bipolar input
- bipolar high current output
- wide-range power supply

Business data

Article number

AD-TV 350 GVF	Please specify input and output data. Example. E: +/- 20 mA; A: +/- 200 mA

Technical specifications

Input current	
Measuring range	+/- 20 mA
Input resistance	ca. 25 Ohm
Input voltage	
Measuring range	+/- 10 V
Input resistance	ca. 100 kOhm
Output current	
Output range	+/- 200 mA
Max. burden	40 Ohm @ 200 mA
Residual ripple	300 µAss @ 200 mA
Output voltage	
Output range	+/- 10 V
Min. burden	100 Ohm @ 10 V
Residual ripple	40 mVss @ 10 V
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	5 VA / 3 W
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	70 ppm/K
Cut-off frequency	ca. 1,5 kHz (-3 dB)
Phase shift I/O	ca. 7,5 °
Power-on drift	ca. 0,1 %
Housing	
Dimensions (WxHxD)	33x110x134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 200 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Signal / supply unit	3 kV, 50 Hz (1 min.)
Input / output	2,5 kV, 50 Hz (1 min.)
Protection circuits	
Input	electrical surge protection
Output	electrical surge protection
Power supply	electrical surge and reverse current protection

[1] During checking, slight signal deviations are possible.

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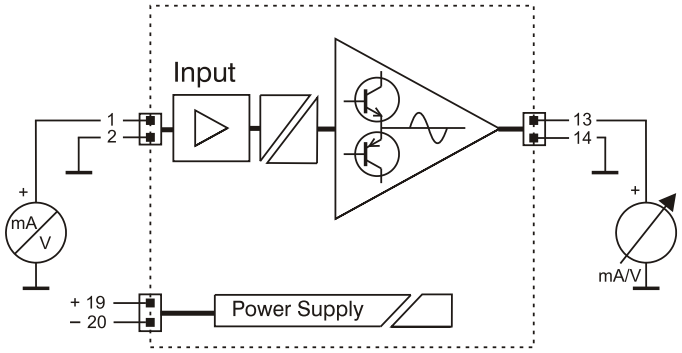
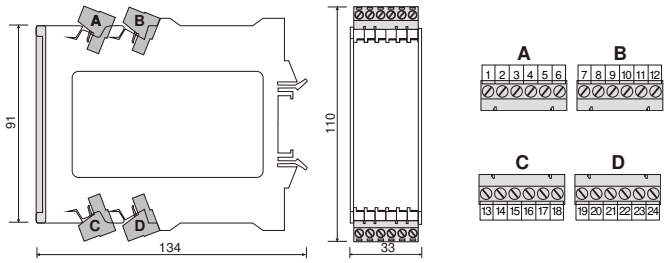
Bipolar High-current Isolation Amplifier

AD-TV 350 GVF

Block and wiring diagram



Dimensions



Isolation Amplifier

Isolation Amplifier (bipolar)

AD-TV 810 GS

Description

The separation amplifier of type family AD-TV 810 serves the galvanic separation, conversion and amplification of bipolar signal sizes. The very high frequency range allows direct current as well as alternating current transfers. Input, output and the supply voltage are galvanically separated from each other. The output signal is independent of the connected load up to a maximum value. The limit frequency of the amplifier can be set at the front as an option.

Application

Recording, galvanic 3-way separation, conversion and amplification of bipolar measuring sizes (voltage or current).

Specific characteristics

- 3dB bandwidth switch (0,1 / 0,5 / 1 / 2 / 20 kHz) are optionally available.

Business data

Order number

AD-TV 810 GS

Technical specifications

Input current	
Measuring range	-20 ... 20 mA [1]
Input resistance	25 Ohm
Input voltage	
Measuring range	-10 ... 10 V [1] (max. +/- 250V)
Input resistance	100 kOhm (10 kOhm / Volt)
Output current	
Output range	-20 ... 20 mA [1]
Max. burden	500 Ohm
Max. residual ripple	40 µAss
Output voltage	
Output range	-10 ... 10 V [1]
Min. burden	1 kOhm
Max. residual ripple	20 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Input power AC/DC	3,5 VA / 1,7 W
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	100 ppm/K
Frequency range	0...20 kHz (-3dB)
Housing	
Dimensions (WxHxD)	23x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Isolation Amplifier (bipolar)

AD-TV 810 GS

Technical specifications

EMC

Product family standard	EN 61326-1 [2]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

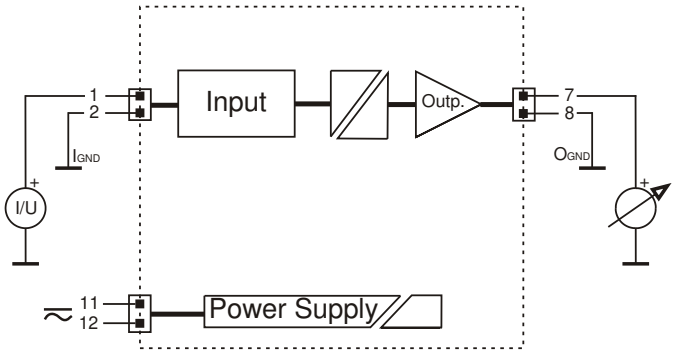
Input / output	3,75 kV, 50 Hz (1 min.)
Signal / supply unit	3,3 kV, 50 Hz (1 min.)

Protection circuits

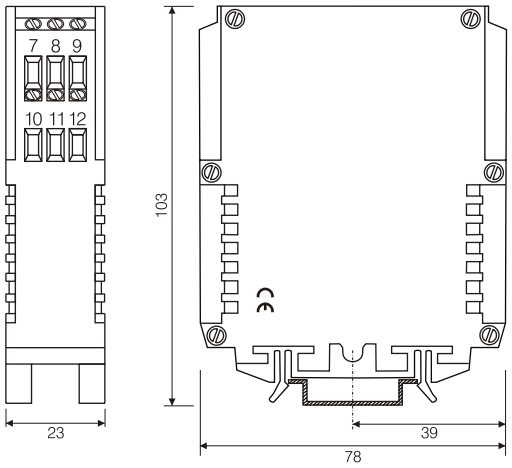
Input	electrical surge protection
Output	electrical surge protection
Power supply	Protection against overvoltage reverse polarity

1) Values must be adviced by order.
2) During checking, slight signal deviations are possible.

Block and wiring diagram



Dimensions



Supply Isolation Amplifier

Isolation Amplifier For Current Signals

AD-STV 2 GX

Description

The supply isolation amplifier AD-STV 2 GX with its width of only 6.2 mm is used for galvanic isolation and amplification of transmitter signals (4-20 mA). The 2- or 3-wire transmitter is supplied directly by a galvanically isolated supply voltage. The input signal can be selected via DIP switches. Manual readjustment is required when switching the measuring range, the start and end values can be set using trimmers. Input, output and the supply voltage are galvanically separated from each other. A high packing density is achieved thanks to the narrow design. In combination with DIN rail connectors, the wiring effort is reduced considerably.

Application

Supply and data acquisition of 2- or 3-wire transmitters such as pressure transmitters, temperature transmitters, etc. with simultaneous amplification and galvanic isolation. Can also be used as a pure burden amplifier.

Specific characteristics

- narrow 6.2mm construction
- Current and voltage input (switchable)
- easy configuration using DIP switches on the side of the device
- Supply via DIN rail connector

Business data

Order number

AD-STV 2 GX

Accessory

DIN-rail connector	AD-GX Connector

Technical specifications

Input voltage

Measuring range	0 ... 10 V
Input resistance	100 kOhm

Input current

Measuring range	0 ... 20 mA; 4 ... 20 mA
Input resistance	50 Ohm

Transmitter supply

Open-circuit voltage	< 20 V
At 20 mA	> 14 V
Current limit	< 30 mA

Output current

Output range	0 ... 20 mA; 4 ... 20 mA
Max. burden	350 Ohm
Residual ripple	< 0,1 %

Transmission behaviour

Response time	< 50 ms (10-90 %)
Linearity error	< 0,1 %
Temperature influence	< 70 ppm/K
Adjust begin	+/- 22%
Adjust end	+/- 5%

Supply

Voltage range	18 ... 30 V DC
Nominal voltage	24 V DC
Power consumption	1,3 W

Housing

Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Manner of fastening	DIN rail 35mm EN 50022
Type of protection	IP 20
Connection method	screw clamp (2,5 mm² flex wire / 4 mm² one wire)
Weight	~ 70 g
Bolting torque terminals	0,5 Nm

Environmental conditions

Ambient temperature	-10 ... +50 °C
Storage and transport	-10 ... +70 °C (no condensation)

EMC

Product family standard [1]	EN 61326-1
Emission [2]	EN 55011, CISPR11 Cl. A, Gr. 1

[1] During electromagnetic disturbance minor changes in output signal are possible.

[2] Warning:
This device is not intended to be used in residential areas and can not ensure adequate protection of radio reception in such environments.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	1,5 kV, 1 min
Signal/auxiliary voltage	1,5 kV, 1 min

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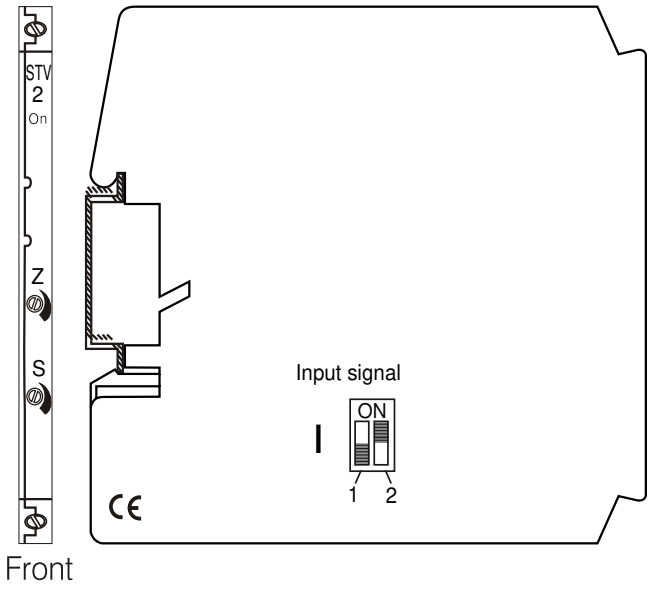
Supply Isolation Amplifier

Isolation Amplifier For Current Signals

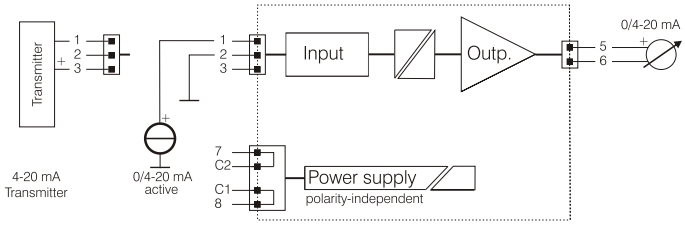
AD-STV 2 GX

Display and operating elements

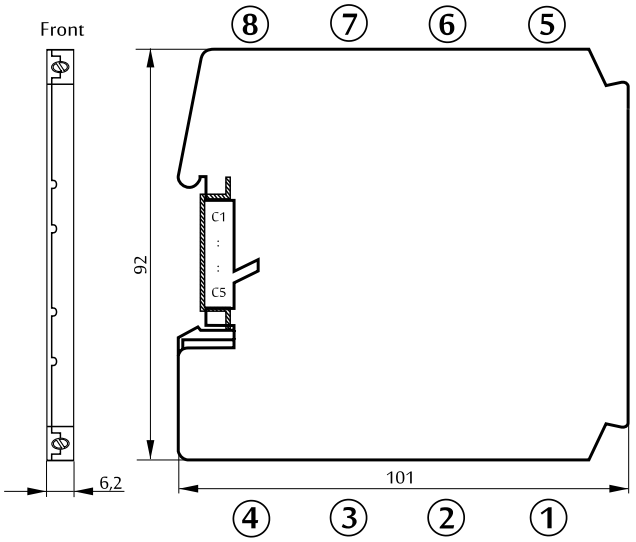


Designation	Value	Meaning
On	LED green	Power supply
Z	+/- 22 %	Adjust begin value
S	+/- 5 %	Adjust end value
I1 / I2	OFF / OFF	Input: 0... 10 V
I1 / I2	OFF / ON	Input: 0... 20 mA

Block and wiring diagram



Dimensions



Supply Isolation Amplifier

AD-STV 24 GVB

Description

The supply isolation amplifier AD-STV 24 GVB serves the galvanic isolation and amplification of current signals in the range 0/4...20 mA. The transmitter is supplied by an isolated and limited supply voltage. Input, output and power supply are galvanically isolated. An integral, electronic power pack is designed with a voltage range of 11 to 30 VDC, also for 12V battery voltage. In combination with the small shape, high packing densities can be achieved.

Application

Supply of 2-wire transmitters like pressure or temperature transmitters and galvanic signal isolation.

Specific characteristics

- 3-way isolation of input, output and supply
- Current transfer ratio 1:1, input = output
- Integrated current-limited power supply
- Suitable for battery voltage of 12VDC

Business data

Order number	AD-STV 24 GVB

Technical specifications

Input current

Measuring range	0 ... 20 mA; 4 ... 20 mA
Input resistance	50 Ohm

Transmitter supply

Open-circuit voltage	< 23 V
At 20 mA	> 17 V
Current limit	< 30 mA

Output current

Output range	0 ... 20 mA; 4 ... 20 mA
Max. burden	< 300 Ohm

Transmission behaviour

Basic accuracy	< 0,2 %
Linearity error	< 0,2 %
Temperature influence	< +/-100 ppm/K
Response time	< 1 ms

Supply

Voltage range	11 ... 30 V DC
Power consumption	1,4 W

Housing

Dimensions (WxHxD)	13x110x134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp (2,5 mm² flex wire / 4 mm² one wire)
Bolting torque terminals	0,5 Nm
Manner of fastening	DIN rail 35mm (EN 50022)
Weight	ca. 100 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

During electromagnetic disturbance minor changes in output signal are possible.

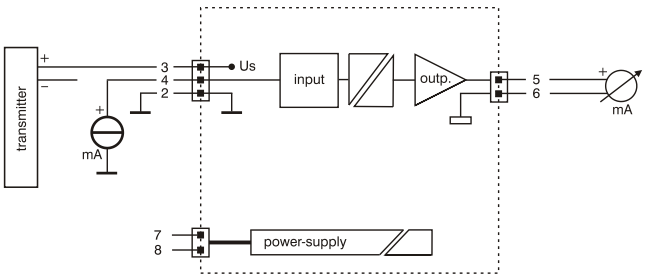
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	3,75 kV, 1 min
Signal/auxiliary voltage	3 kV, 1 min

Block and wiring diagram



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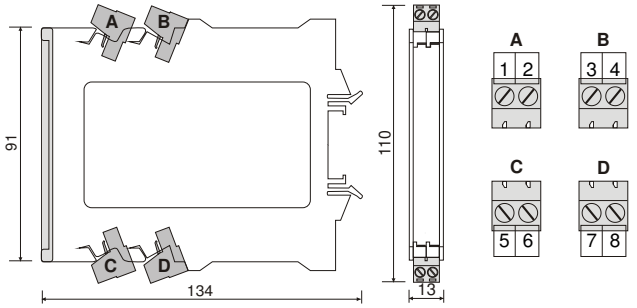

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Supply Isolation Amplifier

AD-STV 24 GL

Description

The supply isolation amplifier AD-STV 24 GL serves the galvanic isolation and amplification of current signals in the range 0/4...20 mA. The transmitter is supplied by an isolated and limited supply voltage. Input, output and power supply are galvanically isolated. The electronic wide range power supply avoids an excessive heating. In combination with the small shape, high packing densities can be achieved.

Application

Supply of 2- or 3-wire transmitters like pressure or temperature transmitters and galvanic signal isolation.

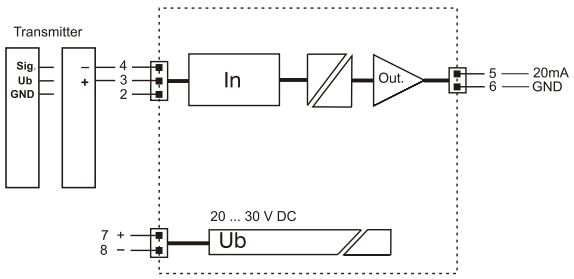
Specific characteristics

- 3-way isolation of input, outtput and supply
- Current transfer ratio 1:1, input = output
- Integrated current-limited power supply

Business data

Order number	AD-STV 24 GL

Block and wiring diagram



Technical specifications

Input current

Measuring range	0 ... 20 mA; 4 ... 20 mA
Input resistance	50 Ohm

Transmitter supply

Open-circuit voltage	< 24 V
At 20 mA	> 17 V
Current limit	< 30 mA

Output current

Output range	0 ... 20 mA; 4 ... 20 mA
Max. burden	< 400 Ohm

Transmission behaviour

Linearity error	< 0,3 %
Temperature influence	< +/-100 ppm/K

Supply

Voltage range	20 ... 30 V DC
Power consumption	< 1,4 W

Housing

Manner of fastening	DIN rail 35mm EN 50022
Type of protection	IP 20
Connector cross section	max. 2,5 mm^2
Weight	ca. 90 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

During electromagnetic disturbance minor changes in output signal are possible.

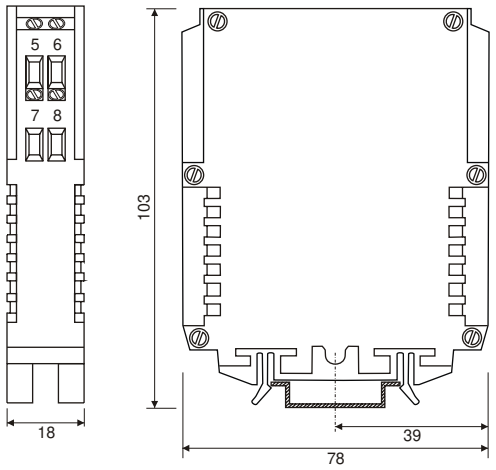
Electrical safety requirements

Product family standard	EN 61010-1

Galvanic isolation, test voltages

Input/output	3,75 kV, 1 min
Signal/auxiliary voltage	4 kV, 1 min

Dimensions



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Supply Isolation Amplifier

AD-STV 22 GVB

Description

The supply isolation amplifier AD-STV 22 GVB serves the galvanic isolation and amplification of current signals in the range 0/4...20 mA. The transmitter is supplied by an isolated and limited supply voltage. Input, output and power supply are galvanically isolated. The electronic wide range power supply avoids an excessive heating. In combination with the small shape, high packing densities can be achieved.

Application

Supply of 2-wire transmitters like pressure or temperature transmitters and galvanic signal isolation.

Specific characteristics

- 3-way isolation of input, output and supply
- Current transfer ratio 1:1, input = output
- Integrated current-limited power supply

Business data

Order number

AD-STV 22 GVB

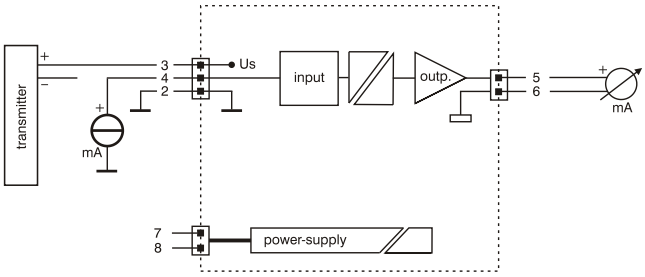
Technical specifications

Input current	
Measuring range	0 ... 20 mA; 4 ... 20 mA
Input resistance	50 Ohm
Transmitter supply	
Open-circuit voltage	< 23 V
At 20 mA	> 17 V
Current limit	< 30 mA
Output current	
Output range	0 ... 20 mA; 4 ... 20 mA
Max. burden	< 400 Ohm
Transmission behaviour	
Basic accuracy	< 0,2 %
Linearity error	< 0,2 %
Temperature influence	< +/-100 ppm/K
Response time	< 1 ms
Supply	
Voltage range	20 ... 253 V DC; 50 ... 253 V AC
Power consumption	1,5 W, 3 VA
Housing	
Dimensions (WxHxD)	13x110x134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp (2,5 mm² flex wire / 4 mm² one wire)
Bolting torque terminals	0,5 Nm
Manner of fastening	DIN rail 35mm (EN 50022)
Weight	ca. 100 g
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Input/output	3,75 kV, 1 min
Signal/auxiliary voltage	3 kV, 1 min

Block and wiring diagram



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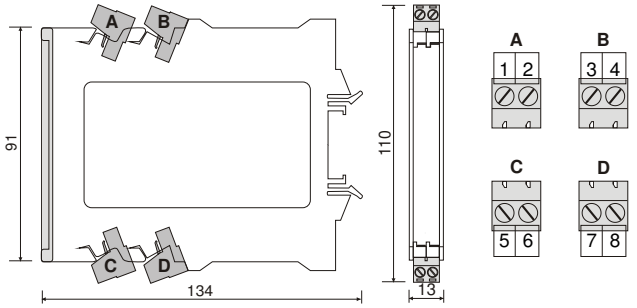

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Supply Isolation Amplifier

AD-STV 22 GL

Description

The supply isolation amplifier AD-STV 22 GL serves the galvanic isolation and amplification of current signals in the range 0/4...20 mA. The transmitter is supplied by an isolated and limited supply voltage. Input, output and power supply are galvanically isolated. The electronic wide range power supply avoids an excessive heating. In combination with the small shape, high packing densities can be achieved.

Application

Supply of 2-wire transmitters like pressure or temperature transmitters and galvanic signal isolation.

Specific characteristics

- 3-way isolation of input, outtput and supply
- Current transfer ratio 1:1, input = output
- Integrated current-limited power supply

Business data

Order number

AD-STV 22 GL

Technical specifications

Input current	
Measuring range	0 ... 20 mA; 4 ... 20 mA
Input resistance	50 Ohm
Transmitter supply	
Open-circuit voltage	< 24 V
At 20 mA	> 17 V
Current limit	< 30 mA
Output current	
Output range	0 ... 20 mA; 4 ... 20 mA
Max. burden	< 400 Ohm
Transmission behaviour	
Linearity error	< 0,3 %
Temperature influence	< +/-100 ppm/K
Supply	
Voltage range	20 ... 253 V DC; 50 ... 253 V AC
Power consumption	1,5 W, 3 VA
Housing	
Manner of fastening	DIN rail 35mm EN 50022
Type of protection	IP 20
Connector cross section	2,5 mm^2 flex wire, 4 mm^2 one wire
Weight	ca. 90 g
Bolting torque terminals	0,5 Nm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
During electromagnetic disturbance minor changes in output signal are possible.	
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Functional safety	
Safety Integrity Level (SIL) according to IEC 61508	SIL 2
Galvanic isolation, test voltages	
Input/output	3,75 kV, 1 min
Signal/auxiliary voltage	3 kV, 1 min

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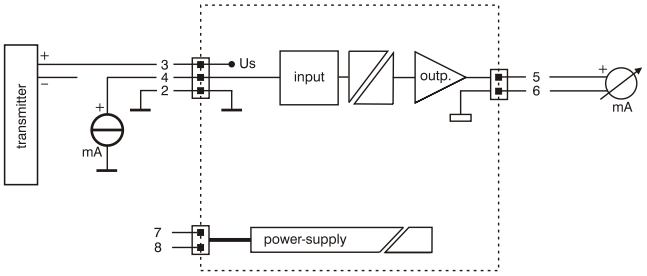
Supply Isolation Amplifier

AD-STV 22 GL

Block and wiring diagram



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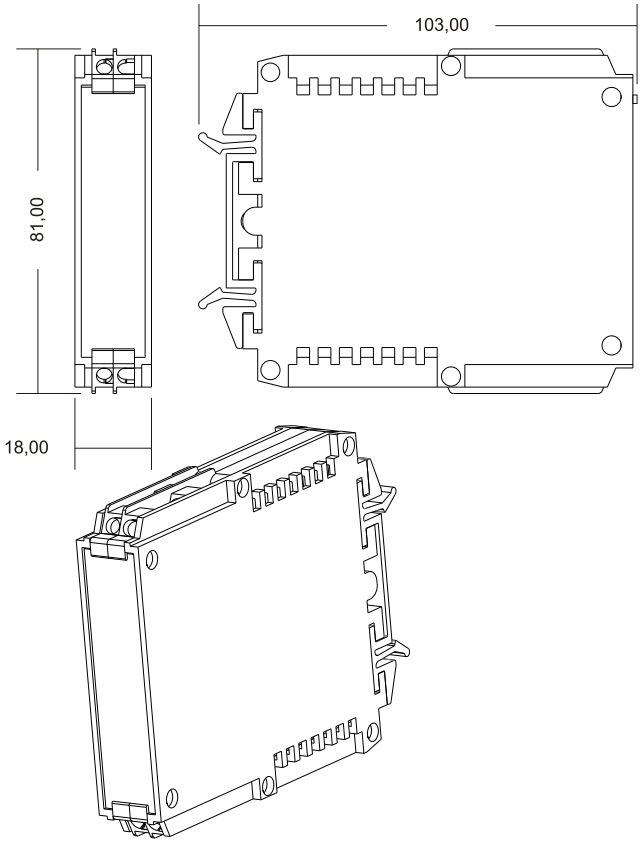


Supply Isolation Amplifier

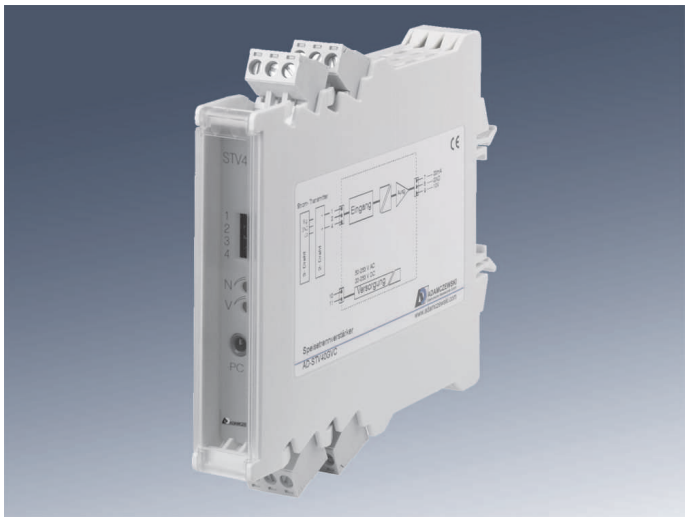
AD-STV 40 GVC

Description

The supply isolation amplifier AD-STV 40 GVC is designed for the galvanic isolation and amplification of transmitter signals (0/4-20 mA) and standard analog signals (0/4-20 mA and 0/2-10VDC). When connecting a 2 - wire transmitter, it is powered directly through an electrically isolated and current limited power supply voltage. The standard signals 0/4-20 mA and 0/2-10 V are freely selectable via switch or terminal on both the input and at the output. All ranges are calibrated fixed, but can be adjusted via front-trimmer. In addition, this device comes standard with a configuration interface AD-PC, with which the input and output measurement signal with the optional AD-Studio programming software in the range of max. 20 mA or 10 VDC can be freely programmed. The selected linear output signal follows the input size up to a limit independent of the connected load. Input, output and power supply voltage are galvanically isolated from each other with high insulation. An integral electronic wide range power supply with high efficiency prevents strong heating and allows high output loads.

Application

Galvanically isolated supply of a transmitter while separation, amplification or conversion of standard analog signals.



Specific characteristics

- All standard signals at the input and output are freely selectable
- Switchable zero and span trimmer
- Special signals can be parameterized via interface
- Weitbereichsnetzteil

Business data

Order number	AD-STV 40 GVC

Technical specifications

Input current	
Measuring range	0 ... 20 mA; 4 ... 20 mA [1]
Input resistance	ca. 50 Ohm
Resolution	10 Bit
Input voltage	
Measuring range	0 ... 10 V; 2 ... 10 V [1]
Input resistance	>700 kOhm
Resolution	10 Bit
Transmitter supply	
Open-circuit voltage	ca. 26 V DC
Full load voltage	ca. 20 V DC
Current limit	ca. 30 mA
Input filter	
Setting range (via interface)	10 ms / filter value (0 ... 30000)
Output current	
Output range	0 ... 20 mA; 4 ... 20 mA [1]
Max. burden	400 Ohm
Residual ripple	50 µAss
Resolution	11 Bit
Output voltage	
Output range	0 ... 10 V; 2 ... 10 V [1]
Min. burden	10 kOhm
Residual ripple	20 mVss
Resolution	11 Bit
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	3,9 VA / 1,9 W
Trimmer	
Trim range	ca. +/- 20 %
Transmission behaviour	
Basic accuracy	< 0,3 %
Temperature influence	100 ppm/K
Response time	~ 70 ms
Housing	
Dimensions (WxHxD)	18x110x134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 130 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Supply Isolation Amplifier

AD-STV 40 GVC

Technical specifications

EMC

Product family standard	EN 61326-1 [2]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input / output	2,5 kV (1 min.)
Signal / supply unit	3 kV (1 min.)

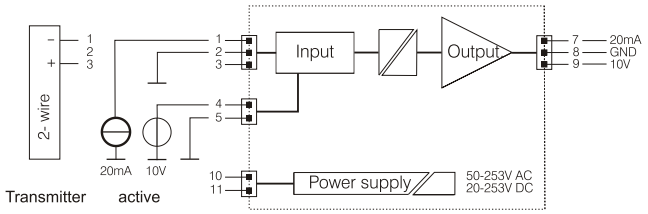
Protection circuits

Input	electrical surge protection
Output	electrical surge protection
Power supply	Protection against overvoltage, overcurrent and reverse polarity

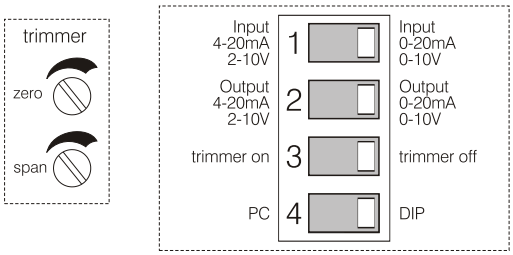
[1] Special signals are configurable via the interface.

[2] During electromagnetic disturbance minor changes in output signal are possible.

Block and wiring diagram



Function DIP-switch



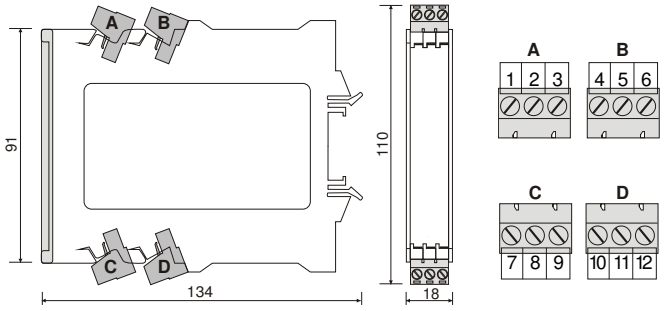
Trimmer on
Factory setting, according to standard signals switches 1 and 2

Trimmer off
Activates the front trimmer for Offset (zero) and span
Adjustment range: + / -20%

DIP Factory settings, input and output signals such as switches 1-3

PC AD-studio setup position, Switches 1-3 functionless

Dimensions



Isolation Amplifier

AD-TV 400 GVD

Description

The isolation amplifier AD-TV 400 GVD serves the galvanic separation of analogue signals and of transmitter signals. When a 2-wire transmitter is connected, this will be supplied directly via a galvanically separated and current-limited supply voltage. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating panel AD-VarioControl or via the programming software AD-Studio. The wide bipolar input measuring range makes this buffer amplifier into the universal type for almost all applications in the area of standard signals and beyond. Due to its current-sinking output, transmitter signals can also be separated or converted. All supply ranges are covered with the wide range power pack.

Application

Amplification, transformation and electrical isolation of current or voltage signals

Specific characteristics

- bipolar current input (+/- 0,5 mA bis +/- 50 mA)
- bipolar voltage input (+/- 1 V bis +/- 100 V)
- Power supply for 2- / 3-wire transmitters
- bipolar current or voltage output
- current sink output
- Operating module as an accessory
- 23 mm narrow housing with detachable terminal clamp

Business data

Order number	
Isolation amplifier	AD-TV 400 GVD
Accessory (optional)	
Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current	
Measuring range	-50 ... + 50 mA DC
Input resistance	40 Ohm
Input voltage	
Measuring range	-100 ... + 100 V DC
Input resistance	1 MOhm
Transmitter supply	
Off-load voltage	24,5 V
Voltage at 20mA	19,5 V
Current limit	~ 25 mA
Output current	
Max. output range	-21,5 ... 21,5 mA DC
Max. burden	400 Ohm
Residual ripple	40 µAss
Output voltage	
Max. output range	-10,5 ... 10,5 V DC
Min. burden	10 kOhm
Residual ripple	30 mVss
Current sink output	
Current sink	0/4 ... 20 mA DC
Max. voltage to be applied	35 V DC
Resolution	
Input	16 bit
Output	12 bit
Transmission behaviour	
Linearity error	0,2 % of full scale
Rise time	200 ms (output auf 90 %)
Temperature influence	+/- 100 ppm/K of full scale
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	4 VA / 2,4 W
Housing	
Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

Printed 18.11.2022 We reserve the right for technical changes.

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Isolation Amplifier

AD-TV 400 GVD

Technical specifications

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

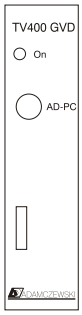
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	3,75 kV (1 min)
Signal/auxiliary voltage	4 kV (1 min)

Display and operating elements

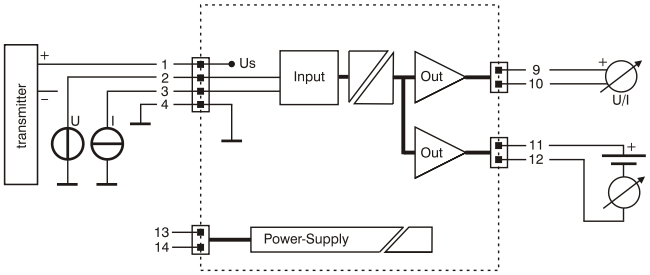


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits

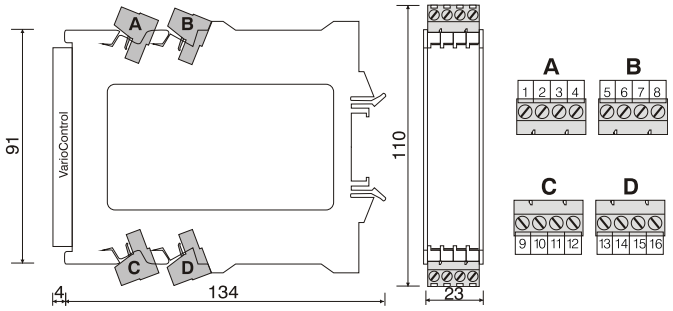
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-TV 400 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40805	2	Scaled input		7	1	0
40809	2	Input signal	mA / V	7	1	0
40909	2	Output signal 1	mA / V	7	1	1
40911	2	Output signal 2	mA / V	7	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Isolation Amplifier

AD-TV 420 GVD

Description

The isolation amplifier AD-TV 420 GVD serves the galvanic separation of analogue signals and of transmitter signals. When a 2-wire transmitter is connected, this will be supplied directly via a galvanically separated and current-limited supply voltage. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating panel AD-VarioControl or via the programming software AD-Studio. The wide bipolar input measuring range makes this buffer amplifier into the universal type for almost all applications in the area of standard signals and beyond. All supply ranges are covered with the wide range power pack.

Application

Amplification, transformation and electrical isolation of current or voltage signals

Specific characteristics

- bipolar current input (+/- 0,5 mA bis +/- 50 mA)
- bipolar voltage input (+/- 1 V bis +/- 100 V)
- Power supply for 2- / 3-wire transmitters
- 2 bipolar current or voltage output
- Operating module as an accessory
- 23 mm narrow housing with detachable terminal clamp

Business data

Order number	
Isolation amplifier	AD-TV 420 GVD
Accessory (optional)	
Operating module	AD-VarioControl / AD-VarioConnect
USB programming adapter	AD-Variopass
Configuration software	70|AD-Studio
Test	
Modbus Protokoll	http://www.modbus.org/specs.php|Protokoll-Spezifikation der Modbus Organisation
GTC	agb.pdf|Adamczewski AGB

Technical specifications

Input current	
Measuring range	-50 ... + 50 mA DC
Input resistance	40 Ohm
Input voltage	
Measuring range	-100 ... + 100 V DC
Input resistance	1 MOhm
Transmitter supply	
Off-load voltage	24,5 V
Voltage at 20mA	19,5 V
Current limit	~ 25 mA
Current outputs	
Max. output range	-21,5 ... 21,5 mA DC
Max. burden	400 Ohm
Residual ripple	40 µAss
Voltage outputs	
Max. output range	-10,5 ... 10,5 V DC
Min. burden	10 kOhm
Residual ripple	30 mVss
Resolution	
Input	16 bit
Output	12 bit
Transmission behaviour	
Linearity error	0,2 % of full scale
Rise time	200 ms (output auf 90 %)
Temperature influence	+/- 100 ppm/K of full scale
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	4,4 VA / 2,8 W
Housing	
Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

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Isolation Amplifier

AD-TV 420 GVD

Technical specifications

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

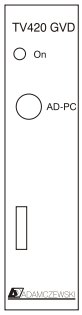
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	3,51 kV (1 min)
Signal/auxiliary voltage	3,75 kV (1 min)

Display and operating elements

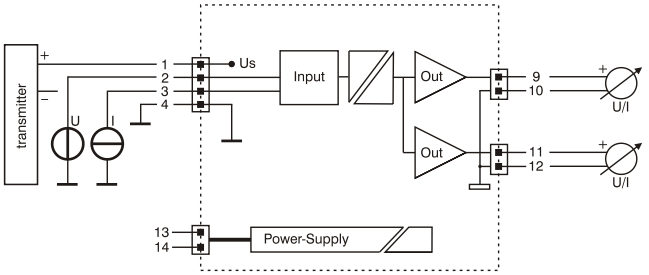


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits

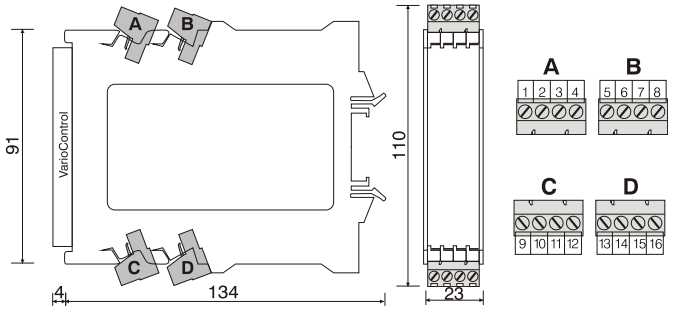
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-TV 420 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40805	2	Scaled input		7	1	0
40809	2	Input signal	mA / V	7	1	0
40909	2	Output signal 1	mA / V	7	1	1
40911	2	Output signal 2	mA / V	7	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Supply Isolation Amplifier

HART-Supply Isolation Amplifier

AD-STH 40 GVC

Description

The HART supply isolation amplifier AD-STH 40 GVC is designed for the galvanic isolation and amplification of transmitter signals (0/4-20 mA) and standard analog signals (0/4-20 mA and 0/2-10VDC). When connecting a 2 - wire transmitter, it is powered directly through an electrically isolated and current limited power supply voltage. Because the AD-STH 40 GVC is permeable on the current path for FSK signals (Frequency Shift Keying, eg HART-protocol) also a smart HART-transmitter can be connected at the input of the supply isolation amplifier. This HART transmitter can be programmed or read out from the output of the AD-STH 40 GVC using the integrated programming resistor. The standard signals 0/4-20 mA and 0/2-10 V are freely selectable via switch or terminal on both the input and at the output. All ranges are calibrated fixed, but can be adjusted via front-trimmer. In addition, this device comes standard with a configuration interface AD-PC, with which the input and output measurement signal with the optional AD-Studio programming software in the range of max. 20 mA or 10 VDC can be freely programmed. The selected linear output signal follows the input size up to a limit independent of the connected load. Input, output and power supply voltage are galvanically isolated from each other with high insulation. An integral electronic wide range power supply with high efficiency prevents strong heating and allows high output loads.

Application

Galvanically isolated supply of a smart HART-transmitter while separation, amplification or conversion of standard analog signals.

Specific characteristics

- All standard signals at the input and output are freely selectable
- FSK transmission (e.g. HART protocol)
- Switchable zero and span trimmer
- Special signals can be parameterized via interface

Business data

Order number	AD-STH 40 GVC

Technical specifications

Input current	
Measuring range	0 ... 20 mA; 4 ... 20 mA [1]
Input resistance	ca. 75 Ohm
Resolution	10 Bit
Input voltage	
Measuring range	0 ... 10 V; 2 ... 10 V [1]
Input resistance	>700 kOhm
Resolution	10 Bit
Transmitter supply	
Full load voltage	ca. 20 V DC
Current limit	ca. 30 mA
Open-circuit voltage	ca. 26 V DC
Input filter	
Setting range (via interface)	10 ms / filter value (0 ... 30000)
Output current	
Output range	0 ... 20 mA; 4 ... 20 mA [1]
Max. burden	400 Ohm
Residual ripple	50 µAss
Resolution	11 Bit
Output voltage	
Output range	0 ... 10 V; 2 ... 10 V [1]
Min. burden	10 kOhm
Residual ripple	20 mVss
Resolution	11 Bit
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	3,9 VA / 1,9 W
Trimmer	
Trim range	ca. +/- 20 %
Transmission behaviour	
Basic accuracy	< 0,3 %
Temperature influence	100 ppm/K
Response time	~ 70 ms
Housing	
Dimensions (WxHxD)	18x110x134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 130 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

Printed 23.08.2022 We reserve the right for technical changes.

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Supply Isolation Amplifier

HART-Supply Isolation Amplifier

AD-STH 40 GVC

Technical specifications

EMC

Product family standard	EN 61326-1 [2]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input / output	2,5 kV (1 min.)
Signal / supply unit	3 kV (1 min.)

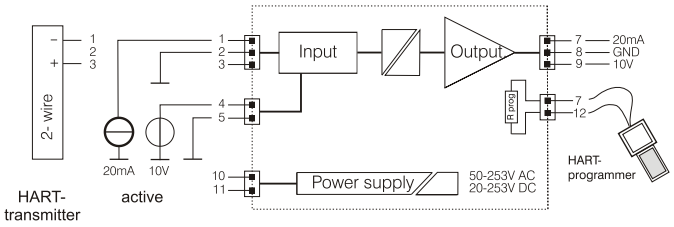
Protection circuits

Input	electrical surge protection
Output	electrical surge protection
Power supply	Protection against overvoltage, overcurrent and reverse polarity

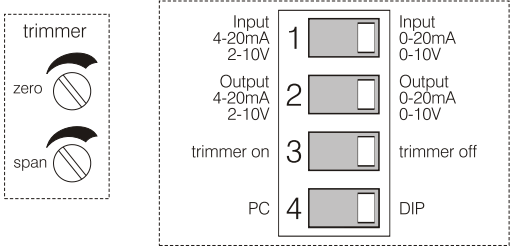
[1] Special signals are configurable via the interface.

[2] During electromagnetic disturbance minor changes in output signal are possible.

Block and wiring diagram



Function DIP-switch



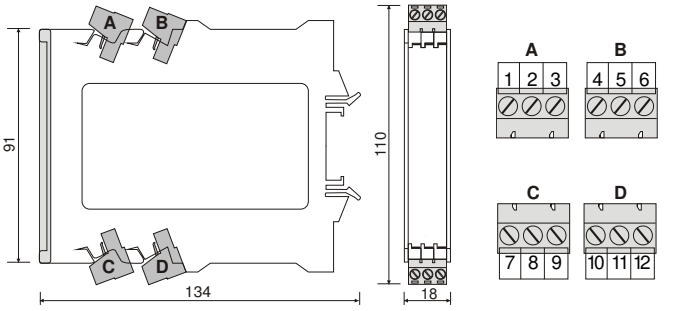
Trimmer on
Factory setting, according to standard signals switches 1 and 2

Trimmer off
Activates the front trimmer for Offset (zero) and span
Adjustment range: + / -20%

DIP Factory settings, input and output signals such as switches 1-3

PC AD-studio setup position, Switches 1-3 functionless

Dimensions



Supply Isolation Amplifier

AD-STV 300 GS

Description

The universal supply isolating amplifier AD-STV 300 GS converts the two active standard industrial signals 0...20 mA and 4...20 mA, amplifies them and separates them galvanically. In addition, the device still has a current-limited supply voltage for the supply of two-wire transmitters. The signals are also available at the output. All combinations are possible. A switchover is not necessary. The signal combination from input to output is selected via the terminals.

Application

Amplification and adaptation of standard active signals and transmitter signals with easy conversion to a freely selectable output signal.

Specific characteristics

- Three signals freely selectable at the input and output
- current limited supply voltage of transmitters
- Galvanic isolation and amplification
- No mechanical switches necessary
- Input / output combination by clamping the desired signals
- No subsequent adjustment necessary
- Suppression of live zero signal (4mA)
- Price / performance ratio allows for warehousing

Business data

Order number	AD-STV 300 GS

Technical specifications

Current inputs	
Measuring range 1	0 ... 20 mA
Measuring range 2	4 ... 20 mA
Input resistance 1/2	50 Ohm
Transmitter supply	
Open-circuit voltage	20 V
Voltage at 20 mA	14 V
Current limit	ca. 30 mA
Current outputs	
Output range 1	0 ... 20 mA
Output range 2	4 ... 20 mA
Maximum burden 1/2	500 Ohm
Simultaneous use	Nein
Output voltage	
Output range	0 ... 10 V
Min. burden	1000 Ohm
Supply	
Voltage range	50 ... 253 V AC (50 Hz), 20 ... 253 V DC
Nominal voltage	230 V AC (50 Hz), 24 V DC
Power consumption	4 VA, 2 W
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	100 ppm/K
Response time	~ 50 ms (10...90 % output signal)
Housing	
Dimensions (WxHxD)	18x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 140 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Input to output	3,75 kV, 50 Hz (1 min.)
Input, output to supply	3 kV, 50 Hz (1 min.)

[1] During checking, slight signal deviations are possible.

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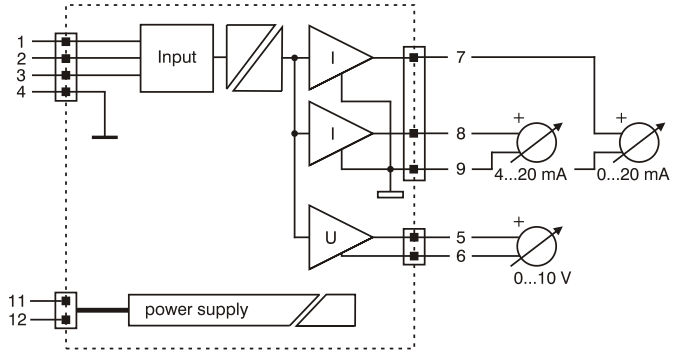
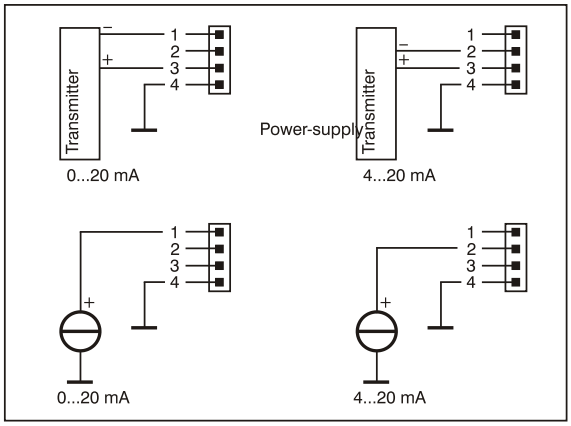
Supply Isolation Amplifier

AD-STV 300 GS

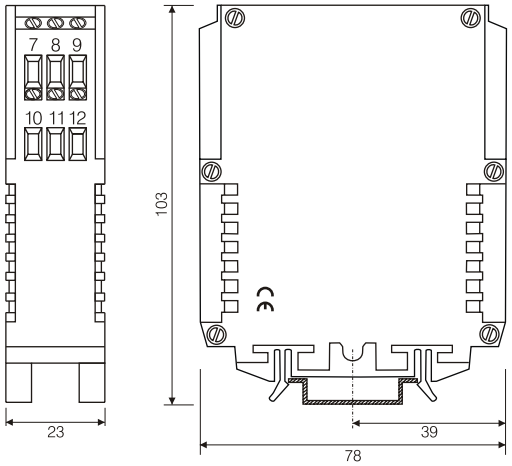
Block and wiring diagram



input wiring



Dimensions



Supply Isolation Amplifier

Isolation Amplifier With Reference Function

AD-TV 320 GS

Description

The set value buffer amplifier AD-TV 320 GS serves the galvanic separation, transformation and amplification of DC current and voltage signals (0/4-20mA or 0/2-10V).The device has additionally a transmitter supply and a set value function, which can be switched on. The activation of the set value function is carried out selectable with a brief depression of the key at the front or with a control signal (24V active or contact) at the remote control input. Any output set value is set with the potentiometer at the front. Activation of zero trimmers and full trimmers is possible with longer depression of the set value key. With this, the signal magnitudes are adjustable in the range of ±25%. An integral electronic wide range power pack allows operation in a wide supply area.

Application

Transformation, burden amplification and galvanic disconnection of impressed transmitter signals, current signals and voltage signals with additional simulation function via set value specification, which can be activated.

Specific characteristics

- Restoration of the last device condition on supply connection (i.e. after power cut).
- Setting of a set value is carried out undamped and independent of the trimmer positions between 0...100% of the specified output range.
- Check back contact in set value condition (closer).
- The output signal remains even with missing input signal at the output start (i.e. 4 mA).
- Configurable via AD-STUDIO.

Business data

Order number	AD-TV 320 GS

Technical specifications

Transmitter supply	
Feeding voltage	26 ... 19 V (4 ... 20 mA)
Current limit	~ 25 mA
Input current	
Measuring range	0 ... 20 mA [1]
Input resistance	50 Ohm
Input voltage	
Measuring range	0 ... 10 V [1]
Input resistance	100 kOhm (10 kOhm / Volt)
Output current	
Output range	0 ... 20 mA [1]
Max. burden	500 Ohm
Max. residual ripple	40 µAss
Output voltage	
Output range	0 ... 10 V [1]
Min. burden	1 kOhm
Max. residual ripple	20 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Input power AC/DC	3,5 VA / 2,0 W
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	100 ppm/K
Response time	50 ms
Damping (optional)	0,1 %/s (linear max. ~950 s)
Trimmer function	+/- 25%
Linearization (optional)	24 x/y, interpoliert
Setpoint encoder	0 ... 270° = 0 ... 100 %
Remote control	
Input	Optokoppler
Voltage	10 ... 30 V DC
Pulse controlled	200 ... 1000 ms
Static	> 1000 ms
Front button	~ 200 ms
Housing	
Dimensions (WxHxD)	23x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Supply Isolation Amplifier

Isolation Amplifier With Reference Function

AD-TV 320 GS

Technical specifications

EMC

Product family standard	EN 61326-1 [2]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

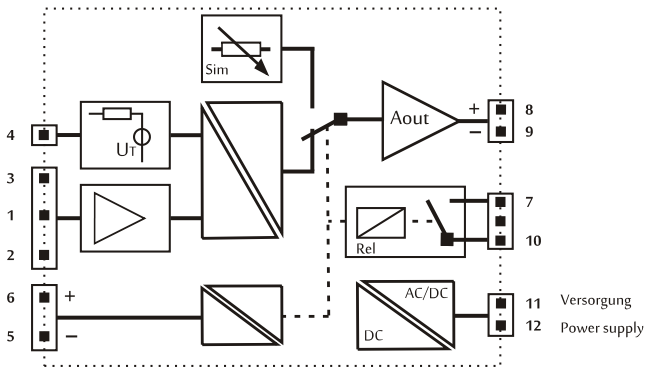
Input / output	1,5 kV, 50 Hz (1 min.)
Signal / supply unit	3 kV, 50 Hz (1 min.)

Protection circuits

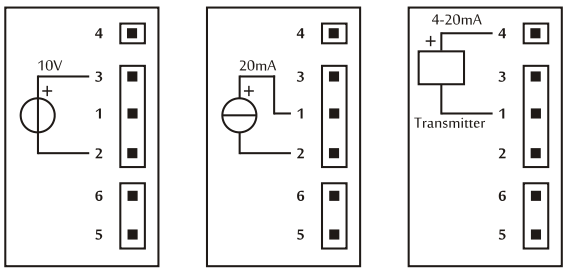
Input	electrical surge protection
Output	electrical surge protection
Power supply	Protection against overvoltage reverse polarity

1) Values must be adviced by order.
2) During checking, slight signal deviations are possible.

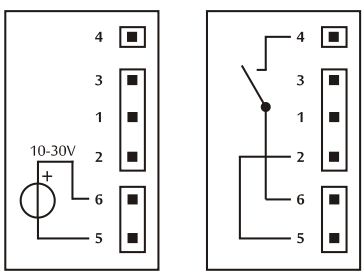
Block and wiring diagram



Eingangsbeschaltung / input wiring



Simulationsbeschaltung / simulation wiring



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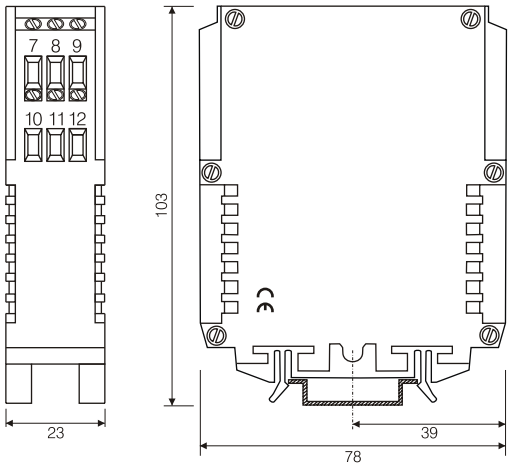
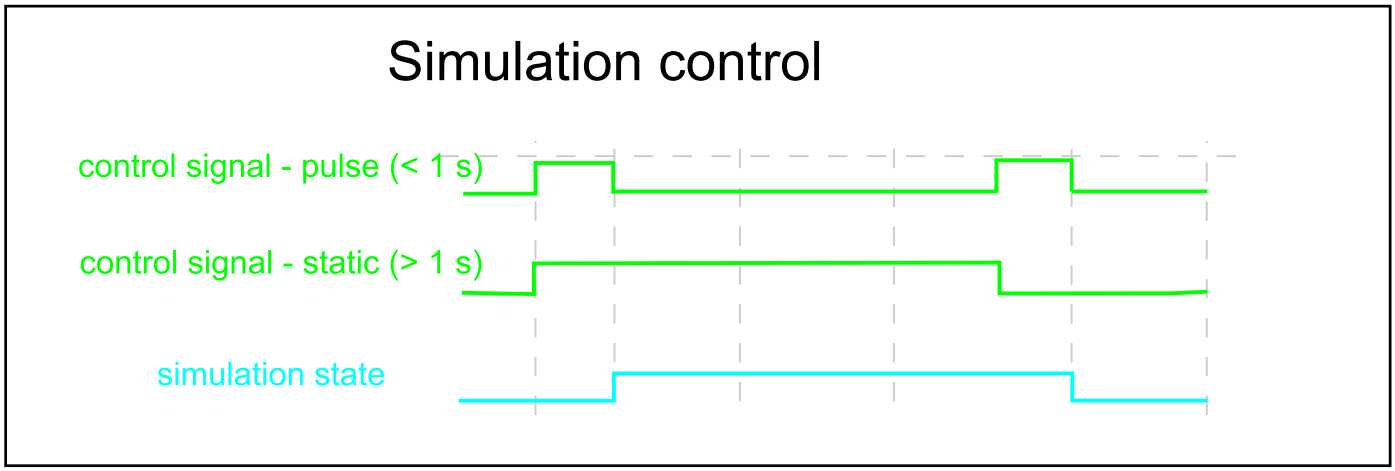


Isolation Amplifier With Reference Function

AD-TV 320 GS

Circuit examples



Supply Isolation Amplifier

AD-STV 810 GS

Description

The separation amplifier of type family AD-STV 810 serves the galvanic separation, conversion and amplification of unipolar signal sizes. The very high frequency range allows direct current as well as fast current transfers. Input, output and the supply voltage are galvanically separated from each other. The output signal is independent of the connected load up to a maximum value. The limit frequency of the amplifier can be set at the front as an option.

Application

Recording, galvanic 3-way separation, conversion and amplification of unipolar measuring sizes (voltage or current).

Specific characteristics

- 3dB bandwidth switch (0,1 / 0,5 / 1 / 2 / 20 kHz) are optionally available

Business data

Order number	AD-STV 810 GS

Technical specifications

Transmitter supply	
Feeding voltage	24 ... 20 V (4 ... 20 mA)
Current limit	< 30 mA
Input current	
Measuring range	0 ... 20 mA [1]
Input resistance	25 Ohm
Input voltage	
Measuring range	0 ... 10 V [1]
Input resistance	100 kOhm (10 kOhm / Volt)
Output current	
Output range	-20 ... 20 mA [1]
Max. burden	500 Ohm
Max. residual ripple	40 µAss
Output voltage	
Output range	-10 ... 10 V [1]
Min. burden	1 kOhm
Max. residual ripple	20 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Input power AC/DC	4,4 VA / 2,4 W
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	100 ppm/K
Frequency range	0...20 kHz (-3dB)
Housing	
Dimensions (WxHxD)	23x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Supply Isolation Amplifier

AD-STV 810 GS

Technical specifications

EMC

Product family standard	EN 61326-1 [2]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

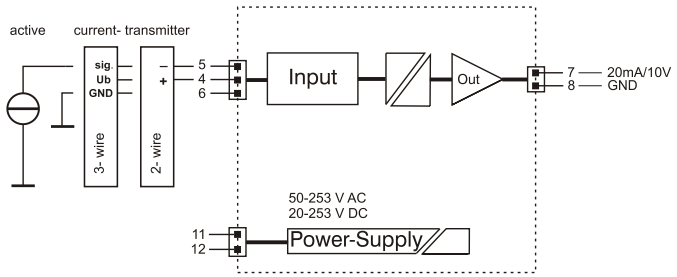
Input / output	3,75 kV, 50 Hz (1 min.)
Signal / supply unit	3,3 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Output	electrical surge protection
Power supply	Protection against overvoltage reverse polarity

1) Values must be adviced by order.
2) During checking, slight signal deviations are possible.

Block and wiring diagram



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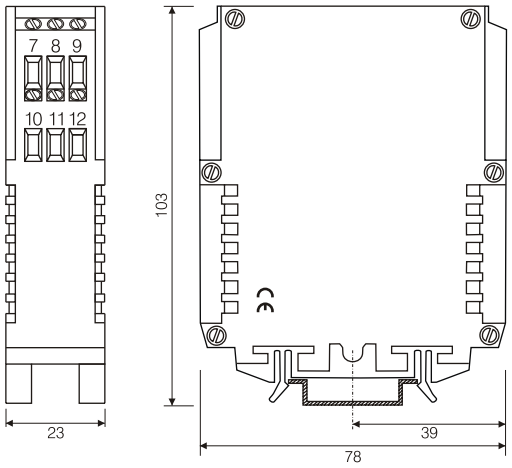

AC Isolation Converter

Current-transformer-transmitter

AD-SWT 50 SO
AD-SWT 100 SO
AD-SWT 200 SO

Description

The SWT series of devices (AD-SWT 50 SO, AD-SWT 100 SO and AD-SWT 200 SO) serves the measuring of large sinusoidal currents and simultaneous conversion to 4...20 mA transmitter signal. The devices are designed in two-wire technology and can be operated in a wide range of voltages. Dependent on the amount of the primary current, the devices sink a proportional 4...20 mA signal from the connected supply voltage. Due to the integral protection against polarization error and over-voltage, the transmitter are also protected against erroneous applications or transient over-voltages. The housing is designed in external clamp-on transformer format and therefore can be easily integrated into existing units.

Application

Measurings of large sinusoidal alternating currents, which, for instance, correspond to motor currents, pump currents or generator currents.

Attention: when fitting, it must be ensured that the ferrite surfaces of the SWT are free from dirt or fat residues through contact. Otherwise measuring value deviations or even error measurings are possible.

Specific characteristics

- Clamp-on transformer technology
- Extended supply voltage range
- 4 ... 20 mA transmitter signal
- Easy installation

Business data

Order number	
AD-SWT 50 SO	50 A AC Primärstrom
AD-SWT 100 SO	100 A AC Primärstrom
AD-SWT 200 SO	200 A AC Primärstrom
Accessory	
DIN rail holder	35 mm Normschiene

Technical specifications

Primary current	
Measurement method	inductive
Measuring range	0 ... 50/100/200 A AC
Max. conductor diameter	23 mm
Transmitter output	
Output range	4 ... 20 mA
Residual ripple	50 µAss
Transmitter-supply	
Voltage range DC	10 ... 30 V DC
Nominal voltage DC	24 V DC
Transmission behaviour	
Basic accuracy	< 1 %
Temperature influence	100 ppm/K
Response time	< 2 s (10...90 %)
Housing	
Dimensions (WxHxD)	50x42x82 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	1,5 mm² flex wire / 2,5 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 200 g
Manner of fastening	Folding transducer housing
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	61010-2-030
Measurement category	CAT III
Galvanic isolation, test voltages	
Input / output	4 kV, 50 Hz (1 min.)
Protection circuits	
Output	electrical surge and reverse current protection

[1] During checking, slight signal deviations are possible.

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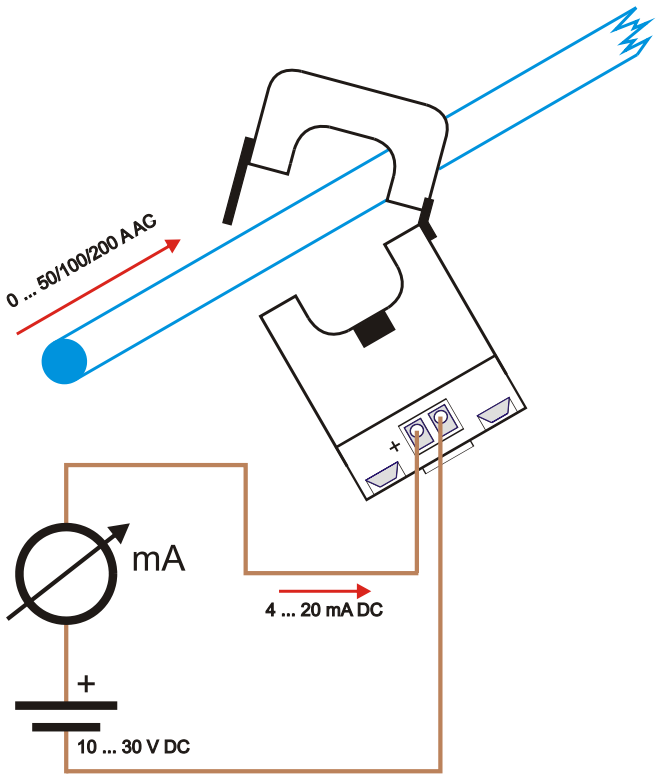
AC Isolation Converter

Current-transformer-transmitter

AD-SWT 50 SO
AD-SWT 100 SO
AD-SWT 200 SO

Block and wiring diagram



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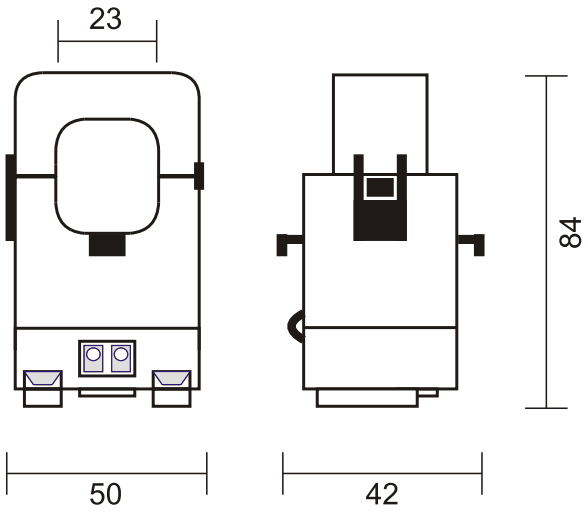

AC Isolation Converter

Current Transformer Transmitter TRMS

AD-SWT 50 SO-TRMS
AD-SWT 100 SO-TRMS
AD-SWT 200 SO

Description

The SWT-TRMS series of devices (AD-SWT 50 SO-TRMS, AD-SWT 100 SO-TRMS and AD-SWT 200 SO-TRMS) serves the measuring of large AC currents and simultaneous conversion to 4...20 mA transmitter signal. Because of the RMS measurement, the current consumption of non-linear consumers can be measured. Even strong distortions of the sinusoidal signal are easily measurable through the high sampling rate. The devices are designed in two-wire technology and can be operated in a wide range of voltages. Dependent on the amount of the primary current, the devices sink a proportional 4...20 mA signal from the connected supply voltage. Due to the integral protection against polarization error and over-voltage, the transmitter are also protected against erroneous applications or transient over-voltages. The housing is designed in external clamp-on transformer format and therefore can be easily integrated into existing units.

Application

Measurement of large alternating currents, of linear or non-linear loads.

Attention: when fitting, it must be ensured that the ferrite surfaces of the SWT are free from dirt or fat residues through contact. Otherwise measuring value deviations or even error measurings are possible.

Specific characteristics

- Clamp-on transformer technology
- TRMS measurement
- Extended supply voltage range
- 4 ... 20 mA transmitter signal
- Easy installation

Business data

Order number

AD-SWT 50 SO-TRMS	50 A AC primary current
AD-SWT 100 SO-TRMS	100 A AC primary current
AD-SWT 200 SO-TRMS	200 A AC primary current

Accessory

DIN rail holder	35 mm DIN rail 35mm

Technical specifications

Primary current

Measurement method	inductive
Sample rate	1 kHz (20 measurements / mains period)
Max. measurable harmonic	10 (500 Hz)
Calculation method	root mean square TRMS
Short-term overload (1 s)	twenty times of the nominal value
Permanent overload (24 h)	120 % of the nominal value
Measuring range	0 ... 50/100/200 A AC (50 Hz)
Max. conductor diameter	23 mm

Transmitter output

Output range	4 ... 20 mA
Residual ripple	30 µAss

Transmitter-supply

Voltage range DC	10 ... 30 V DC
Nominal voltage DC	24 V DC

Transmission behaviour

Basic accuracy	< 0,5 % (at fundamental 50 Hz)
Temperature influence	100 ppm/K
Response time	< 1 s (10...90 %)

Housing

Dimensions (WxHxD)	50x42x82 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	1,5 mm² flex wire / 2,5 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 200 g
Manner of fastening	Folding transducer housing

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Input / output	4 kV, 50 Hz (1 min.) + insulation of the primary wire

Protection circuits

Output	electrical surge and reverse current protection

[1] During checking, slight signal deviations are possible.

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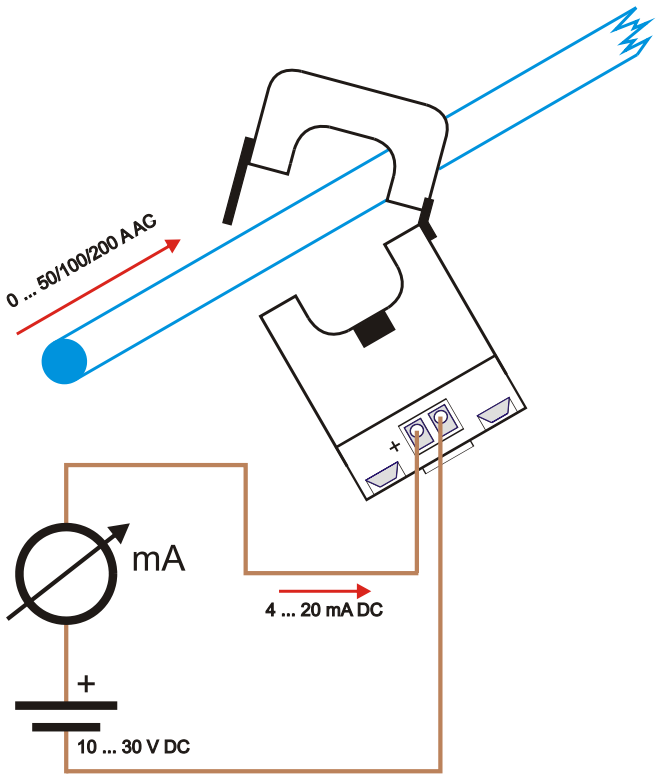
AC Isolation Converter

Current Transformer Transmitter TRMS

AD-SWT 50 SO-TRMS
AD-SWT 100 SO-TRMS
AD-SWT 200 SO

Block and wiring diagram



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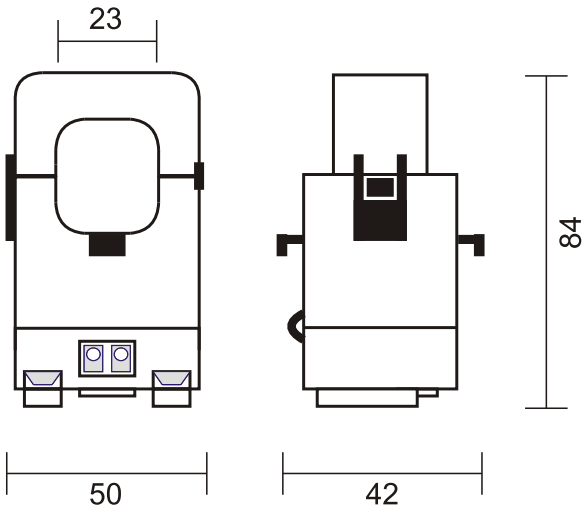

AC Isolation Amplifier

AD-TV 515 GS

Description

The isolation amplifier AD-TV 515 GS serve as registry of sine wave alternating currents of sizes 0-1A AC and 0-5A AC. The alternating current is galvanically separated and converted to an impressed OC-standard signal. The alternating currents (1 A or 5 A) are supplied to the unit via high current connectors, external shunts are therefore obsolete. For the measurement of larger currents, current transformers can be connected at any time. The output signals are amplified and are independent of the connected load up to a maximum value. The signals can be adapted to the application via a frontal trimmer.

Application

Adaptation of current transformer signals (1A AC or 5A AC) to DC standard signals by simultaneous galvanic isolation and amplification.

Specific characteristics

- 1A AC current-input
- 5A AC current-input
- nominal-signal-output (0/4...20 mA or 0/2...10 V)
- zero- and span-trimmer
- Allpower power supply

Business data

Order number	AD-TV 515 GS

Technical specifications

Input

Measuring range	0 ... 1 A AC / 0 ... 5 A AC
Input frequency	40 ... 60 Hz (sinusoidal)
Short-term overload (1 s)	twenty times of the nominal value
Permanent overload (24 h)	120 % of the rated value

Output current

Max. output range	0/4 ... 20 mA [1)]
Max. burden	400 Ohm
Residual ripple	50 µAss

Output voltage

Max. output range	0 .. 10 V [1)]
Min. burden	1 kOhm
Residual ripple	30 mVss

Transmission behaviour

Linearity error	max. 0,5 % of full scale
Rise time (10 ... 90%)	ca. 2 s
Temperature influence	+/- 100 ppm/K

Supply

Supply voltage	20 ... 253 V DC / 50 ... 253 V AC
Max. power consumption	1,7 W / 3,5 VA

Housing

Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Bolting torque screw terminals	0,5 Nm
Weight	ca. 110 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 60 °C

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Elevation	max. 2000 m
Safety measurement	EN 61010-2-030
Measurement category	CAT III
Max. permanent working voltage	300 V AC

Galvanic isolation, test voltages

Input/output	4 kV (1 min)
Input/power-supply	4 kV (1 min)
Output/power-supply	3 kV (1 min)

[1)] Values must be advised by order

[2)] During electromagnetic disturbance minor changes in output signal are possible.

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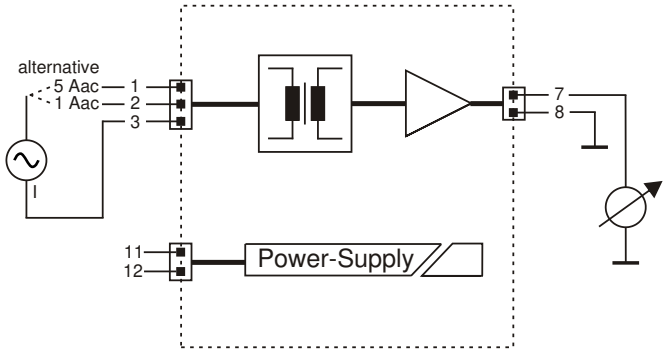
AC Isolation Amplifier

AD-TV 515 GS

Block and wiring diagram



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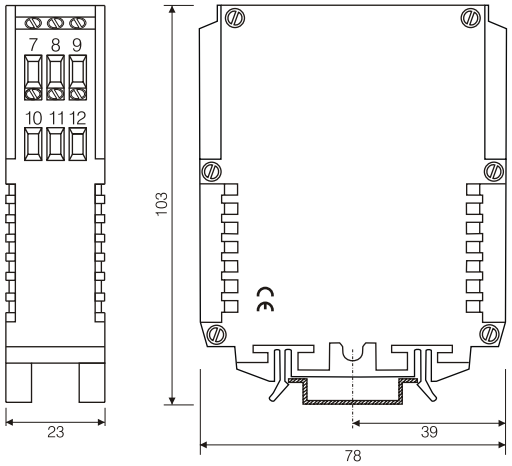

AC Isolation Amplifier

AD-TV 561 GS

Description

The isolation amplified AD-TV 561 GS converts sinus wave alternating voltages to analogue, optionally according to the effective values, output signals in up to three independent channels. With the measuring principle of real effective value measuring, distorted alternating signals can also be accurately captured. Input, output, the supply voltage and the channels amongst each other are galvanically isolated from each other. The output signals are independent of the connected load up to a maximum value.

Application

Capturing, galvanic isolation, conversion and amplification of alternating voltages in analogue signals. Optional effective value conversion, adaptation and amplification of output signals of voltage converters.

Business data

Order number	AD-TV 561 GS

Technical specifications

Input

Mess. range min/max	0 ... 30 V AC / 0 ... 600 V AC [1]
Input frequency	50 ... 60 Hz, Sinus Grundschwingung
Input resistance	1 kOhm / V input voltage

Output current

Max. output range	0/4 ... 20 mA [1]
Max. burden	500 Ohm

Output voltage

Max. output range	0 .. 10 V [1]
Min. burden	1 kOhm

Transmission behaviour

Linearity error	0,3 % from the final value at fundamental
Rise time (10...90%)	700 ms
Temperature influence	+/- 100 ppm/K
Ripple current	max. 50 µAss
Ripple voltage	max. 100 mVss

Supply

Supply voltage	20 ... 253 V DC / 50 ... 253 V AC
Max. power consumption	1 W / 2,1 VA

Housing

Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Bolting torque screw terminals	0,5 Nm
Weight	ca. 110 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 60 °C

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Input/output	4 kV (1 min)
Input/power-supply	4 kV (1 min)
Output/power-supply	3 kV (1 min)

[1] Values must be advised by order

[2] During electromagnetic disturbance minor changes in output signal are possible.

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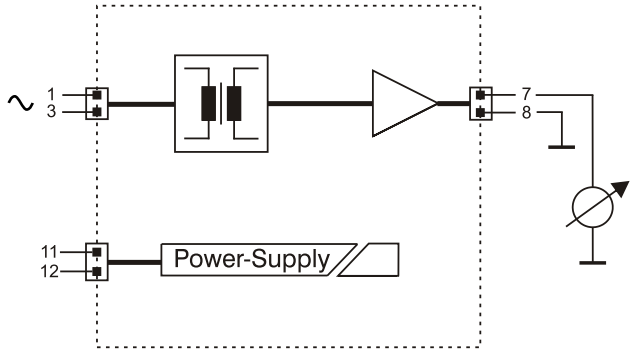
AC Isolation Amplifier

AD-TV 561 GS

Block and wiring diagram



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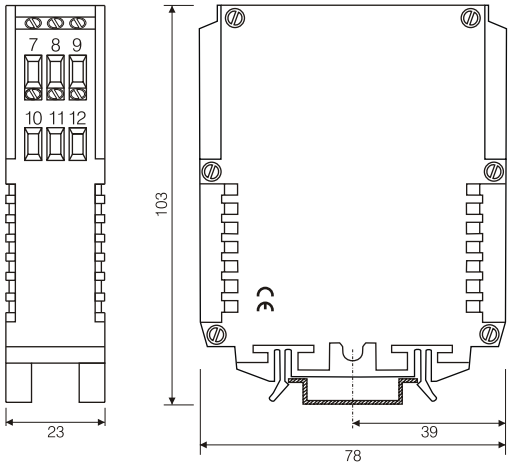

AC Isolation Amplifier

AD-TV 581 GS

Description

The alternating current isolation amplifier AD-TV 581 GS detects the true RMS value of an alternating current. The input variable 0-1A AC or 0-5A AC is here freely selectable via terminal. The alternating current is galvanic separated and transformed into an impressed DC standard signal 0/4-20 mA or 0/2-10 VDC. The zero point and the range of the measuring signal can be adjusted with trimmers at the front. The trimmers can be activated via a wire bridge. The start of the output range can be modified via a wire bridge from 0 to 4mA or from 0 to 2V, exceeding the measuring range or falling below the measuring range is indicated with a flashing LED at the front of the device. The device can be configured with a PC software via the interface on the front interface.

Application

Freely configurable transformation of AC current signals to DC standard signals, with simultaneous galvanic separation.

Specific characteristics

- true-rms
- zero point trimmer and final value trimmer can be switched on
- programming via optional AD-Studio Configuration software possible

Business data

Order number	AD-TV 581 GS

Technical specifications

Input current	
Measuring range	0 ... 1 A AC / 0 ... 5 A AC [1]
Input frequency	40 ... 400 Hz
Overload temporary	+ 100 % (3 s)
Overload permanent	+ 50 %
Output current	
Max. output range	0 ... 20 mA [1]
Max. burden	500 Ohm
Output voltage	
Max. output range	0 .. 10 V [1]
Min. burden	10 kOhm
Transmission behaviour	
Trim range	+/-20 % [1]
Linearity error	0,5 % of full scale
Measuring time	20 ms (1 Period)
Rise time (90%)	200 ms (min. 60 ms) [3]
Response time	220 ms (min. 80 ms) [3]
Temperature influence	+/- 100 ppm/K
Supply	
Supply voltage	20 ... 253 V DC / 50 ... 253 V AC
Max. power consumption	1,2 W / 2,2 VA
Housing	
Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Bolting torque screw terminals	0,5 Nm
Weight	ca. 110 g
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 60 °C
EMC	
Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III
Galvanic isolation, test voltages	
Input/output	4 kV (1 min)
Input/power-supply	4 kV (1 min)
Output/power-supply	3 kV (1 min)

[1] Different values must be advised by order

[2] During electromagnetic disturbance minor changes in output signal are possible.

[3] Filter 5 (Filter 0).

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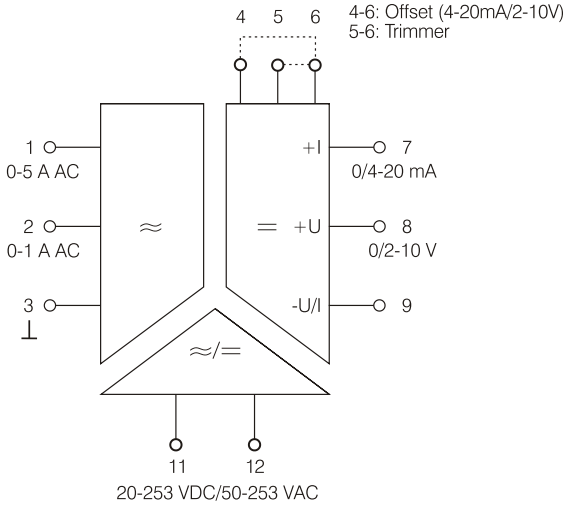
AC Isolation Amplifier

AD-TV 581 GS

Block and wiring diagram



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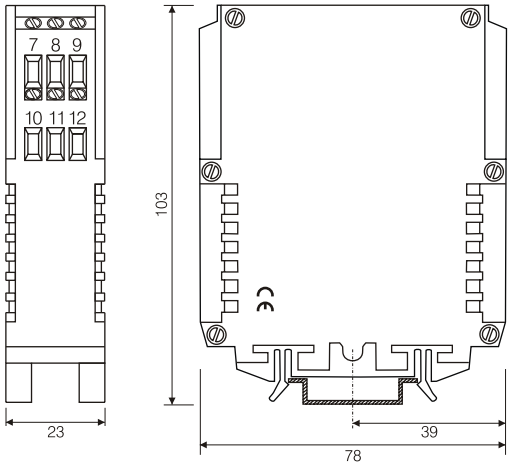

AC Isolation Amplifier

AD-TV 591 GS

Description

The alternating voltage isolation amplifier AD-TV 591 GS detects the true RMS value of an alternating voltage. The input variable 0-250V AC or 0-450V AC is here freely selectable via terminal. The alternating voltage is galvanic separated and transformed into an impressed DC standard signal 0/4-20 mA or 0/2-10 VDC. The zero point and the range of the measuring signal can be adjusted with trimmers at the front. The trimmers can be activated via a wire bridge. The start of the output range can be modified via a wire bridge from 0 to 4mA or from 0 to 2V, exceeding the measuring range or falling below the measuring range is indicated with a flashing LED at the front of the device. The device can be configured with a PC software via the interface on the front interface.

Application

Freely configurable transformation of AC voltage signals to DC standard signals, with simultaneous galvanic separation.

Specific characteristics

- true-rms
- zero point trimmer and final value trimmer can be switched on
- programming via optional AD-Studio Configuration software possible

Business data

Order number	AD-TV 591 GS

Technical specifications

Input voltage	
Measuring range	0 ... 250 V AC / 0 ... 450 V AC [1]
Input frequency	40 ... 400 Hz
Output current	
Max. output range	0 ... 20 mA [1]
Max. burden	500 Ohm
Output voltage	
Max. output range	0 .. 10 V [1]
Min. burden	10 kOhm
Transmission behaviour	
Trim range	+/-20 % [1]
Linearity error	0,5 % of full scale
Measuring time	20 ms (1 Period)
Rise time (90%)	200 ms (min. 60 ms) [3]
Response time	220 ms (min. 80 ms) [3]
Temperature influence	+/- 100 ppm/K
Supply	
Supply voltage	20 ... 253 V DC / 50 ... 253 V AC
Max. power consumption	1,2 W / 2,2 VA
Housing	
Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Bolting torque screw terminals	0,5 Nm
Weight	ca. 120 g
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 60 °C
EMC	
Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III
Galvanic isolation, test voltages	
Input/output	4 kV (1 min)
Input/power-supply	4 kV (1 min)
Output/power-supply	3 kV (1 min)

[1] Different values must be advised by order

[2] During electromagnetic disturbance minor changes in output signal are possible.

[3] Filter 5 (Filter 0).

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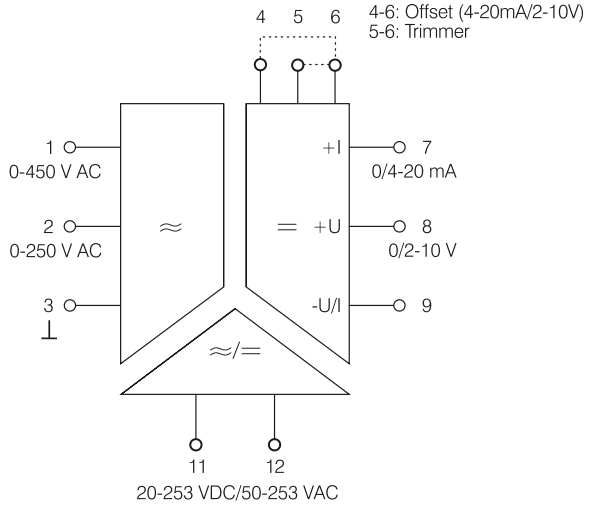
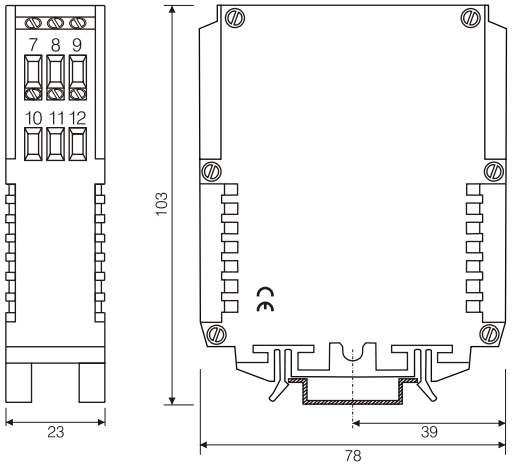
AC Isolation Amplifier

AD-TV 591 GS

Block and wiring diagram



Dimensions



AC Isolation Amplifier

AC-Isolation Amplifier/Limit Switch

AD-TV 588 GVD

Description

The AD-TV 588 GVD is used for measuring the rms value of alternating current via a built-in current transformer up to 5A or via an external clamp on / split core current transformer up to 600A. The detected current is outputted as a galvanically isolated standard current signal in the range 0 to 20 mA and as a standard voltage signal in the range 0 to 10 volts. An additional relay output can indicate a limit value or a window. All parameters such as range, output range, relay functions, limiting values, etc. can be freely set via the configuration software.

Application

Measuring the current of single-phase loads up to 600A. Monitoring of current consumption to certain limits with hysteresis threshold by limit function. Monitoring a certain range of the current consumption by window function.

Specific characteristics

- Detection of the rms value of alternating currents up to 600A
- Current and voltage output can be used simultaneously
- Relay output, NO
- Wide range power supply. Supply with 24V DC or 230V AC available
- External clamp on/split core current transformers as accessory available
- Configuration information, such as limits, input current, etc. can be adjusted by the customer via configuration software or be specified when ordering
- Operating module as an accessory

Business data

Order number	
AC Isolation Amplifier	AD-TV 588 GVD
Accessory (optional)	
Split core current transformer	AD-KSW 5/50/100/200/400/600 A AC
Display/control module	AD-VarioControl, VarioConnect
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current directly	
Measuring range 1 A	0 ... 1 A AC
Measuring range 5 A	0 ... 5 A AC
Remark	DO NOT CONFUSE THE INPUT OF THE CLAMP ON CURRENT TRANSFORMER.
Current input via Clamp on Current Transformer	
Measuring range, Re, Terminals	0 ... 1,66 mA AC, 200 Ohm, 5/6
Measuring range, Re, Terminals	0 ... 16,6 mA AC, 20 Ohm, 6/7
Measuring range, Re, Terminals	0 ... 33,3 mA AC, 10 Ohm, 7/8 (alle AD-KSW XXX)
Measuring range, Re, Terminals	0 ... 66,6 mA AC, 5 Ohm, 8/1
All current inputs	
Rated frequency	50 Hz
Frequency range	40 ... 400 Hz
Sampling	2 kHz
All signal outputs	
Simultaneous use	Yes. Minus (terminals 10/12) may not be connected.
Bit width D/A converter (PWM)	11 Bit
Output current	
Maximum output range	0 ... 20 mA
Resolution	~10 uA
Max. burden	500 Ohm
Output voltage	
Maximum output range	0 ... 10 V
Resolution	~5 mV
Min. burden	1 kOhm
Relay output	
Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	closing contact
Switching operations mechanical	10.000.000
At 230V/2A AC, cos(phi)=1	600.000
At 230V/2A AC, cos(phi)=0,4	200.000
At 24V/1 A DC	200.000
Transmission behaviour	
Maximum linearity error	0,5 % of full scale
Rise time 0..90%	200 ms
Temperature influence	+/- 100 ppm/K
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	3 VA / 1,5 W

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AC Isolation Amplifier

AC-Isolation Amplifier/Limit Switch

AD-TV 588 GVD

Technical specifications

Housing

Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Bolting torque screw terminals	0,5 Nm
Weight	~120 g

Environmental conditions

Operation	-10 ... 50 °C
Storage, transport	-10 ... 60 °C

EMC

Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1

Galvanic isolation, test voltages

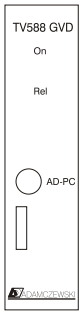
Input/output	4 kV, 1 min
Input, output/supply	4 kV, 1 min

Notifications

Operation	green LED. Blinks when signal outside range
Relay	red LED. Lit when relay is energized

[1)]During electromagnetic disturbance minor changes in output signal are possible.

Display and operating elements

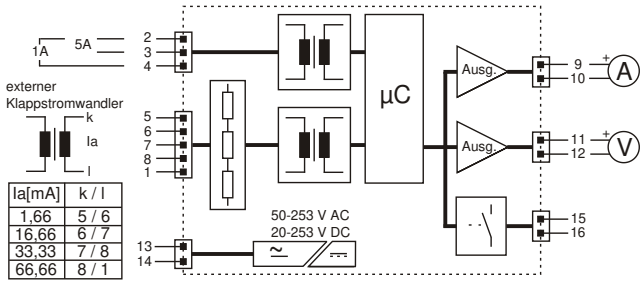


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits
Rel: LED for relay in red
on - relay activated

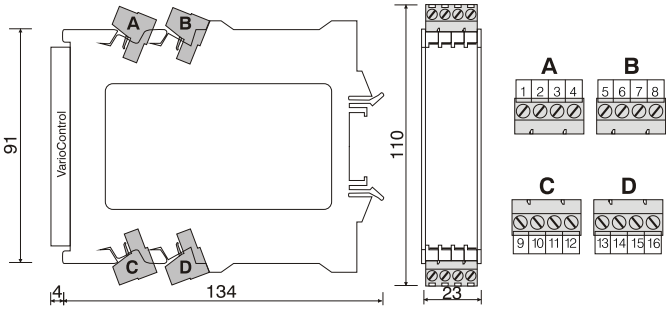
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus/RTU Communication

The optional AD-VarioConnect operating module is required for communication via Modbus/RTU. It has an RS-485 interface. The data format is 19200,e,8,1. The slave address is 1. These settings can be changed using the AD-VarioConnect operating module. The following data can be communicated.

Start address	Number of registers	Name	Unit	Data type	read	write
40701	2	Scaled input	A AC	float	1	0
40801	2	Output signal current	mA	float	1	1
40803	2	Output signal voltage	V	float	1	1

Use of the Adamczewski AD-KSW XXX folding current transformers

All AD-KSW XXX folding current transformers provide an output current of 33.33 mA regardless of the input current. Therefore, when using these transformers, ALWAYS use input terminals 7/8.

Power Measurement

Split Core Current Transformer

AD-KSW xx SO

Description

With the clamp on current transformers AD-KSW50, AD-KSW100, AD-KSW200, AD-KSW400 and AD-KSW600 high currents can be measured without contact in connection with the power measurement devices from the Adamczewski GmbH. There are transformers for the range up to 600 A AC available. By their small size they can be easily mounted on the current carrying conductors and can therefore be mounted easily to existing systems without disconnecting the main cable. The secondary side mA-currents are not critical and can be wired over several meters. By the internal voltage limitation there are no high voltages on the secondary side possible.

Application

Measurement of high currents, power or energy in plants or buildings in connection with the measurement technology from the Adamczewski GmbH.

Specific characteristics

- non-contact measurement of high currents
- no disconnection of the main cable during installation
- uncritical mA-signals at the secondary side of the transformer

Business data

Order number

AD-KSW 50 SO	50 A AC primary current
AD-KSW 100 SO	100 A AC primary current
AD-KSW 200 SO	200 A AC primary current
AD-KSW 400 SO	400 A AC primary current
AD-KSW 600 SO	600 A AC primary current

Power measurement transducer

AD-LU 25 GT	power measurement transducer

Compatible transducer

AD-LU 35 GT	power measurement transducer
AD-LU 55 GT	power measurement transducer
AD-LU 680 GA	power measurement transducer

Technical specifications

Max. primary conductor diameter

AD-KSW50	23 mm
AD-KSW100	23 mm
AD-KSW200	23 mm
AD-KSW400	35 mm
AD-KSW600	35 mm

Primary current

AD-KSW50	0 ... 50 A AC
AD-KSW100	0 ... 100 A AC
AD-KSW200	0 ... 200 A AC
AD-KSW400	0 ... 400 A AC
AD-KSW600	0 ... 600 A AC

Secondary current

All transformer types	0 ... 33 mA AC

Nominal load

All transformer types	7 Ohm

Dimension

AD-KSW50	34,4 x 45 x 65,5 mm
AD-KSW100	34,4 x 45 x 65,5 mm
AD-KSW200	34,4 x 45 x 65,5 mm
AD-KSW400	38,4 x 57 x 81,5 mm
AD-KSW600	38,4 x 57 x 81,5 mm

Weight

AD-KSW50	ca. 180 g
AD-KSW100	ca. 180 g
AD-KSW200	ca. 180 g
AD-KSW400	ca. 350 g
AD-KSW600	ca. 350 g

Accuracy

All transformer types	< 0,5 %

Phase error

All transformer types	1° (primary to secondary)

Secundary wires

Connections	white: k, black: l
Cable length	ca. 50 cm

Frequency range

All transformer types	50 ... 400 Hz

Rated frequency

All transformer types	50 / 60 Hz

Isolation-voltage

All transformer types	2500 V AC (1 min) + cable insulation

Environmental conditions

Operation	-10 ... 60 °C
Storage and transport	-20 ... 70 °C (no condensation)

Certifications

All transformer types	CE, UL, RoHS

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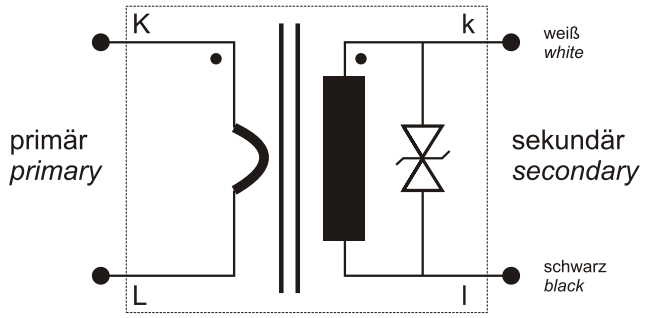
Split Core Current Transformer

AD-KSW xx SO

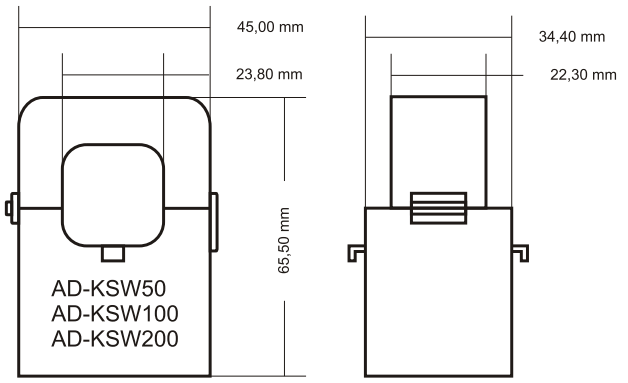
Block and wiring diagram

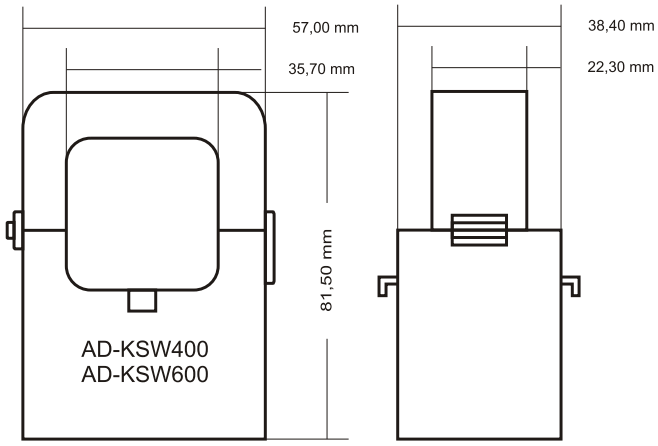


Bitte Montagerichtung beachten
K: Netzseite / Quelle
L: Verbraucherseite / Last

Please note the mounting direction
K: network side / Source
L: consumer side / load

Dimensions





Power Measurement

AD-HSH 50 WG
AD-HSH 100 WG
AD-HSH 200 WG

Description

With the AD-HSH xxx WG it is possible to mount three Adamczewski split-core current transformers AD-KSW 50 WG, AD-KSW 100 WG or AD-KSW 200 WG together on the DIN rail. The output currents (max 33.33 mA) are provided via terminals. The AD-HSH-S is supplied fully assembled, therefore the size of the folding current transformer must be specified when ordering.

Application

Mounting of split-core current transformers on the DIN rail.

Business data

Order number	AD-HSH 50 WG;AD-HSH 100 WG;AD-HSH 200 WG

Technical specifications

Housing

Dimensions (WxHxD)	134,9x77x91 mm
Type of protection	IP 20
Connection method	spring clamp terminals
Terminals, wire cross section	1,5 mm² flex wire / 2,5 mm² one wire
Weight	~ 520 g (incl. split-core transformers)
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 60 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Elevation	max. 2000 m
Safety measurement	61010-2-030
Measurement category	CAT III
Max. permanent working voltage	300 VAC

Galvanic isolation, test voltages

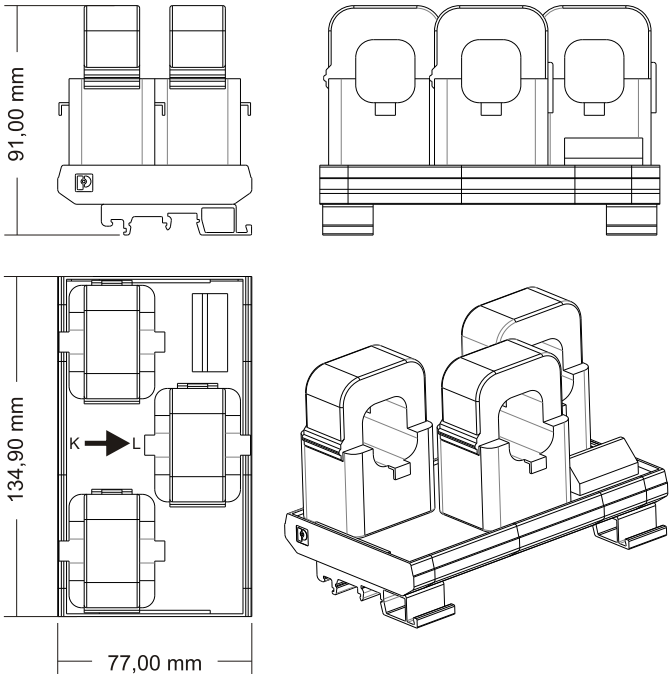
Input / output	2500 V AC (1 min) + cable insulation

Protection circuits

Output	internal voltage limitation with open secondary lines

[1] During checking, slight signal deviations are possible.

Dimensions



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Current Transformer

AD-SW 3 GL (3-channel)

Description

With the current converter AD-SW 3 GL up to three independent current magnitudes can be converted to a DC voltage of ±0-10 V. The amplitude value (sinus) or the true effective value (True RMS) can be presented.

Inputs, outputs and supply voltage are galvanically separated from each other with high insulation. The outputs refer to a common mass. An integral electronic wide range power pack with high efficiency prevents strong increase in heat.

Application

For conversion of up to 3 AC currents to an amplitude linear or effective value relevant voltage.

Technical data

construction type	switchboard housing
power-supply	ALLPOWER 20-253V AC/DC internal galvanical separated
power consumption	approx. 2 VA resp. 1 W
input	3x current AC (max. 10A) as bar-type transformer
input overload	(IEC 688) 20 x I_{nenn} to 1sec., 125% I_{nenn} continual
output	3x 0-10V, common mass input following or RMS limited to 11V
output load	min. 2 kOhm each channel
band width	approx. 2 kHz
linearity error	< 0,5%
effect of temperature	< 0,003%
insulation test voltage	input/output: 8 kV RMS signal/power-supply: 4 kV RMS
protection systems	input/output: against over-voltage confusing the poles, over-current power-supply: against over-current, over-voltage, over-temperature
CE-conformity	EN 50081-2; EN 50082-2
ambient-temperature	0..+50°C

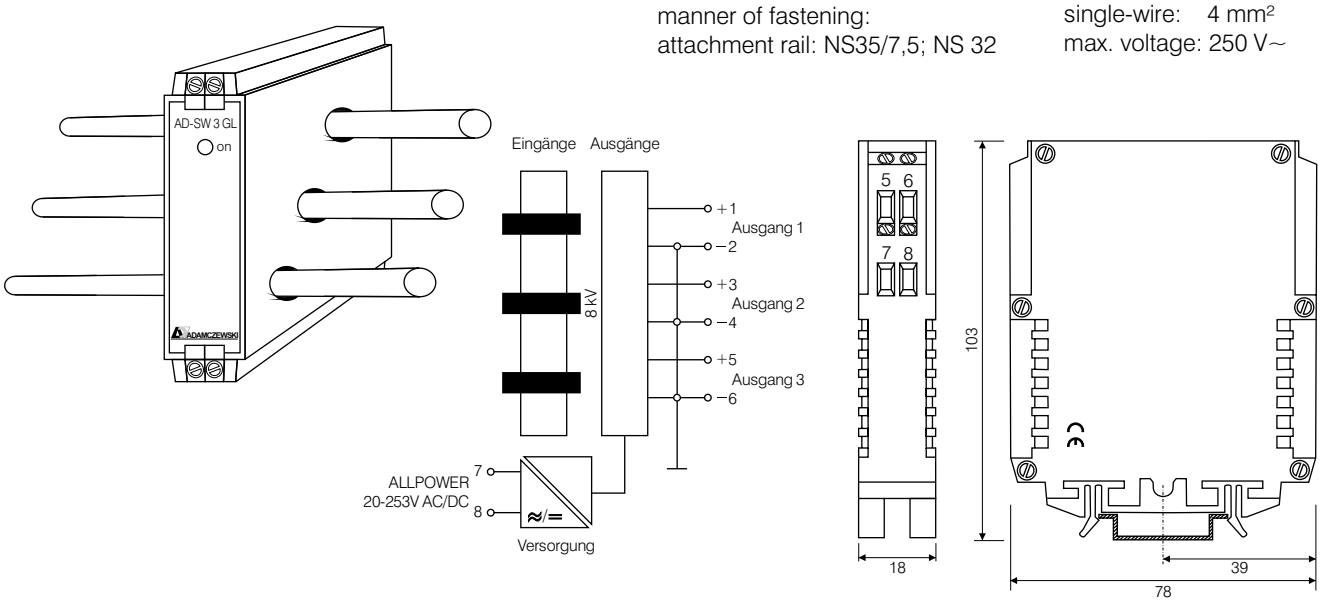
(*) values must be defined by order

Connections and dimensions: AD-SW 3 GL

Input 3x current AC (max. 10A) as bar-type transformer
Output 3x voltage (max. 10V)

weight 160 g
protection: IP 20
manner of fastening:
attachment rail: NS35/7,5; NS 32

connection data:
fine-wire: 2,5 mm²
single-wire: 4 mm²
max. voltage: 250 V~



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AC Isolation Amplifier

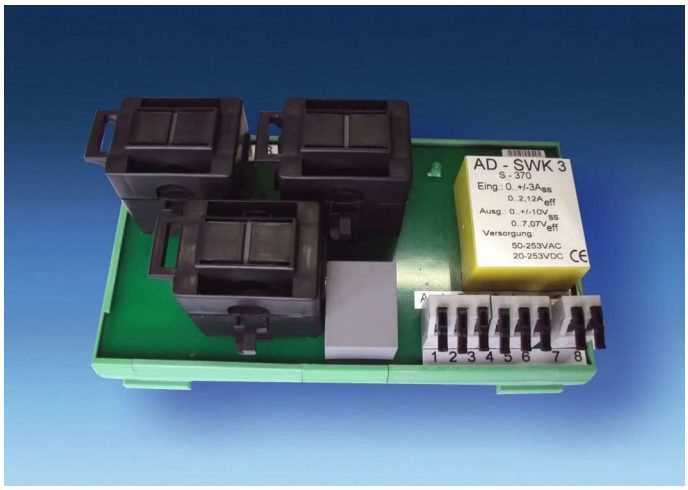
AD-SWK 3 WG

Description

With the current converter AD-SWK 3 WG up to three independent alternating current magnitudes can be converted to three alternating voltage of ±0-10 V. The frequency-response curve at the output is equivalent to input. Inputs, outputs and supply voltage are galvanically separated from each other with high insulation. The outputs refer to a common mass. An integral electronic wide range power pack with high efficiency prevents strong increase in heat.

Application

For conversion of up to three alternating currents to three alternating voltage



Business data

Order number	AD-SWK 3 WG

Technical specifications

Input

Measuring range	0 ... 5A AC (max. 0 ... 10 A AC)
Max. measurable harmonic	80 (4 kHz)
Ct size (inside diameter)	<8 mm
Permanent overload	120 % of the rated value
Temporary overload (1s)	rated value x 20

Output

Output range	0 ... 7,07 V AC (10 V amplitude)
Min. burden	10 kOhm

Accuracy

Unit	<0,5 %
Temperature influence	<100 ppm / K
Phase backfill Input/Output	output 3,6° lagging

Supply

Supply voltage AC	50 ... 253 V AC
Nominal voltage AC	230 V AC
Supply voltage DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	1,8 VA / 0,8 W

Housing

Connection method	spring force terminal
Connection method input	split core current transformer
Manner of fastening	35 mm DIN rail 35mm
Dimensions (WxHxD)	138x80x64(88)mm
Weight	280 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

During checking, slight signal deviations are possible

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	2,2 kV AC + over voltage cable
Signal/auxiliary voltage	3 kV RMS

Protective systems

Input/output	over voltage and over current
Power supply	over voltage, over current and over temperature

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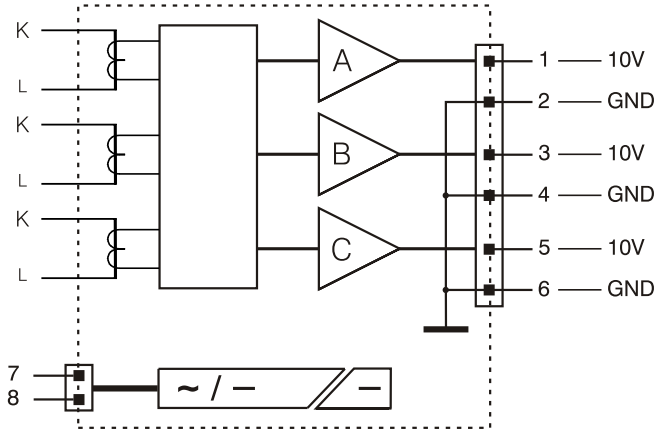
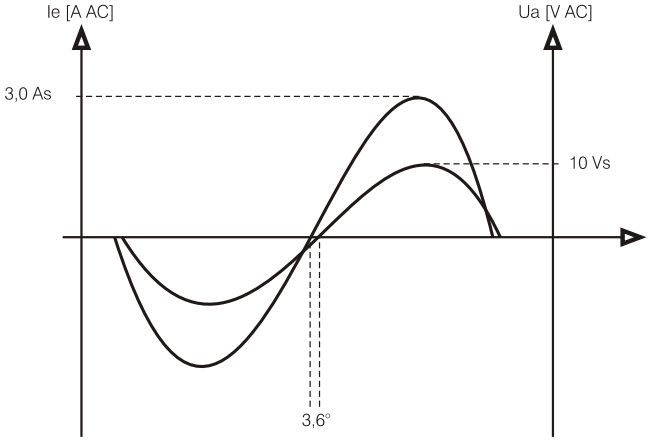
AC Isolation Amplifier

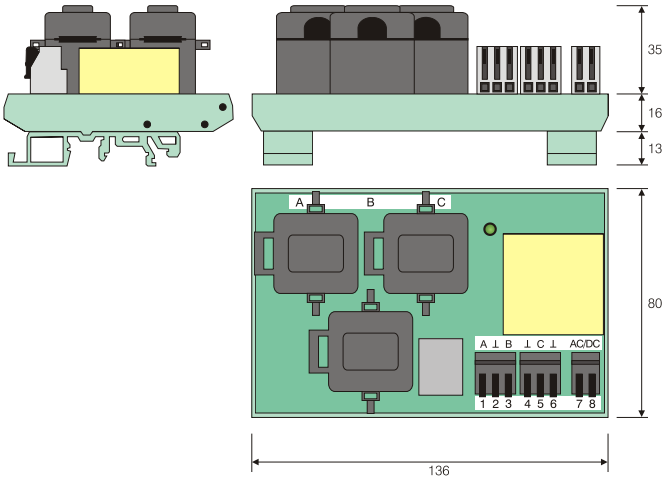
AD-SWK 3 WG

Block and wiring diagram





Dimensions



AC Isolation Amplifier

AD-SWK 6 WG

Description

With the current converter AD-SWK 6 WG up to three independent alternating current magnitudes can be converted to three alternating voltages of 0-10 V. The frequency-response curve at the output is equivalent to input. There are 3 switchable input ranges available. Inputs, outputs and supply voltage are galvanically separated from each other. The outputs refer to a common mass. An integral electronic wide range power pack with high efficiency prevents strong increase in heat.

Application

For conversion of up to three alternating currents to three alternating voltages

Business data

Order number	AD-SWK 6 WG

Technical specifications

Input

Measuring range	0 ...1,5 / 2 / 3 A AC amplitude - switchable
Max. measurable harmonic	80 (4 kHz)
Ct size (inside diameter)	<8 mm
Permanent overload	120 % of the rated value
Temporary overload (1s)	rated value x 20

Output

Output range	0 ... 10 V AC amplitude (7,07 V ACeff)
Min. burden	10 kOhm

Accuracy

Unit	<0,5 %
Temperature influence	<100 ppm / K
Phase backfill Input/Output	output 3,6° lagging

Supply

Supply voltage AC	50 ... 253 V AC
Nominal voltage AC	230 V AC
Supply voltage DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	1,8 VA / 0,8 W

Housing

Connection method input	split core current transformer
Connection method	spring force terminal
Manner of fastening	35 mm DIN rail 35mm
Dimensions (WxHxD)	138x80x64(88)mm
Weight	280 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

During checking, slight signal deviations are possible

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Input/output	2,2 kV AC + Test voltage of the cable of minimum 1000 V
Signal/auxiliary voltage	3 kV RMS
Working voltage	300 V AC/DC

Protective systems

Input/output	over voltage and over current
Power supply	over voltage, over current and over temperature

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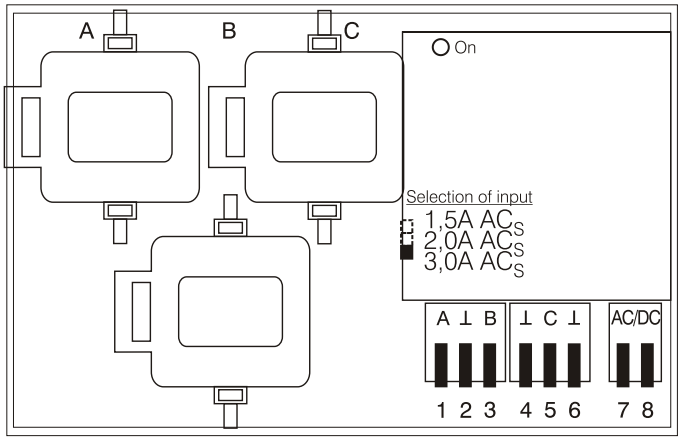
AC Isolation Amplifier

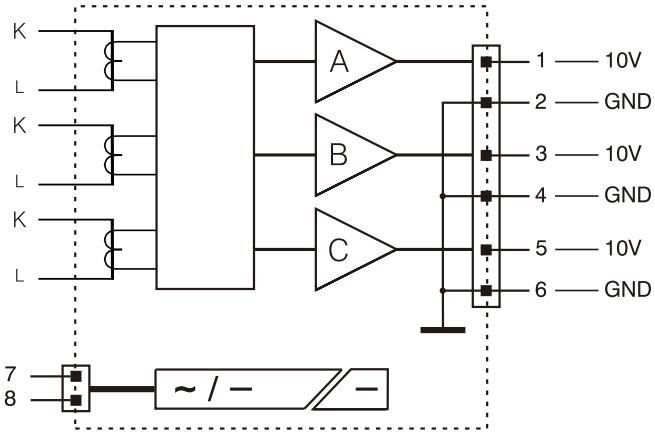
AD-SWK 6 WG

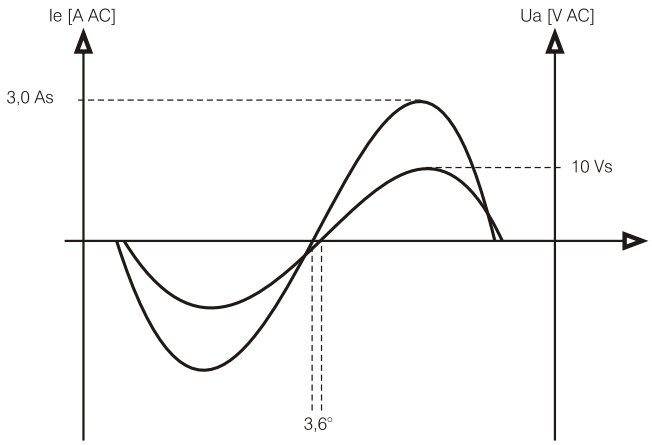
Display and operating elements



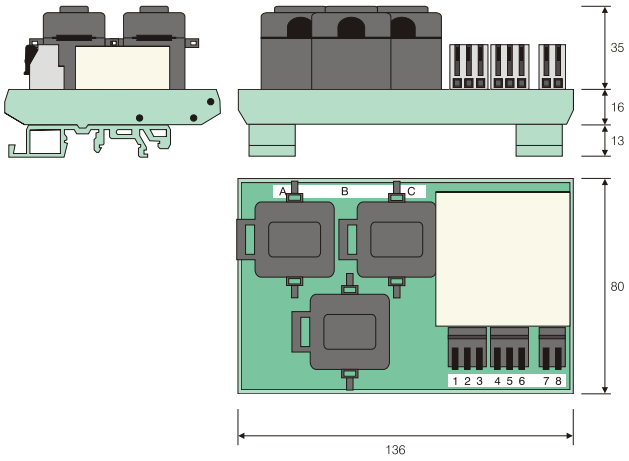
On: LED for operating display in green
Selection of input: Switch for the input ranges

Block and wiring diagram





Dimensions



Isolation Converter

AD-TW 41 GM

AD-TW 41 ST

Description

The separation converter serves the galvanic separation of impressed currents. It obtains its auxiliary energy form the input signal. The connection of an additional auxiliary voltage is not necessary. The output current is independent of the connected load up to the maximum value. The isolating transformer is also available as a TWB variant, which does not interrupt the input current if its output current is interrupted (bypass function).

Application

Economic separation of computer inputs, protection of sensitive units against potential delay, galvanic decoupling in complex measuring units. Optional available FSK-capable (HART® Communications Protocol). Caution: with open output the input becomes high-impedance! To avoid this behavior, the version can be used with bypass.

Business data

Order number	
AD-TW 41 GM	design GM
AD-TWB 41 GM	design GM with Bypass-Function
AD-TWH 41 GM	design GM, FSK-transparency (HART®-Protokoll)
AD-TW 41 ST	design ST
AD-TWB 41 ST	design ST with Bypass-Function

Technical specifications

Input current	
Measuring range	0 ... 20 mA
Input voltage	< 25 V
Voltage drop device	< 2,5 V
Output current	
Output range	0 ... 20 mA
Max. burden	1000 Ohm
Burden error	-0,03% / 100 Ohm
Residual ripple	0,5 % (1000 Ohm; 20 mA)
Transmission behaviour	
Basic accuracy	< 0,2 %
Input / output	1 : 1
Temperature influence	50 ppm/K
Response time	~ 20 ms
Transmission frequency	500 Hz (500 Ohm)
Housing GM	
Dimensions (WxHxD)	15x42,5x102 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 60 g
Manner of fastening	35 mm DIN rail 35mm
Housing ST	
Dimensions (WxHxD)	15x42,5x102 mm
Type of protection	IP 20
Pluggable	
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 50 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Galvanic isolation	
Base isolation, functional separation	
Working voltage	50 VDC
Test voltages input / output	500 V, 50 Hz (1 min.)
Protection circuits	
Input	electrical surge protection
Output	electrical surge protection

[1] During checking, slight signal deviations are possible.

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Isolation Converter

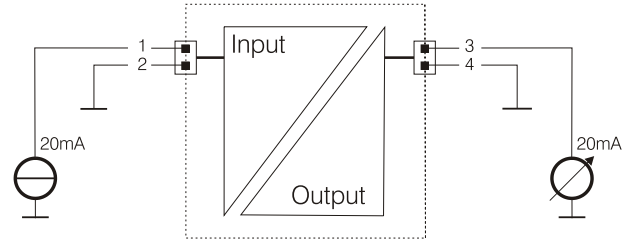
AD-TW 41 GM

AD-TW 41 ST

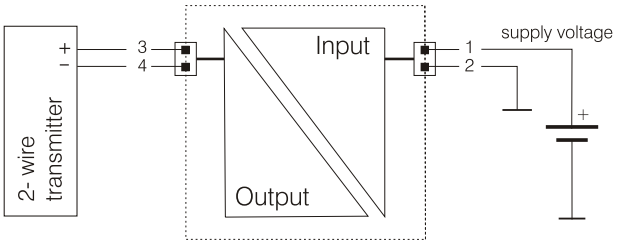
Block and wiring diagram

GM

Isolation of active current signals

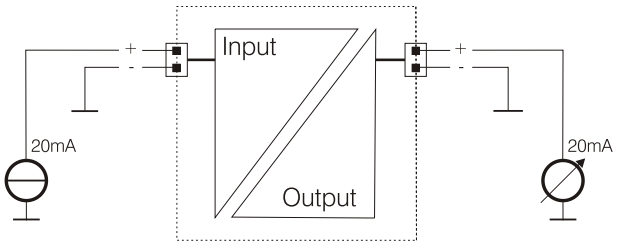


Isolation of transmitter signals

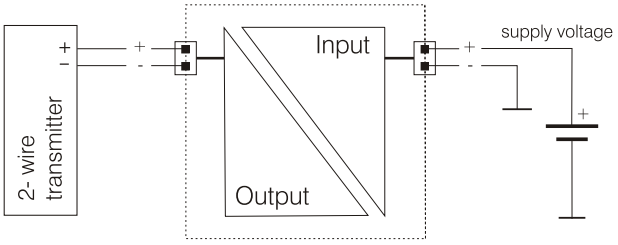


ST

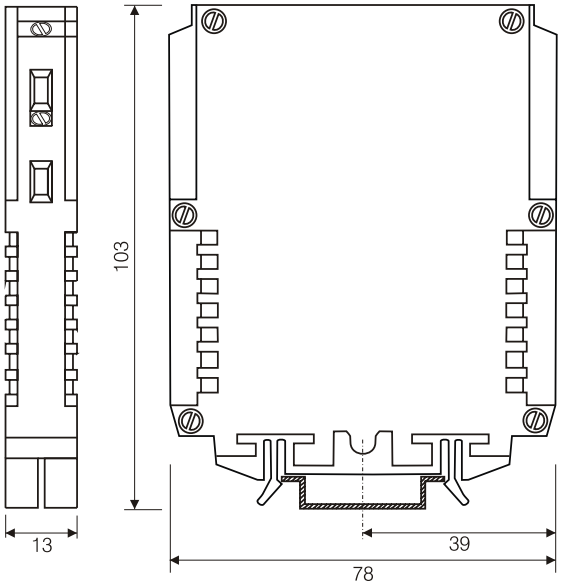
Isolation of active current signals

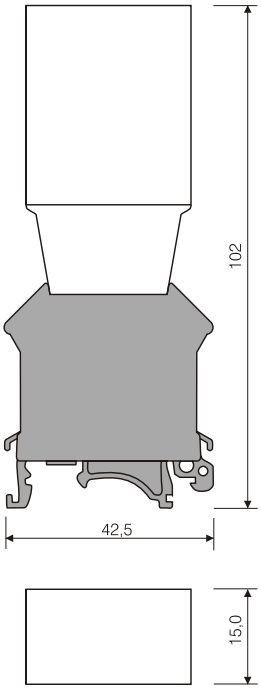


Isolation of transmitter signals



Dimensions





Isolation Converter

AD-TW 201 GS

AD-TW 202 GS

Description

The separation converter serves the galvanic separation of impressed currents. It obtains its auxiliary energy form the input signal. The device is available as a single-channel (AD-TW 201 GS) or dual-channel (AD-TW 202 GS) version. The connection of an additional auxiliary voltage is not necessary. The output current is independent of the connected load up to the maximum value. The isolating transformer is also available as a TWB variant, which does not interrupt the input current if its output current is interrupted (bypass function).

Application

Economic separation of computer inputs, protection of sensitive units against potential delay, galvanic decoupling in complex measuring units.

Business data

Order number

AD-TW 201 GS	one channel
AD-TW 202 GS	two channels
AD-TWB 201 GS	einkanalig mit Bypass
AD-TWB 202 GS	zweikanalig mit Bypass

Technical specifications

Input current

Measuring range	0 ... 20 mA
Input voltage	< 25 V
Drop voltage	< 2,5 V
Oscillation current	< 80 µA

Output current

Output range	0 ... 20 mA
Max. burden	500 Ohm
Burden error	-0,03% / 100 Ohm
Residual ripple	0,5 % (500 Ohm; 20 mA)

Transmission behaviour

Basic accuracy	< 0,3 %
Input / output	1 : 1
Temperature influence	50 ppm/K
Response time	~ 20 ms
Transmission frequency	500 Hz (500 Ohm)

Housing

Dimensions (WxHxD)	20x30x16,5 mm
Type of protection	IP 20
Connection method	screw clamp
Weight	max. 150 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Galvanic isolation

Base isolation, functional separation

Working voltage	50 V DC
Test voltages input / output	500 V, 50 Hz (1 min.)

[1] During checking, slight signal deviations are possible.

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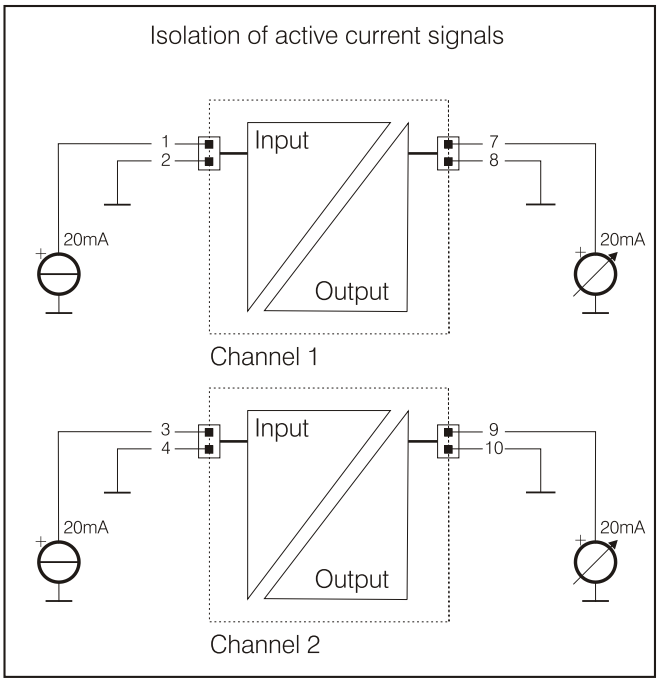
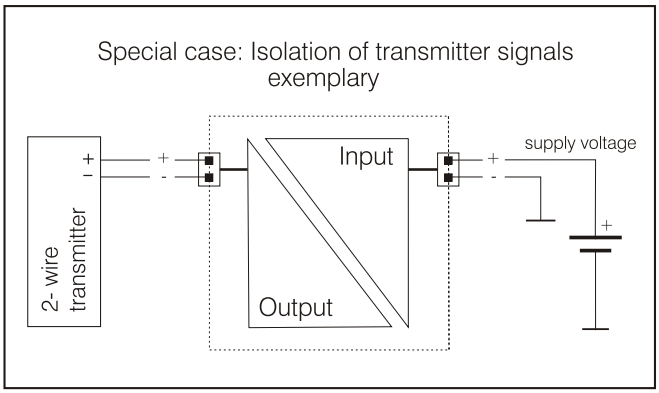
Isolation Converter

AD-TW 201 GS

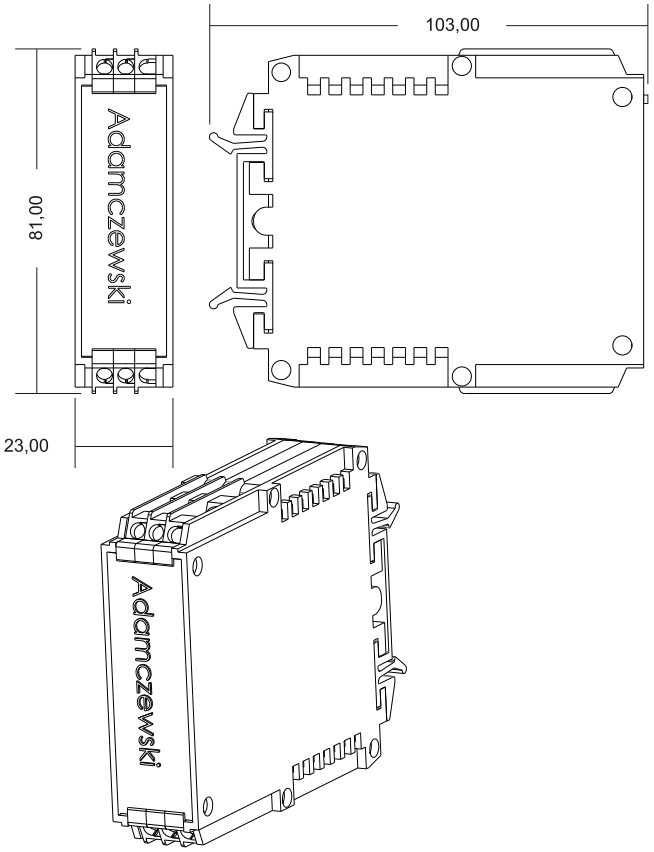
AD-TW 202 GS

Block and wiring diagram





Dimensions



Isolation Converter

AD-TW 201 ST

Description

The separation converter serves the galvanic separation of impressed currents. It obtains its auxiliary energy form the input signal. The connection of an additional auxiliary voltage is not necessary. The output current is independent of the connected load up to the maximum value.

Application

Economic separation of computer inputs, protection of sensitive units against potential delay, galvanic decoupling in complex measuring units.The device is designed in plug-in module technology.

Business data

Order number	AD-TW 201 ST

Technical specifications

Input current

Measuring range	0 ... 20 mA
Input voltage	< 25 V
Drop voltage	< 2,5 V
Oscillation current	< 80 µA

Output current

Output range	0 ... 20 mA
Max. burden	500 Ohm
Burden error	-0,03% / 100 Ohm
Residual ripple	0,5 % (500 Ohm; 20 mA)

Transmission behaviour

Basic accuracy	< 0,3 %
Input / output	1 : 1
Temperature influence	50 ppm/K
Response time	~ 20 ms
Transmission frequency	500 Hz (500 Ohm)

Housing

Dimensions (WxHxD)	20x30x16,5 mm
Type of protection	IP 20
Connection method	Steckmodul
Weight	~ 80 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Galvanic isolation

Base isolation, functional separation	
Working voltage	50 V DC
Test voltages input / output	500 V, 50 Hz (1 min.)

[1)] During checking, slight signal deviations are possible.

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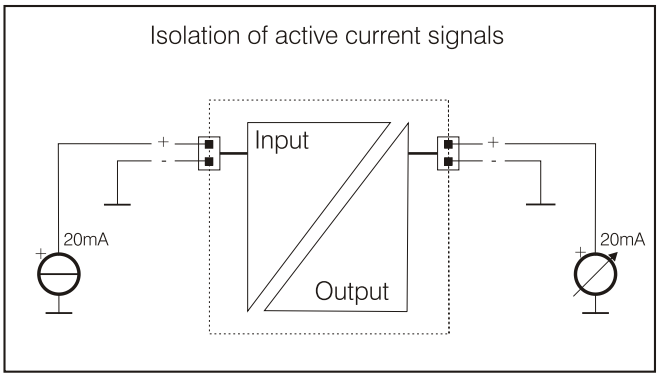
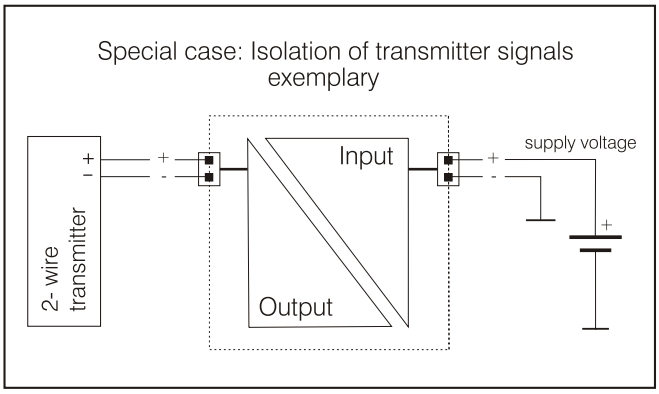
Isolation Converter

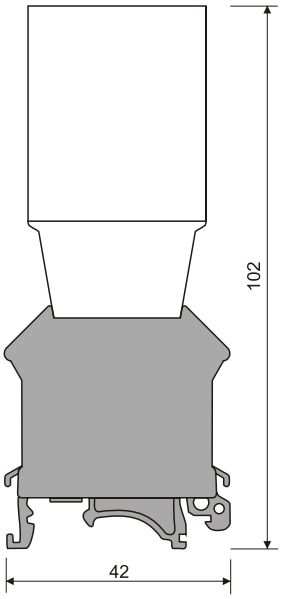
AD-TW 201 ST

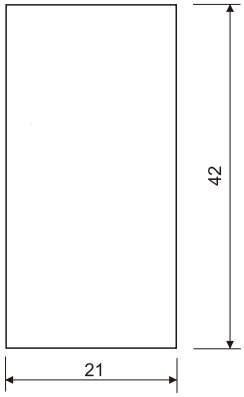
Block and wiring diagram





Dimensions





Isolation Converter

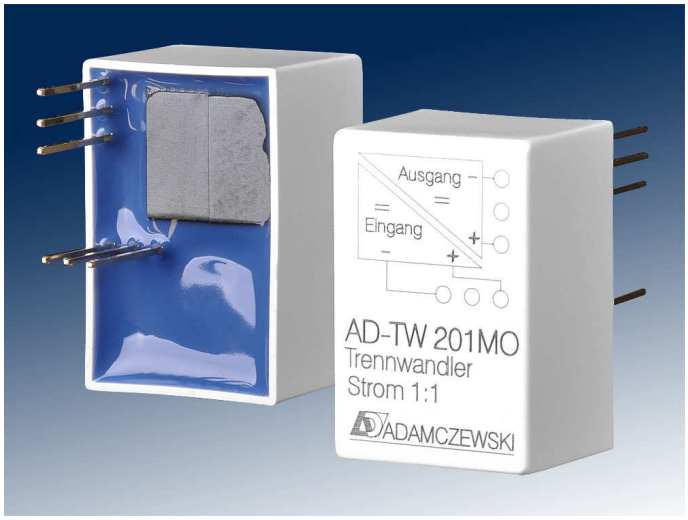
AD-TW 201 MO

Description

The separation converter serves the galvanic separation of impressed currents. It obtains its auxiliary energy form the input signal. The connection of an additional auxiliary voltage is not necessary. The output current is independent of the connected load up to the maximum value.

Application

Economic separation of computer inputs, protection of sensitive units against potential delay, galvanic decoupling in complex measuring units.



Business data

Order number	AD-TW 201 MO

Technical specifications

Input current

Measuring range	0 ... 20 mA
Input voltage	< 25 V
Drop voltage	< 2,5 V
Oscillation current	< 80 µA

Output current

Output range	0 ... 20 mA
Max. burden	500 Ohm
Burden error	-0,03% / 100 Ohm
Residual ripple	0,5 % (500 Ohm; 20 mA)

Transmission behaviour

Basic accuracy	< 0,3 %
Input / output	1 : 1
Temperature influence	50 ppm/K
Response time	~ 20 ms
Transmission frequency	500 Hz (500 Ohm)

Housing

Dimensions (WxHxD)	20x30x16,5 mm
Type of protection	IP 20
Connection method	soldering pins
Weight	~ 25 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

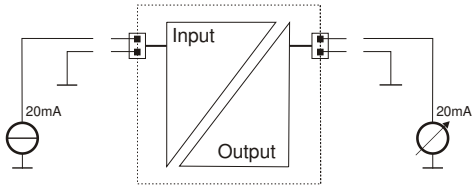
Galvanic isolation

Base isolation, functional separation	
Working voltage	50 V DC
Test voltages input / output	500 V, 50 Hz (1 min.)

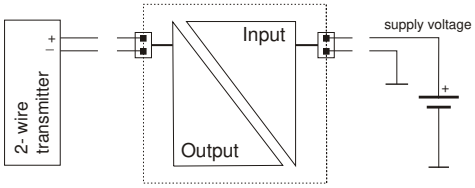
[1] During checking, slight signal deviations are possible.

Block and wiring diagram

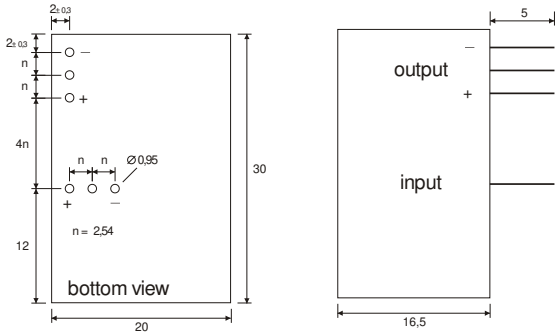
Isolation of active current signals



Isolation of transmitter signals



Dimensions



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Isolation Converter

AD-TW 21 GVD

AD-TW 25 GVD

Description

The passive AC current separation transducer serve the conversion of AC currents of magnitudes 0-1 A AC or 0-5 A AC in an impressed DC current of 0-20 mA. The galvanically separated output signal is, up to a maximum value, independent of the connected burden. The separation transducer does not require an auxiliary energy, the necessary energy is gained from the measuring signal.

Application

Remote transmission of current transducer signals, galvanic separation and coupling to systems with 0-20 mA inputs.

Specific characteristics

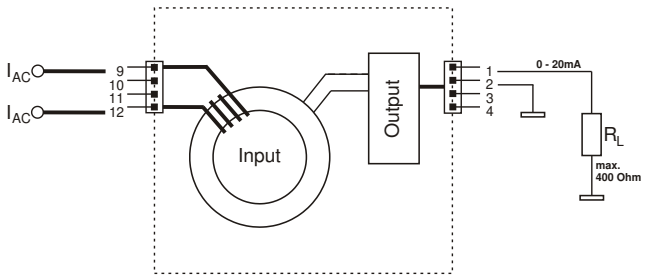
- for 1 A AC or 5 A AC current transducer signals
- galvanically separated output 0-20 mA
- no auxiliary energy required
- connection terminals can be pulled off

Business data

Order number

AD-TW 21 GVD	input 0 ... 1 A AC
AD-TW 25 GVD	input 0 ... 5 A AC

Block and wiring diagram



Technical specifications

Input current

AD-TW 21 GVD	0 ... 1 A AC (50Hz Sinus)
AD-TW 25 GVD	0 ... 5 A AC (50Hz Sinus)

Output current

Max. output range	0 ... 20 mA
Max. burden	400 Ohm
Load influence	-0,12% / 100 Ohm

Transmission behaviour

Basic accuracy	< 0,3 % of full scale
Temperature influence	< 30 ppm/K
Response time	< 0,5s (0 ... 90 %)

Supply

Passive, no power supply required!	
Self-consumption via input signal	~ 1,6 VA

Housing

Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Weight	~ 285 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [2)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[2)] During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

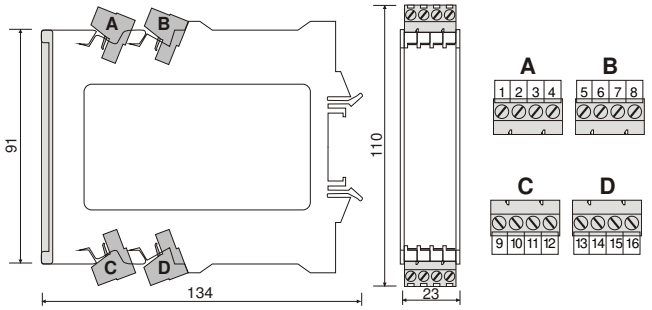
Galvanic isolation, test voltages

Signal/auxiliary voltage	2 kV (1 min)

Protective systems

Input/output	over voltage and over current

Dimensions



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AC Isolation Converter

Current-transformer-transmitter

AD-SWT 50 SO
AD-SWT 100 SO
AD-SWT 200 SO

Description

The SWT series of devices (AD-SWT 50 SO, AD-SWT 100 SO and AD-SWT 200 SO) serves the measuring of large sinusoidal currents and simultaneous conversion to 4...20 mA transmitter signal. The devices are designed in two-wire technology and can be operated in a wide range of voltages. Dependent on the amount of the primary current, the devices sink a proportional 4...20 mA signal from the connected supply voltage. Due to the integral protection against polarization error and over-voltage, the transmitter are also protected against erroneous applications or transient over-voltages. The housing is designed in external clamp-on transformer format and therefore can be easily integrated into existing units.

Application

Measurings of large sinusoidal alternating currents, which, for instance, correspond to motor currents, pump currents or generator currents.

Attention: when fitting, it must be ensured that the ferrite surfaces of the SWT are free from dirt or fat residues through contact. Otherwise measuring value deviations or even error measurings are possible.

Specific characteristics

- Clamp-on transformer technology
- Extended supply voltage range
- 4 ... 20 mA transmitter signal
- Easy installation

Business data

Order number	
AD-SWT 50 SO	50 A AC Primärstrom
AD-SWT 100 SO	100 A AC Primärstrom
AD-SWT 200 SO	200 A AC Primärstrom
Accessory	
DIN rail holder	35 mm Normschiene

Technical specifications

Primary current	
Measurement method	inductive
Measuring range	0 ... 50/100/200 A AC
Max. conductor diameter	23 mm
Transmitter output	
Output range	4 ... 20 mA
Residual ripple	50 µAss
Transmitter-supply	
Voltage range DC	10 ... 30 V DC
Nominal voltage DC	24 V DC
Transmission behaviour	
Basic accuracy	< 1 %
Temperature influence	100 ppm/K
Response time	< 2 s (10...90 %)
Housing	
Dimensions (WxHxD)	50x42x82 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	1,5 mm² flex wire / 2,5 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 200 g
Manner of fastening	Folding transducer housing
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	61010-2-030
Measurement category	CAT III
Galvanic isolation, test voltages	
Input / output	4 kV, 50 Hz (1 min.)
Protection circuits	
Output	electrical surge and reverse current protection

[1] During checking, slight signal deviations are possible.

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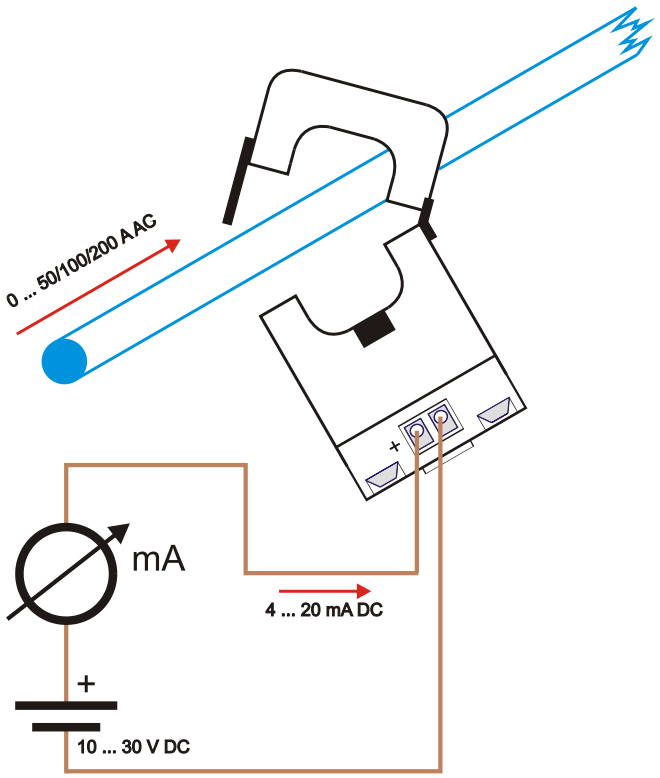
AC Isolation Converter

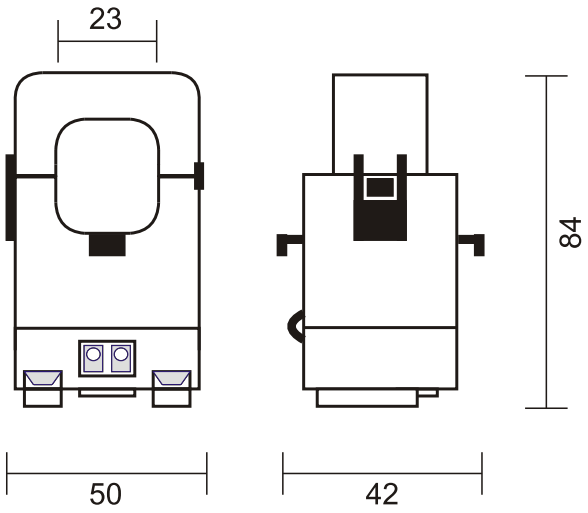
Current-transformer-transmitter

AD-SWT 50 SO
AD-SWT 100 SO
AD-SWT 200 SO

Block and wiring diagram



Dimensions



AC Isolation Converter

Current Transformer Transmitter TRMS

AD-SWT 50 SO-TRMS
AD-SWT 100 SO-TRMS
AD-SWT 200 SO

Description

The SWT-TRMS series of devices (AD-SWT 50 SO-TRMS, AD-SWT 100 SO-TRMS and AD-SWT 200 SO-TRMS) serves the measuring of large AC currents and simultaneous conversion to 4...20 mA transmitter signal. Because of the RMS measurement, the current consumption of non-linear consumers can be measured. Even strong distortions of the sinusoidal signal are easily measurable through the high sampling rate. The devices are designed in two-wire technology and can be operated in a wide range of voltages. Dependent on the amount of the primary current, the devices sink a proportional 4...20 mA signal from the connected supply voltage. Due to the integral protection against polarization error and over-voltage, the transmitter are also protected against erroneous applications or transient over-voltages. The housing is designed in external clamp-on transformer format and therefore can be easily integrated into existing units.

Application

Measurement of large alternating currents, of linear or non-linear loads.

Attention: when fitting, it must be ensured that the ferrite surfaces of the SWT are free from dirt or fat residues through contact. Otherwise measuring value deviations or even error measurings are possible.

Specific characteristics

- Clamp-on transformer technology
- TRMS measurement
- Extended supply voltage range
- 4 ... 20 mA transmitter signal
- Easy installation

Business data

Order number

AD-SWT 50 SO-TRMS	50 A AC primary current
AD-SWT 100 SO-TRMS	100 A AC primary current
AD-SWT 200 SO-TRMS	200 A AC primary current

Accessory

DIN rail holder	35 mm DIN rail 35mm

Technical specifications

Primary current

Measurement method	inductive
Sample rate	1 kHz (20 measurements / mains period)
Max. measurable harmonic	10 (500 Hz)
Calculation method	root mean square TRMS
Short-term overload (1 s)	twenty times of the nominal value
Permanent overload (24 h)	120 % of the nominal value
Measuring range	0 ... 50/100/200 A AC (50 Hz)
Max. conductor diameter	23 mm

Transmitter output

Output range	4 ... 20 mA
Residual ripple	30 µAss

Transmitter-supply

Voltage range DC	10 ... 30 V DC
Nominal voltage DC	24 V DC

Transmission behaviour

Basic accuracy	< 0,5 % (at fundamental 50 Hz)
Temperature influence	100 ppm/K
Response time	< 1 s (10...90 %)

Housing

Dimensions (WxHxD)	50x42x82 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	1,5 mm² flex wire / 2,5 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 200 g
Manner of fastening	Folding transducer housing

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Input / output	4 kV, 50 Hz (1 min.) + insulation of the primary wire

Protection circuits

Output	electrical surge and reverse current protection

[1] During checking, slight signal deviations are possible.

Printed 23.08.2022 We reserve the right for technical changes.

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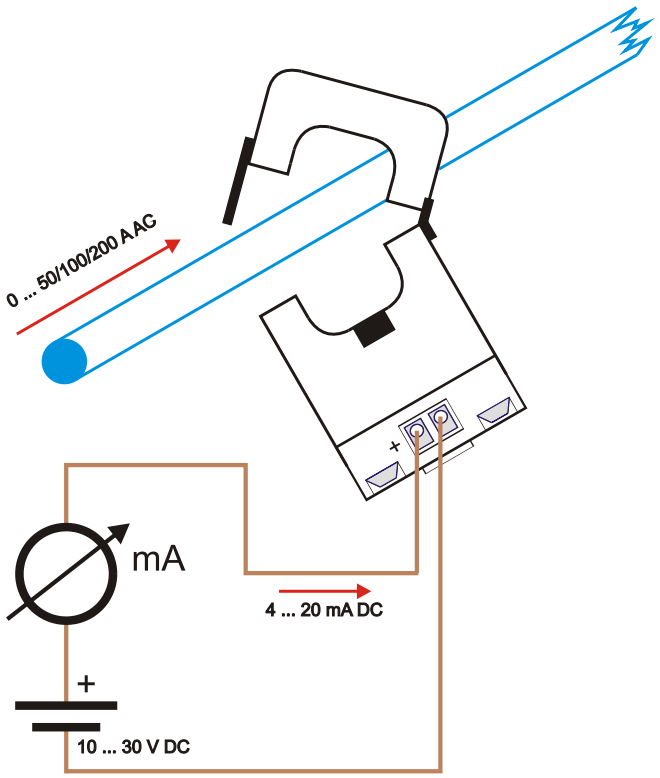
AC Isolation Converter

Current Transformer Transmitter TRMS

AD-SWT 50 SO-TRMS
AD-SWT 100 SO-TRMS
AD-SWT 200 SO

Block and wiring diagram



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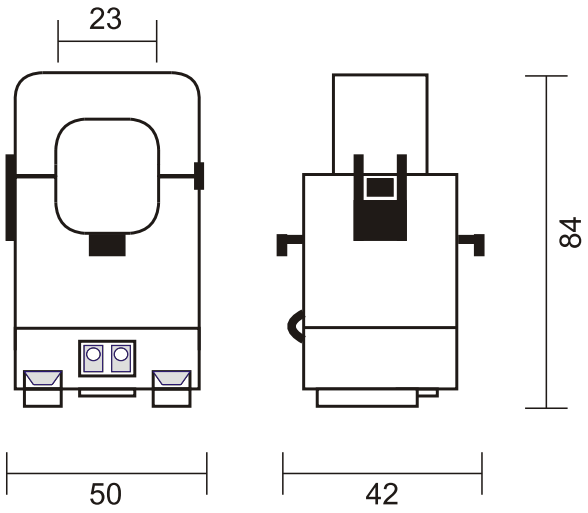

Isolation Amplifier

AD-TV 400 GVD

Description

The isolation amplifier AD-TV 400 GVD serves the galvanic separation of analogue signals and of transmitter signals. When a 2-wire transmitter is connected, this will be supplied directly via a galvanically separated and current-limited supply voltage. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating panel AD-VarioControl or via the programming software AD-Studio. The wide bipolar input measuring range makes this buffer amplifier into the universal type for almost all applications in the area of standard signals and beyond. Due to its current-sinking output, transmitter signals can also be separated or converted. All supply ranges are covered with the wide range power pack.

Application

Amplification, transformation and electrical isolation of current or voltage signals

Specific characteristics

- bipolar current input (+/- 0,5 mA bis +/- 50 mA)
- bipolar voltage input (+/- 1 V bis +/- 100 V)
- Power supply for 2- / 3-wire transmitters
- bipolar current or voltage output
- current sink output
- Operating module as an accessory
- 23 mm narrow housing with detachable terminal clamp

Business data

Order number	
Isolation amplifier	AD-TV 400 GVD
Accessory (optional)	
Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current	
Measuring range	-50 ... + 50 mA DC
Input resistance	40 Ohm
Input voltage	
Measuring range	-100 ... + 100 V DC
Input resistance	1 MOhm
Transmitter supply	
Off-load voltage	24,5 V
Voltage at 20mA	19,5 V
Current limit	~ 25 mA
Output current	
Max. output range	-21,5 ... 21,5 mA DC
Max. burden	400 Ohm
Residual ripple	40 µAss
Output voltage	
Max. output range	-10,5 ... 10,5 V DC
Min. burden	10 kOhm
Residual ripple	30 mVss
Current sink output	
Current sink	0/4 ... 20 mA DC
Max. voltage to be applied	35 V DC
Resolution	
Input	16 bit
Output	12 bit
Transmission behaviour	
Linearity error	0,2 % of full scale
Rise time	200 ms (output auf 90 %)
Temperature influence	+/- 100 ppm/K of full scale
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	4 VA / 2,4 W
Housing	
Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

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Isolation Amplifier

AD-TV 400 GVD

Technical specifications

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

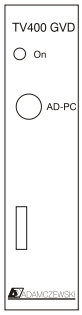
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	3,75 kV (1 min)
Signal/auxiliary voltage	4 kV (1 min)

Display and operating elements

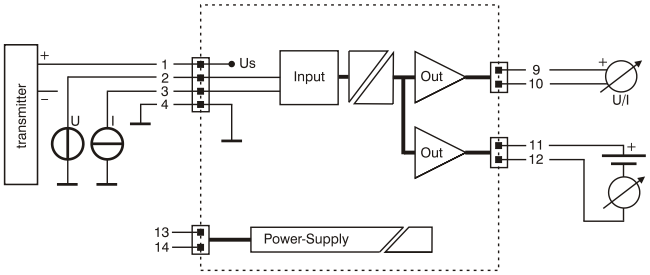


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits

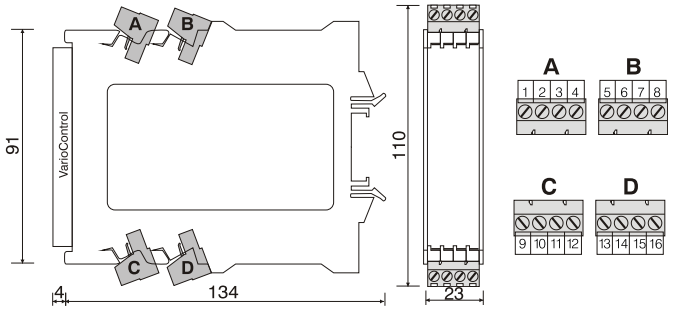
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-TV 400 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40805	2	Scaled input		7	1	0
40809	2	Input signal	mA / V	7	1	0
40909	2	Output signal 1	mA / V	7	1	1
40911	2	Output signal 2	mA / V	7	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Isolation Transmitter

AD-TWT 24 GM

Description

The isolation transmitter AD-TWT 24 GM in 2-wire-transmitter technique impress into a supply voltage a standard measurement signal of 4-20 mA. The output signal follows linear the input signal up to a maximum value. The connection of an additional auxiliary voltage is not necessary. It obtains its auxiliary energy from the transmitter supply.

Application

Economical galvanical isolation of a active analog signal in a impressed passive 4-20mA signal (2-wire-transmitter technique).

Specific characteristics

- 2-wire-transmitter technique, low amount of cabling
- output signal of 4-20 mA independent from supply voltage
- compact design (DIN rail)

Business data

Order number	AD-TWT 24 GM

Technical specifications

Input current	
Measuring range	4 ... 20 mA
Required input voltage	2,7 V (4 V no load)
Transmitter output	
Output range	4 ... 20 mA
Feeding voltage	8 - 30 V DC
Residual ripple	max. 0,5 % of full scale
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	150 ppm/K
Response time	~ 700 ms
Housing	
Dimensions (WxHxD)	13x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 m² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Maximum permanent working voltage across the galvanic isolation	45 V DC
Galvanic isolation, test voltages	
Input / output	510 V, 50 Hz (1 min.)
Protection circuits	
Input	electrical surge and reverse current protection
Output	electrical surge protection

[1] During checking, slight signal deviations are possible.

Printed 23.08.2022 We reserve the right for technical changes.

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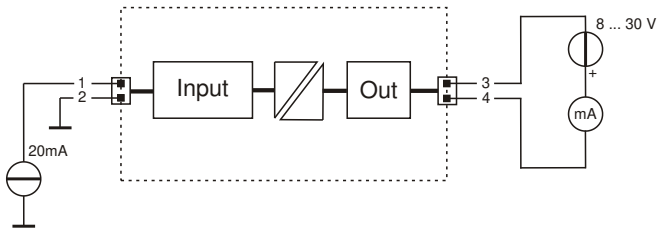
Isolation Transmitter

AD-TWT 24 GM

Block and wiring diagram



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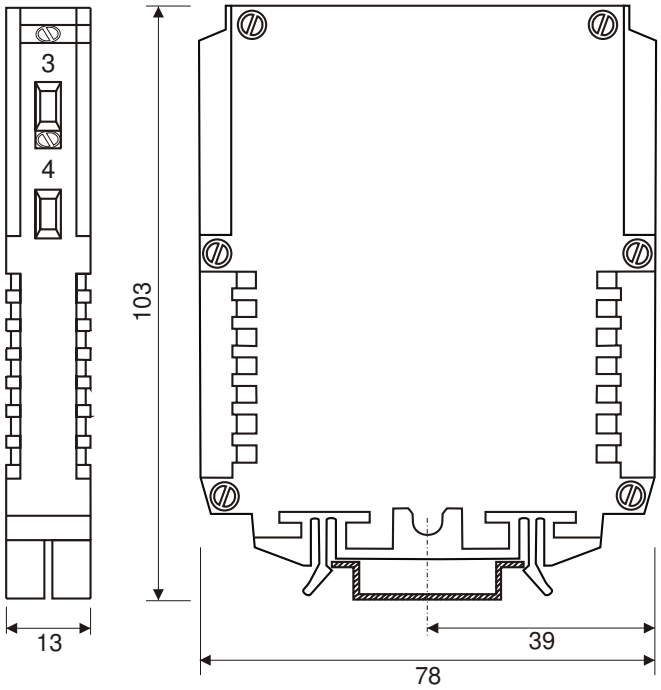

AC Isolation Converter

Current-transformer-transmitter

AD-SWT 50 SO
AD-SWT 100 SO
AD-SWT 200 SO

Description

The SWT series of devices (AD-SWT 50 SO, AD-SWT 100 SO and AD-SWT 200 SO) serves the measuring of large sinusoidal currents and simultaneous conversion to 4...20 mA transmitter signal. The devices are designed in two-wire technology and can be operated in a wide range of voltages. Dependent on the amount of the primary current, the devices sink a proportional 4...20 mA signal from the connected supply voltage. Due to the integral protection against polarization error and over-voltage, the transmitter are also protected against erroneous applications or transient over-voltages. The housing is designed in external clamp-on transformer format and therefore can be easily integrated into existing units.

Application

Measurings of large sinusoidal alternating currents, which, for instance, correspond to motor currents, pump currents or generator currents.

Attention: when fitting, it must be ensured that the ferrite surfaces of the SWT are free from dirt or fat residues through contact. Otherwise measuring value deviations or even error measurings are possible.

Specific characteristics

- Clamp-on transformer technology
- Extended supply voltage range
- 4 ... 20 mA transmitter signal
- Easy installation

Business data

Order number	
AD-SWT 50 SO	50 A AC Primärstrom
AD-SWT 100 SO	100 A AC Primärstrom
AD-SWT 200 SO	200 A AC Primärstrom
Accessory	
DIN rail holder	35 mm Normschiene

Technical specifications

Primary current	
Measurement method	inductive
Measuring range	0 ... 50/100/200 A AC
Max. conductor diameter	23 mm
Transmitter output	
Output range	4 ... 20 mA
Residual ripple	50 µAss
Transmitter-supply	
Voltage range DC	10 ... 30 V DC
Nominal voltage DC	24 V DC
Transmission behaviour	
Basic accuracy	< 1 %
Temperature influence	100 ppm/K
Response time	< 2 s (10...90 %)
Housing	
Dimensions (WxHxD)	50x42x82 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	1,5 mm² flex wire / 2,5 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 200 g
Manner of fastening	Folding transducer housing
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	61010-2-030
Measurement category	CAT III
Galvanic isolation, test voltages	
Input / output	4 kV, 50 Hz (1 min.)
Protection circuits	
Output	electrical surge and reverse current protection

[1] During checking, slight signal deviations are possible.

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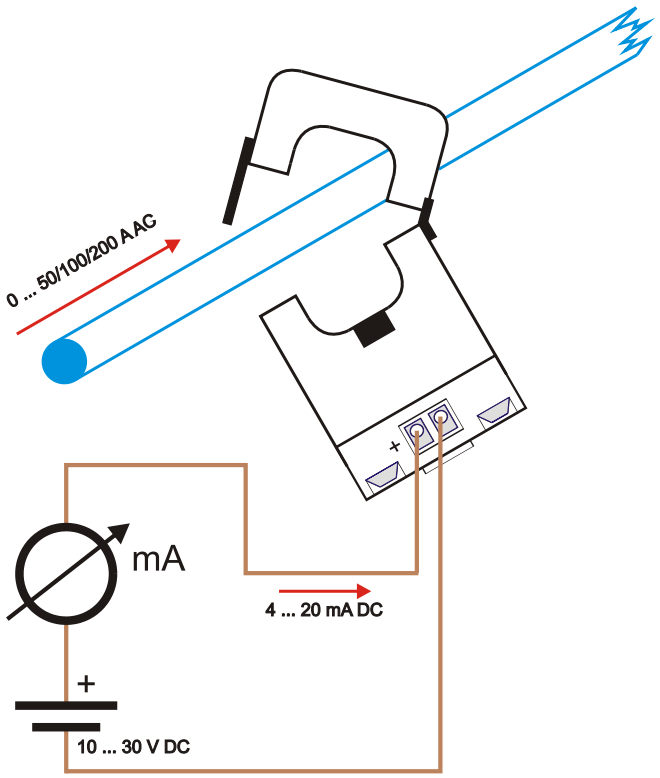
AC Isolation Converter

Current-transformer-transmitter

AD-SWT 50 SO
AD-SWT 100 SO
AD-SWT 200 SO

Block and wiring diagram



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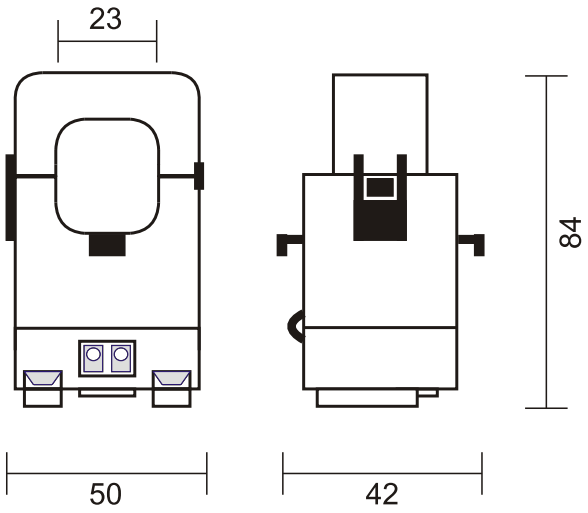

AC Isolation Converter

Current Transformer Transmitter TRMS

AD-SWT 50 SO-TRMS
AD-SWT 100 SO-TRMS
AD-SWT 200 SO

Description

The SWT-TRMS series of devices (AD-SWT 50 SO-TRMS, AD-SWT 100 SO-TRMS and AD-SWT 200 SO-TRMS) serves the measuring of large AC currents and simultaneous conversion to 4...20 mA transmitter signal. Because of the RMS measurement, the current consumption of non-linear consumers can be measured. Even strong distortions of the sinusoidal signal are easily measurable through the high sampling rate. The devices are designed in two-wire technology and can be operated in a wide range of voltages. Dependent on the amount of the primary current, the devices sink a proportional 4...20 mA signal from the connected supply voltage. Due to the integral protection against polarization error and over-voltage, the transmitter are also protected against erroneous applications or transient over-voltages. The housing is designed in external clamp-on transformer format and therefore can be easily integrated into existing units.

Application

Measurement of large alternating currents, of linear or non-linear loads.

Attention: when fitting, it must be ensured that the ferrite surfaces of the SWT are free from dirt or fat residues through contact. Otherwise measuring value deviations or even error measurings are possible.

Specific characteristics

- Clamp-on transformer technology
- TRMS measurement
- Extended supply voltage range
- 4 ... 20 mA transmitter signal
- Easy installation

Business data

Order number

AD-SWT 50 SO-TRMS	50 A AC primary current
AD-SWT 100 SO-TRMS	100 A AC primary current
AD-SWT 200 SO-TRMS	200 A AC primary current

Accessory

DIN rail holder	35 mm DIN rail 35mm

Technical specifications

Primary current

Measurement method	inductive
Sample rate	1 kHz (20 measurements / mains period)
Max. measurable harmonic	10 (500 Hz)
Calculation method	root mean square TRMS
Short-term overload (1 s)	twenty times of the nominal value
Permanent overload (24 h)	120 % of the nominal value
Measuring range	0 ... 50/100/200 A AC (50 Hz)
Max. conductor diameter	23 mm

Transmitter output

Output range	4 ... 20 mA
Residual ripple	30 µAss

Transmitter-supply

Voltage range DC	10 ... 30 V DC
Nominal voltage DC	24 V DC

Transmission behaviour

Basic accuracy	< 0,5 % (at fundamental 50 Hz)
Temperature influence	100 ppm/K
Response time	< 1 s (10...90 %)

Housing

Dimensions (WxHxD)	50x42x82 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	1,5 mm² flex wire / 2,5 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 200 g
Manner of fastening	Folding transducer housing

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Input / output	4 kV, 50 Hz (1 min.) + insulation of the primary wire

Protection circuits

Output	electrical surge and reverse current protection

[1] During checking, slight signal deviations are possible.

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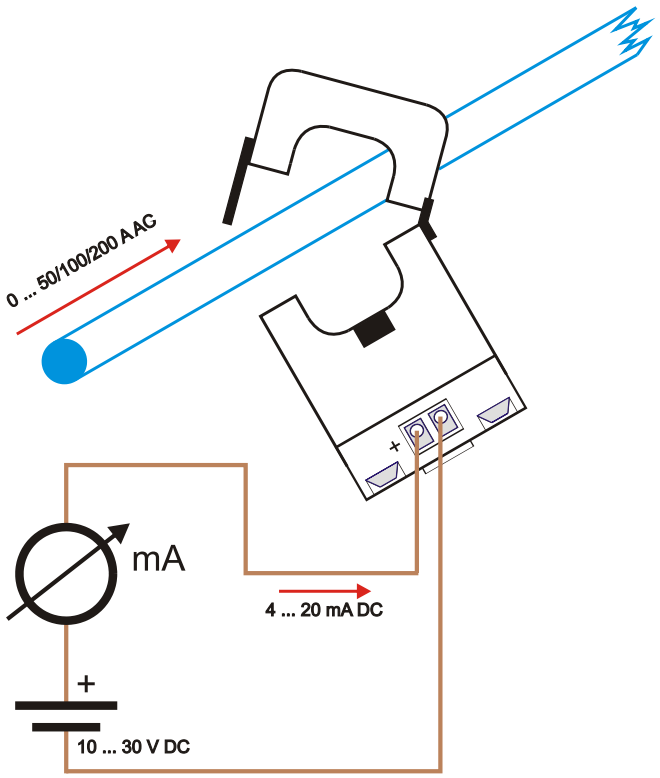
AC Isolation Converter

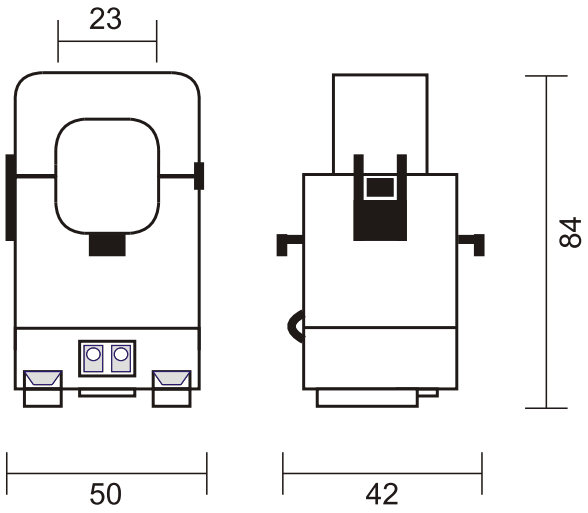
Current Transformer Transmitter TRMS

AD-SWT 50 SO-TRMS
AD-SWT 100 SO-TRMS
AD-SWT 200 SO

Block and wiring diagram



Dimensions



Transmitter

PT100-Transmitter

AD-MWT 50 ST

Description

The transmitter AD-MWT 50 ST converts a Pt 100 temperature sensor signal into a passive transmitter signal (current sink: 4-20mA). An external supply voltage is not necessary. The necessary energy is taken from the transmitter supply at the output of the device. The impressed output signal corresponds to the desired input temperature range.

Application

Inexpensive conversion of a Pt 100 temperature transmitter signal into a passive impressed 4-20mA signal (2-wire transmitter technology)

Specific characteristics

- 2-wire transmitter technology, low wiring effort
- highly linear conversion, no adjustment due to 3-wire technology
- supply voltage independent output signal of 4-20 mA
- user-friendly plug-in design on terminal block

Business data

Order number	AD-MWT 50 ST

Technical specifications

PT100-input

Measuring range	customer specification
Type	PT100 3-wire system DIN IEC 751
Wiring	3-Leiter

Output current

Output range	4 ... 20 mA
Type	current sink
Residual ripple	30 µAss
Supply voltage drift	kein (betw. 8 ... 32 V)

Supply

Voltage range DC	8 ... 32 V DC
Nominal voltage DC	24 V DC
Power consumption DC	max. 0,65 W

Transmission behaviour

Basic accuracy	< 0,2 %
Temperature influence	100 ppm/K
Response time	~ 20 ms

Housing

Dimensions (WxHxD)	20,8x42x102 mm
Type of protection	IP 20
Connection method	Screw terminals in plug-in socket
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm Plug-in socket

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Elevation	max. 2000 m
Pollution degree	2

Protection circuits

Input	electrical surge protection
Output	electrical surge protection

[1] During checking, slight signal deviations are possible.

Printed 17.10.2022 We reserve the right for technical changes.

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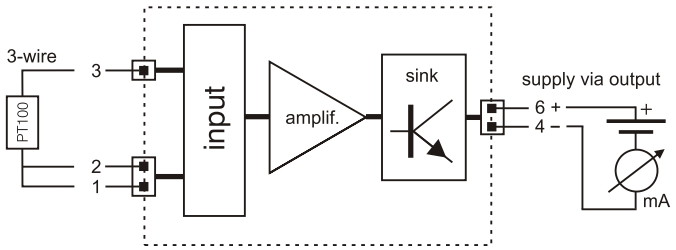
Transmitter

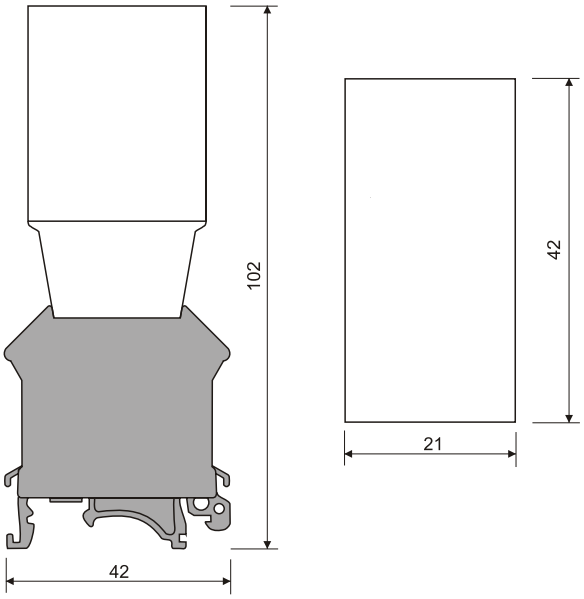
PT100-Transmitter

AD-MWT 50 ST

Block and wiring diagram



Dimensions



Supply Isolation Amplifier

AD-STVEX 710 GVD

Description

The AD-STVEX 710 GVD supply isolating amplifier is used for the intrinsically safe supply of a transmitter installed in the hazardous area. The supply isolation amplifier itself is installed as associated electrical equipment in the non-hazardous area, i.e. the safe area. The signal is galvanically isolated and transmitted to the non-hazardous area. The passive input also allows active signals from the hazardous area. The active current output, the current sink output and the voltage output facilitate the adaptation to the following signal input. The device can be operated at 24 V DC or 230 V AC.

Application

Supply of a transmitter in the hazardous area and galvanic isolation of the signal.

Specific characteristics

- Supply of a transmitter up to zone 0 (gas) or 20 (dust)
- Active current output, current sink output and voltage output
- Open-circuit detection according to Namur recommendation NE43
- Further parameters configurable via configuration software AD-Studio
- Detachable, coded connection terminals
- Zero and full scale adjustment possible via front panel keys

Business data

Order number

AD-STVEX 710 GVD	Ex input top
AD-STVEX 710 GVD S-388	Ex input bottom

Technical specifications

Transmitter input, intrinsically safe

Feeding voltage	23V @ 4mA ... 16V @ 20mA
Maximum measuring range	0 ... 22 mA
Maximum short circuit current	68 mA

Current input, intrinsically safe

Maximum measuring range	0 ... 22 mA
Input resistance	50 Ohm

Current output, active

Maximum output range	0 ... 22 mA
Max. burden	500 Ohm

Current sink output, passive

Maximum output range	0 ... 22 mA
Max. external supply voltage	25 V DC
Max. burden	(U_{extern} - 2V) / 20mA

Output voltage

Maximum output range	0 ... 11 V
Min. burden	2 kOhm

Transmission behaviour

Resolution input	~ 20 µA/LSB
Resolution current output	~ 20 µA/LSB
Resolution voltage output	~ 10 mV/LSB
Maximum error	0,2 % of full scale
Temperature influence	~ 50 ppm/K
Response time	~ 100 ms (10 ... 90 %)

Auxiliary voltage

Range	20 ... 120 V DC / 50 ... 250 V AC
Power consumption	1,8 W / 3,5 VA

Environmental conditions

Ambient temperature	-20 ... +60 °C

Approval

ATEX	II (1) G [Ex ia Ga] IIC II (1) D [Ex ia Da] IIIC
Type examination certificate	BVS 11 ATEX E 013 X
Standards	EN 60079-0, EN 60079-11 EN 60079-26, EN 61241-11

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Kl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

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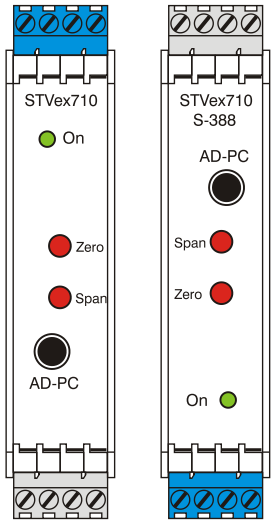
Supply Isolation Amplifier

AD-STVEX 710 GVD

Display and operating elements



Standard S-388

On: Operation LED
Steady light: Ready to operate
Flashing 2x: Keystroke
Flashing 1Hz: Invalid measured value according to NE43

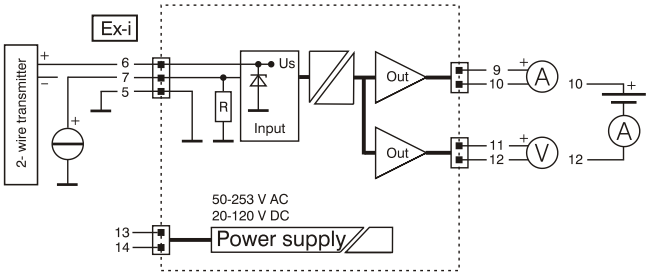
Zero: Pushbutton zero
Set start of measuring range

Full: Pushbutton full point
Set end of measuring range

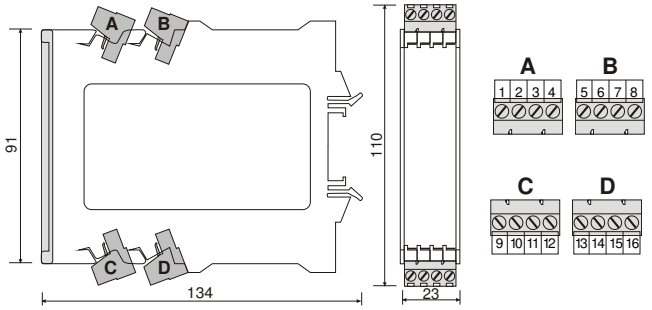
Zero & Full
Set measuring range to factory values

AD-PC: Configuration
Jack socket for communication with PC configuration software.

Block and wiring diagram



Dimensions



Coupling Relays

Contact Amplifier

AD-KVEX 100 GVD

AD-KVEX 200 GVD

Description

The contact amplifier (switching amplifier) serves preferably the protection of weak sensor contacts or the amplification of binary sensor signals. The AD-KVEX 100/200 GVD provides a logical input signal amplified at a contact output. Typical input signals are reed contacts, signal sensor according to Namur Namur (DIN EN 60947-5-6) or resistance changes. At the output, heavy-duty and potential free contacts are provided. The logical switching direction as well as the line fault recognition is separately switchable for each conduit. The version AD-KVEX 100/200 GVDO has wear-free semi-conductor outputs, which are also galvanically separated via an optic isolation. The device contains an electronic wide range power supply and can operate in a wide supply voltage range.

Application

Pulse recording of water meters or flow monitors for counting through-flow quantities. Amplification and contact protection of weak sensor signals (reed contacts, limit switches, etc.), switching signal transmission in control circuits, switching amplifier for inductive and capacitive proximity switches according to Namur (DIN EN 60947-5-6).

Specific characteristics

- Intrinsically safe input [Ex ia] IIC
- Up to two independent switching channels (AD-KVEX 200)
- Switching function can be reversed
- Line fault detection
- LEDs for signal and error display
- Wide range power supply
- Optional version with semiconductor output
- Optional available with Ex input terminal at the bottom (order option: S-488)

Business data

Order number

AD-KVEX 100 GVD	1 relay output
AD-KVEX 100 GVD-O	1 semiconductor output
AD-KVEX 200 GVD	2 relay outputs
AD-KVEX 200 GVD-O	2 semiconductor outputs

Options

Ex input terminals below	special order type S-488

Technical specifications

Signal input

Min. pulse width	100 ms
Namur supply voltage	ca. 8,2 V DC +/-3%
Logic level, Low	< 1,6 mA
Logic level, High	> 1,9 mA
Wire breakage detection	< 0,2 mA
Short circuit detection	> 7,8 mA
Signal types	Initiator DIN EN 60947-5-6, contact, transistor

Contact output

Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	potential-free changeover
Switching operations mechanical	1 x 10^{7}
At 230V/2A AC, cos(phi)=1	6 x 10^{5}
At 230V/2A AC, cos(phi)=0,4	2 x 10^{5}
At 50V/2 A DC	2 x 10^{5}

Semiconductor output

Max switching voltage	30 V DC
Max. switching current	50 mA DC

Supply

Voltage range AC	50 ... 250 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Power consumption AC	3,5 VA (2,3 VA ; KVEX 100 GVD)
Voltage range DC	20 ... 120 V DC
Nominal voltage DC	24 V DC
Power consumption DC	1,8 W (1W ; KVEX 100 GVD)

Transmission behaviour

Response time	~ 100 ms

Housing

Dimensions (WxHxD)	23 x 110 x 134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 115 g
Manner of fastening	35 mm DIN rail 35mm (EN50022)

Environmental conditions

Ambient temperature	-20 ... +60 °C
Storage and transport	-20 ... +70 °C (no condensation)

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Coupling Relays

Contact Amplifier

AD-KVEX 100 GVD

AD-KVEX 200 GVD

Technical specifications

Approval

ATEX	II(1) G [Ex ia Ga] IIC II(1) D [Ex ia Da] IIIC
EU-Type Examination Certificate	BVS 16 ATEX E 038 X

Safety Specifications per channel

Voltage Uo	9,56 V DC
Current Io	10,62 mA DC
Power Po	25,4 mW
Max. external capacitance Co	
||C	3,6 µF
||B |||C	26 µF
||A	210 µF
Max. external inductance Lo	
||C	315 mH
||B |||C	1261 mH
||A	2522 mH
Max. external inductance / resistance ratio Lo/Ro	
||C	1,41 mH/Ohm
||B |||C	5,65 mH/Ohm
||A	11,3 mH/Ohm
Internal capacitance Ci	N/A
Internal inductance Li	N/A

Safety Specifications 2 channels parallel

Voltage Uo	9,56 V DC
Current Io	21,24 mA DC
Power Po	50,8 mW
Max. external capacitance Co	
||C	3,6 µF
||B |||C	26 µF
||A	210 µF
Max. external inductance Lo	
||C	78,8 mH
||B |||C	315,25 mH
||A	630,5 mH
Max. external inductance / resistance ratio Lo/Ro	
||C	0,706 mH/Ohm
||B |||C	2,826 mH/Ohm
||A	5,565 mH/Ohm
Internal capacitance Ci	N/A
Internal inductance Li	N/A

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input / output	3 kV, 50 Hz (1 min.)
Signal / supply unit	3 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Power supply	protection against over voltage, over temperature and reverse polarity

[1] During checking, slight signal deviations are possible.

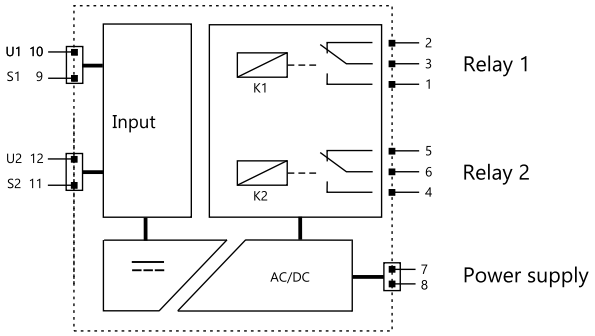
Coupling Relays

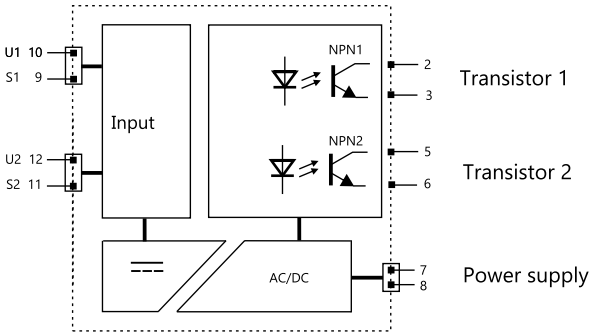
Contact Amplifier

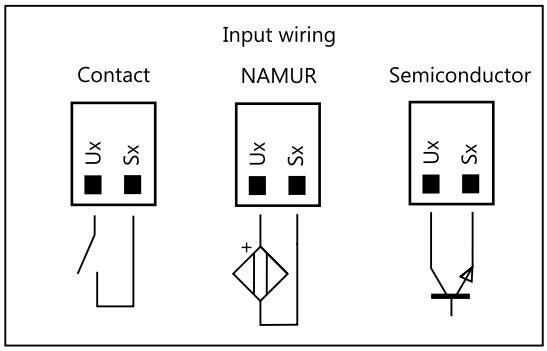
AD-KVEX 100 GVD

AD-KVEX 200 GVD

Block and wiring diagram



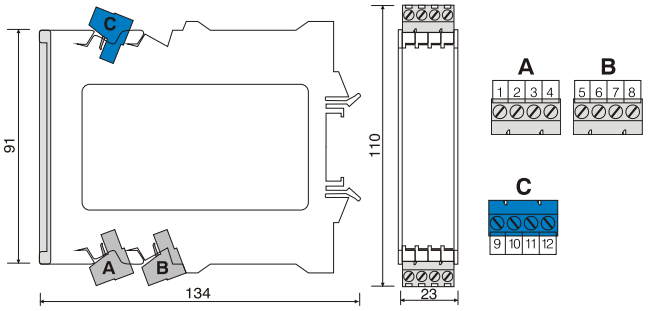




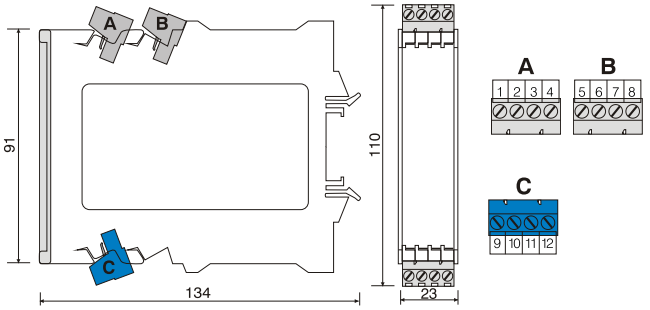
Function of Frontswitch

Switch	Function	OFF	ON
1	Invers 1	off	on
2	Error detector 1	on	off
3	Invers 2	off	on
4	Error detector 2	on	off

Dimensions



S-488



Multifunction Transducer

AD-VC 1 GVD

Description

The digital multi-function measuring transformers of series VarioCheck AD-VC 1 are freely programmable digital measuring transducers with two analogue outputs and up to 2 limiting value relays. Extensive standard equipment and additional options solve almost all imaginable tasks of a modern evaluation. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating modul AD-VarioControl or via the programming software AD-Studio. VarioCheck AD-VC 1 fulfils all tasks of a universal and secure measuring value recording through integral function modules such as limiting value messages, freely adjustable hysteresis, selectable relay functions, time-delayed switching, automatic or manual simulation modus, free linearizing curves and a wide range of supply voltage.

Specific characteristics

- bipolar current input
- bipolar mV voltage input
- voltage input
- Power supply for 2-wire transmitters
- Thermocouples inputs, types J, T, K, E, N, S, R, B, C; internal or external reference junction
- Resistance thermometer inputs, types Pt/Ni 100, Pt/Ni 500, Pt/Ni 1000
- Resistance, Potentiometer input
- Sensor error detection for thermocouples and resistance thermometers
- Input of a characteristic curve possible
- Automatic or manual simulation operation
- 2 bipolar current or voltage output
- 23 mm narrow housing with detachable terminal clamp
- Operating module AD-VarioControl as an accessory

Business data

Order number	
AD-VC1 GVD-R0	without relay
AD-VC1 GVD-R2	two relays
Accessory (optional)	
Operating module	AD-VarioControl
Control panel with RS-485	AD-VarioConnect
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current	
Measuring range	-24 ... + 24 mA DC
Input resistance	20 Ohm
Basic accuracy	4 µA
Transmitter supply	
Off-load voltage	24,0 V
Voltage at 20mA	18,0 V
Current limit	~ 25 mA
Input voltage	
Measuring ranges	0 ... + 12 V DC
Input resistance	1 MOhm
Basic accuracy	1 mV
Input voltage mV	
Measuring ranges	-15 ... +15 mV -30 ... +30 mV -60 ... +60 mV -125 ... +125 mV -250 ... +250 mV
Input resistance	1 MOhm
Basic accuracy	20 µV
Thermocouples	
Comparative place:	
Internal	measurement with sensor in the device connecting terminals
External	Cold junction temperature selectable by parameters
To DIN EN 60584:	
measuring range type J	-200 ... +1200 °C
measuring range type T	-200 ... +400 °C
measuring range type K	-200 ... +1360 °C
measuring range type E	-200 ... +1000 °C
measuring range type N	-200 ... +1300 °C
basic accuracy	1 K
To DIN EN 60584:	
measuring range type S	-40 ... +1760 °C
measuring range type R	-40 ... +1760 °C
measuring range type B	+400 ... +1800 °C
basic accuracy	2 K
After standard ASTM E988:	
measuring range type C	0 ... +2320 °C
basic accuracy	2 K

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Multifunction Transducer

AD-VC 1 GVD

Technical specifications

Resistance input

Resistance thermometer inputs DIN EN 60751: Pt100, Pt500 and Pt1000 DIN 43760: Ni100, Ni500 and Ni1000

measuring range Pt	-200 ... +850 °C
measuring range Ni	-60 ... +230 °C
smallest measuring spans	20 K
short circuit detection	< 20 Ohm
basic accuracy	0,2 K
Linear resistance	
measuring range	0 ... 4000 Ohm
basic accuracy	0,1 Ohm
Connection method	2-, 3- oder 4-wire system
Sensor supply	100 µA
Max line resistance [1)]	50 Ohm/cable

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Potentiometer input

Connection method	3-wire system
Max. Resistance	50 Ohm ... 100 kOhm
Sensor supply	<=500µA

Current outputs

Max. output range	-21,5 ... 21,5 mA DC
Max. burden	400 Ohm
Residual ripple	20 µAss

Voltage outputs

Max. output range	-10,5 ... 10,5 V DC
Min. burden	10 kOhm
Residual ripple	10 mVss

Relay outputs A/B

Contact type	potential free changeover
Max. AC-breaking capacity	250 V AC, 2 A AC, 50Hz
Max. DC-breaking capacity	50 V DC, 2 A DC
Switching operations	
Mechanical	10^7
AC: 230V / 2A, cos(phi)=1	$6 * 10^5$
AC: 230V / 2A, cos(phi)=0,4	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$

Transmission behaviour

Linearity error	< 0,2 % of the measuring range
Rise time	500 ms (0...90 %, 100...10 %)
Rise time (temperature input)	< 1s (0...90 %, 100...10 %)
Temperature influence	+/- 100 ppm/K of the measuring range

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Voltage range DC	20 ... 253 V DC
Nominal voltage AC / DC	230 V AC / 24 V DC
Power consumption AC / DC	5,2 VA / 3,2 W
Power consumption with operating module AC / DC	5,4 VA / 3,6 W

Housing

Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

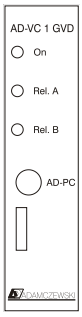
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

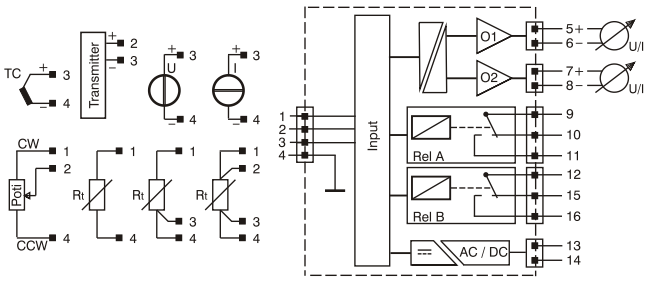
Input to output	2,5 kV (1 min)
In-/output to auxiliary voltage	4 kV (1 min)

Display and operating elements

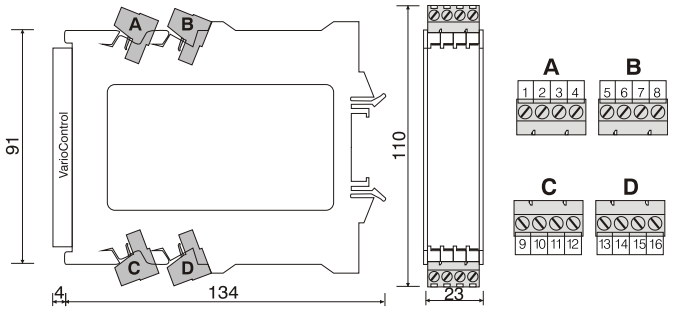


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits
Rel: two LEDs for relays A and B in red
on - relay activated
AD-PC: Communication interface for configuration by a PC
Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-VC 1 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40101	2	Input signal	InUnit	7	1	0
40103	2	Cold-junction temperature	°C	7	1	0
40301	2	Output signal 1	OutUnit	7	1	1
40303	2	Output signal 2	OutUnit	7	1	1
40601	1	Relay state A		3	1	1
40602	1	Relay state B		3	1	1
40801	2	Scaled input	ScUnit	7	1	0

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Measuring Converter

Measuring Transducer For Potentiometer

AD-MV 110 GS

Description

The measuring transducer transforms the position of a remote transmitter (potentiometer) into a proportional output signal. All remote transmitter can be used with the full-scale values ??of 100 ohms up to 100 kohms. Precision calibration trimmer for zero and full scale are included in the amplifier. The output signal is independent of the connected load up to maximum resistance. It can be selected between current or voltage output. Due to the highly efficient integrated wide range power supply high output loads are achieved with low power consumption.

Application

Continuous indication of height level sensors, manometers, position sensors etc. with remote transmitter as potentiometer.

Specific characteristics

- Scanning of potentiometers of 100 ohms to 100 ohms
- Zero and span trimmer for wire calibration
- Current or voltage output
- Wide range power supply

Business data

Order number

AD-MV 110 GS	Ausgabereich im Klartext angeben

Technical specifications

Potentiometer-input	
Measuring range	0 ... 100 Ohm up to 0 ... 100 kOhm
Feeding voltage	~ 1V DC
Output current	
Output range	0 ... 20 mA, 4 ... 20 mA[1]
Max. burden	500 Ohm
Residual ripple	20 µAss
Output voltage	
Output range	0 ... 10 V, 2 ... 10 V [1]
Min. burden	500 Ohm
Residual ripple	50 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	2,2 VA / 1,1 W
Transmission behaviour	
Accuracy	< 0,2 %
Temperature influence	50 ppm/K
Response time	~ 200 ms
Housing	
Dimensions (WxHxD)	23x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [2]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Signal / supply unit	4 kV (1 min.)
Protection circuits	
Input	electrical surge protection
Output	electrical surge protection
Power supply	electrical surge and reverse current protection

[1] Specify signal range in plain text when ordering.

[2] During electromagnetic disturbance minor changes in output signal are possible.

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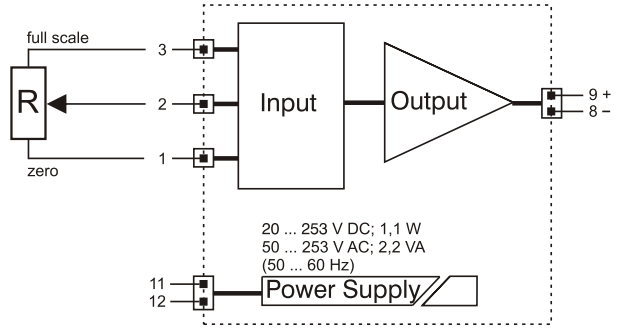
Measuring Converter

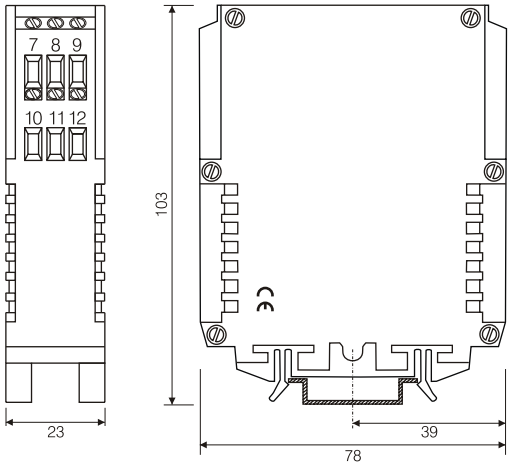
Measuring Transducer For Potentiometer

AD-MV 110 GS

Block and wiring diagram



Dimensions



Multifunction Transducer

Temperature Measuring Converter

AD-MV 550 GVD

Description

The digital temperature measuring transformer AD-MV 550 GVD serves the galvanic separation and transformation of resistance transmitter or thermocouples to an impressed output signal (i.e. 0-20 mA). All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional control panel AD-VarioControl or via the programming software AD-Studio. Due to its current-sinking output, transmitter signals can also be galvanic separated or transformed. The wide range power pack covers all supply regions.

Specific characteristics

- Resistance thermometer inputs, types Pt/Ni 100, Pt/Ni 500, Pt/Ni 1000
- Thermocouples inputs, types J, T, K, E, N, S, R, B, C or inputs a mV/T-characteristic curve. Selectable internal or external reference junction
- A bipolar mV-Voltage input. Free linearizing curves possible.
- bipolar current or voltage output
- current sink output
- Operating module as an accessory
- 23 mm narrow housing with detachable terminal clamp

Business data

Order number

Temperature Measuring Converter	AD-MV 550 GVD

Accessory (optional)

Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Resistance thermometer inputs Pt100, Pt500, Pt1000 to DIN EN 60751

Measuring range	-200 ... +850 °C
Connection method	2-, 3- oder 4-wire system
Accuracy	0,5 K
Smallest measuring spans	20 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	
Pt100	1 mA
Pt500, Pt1000	210 µA

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Resistance thermometer inputs Ni100, Ni500, Ni1000 to DIN EN 43760

Measuring range	-60 ... +230 °C
Connection method	2-, 3- oder 4-wire system
Accuracy	0,5 K
Smallest measuring spans	20 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	
Ni100	1 mA
Ni500, Ni1000	210 µA

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Thermocouples

Comparative place:	
Internal	measurement with LM35 in the device connecting terminals
External	Cold junction temperature selectable by parameters
Measuring range type J	-200 ... +1200 °C
To DIN EN 60584:	
Measuring range type T	-200 ... +400 °C
Measuring range type K	-200 ... +1360 °C
Measuring range type E	-200 ... +1000 °C
Measuring range type N	-200 ... +1300 °C
Measuring range type S	-40 ... +1760 °C
Measuring range type R	-40 ... +1760 °C
Measuring range type B	+400 ... +1800 °C
After standard ASTM E988:	
Measuring range type C	0 ... +2320 °C
Smallest measuring spans	100 K

Voltage inputs

Measuring range	-18 ... +18 mV
	-36 ... +36 mV
	-72 ... +72 mV
	-144 ... +144 mV

Printed 23.08.2022 We reserve the right for technical changes.

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Multifunction Transducer

Temperature Measuring Converter AD-MV 550 GVD

Technical specifications

Output current

Max. output range	-21,5 ... 21,5 mA DC
Max. burden	400 Ohm
Residual ripple	40 µAss

Output voltage

Max. output range	-10,5 ... 10,5 V DC
Min. burden	10 kOhm
Residual ripple	30 mVss

Current sink output

Current sink	0/4 ... 20 mA DC
Max. voltage to be applied	35 V DC

Resolution

Input	16 bit
Output	12 bit

Transmission behaviour

Linearity error	0,2 % of full scale
Rise time	600 ms (output auf 90 %)
Temperature influence	+/- 100 ppm/K of full scale

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	2,4 VA / 1,2 W

Housing

Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)] During electromagnetic disturbance minor changes in output signal are possible.

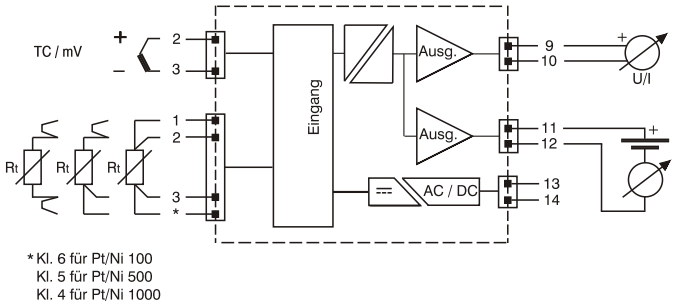
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

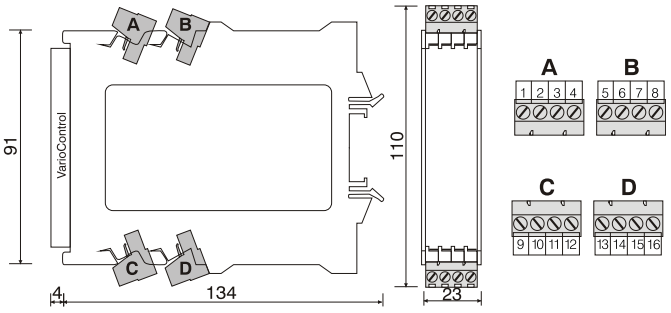
Input/output	2,5 kV (1 min)
Signal/auxiliary voltage	4 kV (1 min)

Block and wiring diagram



* Kl. 6 für Pt/Ni 100
Kl. 5 für Pt/Ni 500
Kl. 4 für Pt/Ni 1000

Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.

The Modbus master can read out the individual registers of the AD-MB 550 GVD via the addresses.

The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40801	2	Input signal	Ohm / mV	7	1	0
40803	2	Cold-junction temperature	°C	7	1	0
40805	2	Scaled input	°C / …	7	1	0
40905	2	Output signal 2	mA	7	1	1
40907	2	Output signal 1	mA / V	7	1	0

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Measuring Converter

Pt100 Converter

AD-MV 50 GX

AD-MV 54 GX

Description

The measuring value amplifier AD-MV 50 GX (for 2/3 lead technology) or AD-MV 54 GX (for 4-lead technology only) converts the measuring signal issued from a resistance generator Pt 100 (according to DIN IEC 751) to an impressed output signal (i.e. 0-20 mA or similar). The output characteristic curve is issued temperature linear. When using the 3-lead switching lead, resistance up to 100 Ohms are compensated. In 2-lead switching a subsequent zero alignment and full alignment via trim potentiometers at the front is possible. The analogue output signal is galvanically separated from the supply voltage. A highly efficient, integrated electronic wide-range power pack (ALLPOWER) enables operation with 18-30V DC. The power supply is independet of polarity.A high packing density is achieved due to its narrow build.
Temperature range and output must be defined when ordering equipment.

Application

Temperature measuring with Pt 100 temperature transmitter for continuous transformation of temperature variables to analogue signals.

Specific characteristics

- Pt 100 signal conversion into standard signals
- wide range power supply
- conversion of 2, 3-wire technology (MV50GX)
- conversion of 4-wire technology (MV54GX)
- narrow design
- operating display with green LED

Business data

Order number

AD-MV 50 GX	for 2 - and 3-wire connection
AD-MV 54 GX	for 4-wire connection

Accessory

DIN-rail connector	AD-GX Connector

Technical specifications

Pt100 input

Max. measuring range	-200 ... 850 °C [1]
Connection method	2, 3 or 4-wire

Output current

Output range	0 ... 20 mA, 4 ... 20 mA[1]
Max. burden	400 Ohm
Residual ripple	20 µAss

Output voltage

Output range	0 ... 10 V[1]
Min. burden	10 kOhm
Residual ripple	10 mVss

Supply

Voltage range DC	18 ... 30 V DC
Nominal voltage DC	24 V DC
Power consumption DC	650 mW

Transmission behaviour

Accuracy	< 0,2 %
Linearity error	< 0,2 %
Temperature influence	100 ppm/K
Response time	~ 50 ms

Housing

Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 70 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... +70 °C (avoid condensation)

EMC

Product family standard [2]	EN 61326-1
Emission [3]	EN 55011, CISPR11 Cl. A, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Signal / supply unit	1,5 kV (1 min.)

Protection circuits

Input	electrical surge protection
Output	electrical surge protection
Power supply	electrical surge and reverse current protection

[1] Specify signal range in plain text when ordering.

[2] During electromagnetic disturbance minor changes in output signal are possible.

[3] Warning:
This device is not intended to be used in residential areas and can not ensure adequate protection of radio reception in such environments.

Printed 23.08.2022 We reserve the right for technical changes.

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Measuring Converter

Pt100 Converter

AD-MV 50 GX

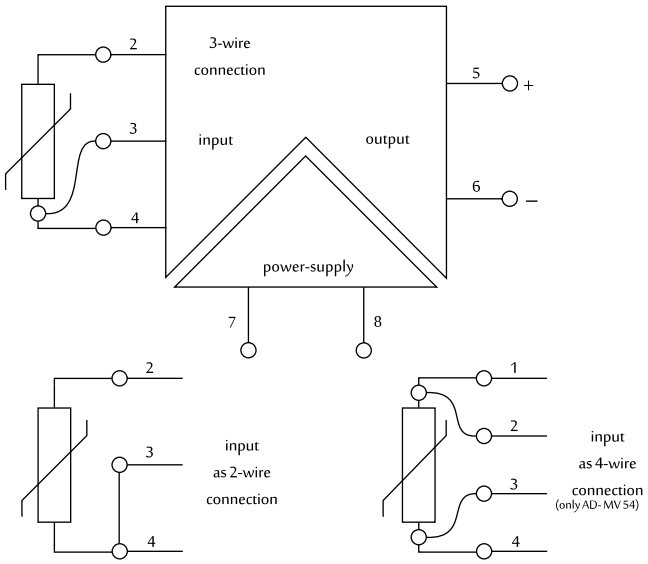
AD-MV 54 GX

Display and operating elements

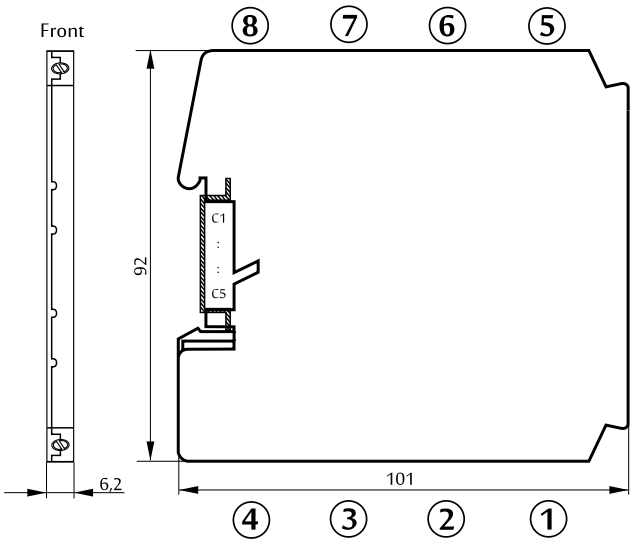
Front

Designation	Meaning
On	LED green, Power supply
N	Trimmer 0 %-Value
V	Trimmer 100 %-Value

Block and wiring diagram



Dimensions



Measuring Converter

Pt100 Converter

AD-MV 50 GL

AD-MV 54 GL

Description

The measuring value amplifier AD-MV 50 GL (for 2/3 lead technology) or AD-MV 54 GL (for 4-lead technology only) converts the measuring signal issued from a resistance generator Pt 100 (according to DIN IEC 751) to an impressed output signal (i.e. 0-20 mA or similar). The output characteristic curve is issued temperature linear. When using the 3-lead switching lead, resistance up to 100 Ohms are compensated. In 2-lead switching a subsequent zero alignment and full alignment via trim potentiometers at the front is possible. The analogue output signal is galvanically separated from the supply voltage. A highly efficient, integrated electronic wide-range power pack (ALLPOWER) enables operation with 20-253V DC and 50-253V AC. There is no possibility of cross polarity of the connection voltage. A high packing density is achieved due to its narrow build.

Application

Temperature measuring with Pt 100 temperature transmitter for continuous transformation of temperature variables to analogue signals.

Specific characteristics

- Pt 100 conversion into standard signals
- current or voltage output
- Wide range power supply
- Conversion of 2, 3 and 4-wire technology possible

Business data

Order number

AD-MV 50 GL	for 2 - and 3-wire connection
AD-MV 54 GL	for 4-wire connection

Technical specifications

Pt100 input	
Max. measuring range	-200 ... 800 °C [1]
Connection method	2, 3 or 4-wire
Output current	
Output range	0 ... 20 mA, 4 ... 20 mA[1]
Max. burden	400 Ohm
Residual ripple	25 µAss
Output voltage	
Output range	0 ... 10 V, 2 ... 10 V [1]
Min. burden	1 kOhm
Residual ripple	50 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 VAC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	1,8 VA / 1W
Transmission behaviour	
Accuracy	< 0,2 %
Temperature influence	100 ppm/K
Response time	~ 50 ms
Housing	
Dimensions (WxHxD)	18x81x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [2]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Signal / supply unit	3 kV (1 min.)
Protection circuits	
Input	electrical surge protection
Output	electrical surge protection
Power supply	electrical surge and reverse current protection

[1] Specify signal range in plain text when ordering.

[2] During electromagnetic disturbance minor changes in output signal are possible.

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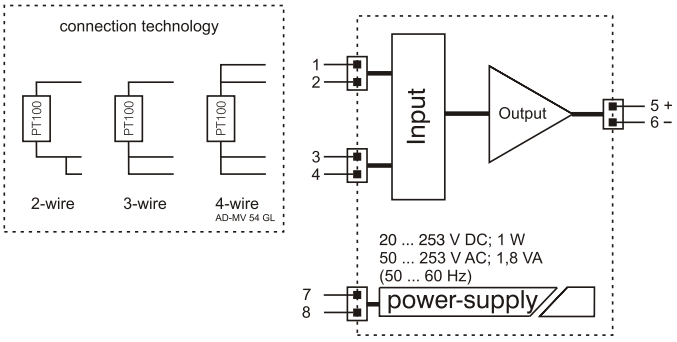
Measuring Converter

Pt100 Converter

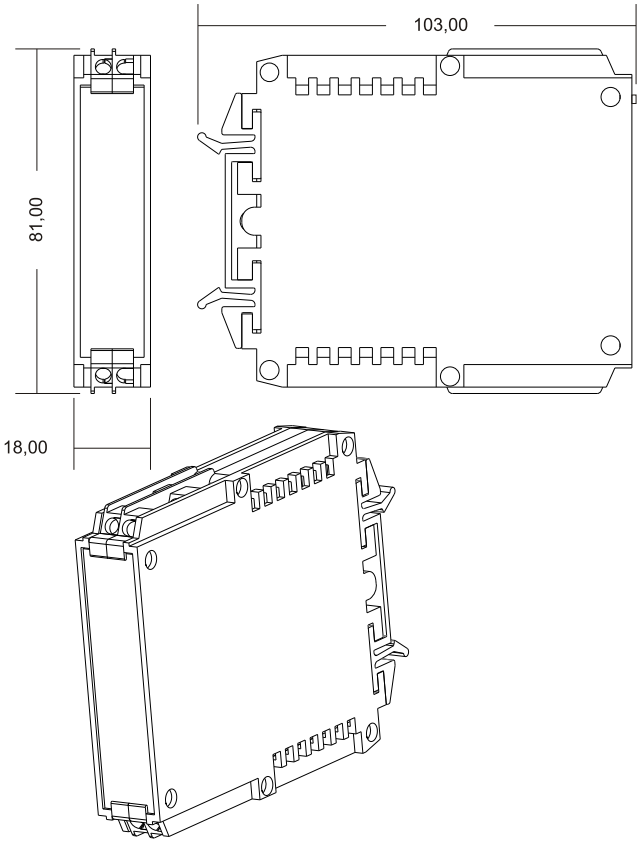
AD-MV 50 GL

AD-MV 54 GL

Block and wiring diagram



Dimensions



Temperature-Input-Bus-Converter

AD-MV 55 GX

Description

The digital temperature measuring converter of series AD-MV55 GX are freely programmable digital measuring transducer with RS485 interface. Device addresses from 1 to 99 can be set via the laterally accessible address switches. The input of all characteristics directly on the device, or use the configuration software "AD-Studio". The device fulfils all tasks of a universal measuring value recording through integral function modules such as selectable relay functions, simulation modus, free linearizing curves and a wide range of supply voltage. The operating voltage is indicated by a green LED. The data communication is signaled by a yellow LED. Invalid measurement signals outside the defined measuring range are detected. In this case, the green LED flashes. The power supply as well as the RS485 bus interface is possible via the rear DIN rail connector.

Specific characteristics

- Resistance thermometer inputs, types Pt/Ni 100, Pt/Ni 500, Pt/Ni 1000
- Thermocouples inputs, types J, T, K, E, N, S, R, B, C or inputs a mV/T-characteristic curve. Selectable internal or external reference junction
- A bipolar mV-Voltage input. Free linearizing curves possible.
- Freely definable scaling of the quantity to be measured through stating range, decimal point position and unit from the list or defined unit.
- Zoom function, expanded scale, linearizing, inverse modus.
- Non-volatile saving of all set parameters.

Business data

Order number	AD-MV 55 GX

Technical specifications

Resistance thermometer inputs Pt100, Pt500, Pt1000 to DIN EN 60751

Measuring range	-200 ... +850 °C
Connection method	2-, 3- oder 4-wire system
Resolution	16 Bit
Accuracy	0,5 K
Smallest measuring spans	30 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	
Pt100	1 mA
Pt500, Pt1000	210 µA

[1] With 2-conductor the line resistance comes as an offset into the measurement.

Resistance thermometer inputs Ni100, Ni500, Ni1000 to DIN EN 43760

Measuring range	-60 ... +230 °C
Connection method	2-, 3- oder 4-wire system
Resolution	16 Bit
Accuracy	0,5 K
Smallest measuring spans	30 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	
Ni100	1 mA
Ni500, Ni1000	210 µA

[1] With 2-conductor the line resistance comes as an offset into the measurement.

Thermocouples

Comparative place:	
Internal	measurement with LM35 in the device connecting terminals
External	Cold junction temperature selectable by parameters
Resolution	16 Bit
Accuracy	0,2 % of measuring range
Measuring range type J	-200 ... +1200 °C
To DIN EN 60584:	
Measuring range type T	-200 ... +400 °C
Measuring range type K	-200 ... +1360 °C
Measuring range type E	-200 ... +1000 °C
Measuring range type N	-200 ... +1300 °C
Measuring range type S	-40 ... +1760 °C
Measuring range type R	-40 ... +1760 °C
Measuring range type B	+400 ... +1800 °C
After standard ASTM E988:	
Measuring range type C	0 ... +2320 °C
Smallest measuring spans	100 K

Voltage inputs

Measuring range	-18 ... +18 mV
	-36 ... +36 mV
	-72 ... +72 mV
	-144 ... +144 mV
Resolution	16 Bit
Accuracy	0,2 % of measuring range

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Temperature-Input-Bus-Converter AD-MV 55 GX

Technical specifications

Transmission behaviour

Sampling rate	1 measure/s
Temperature influence	+/-100 ppm/K of full scale

RS485-Bus

Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no spur lines)
Cable	twisted and shielded

LEDs

Green [On]	Supply (blinking on error)
Yellow [D]	RS485 Communication

Controls

Address switch	10 + 1

Supply

Supply voltage	18 ... 30 V DC
Max power consumption at 24V DC	300 mW

Housing

Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Manner of fastening	DIN rail mounting 35mm, EN 50022
Type of protection	IP 20
Connection method	screw clamp
Bolting torque terminals	0,5 Nm
Wire cross section	max. 2,5 mm²
Weight	~ 70 g

Environmental conditions

Permissible ambient temperature	-10 ... +50 °C
Storage and transport	-10 ... +70 °C (no condensation)

EMC

Product family standard [2]	EN 61326-1
Emission [3]	EN 55011, CISPR11 Cl. A, Gr. 1

[2] During electromagnetic disturbance minor changes in output signal are possible.

[3] Warning:
This device is not intended to be used in residential areas and can not ensure adequate protection of radio reception in such environments.

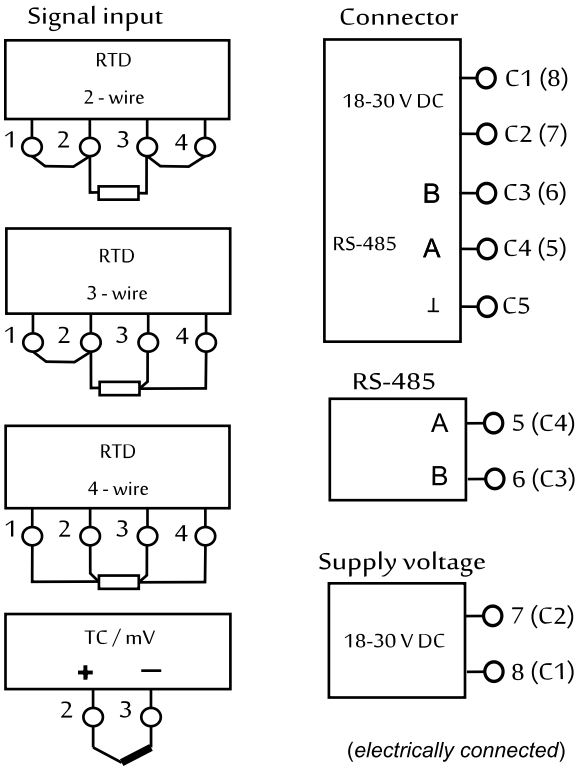
Electrical safety requirements

Product family standard	EN 61010-1

Galvanic isolation, test voltages

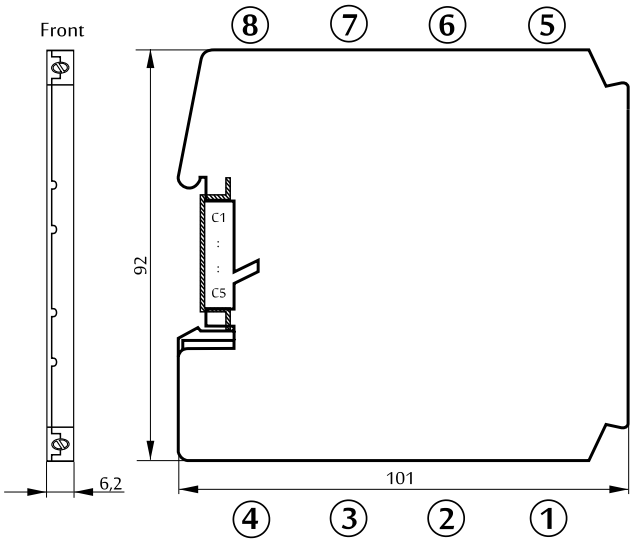
Signal / supply unit	1,5 kV, 50 Hz (1 min.)
Signal / RS485 bus	no galvanic isolation

Block and wiring diagram



(*electrically connected*)

Dimensions



Temperature-Input-Bus-Converter AD-MV 55 GX

Modbus Communikation

The AD-MV 55 GX has an RS485 bus interface on which the Modbus RTU protocol is used. About this bus interface all measured data of the device can be read. The preset standard data format is 19200,e,8,1. Adaptation to a different data format is possible at any time. The bus address (1...99) is set to the side-mounted rotary switches. The address 0 is not permitted for the bus operation. However, on this zero position the device only via the standard data format (19200, e, 8.1) accessible. The position 0 thus represents a service position, the example can be used during parameterization error.

The AD-MV 55 GX supports two Modbus functions. These are the functions **"Read Holding Registers" (0x03)** and **"Write Holding Registers" (0x10)**. With the **"Read Holding Registers"** function data can be read from the device and written with **"Write Holding Registers"** data. The individual register width is 16 bits. Please see the Modbus specification for detailed explanations of the Modbus communication. This is online available for free, but can also be purchased from the Adamczewski homepage.

The following Modbus data are accessible via the RS485 bus:

Start address	Reg. number	Name	Unit	Datatype	[Code] = Value	read	write
Observations:							
40113	1	signal status	keine	U16	0 / 1 / 2 / 4	yes	no
40851	2	signal value	°C / mV	float	####,#	yes	no
40852	6	scale unit	°C / mV	string	unit	yes	no
40811	2	terminal temperature	°C	float	##,####	yes	no
Parameters:							
43101	2	filter value	numeric	float	seconds	yes	yes
43001	1	signal type	list	U16	[0]=RTD; [1]= TC; [2]=mV	yes	yes
43002	1	RTD type	list	U16	RTD-Liste	yes	yes
43003	1	RTD connectivity	list	U16	2-3-4-Leiter	yes	yes
43201	2	range begin Pt100	°C	float	-200...+850	yes	yes
43301	2	range end Pt100	°C	float	-200...+850	yes	yes
43202	2	range begin Pt500	°C	float	-200...+850	yes	yes
43302	2	range end Pt500	°C	float	-200...+850	yes	yes
43203	2	range begin Pt1000	°C	float	-200...+850	yes	yes
43303	2	range end Pt1000	°C	float	-200...+850	yes	yes
43204	2	range begin Ni100	°C	float	-60...+230	yes	yes
43304	2	range end Ni100	°C	float	-60...+230	yes	yes
43205	2	range begin Ni500	°C	float	-60...+230	yes	yes
43305	2	range end Ni500	°C	float	-60...+230	yes	yes
43206	2	range begin Ni1000	°C	float	-60...+230	yes	yes
43306	2	range end Ni1000	°C	float	-60...+230	yes	yes
43207	2	range begin R/T	°C	float	-200...1500	yes	yes
43307	2	range end R/T	°C	float	-200...1500	yes	yes
43401	2	R/T characteristic X1	Ohm	float	0...4000	yes	yes
43425	2	R/T characteristic Y1	°C	float	-200...1500	yes	yes
43400 + n	2	R/T characteristic Xn	Ohm	float	0...4000	yes	yes
43424 + n	2	R/T characteristic Yn	°C	float	-200...1500	yes	yes
43424	2	R/T characteristic X24	Ohm	float	0...4000	yes	yes
43448	2	R/T characteristic Y24	°C	float	-200...1500	yes	yes
43004	1	TC type	list	U16	TC-Liste	yes	yes
43005	1	junction	list	U16	[0]=int.; [1]=ext.	yes	yes
43102	2	junction temperature	°C	float	0...100	yes	yes
43208	2	range begin Typ J	°C	float	-200...+1200	yes	yes
43308	2	range end Typ J	°C	float	-200...+1200	yes	yes
43209	2	range begin Typ T	°C	float	-200...+400	yes	yes
43309	2	range end Typ T	°C	float	-200...+400	yes	yes
43210	2	range begin Typ K	°C	float	-200...+1360	yes	yes
43310	2	range end Typ K	°C	float	-200...+1360	yes	yes
43211	2	range begin Typ E	°C	float	-200...+1000	yes	yes
43311	2	range end Typ E	°C	float	-200...+1000	yes	yes
43212	2	range begin Typ N	°C	float	-200...+1300	yes	yes
43312	2	range end Typ N	°C	float	-200...+1300	yes	yes
43213	2	range begin Typ S	°C	float	-40...+1760	yes	yes
43313	2	range end Typ S	°C	float	-40...+1760	yes	yes
43214	2	range begin Typ R	°C	float	-40...+1760	yes	yes
43314	2	range end Typ R	°C	float	-40...+1760	yes	yes
43215	2	range begin Typ B	°C	float	+400...+1800	yes	yes
43315	2	range end Typ B	°C	float	+400...+1800	yes	yes
43216	2	range begin Typ C	°C	float	0...+2320	yes	yes
43316	2	range end Typ C	°C	float	0...+2320	yes	yes

43217	2	range begin U/T	°C	float	-200...+2500	yes	yes
43317	2	range end U/T	°C	float	-200...+2500	yes	yes
43449	2	U/T characteristic X1	mV	float	-144...144	yes	yes
43473	2	U/T characteristic Y1	°C	float	-200...1500	yes	yes
43448 + n	2	U/T characteristic Xn	mV	float	-144...144	yes	yes
43472 + n	2	U/T characteristic Yn	°C	float	-200...1500	yes	yes
43472	2	U/T characteristic X24	mV	float	-144...144	yes	yes
43496	2	U/T characteristic Y24	°C	float	-200...1500	yes	yes
42997	1	baud rate	index	U16	see list below	yes	yes
42998	1	parity		U16	[0]=even; [1]=odd; [2]=no	yes	yes

Coding baudrate list

index	0	1	2	3	4	5	6	7	8	9
baud	2400	4800	9600	14400	19200	28800	38400	57600	76800	115200

Measuring Converter

Pt100 Converter

AD-MV 500 GL

Description

The measuring value transformer AD-MV 500 GL transforms the measuring signal emitted from a resistance thermometer (Pt 100) to an impressed output signal (i.e. 4...20 mA, 0...10 V o.a.). The output characteristic is outputted temperature-linear. When using the 3- or 4-conductor switching, the conductor resistances are compensated up to 100 Ohm. With 2-conductor switching, a subsequent zero balance and full balance is necessary. The measuring process can be set via easily accessible DIP switches at the front. The analogue output signal is always galvanic separated from the supply voltage and also from the input. Input and output data must be stated in clear text when ordering. With the input, the temperature measuring range must be stated and with the output, as alternative, current or voltage output can be selected.

Application

Temperature measuring with Pt100 temperature transmitter for continuous transformation of temperature variables to analogue signals.

Specific characteristics

- Pt100 input
- current or voltage output
- type of connection selectable over DIP switch on the front-panel
- galvanic isolation between input, output and power-supply
- Trimmer for fine adjustment on the front-panel

Business data

Order number	AD-MV 500 GL

Technical specifications

Pt100 input	
Max. measuring range	-200 ... 800 °C [1]
Connection method	2, 3 or 4-wire
Output current	
Output range	0 ... 20 mA, 4 ... 20 mA[1]
Max. burden	400 Ohm
Residual ripple	50 µAss
Output voltage	
Output range	0 ... 10 V, 2 ... 10 V [1]
Min. burden	1 kOhm
Residual ripple	70 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 VAC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	2 VA / 1W
Transmission behaviour	
Accuracy	< 0,2 %
Temperature influence	100 ppm/K
Response time	~ 50 ms
Housing	
Dimensions (WxHxD)	18x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [2]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Input / output	3,75 kV (1 min.)
Signal / supply unit	4 kV (1 min.)
Protection circuits	
Input	electrical surge protection
Output	electrical surge protection
Power supply	electrical surge and reverse current protection

[1] Specify signal range in plain text when ordering.

[2] During electromagnetic disturbance minor changes in output signal are possible.

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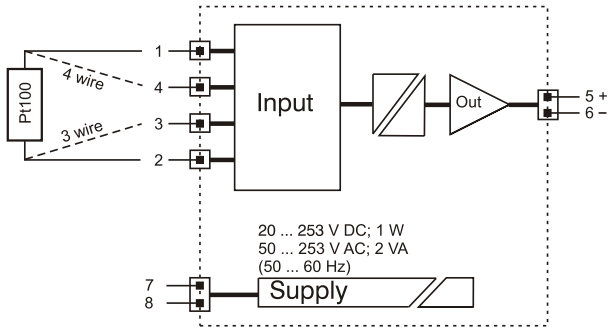
Measuring Converter

Pt100 Converter

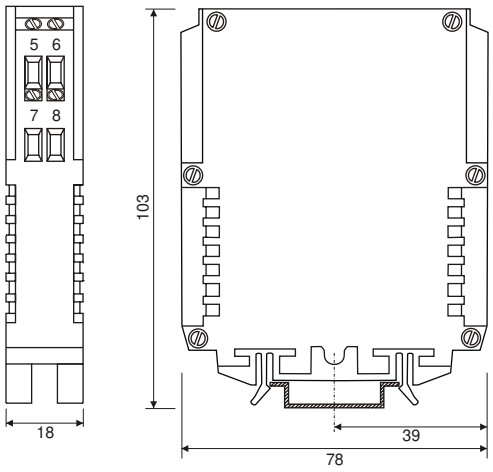
AD-MV 500 GL

Block and wiring diagram



DIP-switch function table			
measure	S1.1	S1.2	S1.3
2-wire	0	1	1
3-wire	0	1	0
4-wire	1	0	0

Dimensions



Multifunction Transducer

AD-VC 1 GVD

Description

The digital multi-function measuring transformers of series VarioCheck AD-VC 1 are freely programmable digital measuring transducers with two analogue outputs and up to 2 limiting value relays. Extensive standard equipment and additional options solve almost all imaginable tasks of a modern evaluation. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating modul AD-VarioControl or via the programming software AD-Studio. VarioCheck AD-VC 1 fulfils all tasks of a universal and secure measuring value recording through integral function modules such as limiting value messages, freely adjustable hysteresis, selectable relay functions, time-delayed switching, automatic or manual simulation modus, free linearizing curves and a wide range of supply voltage.

Specific characteristics

- bipolar current input
- bipolar mV voltage input
- voltage input
- Power supply for 2-wire transmitters
- Thermocouples inputs, types J, T, K, E, N, S, R, B, C; internal or external reference junction
- Resistance thermometer inputs, types Pt/Ni 100, Pt/Ni 500, Pt/Ni 1000
- Resistance, Potentiometer input
- Sensor error detection for thermocouples and resistance thermometers
- Input of a characteristic curve possible
- Automatic or manual simulation operation
- 2 bipolar current or voltage output
- 23 mm narrow housing with detachable terminal clamp
- Operating module AD-VarioControl as an accessory

Business data

Order number	
AD-VC1 GVD-R0	without relay
AD-VC1 GVD-R2	two relays
Accessory (optional)	
Operating module	AD-VarioControl
Control panel with RS-485	AD-VarioConnect
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current	
Measuring range	-24 ... + 24 mA DC
Input resistance	20 Ohm
Basic accuracy	4 µA
Transmitter supply	
Off-load voltage	24,0 V
Voltage at 20mA	18,0 V
Current limit	~ 25 mA
Input voltage	
Measuring ranges	0 ... + 12 V DC
Input resistance	1 MOhm
Basic accuracy	1 mV
Input voltage mV	
Measuring ranges	-15 ... +15 mV -30 ... +30 mV -60 ... +60 mV -125 ... +125 mV -250 ... +250 mV
Input resistance	1 MOhm
Basic accuracy	20 µV
Thermocouples	
Comparative place:	
Internal	measurement with sensor in the device connecting terminals
External	Cold junction temperature selectable by parameters
To DIN EN 60584:	
measuring range type J	-200 ... +1200 °C
measuring range type T	-200 ... +400 °C
measuring range type K	-200 ... +1360 °C
measuring range type E	-200 ... +1000 °C
measuring range type N	-200 ... +1300 °C
basic accuracy	1 K
To DIN EN 60584:	
measuring range type S	-40 ... +1760 °C
measuring range type R	-40 ... +1760 °C
measuring range type B	+400 ... +1800 °C
basic accuracy	2 K
After standard ASTM E988:	
measuring range type C	0 ... +2320 °C
basic accuracy	2 K

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Multifunction Transducer

AD-VC 1 GVD

Technical specifications

Resistance input

Resistance thermometer inputs DIN EN 60751: Pt100, Pt500 and Pt1000 DIN 43760: Ni100, Ni500 and Ni1000

measuring range Pt	-200 ... +850 °C
measuring range Ni	-60 ... +230 °C
smallest measuring spans	20 K
short circuit detection	< 20 Ohm
basic accuracy	0,2 K
Linear resistance	
measuring range	0 ... 4000 Ohm
basic accuracy	0,1 Ohm
Connection method	2-, 3- oder 4-wire system
Sensor supply	100 µA
Max line resistance [1)]	50 Ohm/cable

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Potentiometer input

Connection method	3-wire system
Max. Resistance	50 Ohm ... 100 kOhm
Sensor supply	<=500µA

Current outputs

Max. output range	-21,5 ... 21,5 mA DC
Max. burden	400 Ohm
Residual ripple	20 µAss

Voltage outputs

Max. output range	-10,5 ... 10,5 V DC
Min. burden	10 kOhm
Residual ripple	10 mVss

Relay outputs A/B

Contact type	potential free changeover
Max. AC-breaking capacity	250 V AC, 2 A AC, 50Hz
Max. DC-breaking capacity	50 V DC, 2 A DC
Switching operations	
Mechanical	10^7
AC: 230V / 2A, cos(phi)=1	$6 * 10^5$
AC: 230V / 2A, cos(phi)=0,4	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$

Transmission behaviour

Linearity error	< 0,2 % of the measuring range
Rise time	500 ms (0...90 %, 100...10 %)
Rise time (temperature input)	< 1s (0...90 %, 100...10 %)
Temperature influence	+/- 100 ppm/K of the measuring range

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Voltage range DC	20 ... 253 V DC
Nominal voltage AC / DC	230 V AC / 24 V DC
Power consumption AC / DC	5,2 VA / 3,2 W
Power consumption with operating module AC / DC	5,4 VA / 3,6 W

Housing

Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

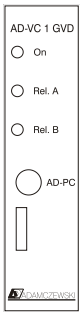
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

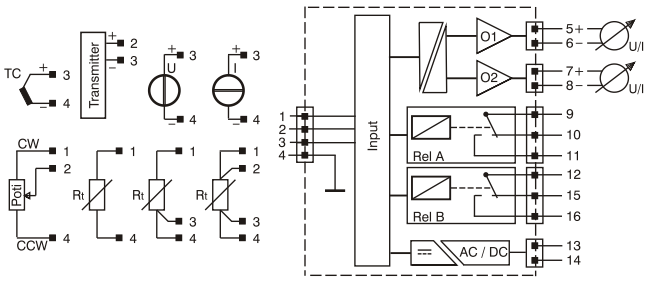
Input to output	2,5 kV (1 min)
In-/output to auxiliary voltage	4 kV (1 min)

Display and operating elements

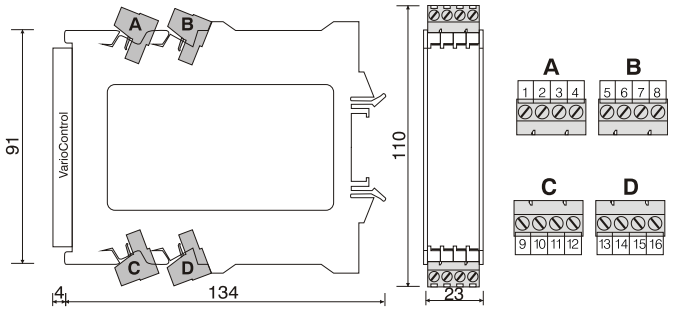


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits
Rel: two LEDs for relays A and B in red
on - relay activated
AD-PC: Communication interface for configuration by a PC
Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-VC 1 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40101	2	Input signal	InUnit	7	1	0
40103	2	Cold-junction temperature	°C	7	1	0
40301	2	Output signal 1	OutUnit	7	1	1
40303	2	Output signal 2	OutUnit	7	1	1
40601	1	Relay state A		3	1	1
40602	1	Relay state B		3	1	1
40801	2	Scaled input	ScUnit	7	1	0

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Limit Switch

Vario - Limit Switch

AD-MK 350 GVD

Description

The limit switch AD-MK 350 GVD serves the switching of limiting values on analogue signals, transmitter signals and resistance thermometer. If a 2-wire transmitter is connected, it will be supplied directly through a galvanic separated and current limited supply voltage. The device has analogue inputs for current, voltage and resistance thermometer, which can be utilised alternatively. The AD-MK 350 GVD can switch maximally two independent limiting values with its two potential-free change-over contacts. The switching thresholds and operating modes can be freely parameterized. This can be carried out via the optional control panel AD-VarioControl or via the programming software AD-Studio. The status of the relevant relay is indicated via LED at the front or at the operating module AD-VarioControl.

Application

Switching limit values to active analog signals, 2- / 3-wire transmitters, and resistance thermometers, e.g. Flows, heights or temperatures.

Specific characteristics

- bipolar current input (+/- 0.5 mA to +/- 50 mA)
- bipolar voltage input (+/- 1 V to +/- 100 V)
- power supply of 2- / 3-wire transmitters
- two potential-free change-over contacts
- operating module as an accessory
- 23mm narrow housing with detachable terminal clamp

Business data

Order number

Vario - Limit Switch	AD-MK 350 GVD

Accessory (optional)

Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current

Measuring range	-50 ... + 50 mA DC
Input resistance	40 Ohm
Resolution	16 Bit
Accuracy	0,1 % of full scale

Input voltage

Measuring range	-100 ... + 100 V DC
Input resistance	1 MOhm
Resolution	16 Bit
Accuracy	0,1 % of full scale

Transmitter supply

Off-load voltage	24,5 V
Voltage at 20mA	17,5 V
Current limit	~ 25 mA

Resistance thermometer inputs Pt100, Pt500, Pt1000 to DIN EN 60751

Measuring range	-200 ... +850 °C
Connection method	2-, 3- oder 4-wire system
Resolution	16 Bit
Accuracy	0,6 K
Smallest measuring spans	20 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	310 µA

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Resistance thermometer inputs Ni100, Ni500, Ni1000 to DIN EN 43760

Measuring range	-60 ... +230 °C
Connection method	2-, 3- oder 4-wire system
Resolution	16 Bit
Accuracy	0,6 K
Smallest measuring spans	20 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	310 µA

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Relay outputs A/B

Contact type	potential free changeover
Max. AC-breaking capacity	250 V AC, 2 A AC, 50Hz
Max. DC-breaking capacity	50 V DC, 2 A DC
Switching operations	
Mechanical	10^7
AC: 230V / 2A, cos(phi)=1	$6 * 10^5$
AC: 230V / 2A, cos(phi)=0,4	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$

Transmission behaviour

Rise time	500 ms (output auf 90 %)
Temperature influence	+/- 100 ppm/K of full scale

Printed 23.08.2022 We reserve the right for technical changes.

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Limit Switch

Vario - Limit Switch

AD-MK 350 GVD

Technical specifications

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	4 VA / 2,4 W

Housing

Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)] During electromagnetic disturbance minor changes in output signal are possible.

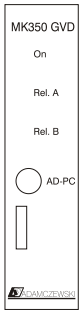
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	2,5 kV (1 min)
Signal/auxiliary voltage	3 kV (1 min)

Display and operating elements

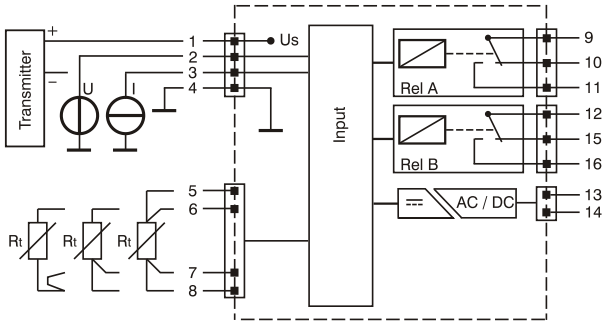


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits
Rel: two LEDs for relays A and B in red
on - relay activated

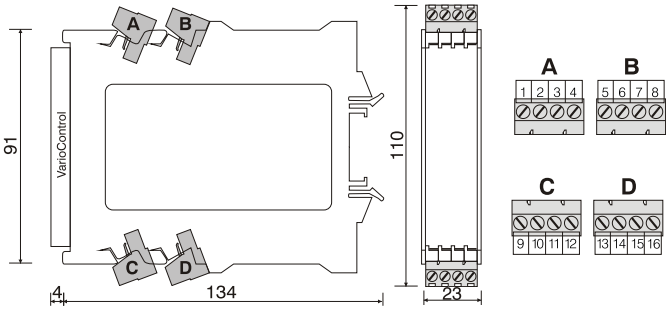
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-MK 350 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40607	2	Input signal	mA / V / Ohm	7	1	0
40609	2	Scaled input	°C / ?	7	1	0

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Limit Switch

Limit-switch For Standard Signals

AD-MK 330 GS

Description

The measuring contactor AD-MK 330 GS serves the switching of limiting values to analogue signals or standard signals. The device has an 0..20 mA, 4..20 mA input and an 0..10 V input, which can be used alternatively. With its two potential-free change-over contacts, the AD-MK 330 GS can switch maximal two independent limiting values. The switching thresholds can be set at the front with the aid of the integral key coding switch in percent steps. The status of the relevant relay is indicated via an LED at the front. The AD-MK 330 GS has two different operating modes, which can be selected via the function keys. Either two independent limiting values can be switched, whereby here one key coding switch per relay is effective. The switching hysteresis is in this case 1 percent. In operating mode hysteresis, both relays are synchronous. Here, the upper and lower switching point (switch-on point and switch-off point) can be selected separately with the two key coding switches. The relays can work in the operating current principle or the closed-circuit current principle in both operating modes. This can also be selected at the function keys. The efficient wide range power pack allows the supply with all established supply networks or voltage levels. Input, output and supply voltage are separated from each other galvanically with high isolation.

Application

Switching of limiting values on active standard signals, which correspond to, for instance, flows, height levels or temperatures.

Specific characteristics

- analog inputs for current and voltage
- two potential-free changeover
- simple point setting using coded key
- wide range power supply
- no software
- status LED

Business data

Order number	AD-MK 330 GS

Technical specifications

Current inputs

Measuring range	0 ... 20 mA / 4 ... 20 mA
Input resistance	50 Ohm

Input voltage

Measuring range	0 ... 10 V
Input resistance	400 kOhm

Relay outputs A/B

Contact type	potential free changeover
Max. AC-breaking capacity	250 V AC, 2 A AC, 50Hz
Max. DC-breaking capacity	50 V DC, 2 A DC
Switching operations	
Mechanical	10^7
AC: 230V / 2A, cos(phi)=1	$6 * 10^5$
AC: 230V / 2A, cos(phi)=0,4	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$

Transmission behaviour

Setting accuracy	1 % (1 Digit)
Accuracy switching threshold	max. +/- 1 % from end value
Temperature influence	+/- 100 ppm/K of full scale
Factory switching hysteresis	Switching threshold - 1 % of end value
Response time	~ 100 ms

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	2,3 VA / 1,5 W

Housing

Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Connection method	screw clamp
Bolting torque terminals	0,5 Nm
Weight	~ 200 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 60 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)] During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/relays	4 kV (1 min)
Input/power-supply	3 kV (1 min)
Relays/power supply	4 kV (1 min)
Relays with each other	3 kV (1 min)

Protective systems

Input	overvoltage
Power supply	Overvoltage, overtemperature

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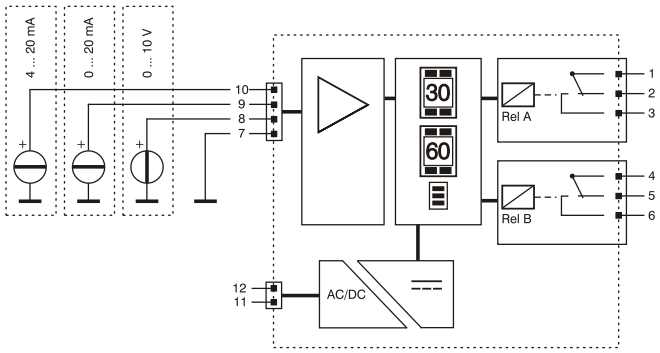
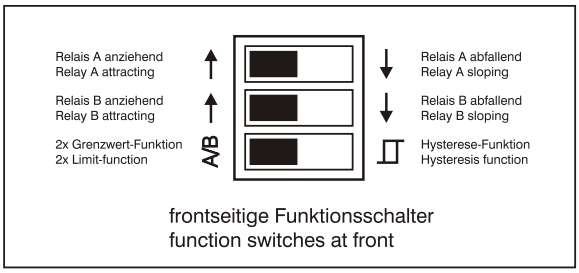
Limit Switch

Limit-switch For Standard Signals

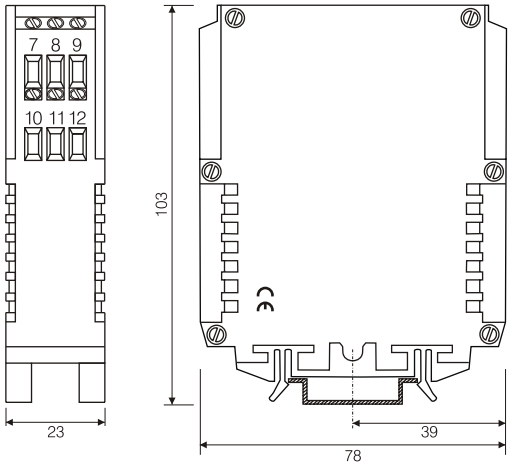
AD-MK 330 GS

Block and wiring diagram

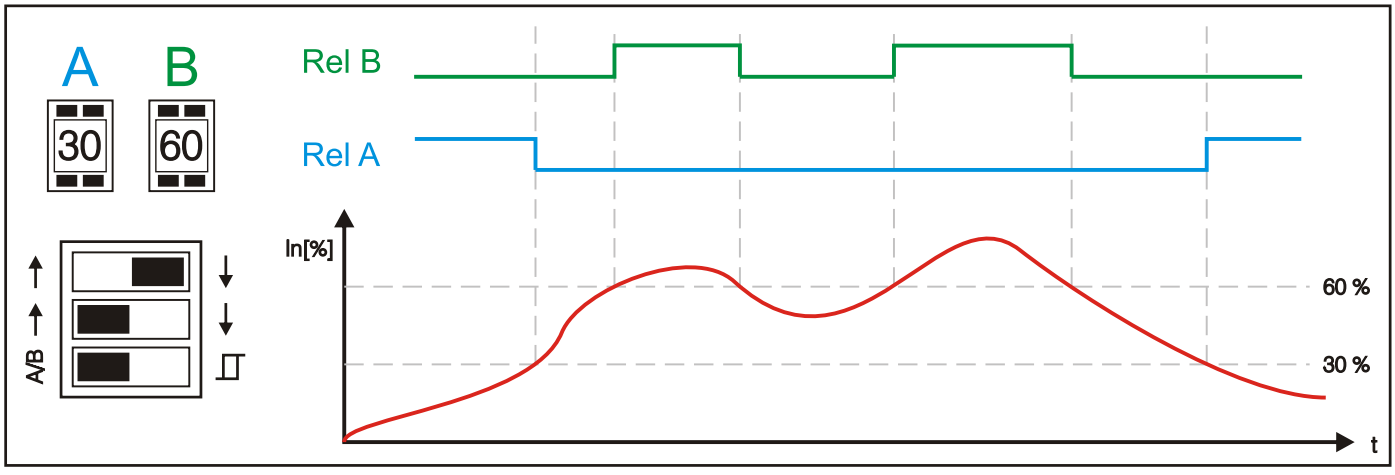


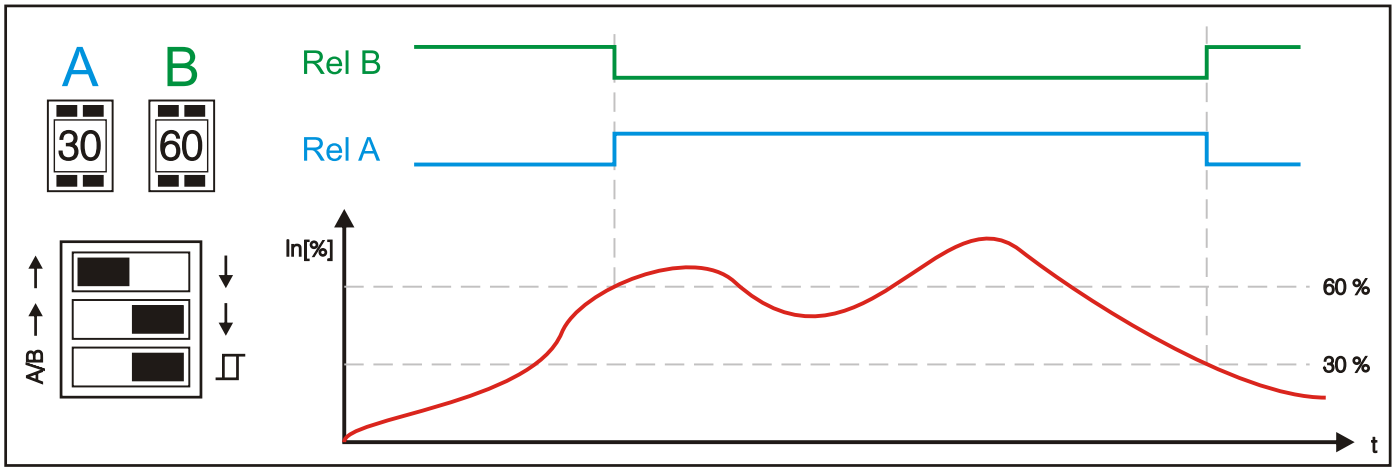


Dimensions



Circuit examples





Limit Switch

Supply-limit-switch

AD-SMK 330 GS

Description

The supply-limit-switch AD-SMK 330 GS serves the switching of limiting values on transmitter signals. The device has an 0..20 mA, 4..20 mA input and an 0..10 V input and a current-limited transmitter feed. With this, 2-wire and 3-wire transmitter can be supplied and measured. With its two potential-free change-over contacts, the AD-SMK 330 GS can switch maximal two independent limiting values. The switching thresholds can be set at the front with the aid of the integral key coding switch in percent steps. The status of the relevant relay is indicated via an LED at the front. The AD-SMK 330 GS has two different operating modes, which can be selected via the function keys. Either two independent limiting values can be switched, whereby here one key coding switch per relay is effective. The switching hysteresis is in this case 1 percent. In operating mode hysteresis, both relays are synchronous. Here, the upper and lower switching point (switch-on point and switch-off point) can be selected separately with the two key coding switches. The relays can work in the operating current principle or the closed-circuit current principle in both operating modes. This can also be selected at the function keys. The efficient wide range power pack allows the supply with all established supply networks or voltage levels. Input, output and supply voltage are separated from each other galvanically with high isolation.

Application

Switching of limiting values on active standard signals, which correspond to, for instance, flows, height levels or temperatures.

Specific characteristics

- analog inputs for current and voltage
- current limited transmitter supply
- two potential-free changeover
- simple point setting using coded key
- wide range power supply

Business data

Order number	AD-SMK 330 GS

Technical specifications

Current inputs

Measuring range	4 ... 20 mA
Input resistance	50 Ohm

Input voltage

Measuring range	0 ... 10 V
Input resistance	400 kOhm

Transmitter supply

Voltage open circuit/full load	less then 21 V / higher 18 V
Current limit	ca. 30 mA

Relay outputs A/B

Contact type	potential free changeover
Max. AC-breaking capacity	250 V AC, 2 A AC, 50Hz
Max. DC-breaking capacity	50 V DC, 2 A DC
Switching operations	
Mechanical	10^7
AC: 230V / 2A, cos(phi)=1	$6 * 10^5$
AC: 230V / 2A, cos(phi)=0,4	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$

Transmission behaviour

Basic accuracy	1 % (1 Digit)
Temperature influence	+/- 100 ppm/K of full scale
Response time	100 ms

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	2,4 VA / 1,8 W

Housing

Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Weight	~ 200 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 60 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)] During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/relays	4 kV (1 min)
Input/power-supply	3 kV (1 min)
Relays/power supply	4 kV (1 min)
Relays with each other	3 kV (1 min)

Protective systems

Input	overvoltage
Power supply	over voltage, over current and over temperature

Printed 23.08.2022 We reserve the right for technical changes.

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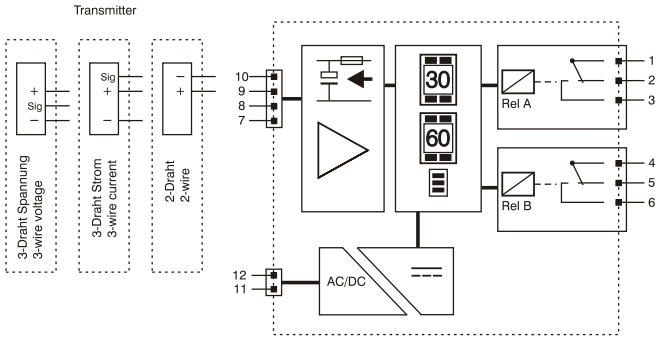
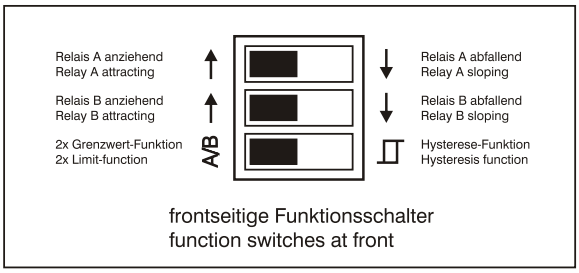
Limit Switch

Supply-limit-switch

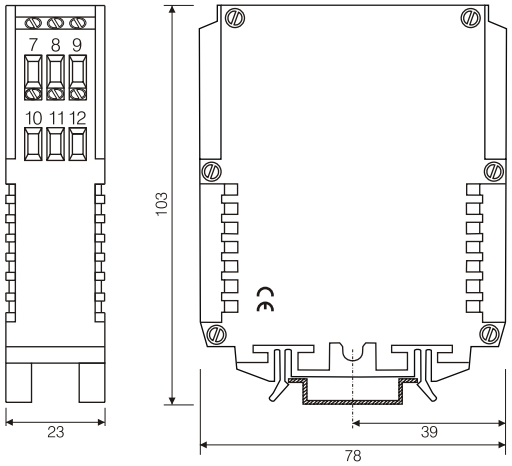
AD-SMK 330 GS

Block and wiring diagram

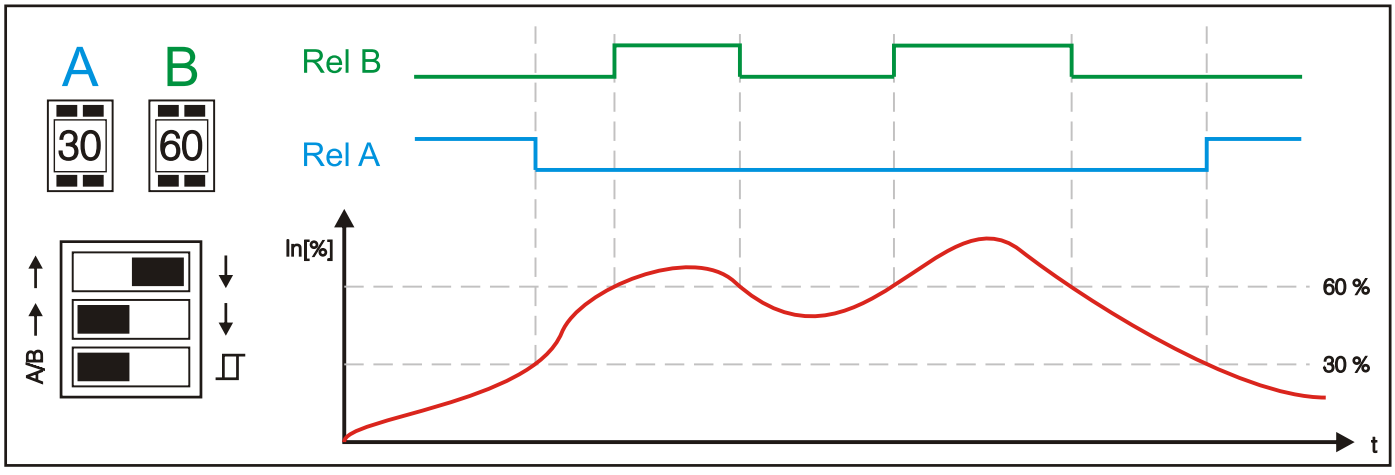


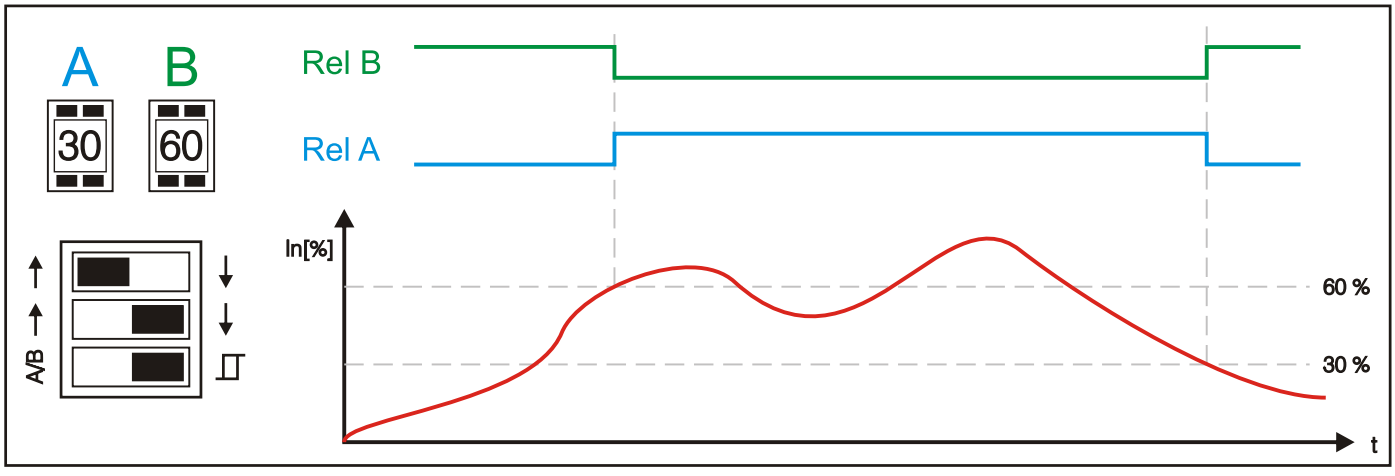


Dimensions



Circuit examples





Monitoring Devices

Three-phase Voltage Monitor

AD-UW 60 GT

Description

The three-phase voltage monitor AD-UW 60 GT monitors all three phases in the three-phase system for overvoltage, undervoltage, phase sequence and phase symmetry. If one or more faults occur, the quiescent current relay will fail. The state of the three phases and the error state is indicated by LEDs. The device is powered by the measuring voltage, therefore the wiring of a separate supply is eliminated. The switching points for overvoltage, undervoltage and switching delay can be set quickly via separate trimmers.

Application

AC motors, Overhead cranes, Trolleys, Goods lifts, Conveyor belts

Specific characteristics

- Setting the limits for undervoltage, overvoltage and switching delay via the front panel
- Check all relevant sizes for a wide variety of purposes
- Display of the phase voltages by green LEDs
- Display of the relay by orange LED
- No separate power supply necessary therefore less wiring effort
- Relay is energized in the good range

Business data

Order number

AD-UW 60 GT

Technical specifications

Voltage inputs/supply	
Nominal voltage	230 V AC, 50 Hz
Connection method	3 phases + neutral conductor
Auxiliary voltage	all three phases
Measurement and supply range	150 ... 253 V AC
Max. power consumption	4 VA
Setting ranges	
Undervoltage	170 ... 229 V AC
Overvoltage	231 ... 250 V AC
Delay	0,1 ... 10 s
Response values	
Asymmetry	10 % of nominal voltage
Hysteresis	10 % overvoltage - undervoltage
Phase loss	~ 10 % der Nennspannung
Timing	
Start delay	1 s
Sampling period	50 ms
Notifications	
L1, L2, L3 (green)	on: Voltage OK Blinking: Error, Delay is running Off: Error
Relais (orange)	On: Relay tightened, everything OK Blinking: Relay dropped, error
Relay output	
Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	potential-free changeover
Galvanic isolation, test voltages	
Mains side to relay output	4 kV, 50 Hz (1 min.)
Housing	
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Type of protection	IP 20
Connection method	screw clamp
Bolting torque terminals	0,6 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	III
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. A [2], Gr. 1

[1] During checking, slight signal deviations are possible.

[2] Warning: This device is not intended to be used in residential areas and can not ensure adequate protection of radio communications in such environments

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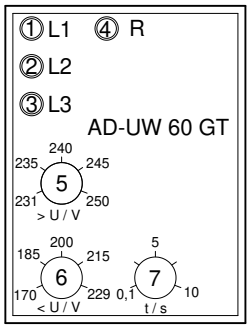
Monitoring Devices

Three-phase Voltage Monitor

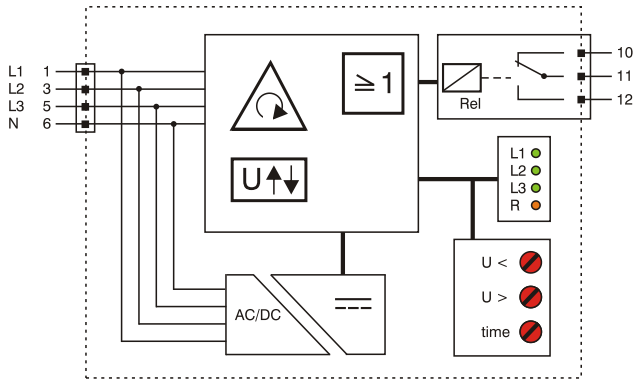
AD-UW 60 GT

Display and operating elements

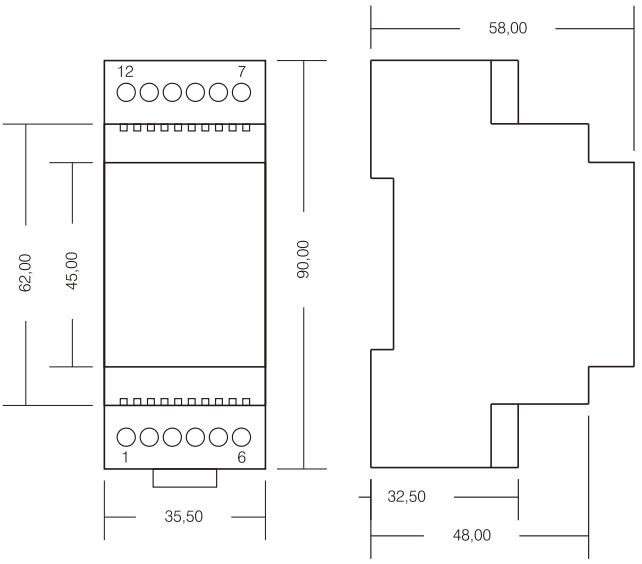


1 Status voltage in L1
2 Status voltage in L2
3 Status voltage in L3
4 Relay state
5 Setting for overvoltage
6 Setting for undervoltage
7 Setting for switching delay

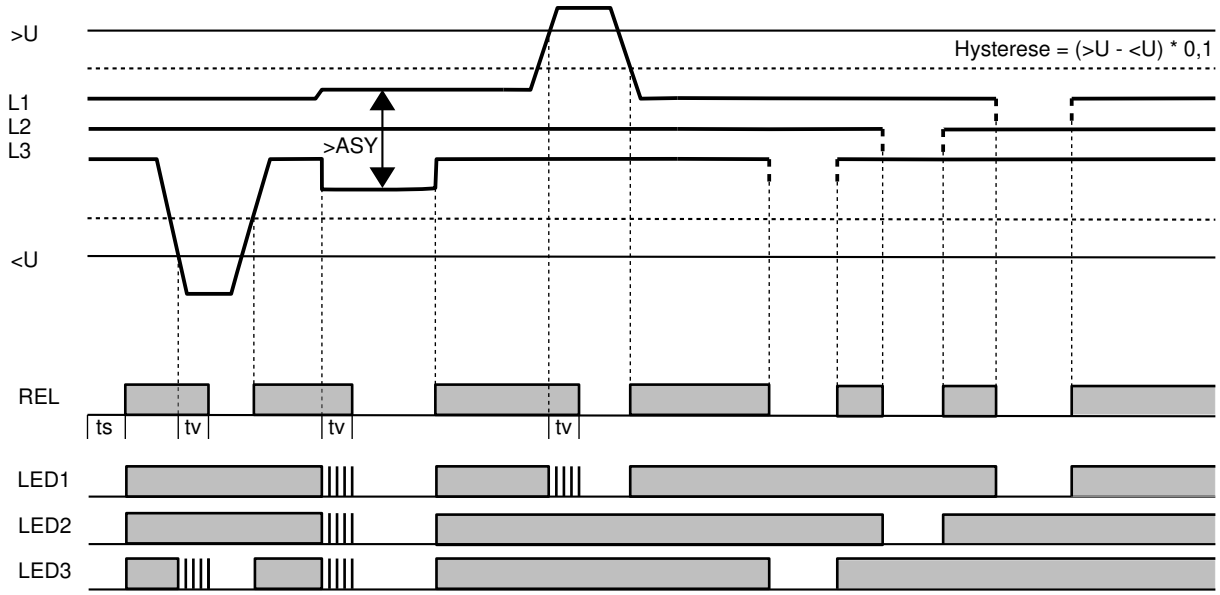
Block and wiring diagram



Dimensions



Diagrams



Power Measurement

Load Monitoring

AD-LW 110 GS

Description

The AD-LW 110 GS monitors the load condition of inductive loads. The main application is asynchronous motors in the 1- or 3-phase network, the load of which is greatly changed. The device makes an evaluation of the cos-phi value and an undervoltage monitoring. Exceeding the set limit values triggers a contact. The switching states are indicated on the front side by LEDs. The measuring principle for the cos-phi is based on the evaluation of the phase shift between voltage and current in one phase. The actual measured variable is therefore the phase angle between voltage and current. The setting value of the cos-phi or of the phase angle is therefore only correct for sinusoidal quantities. The phase shift is almost inverse to the load. A cos-phi of 0 (= 90 °) thus corresponds to a low load while a cos-phi of 1 (= 0 °) corresponds to a large load. An external current transformer can be connected to the current input of the device. Thanks to the integrated, efficient switching power supply, operation is possible in a wide supply voltage range.

Application

Load monitoring of asynchronous machines, e.g. Pumps and drives.

Specific characteristics

- Connection of external current transformer possible
- Wide range power supply
- Limits can be set via potentiometer
- 2 potential-free normally open contacts
- LED display of the relay states

Business data

Order number	AD-LW 110 GS

Technical specifications

Current input (L1)	
Measuring range	0 ... 1/5 A AC (alternatively)
Permanent overload	50 %
Short-term overload 3 s	100 %
Voltage input (L1, L2, L3)	
Measuring range	180 ... 253 V
Input resistance	1 MOhm
Relay outputs	
Maximum switching load AC	230 V, 1 A
Maximum switching load DC	50 V, 1 A
Contact construction	closing contact
Switching operations mechanical	10000000
At 230V/1 A AC, cos(phi)=1	600000
At 230V/1 A AC, cos(phi)=0,4	200000
At 24V/1 A DC	200000
Switching hysteresis	3 % of the measuring range
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	4 VA / 2,5 W
Transmission behaviour	
Basic accuracy	< 2 %
Temperature influence	100 ppm/K
Response time	~ 50 ms
Housing	
Dimensions (WxHxD)	23x78x103 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 120 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Input / relay output	4 kV, 50 Hz (1 min.)
Power supply / relay output	4 kV, 50 Hz (1 min.)
Relay 1 / relay 2	2 kV, 50 Hz (1 min.)
Protection circuits	
Input	electrical surge protection
Power supply	electrical surge protection

[1] During checking, slight signal deviations are possible.

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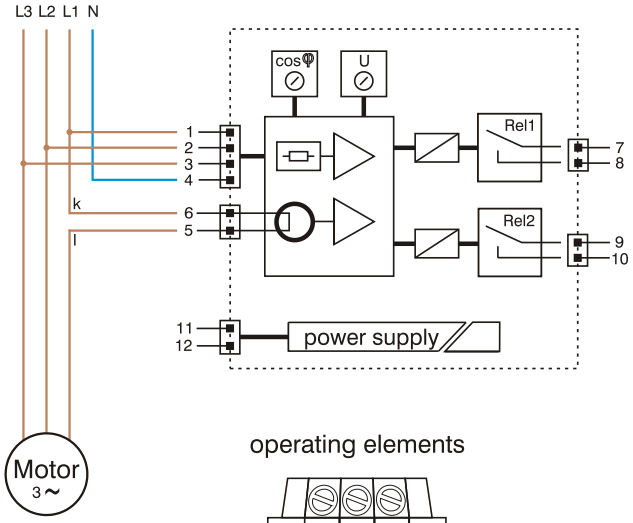
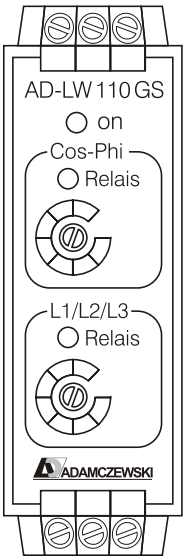
Load Monitoring

AD-LW 110 GS

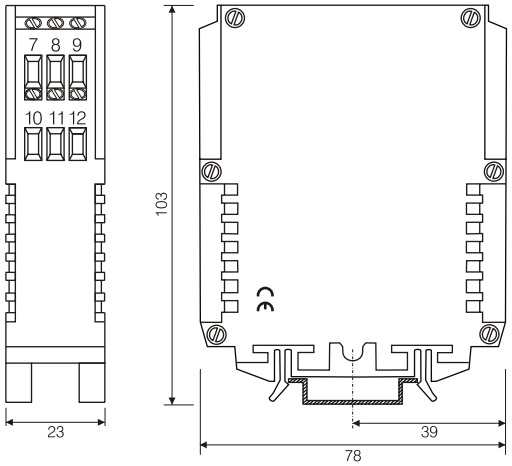
Block and wiring diagram



operating elements



Dimensions



Multifunction Transducer

AD-VC 1 GVD

Description

The digital multi-function measuring transformers of series VarioCheck AD-VC 1 are freely programmable digital measuring transducers with two analogue outputs and up to 2 limiting value relays. Extensive standard equipment and additional options solve almost all imaginable tasks of a modern evaluation. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating modul AD-VarioControl or via the programming software AD-Studio. VarioCheck AD-VC 1 fulfils all tasks of a universal and secure measuring value recording through integral function modules such as limiting value messages, freely adjustable hysteresis, selectable relay functions, time-delayed switching, automatic or manual simulation modus, free linearizing curves and a wide range of supply voltage.

Specific characteristics

- bipolar current input
- bipolar mV voltage input
- voltage input
- Power supply for 2-wire transmitters
- Thermocouples inputs, types J, T, K, E, N, S, R, B, C; internal or external reference junction
- Resistance thermometer inputs, types Pt/Ni 100, Pt/Ni 500, Pt/Ni 1000
- Resistance, Potentiometer input
- Sensor error detection for thermocouples and resistance thermometers
- Input of a characteristic curve possible
- Automatic or manual simulation operation
- 2 bipolar current or voltage output
- 23 mm narrow housing with detachable terminal clamp
- Operating module AD-VarioControl as an accessory

Business data

Order number	
AD-VC1 GVD-R0	without relay
AD-VC1 GVD-R2	two relays
Accessory (optional)	
Operating module	AD-VarioControl
Control panel with RS-485	AD-VarioConnect
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current	
Measuring range	-24 ... + 24 mA DC
Input resistance	20 Ohm
Basic accuracy	4 µA
Transmitter supply	
Off-load voltage	24,0 V
Voltage at 20mA	18,0 V
Current limit	~ 25 mA
Input voltage	
Measuring ranges	0 ... + 12 V DC
Input resistance	1 MOhm
Basic accuracy	1 mV
Input voltage mV	
Measuring ranges	-15 ... +15 mV -30 ... +30 mV -60 ... +60 mV -125 ... +125 mV -250 ... +250 mV
Input resistance	1 MOhm
Basic accuracy	20 µV
Thermocouples	
Comparative place:	
Internal	measurement with sensor in the device connecting terminals
External	Cold junction temperature selectable by parameters
To DIN EN 60584:	
measuring range type J	-200 ... +1200 °C
measuring range type T	-200 ... +400 °C
measuring range type K	-200 ... +1360 °C
measuring range type E	-200 ... +1000 °C
measuring range type N	-200 ... +1300 °C
basic accuracy	1 K
To DIN EN 60584:	
measuring range type S	-40 ... +1760 °C
measuring range type R	-40 ... +1760 °C
measuring range type B	+400 ... +1800 °C
basic accuracy	2 K
After standard ASTM E988:	
measuring range type C	0 ... +2320 °C
basic accuracy	2 K

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Multifunction Transducer

AD-VC 1 GVD

Technical specifications

Resistance input

Resistance thermometer inputs DIN EN 60751: Pt100, Pt500 and Pt1000 DIN 43760: Ni100, Ni500 and Ni1000

measuring range Pt	-200 ... +850 °C
measuring range Ni	-60 ... +230 °C
smallest measuring spans	20 K
short circuit detection	< 20 Ohm
basic accuracy	0,2 K
Linear resistance	
measuring range	0 ... 4000 Ohm
basic accuracy	0,1 Ohm
Connection method	2-, 3- oder 4-wire system
Sensor supply	100 µA
Max line resistance [1)]	50 Ohm/cable

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Potentiometer input

Connection method	3-wire system
Max. Resistance	50 Ohm ... 100 kOhm
Sensor supply	<=500µA

Current outputs

Max. output range	-21,5 ... 21,5 mA DC
Max. burden	400 Ohm
Residual ripple	20 µAss

Voltage outputs

Max. output range	-10,5 ... 10,5 V DC
Min. burden	10 kOhm
Residual ripple	10 mVss

Relay outputs A/B

Contact type	potential free changeover
Max. AC-breaking capacity	250 V AC, 2 A AC, 50Hz
Max. DC-breaking capacity	50 V DC, 2 A DC
Switching operations	
Mechanical	10^7
AC: 230V / 2A, cos(phi)=1	$6 * 10^5$
AC: 230V / 2A, cos(phi)=0,4	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$

Transmission behaviour

Linearity error	< 0,2 % of the measuring range
Rise time	500 ms (0...90 %, 100...10 %)
Rise time (temperature input)	< 1s (0...90 %, 100...10 %)
Temperature influence	+/- 100 ppm/K of the measuring range

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Voltage range DC	20 ... 253 V DC
Nominal voltage AC / DC	230 V AC / 24 V DC
Power consumption AC / DC	5,2 VA / 3,2 W
Power consumption with operating module AC / DC	5,4 VA / 3,6 W

Housing

Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

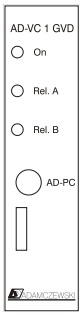
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

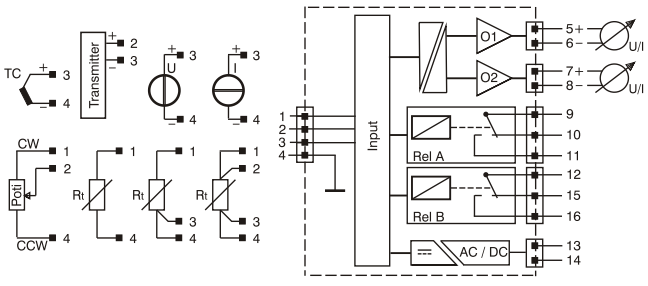
Input to output	2,5 kV (1 min)
In-/output to auxiliary voltage	4 kV (1 min)

Display and operating elements

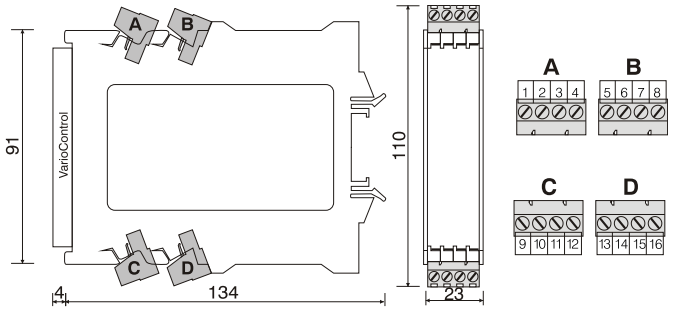


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits
Rel: two LEDs for relays A and B in red
on - relay activated
AD-PC: Communication interface for configuration by a PC
Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-VC 1 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40101	2	Input signal	InUnit	7	1	0
40103	2	Cold-junction temperature	°C	7	1	0
40301	2	Output signal 1	OutUnit	7	1	1
40303	2	Output signal 2	OutUnit	7	1	1
40601	1	Relay state A		3	1	1
40602	1	Relay state B		3	1	1
40801	2	Scaled input	ScUnit	7	1	0

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Multifunction Transducer

AD-VC 3 GF
AD-VC 3 GVF
AD-VC 3 EV

Description

The digital multi-function measuring transformers of series VarioCheck AD-VC 3 are freely programmable digital measuring transducers with two analogue outputs and up to 4 limiting value relays. Extensive standard equipment and additional options solve almost all imaginable tasks of a modern evaluation. Enter all characteristics directly on the device or use the configuration software „AD-Studio“. VarioCheck AD-VC 3 fulfils all tasks of a universal and secure measuring value recording through integral function modules such as limiting value messages, freely adjustable hysteresis, selectable relay functions, time-delayed switching, automatic or manual simulation modus, free linearizing curves and a wide range of supply voltage.

Specific characteristics

- Bipolar voltage/current inputs
- Supply of 2-/3-wire transmitter
- Potentiometer input
- Current and voltage output, differently scalable and can be utilised simultaneously
- Error message with missing or defective sensor at measuring range 4-20 mA
- LCD for display of different operating modes, lit in several colours (R/Y/B).
- Freely definable scaling of the quantity to be measured through stating range, decimal point position and unit from the list or defined unit.
- Zoom function, expanded scale, linearizing, inverse mode
- Learning Mode Range
- Automatic or manual simulation operation
- Monitoring of the measuring signal with up to 4 freely adjustable limiting values
- Slave pointer function (saving min. and max. value)
- Locking the parameterizing via edit lock
- Non-volatile saving of all set parameter
- Menu languages switchable to: German, English
- Housing GVF, GF and EV
- in the housing GVF Pluggable and codable terminal strips

Business data

Order number

AD-VC 3 GF-R0	Bauform GF, without relay
AD-VC 3 GF-R2	Bauform GF, two relays
AD-VC 3 GF-R4	Bauform GF, four relays
AD-VC 3 GVF-R0	design GVF, without relay
AD-VC 3 GVF-R2	design GVF, two relays
AD-VC 3 GVF-R4	design GVF, four relays
AD-VC 3 EV-R2-24V	Bauform EV, zwei Kontaktausgänge, 24 VDC-Versorgung
AD-VC 3 EV-R2-230V	Bauform EV, zwei Kontaktausgänge, 230 VAC-Versorgung

Technical specifications

Input current

Measuring range	-20 ... + 20 mA
Accuracy	5 µA
Input resistance	60 Ohm

Voltage input 10V

Measuring range	-10 ... + 10 V
Accuracy	2,5 mV
Input resistance	1 MOhm

Voltage input 1V

Measuring range	-1 ... + 1 V
Accuracy	250 µV
Input resistance	> 1 MOhm

Potentiometer input

Connection method	3-wire system
Max. Resistance	100 Ohm ... 100 kOhm

Transmitter supply

Off-load voltage	24,5 V
Voltage at 20mA	19,5 V
Current limit	~ 25 mA

Output current

Max. output range	0 ... 20,4 mA
Accuracy	~ 20 µA
Max. burden	500 Ohm
Residual ripple	20 µAss

Output voltage

Max. output range	0 ... 10,2 V (EV: 12,5 V)
Accuracy	~ 10 mV
Min. burden	5 kOhm
Residual ripple	10 mVss

Resolution

Input	13 bit
Output	10 bit

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Multifunction Transducer

AD-VC 3 GF
AD-VC 3 GVF
AD-VC 3 EV

Technical specifications

Relay outputs A...D

Contacts R2 / R4	2 contacts / 4 contacts
Max. AC-breaking capacity	250 V AC, 2 A AC, 50Hz
Max. DC-breaking capacity	50 V DC, 2 A DC
Switching operations	
Mechanical	10^7
AC: 230V / 2A, cos(phi)=1	$6 * 10^5$
AC: 230V / 2A, cos(phi)=0,4	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$

Display

Graphic-LCD	42x64 Pixel, background RGB lights
Digital display	4-digit, can be configured
Display function	scaled input signal, input signal, output, limits, scaled dimension as quasi analogue bar, scaling unit

Transmission behaviour

Linearity error	0,2 % of full scale
Rise time	100 ms (output auf 90 %)
Temperature influence	+/- 100 ppm/K of full scale

Supply

Power supply GF/GVF	20 ... 253 V DC / 50 ... 253 V AC
Power supply EV	20..30 VDC or 50...253 VAC
Max. power consumption GF	3,0 W / 5,3 VA
Max. power consumption GVF	2,6 W / 5 VA
Max. power consumption EV	2,6 W / 5 VA

Housing GF

Dimensions (WxHxD)	38,5x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 215 g
Manner of fastening	35 mm DIN rail 35mm

Housing GVF

Dimensions (WxHxD)	33x110x134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 200 g
Manner of fastening	35 mm DIN rail 35mm

Housing EV

Dimensions (WxHxD)	30,48x128,4x165
Type of protection	IP00
Connection method	32-pin male connector
Weight	~ 300 g
Manner of fastening	19"-Eurocard

Environmental conditions

Ambient temperature	-10 ... 60 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

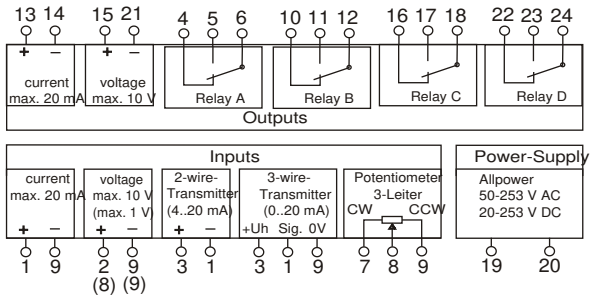
Input/output	2,5 kV (1 min)
Signal/auxiliary voltage	3 kV (1 min)

Multifunction Transducer

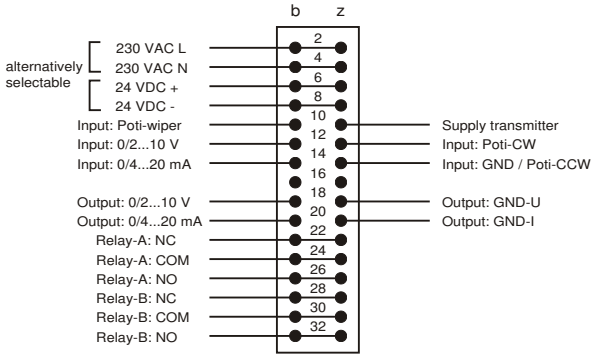
AD-VC 3 GF
AD-VC 3 GVF
AD-VC 3 EV

Block and wiring diagram

Wiring: casing-type GF and GVF

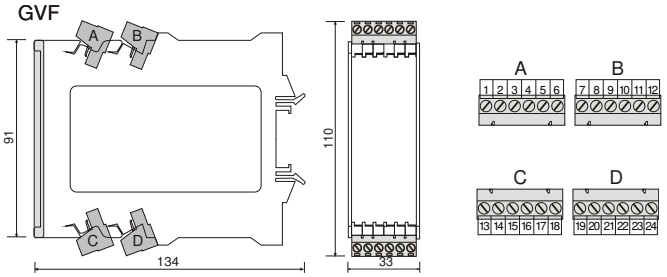


Wiring: casing-type EV (europe-card)

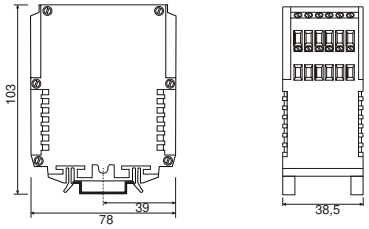


Dimensions

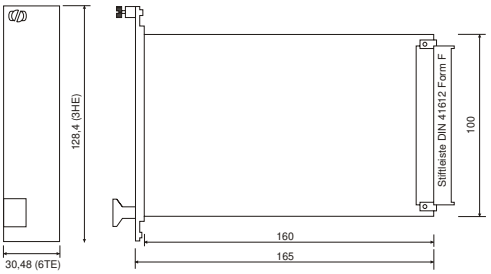
GVF



GF



EV



Multifunction Transducer

AD-VC 3B GVF

Description

The digital multi-function measuring transformer of series VarioCheck AD-VC3B GVF are freely programmable digital measuring transformer with two analogue outputs and up to 4 limiting value relays. Extensive standard equipment and additional options solve almost all imaginable tasks of a modern evaluation. The input of all characteristics is carried out via the configuration software „AD-Studio“. VarioCheck AD-VC3B fulfils all tasks of a universal and secure measuring value recording through integral function modules such as limiting value messages, freely adjustable hysteresis, selectable relay functions, time-delayed switching, automatic or manual simulation modus, free linearizing curves and a wide range of supply voltage.

Specific characteristics

- Bipolar voltage/current inputs
- Supply of 2-/3-wire transmitter
- Potentiometer input
- Current and voltage output, differently scalable and can be utilised simultaneously
- Zoom function, expanded scale, linearizing, inverse modus
- Monitoring of the measuring signal with up to 4 freely adjustable limiting values
- Non-volatile saving of all set parameter
- Pluggable and codable terminal strips
- Parameter configuration via optional PC setup program "AD-Studio"

Business data

Order number

AD-VC 3B GVC-R0	without relay
AD-VC 3B GVF-R2	two relays
AD-VC 3B GVF-R4	four relays

Technical specifications

Input current	
Measuring range	-20 ... + 20 mA
Accuracy	5 µA
Input resistance	60 Ohm
Voltage input 10V	
Measuring range	-10 ... + 10 V
Accuracy	2,5 mV
Input resistance	1 MOhm
Voltage input 1V	
Measuring range	-1 ... + 1 V
Accuracy	250 µV
Input resistance	> 1 MOhm
Potentiometer input	
Connection method	3-wire system
Max. Resistance	100 Ohm ... 100 kOhm
Transmitter supply	
Off-load voltage	24,5 V
Voltage at 20mA	19,5 V
Current limit	~ 25 mA
Output current	
Max. output range	0 ... 20,4 mA
Accuracy	~ 20 µA
Max. burden	500 Ohm
Residual ripple	20 µAss
Output voltage	
Max. output range	0 ... 10,2 V
Accuracy	~ 10 mV
Min. burden	5 kOhm
Residual ripple	10 mVss
Resolution	
Input	13 bit
Output	10 bit
Relay outputs A...D	
Contacts GVF-R2 / GVF-R4	2 changeover contact / 4 changeover contact
Max. AC-breaking capacity	250 V AC, 2 A AC, 50Hz
Max. DC-breaking capacity	35 V DC, 2 A DC
Switching operations	
Mechanical	10^7
AC: 230V / 2A, cos(phi)=1	$6 * 10^5$
AC: 230V / 2A, cos(phi)=0,4	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$
Transmission behaviour	
Linearity error	0,2 % of full scale
Rise time	100 ms (output auf 90 %)
Temperature influence	+/- 100 ppm/K of full scale
Supply	
Supply voltage	20 ... 253 V DC / 50 ... 253 V AC
Max. power consumption	2,6 W / 5 VAC

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Multifunction Transducer

AD-VC 3B GVF

Technical specifications

Housing

Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Weight	~ 200 g

Environmental conditions

Ambient temperature	-10 ... 60 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

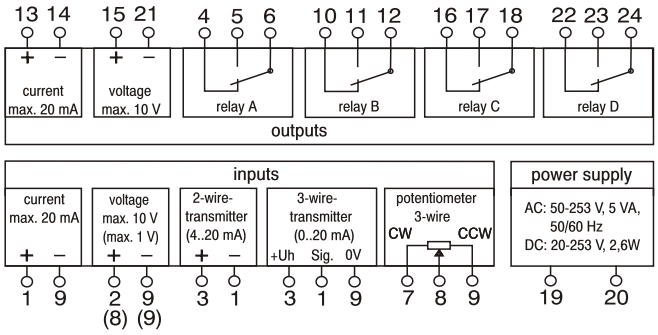
Product family standard	EN 61326-1
Discharge static electricity, ESD	IEC 61000-4-2
Electromagnetic fields [1)]	IEC 61000-4-3
Fast transients, burst	IEC 61000-4-4
Impulse voltage, surge	IEC 61000-4-5
Conducted HF-Signals [1)]	IEC 61000-4-6
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

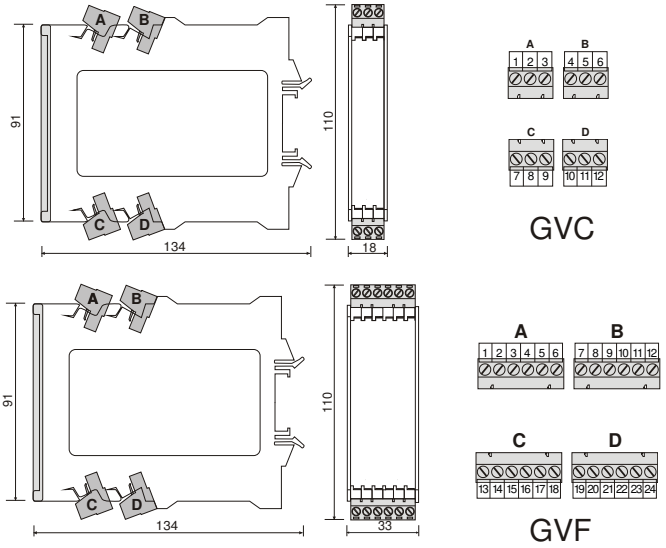
Galvanic isolation, test voltages

Input/output	2,5 kV (1 min)
Signal/auxiliary voltage	4 kV (1 min)

Block and wiring diagram



Dimensions



Multifunction Transducer

Temperature Measuring Converter

AD-VC 5 GVF

Description

The digital temperature measuring converter of series VarioCheck VC5B are freely programmable digital measuring transducer with two analogue outputs and up to 4 limiting value relays. The input of all characteristics directly on the device, or use the configuration software „AD-Studio“. VarioCheck fulfils all tasks of a universal measuring value recording through integral function modules such as selectable relay functions, simulation modus, free linearizing curves and a wide range of supply voltage.

Specific characteristics

- Resistance thermometer inputs, types Pt/Ni 100, Pt/Ni 500, Pt/Ni 1000
- Thermocouples inputs, types J, T, K, E, N, S, R, B, C or inputs a mV/T-characteristic curve. Selectable internal or external reference junction
- A bipolar mV-Voltage input. Free linearizing curves possible.
- Current- and voltage input different scaleable and simultaneously useful. Must not conntect the clamps 8 and 9.
- Galvanic 3-circuit separation of input, output and supply.
- LCD for display of different operating modes, lit in several colours (R/Y/B).
- Freely definable scaling of the quantity to be measured through stating range, decimal point position and unit from the list or defined unit.
- Zoom function, expanded scale, linearizing, inverse modus.
- Monitoring of the measuring signal with up to 4 freely adjustable limiting values.
- Monitoring functions such as limiting values, window function or signal trend each with relay.
- Non-volatile saving of all set parameters.

Business data

Order number

AD-VC 5 GVF-R0	without relay
AD-VC 5 GVF-R2	two relays
AD-VC 5 GVF-R4	four relays

Technical specifications

Resistance thermometer inputs Pt100, Pt500, Pt1000 to DIN EN 60751

Measuring range	-200 ... +850 °C
Connection method	2-, 3- oder 4-wire system
Resolution	16 Bit
Accuracy	0,5 K
Smallest measuring spans	20 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	
Pt100	1 mA
Pt500, Pt1000	210 µA

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Resistance thermometer inputs Ni100, Ni500, Ni1000 to DIN EN 43760

Measuring range	-60 ... +230 °C
Connection method	2-, 3- oder 4-wire system
Resolution	16 Bit
Accuracy	0,5 K
Smallest measuring spans	20 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	
Ni100	1 mA
Ni500, Ni1000	210 µA

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Thermocouples

Comparative place:	
Internal	measurement with LM35 in the device connecting terminals
External	Cold junction temperature selectable by parameters
Resolution	16 Bit
Accuracy	0,2 % of measuring range
Measuring range type J	-200 ... +1200 °C
To DIN EN 60584:	
Measuring range type T	-200 ... +400 °C
Measuring range type K	-200 ... +1360 °C
Measuring range type E	-200 ... +1000 °C
Measuring range type N	-200 ... +1300 °C
Measuring range type S	-40 ... +1760 °C
Measuring range type R	-40 ... +1760 °C
Measuring range type B	+400 ... +1800 °C
After standard ASTM E988:	
Measuring range type C	0 ... +2320 °C
Smallest measuring spans	100 K

Voltage inputs

Measuring ranges	-18 ... +18 mV
	-36 ... +36 mV
	-72 ... +72 mV
	-144 ... +144 mV

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Multifunction Transducer

Temperature Measuring Converter

AD-VC 5 GVF

Technical specifications

Current output 20 mA

Output range	0 ... 20,4 mA
Resolution	10 Bit
Accuracy	20 µA
Max. burden	500 Ohm
Residual ripple	20 µAss

Voltage output 10 V

Output range	0 ... 10,2 V
Resolution	10 Bit
Accuracy	10 mV
Min. burden	5 kOhm
Residual ripple	10 mVss

Werden Stromausgang und Spannungsausgang gleichzeitig benutzt, dürfen die beiden Kreise nicht verbunden werden.

Relay outputs A..D

Max switching voltage	AC 250 V AC
Max switching current AC	2 A AC
Max switching voltage	DC 50 V DC
Max switching current DC	2 A DC

Display

Graphic-LCD	42x64 Pixel, background RGB lights
Digital display	4-digit, can be configured
Display function	scaled input signal, input signal, output, limits, scaled dimension as quasi analogue bar, scaling unit

Transmission behaviour

Sampling rate	1 measure/s
Linearity error	0,2 % of full scale
Temperature influence	+/-100 ppm/K of full scale

Supply

Supply voltage	50 ... 253 V AC 20 ... 253 V DC
Max power consumption at 24V DC	2,6 W
Max power consumption at 230V AC	5 VA

Housing

Dimension	BxHxT 33x110x128 mm
Manner of fastening	DIN rail mounting 35mm, EN 50022
Type of protection	IP 20
Connection method	detachable terminal clamp, 5 mm grid
Wire cross section	max. 2,5 mm^2
Weight	ca. 200 g

Environmental conditions

Permissible ambient temperature	-10 ... +60 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISR11 Cl. B, Gr. 1

[1)] Während der Störeinwirkung sind geringe Signalabweichungen möglich.

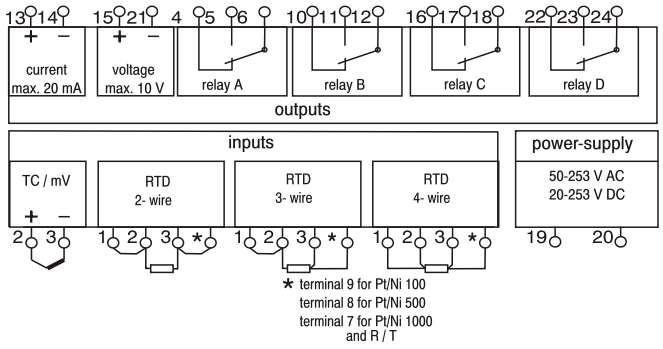
Electrical safety requirements

Product family standard	EN 61010-1

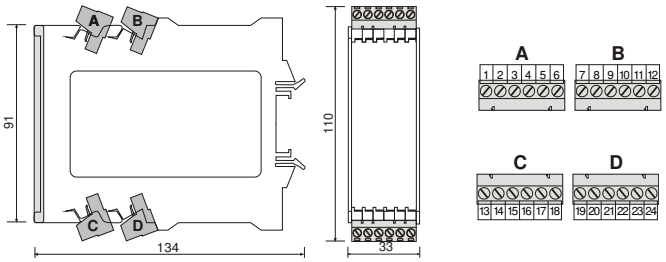
Galvanic isolation, test voltages

Input to output	2,5 kV, 1min
Input/output to auxiliary voltages	4 kV, 1min
Outputs together	no galvanic isolation
Input to the programming interface	no galvanic isolation

Block and wiring diagram



Dimensions



Multifunction Transducer

Temperature Measuring Converter

AD-VC 5B GVF

Description

The digital temperature measuring converter of series VarioCheck VC 5B GVF are freely programmable digital measuring transformer with two analogue outputs and up to 4 limiting value relays. The input of all characteristics is carried out via the configuration software AD-Studio. VarioCheck fulfils all tasks of a universal measuring value recording through integral function modules such as selectable relay functions, simulation modus, free linearizing curves and a wide range of supply voltage.

Specific characteristics

- Resistance thermometer inputs, types Pt/Ni 100, Pt/Ni 500, Pt/Ni 1000
- Thermocouples inputs, types J, T, K, E, N, S, R, B, C or inputs a mV/T-characteristic curve. Selectable internal or external reference junction
- A bipolar mV-Voltage input. Free linearizing curves possible.
- Current- and voltage input different scaleable and simultaneously useful. Must not conntect the clamps 8 and 9.
- Galvanic 3-circuit separation of input, output and supply.
- Freely definable scaling of the quantity to be measured through stating range, decimal point position and unit from the list or defined unit.
- Zoom function, expanded scale, linearizing, inverse modus.
- Monitoring of the measuring signal with up to 4 freely adjustable limiting values.
- Monitoring functions such as limiting values, window function or signal trend each with relay.
- Non-volatile saving of all set parameters.

Business data

Order number

AD-VC 5B GVC-R0	without relay
AD-VC 5B GVF-R2	two relays
AD-VC 5B GVF-R4	four relays

Technical specifications

Resistance thermometer inputs Pt100, Pt500, Pt1000 to DIN EN 60751

Measuring range	-200 ... +850 °C
Connection method	2-, 3- oder 4-wire system
Resolution	16 Bit
Accuracy	0,5 K
Smallest measuring spans	20 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	
Pt100	1 mA
Pt500, Pt1000	210 µA

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Resistance thermometer inputs Ni100, Ni500, Ni1000 to DIN EN 43760

Measuring range	-60 ... +230 °C
Connection method	2-, 3- oder 4-wire system
Resolution	16 Bit
Accuracy	0,5 K
Smallest measuring spans	20 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	
Ni100	1 mA
Ni500, Ni1000	210 µA

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Thermocouples

Comparative place:	
Internal	measurement with LM35 in the device connecting terminals
External	Cold junction temperature selectable by parameters
Resolution	16 Bit
Accuracy	0,2 % of measuring range
To DIN EN 60584:	
Measuring range type J	-200 ... +1200 °C
Measuring range type T	-200 ... +400 °C
Measuring range type K	-200 ... +1360 °C
Measuring range type E	-200 ... +1000 °C
Measuring range type N	-200 ... +1300 °C
Measuring range type S	-40 ... +1760 °C
Measuring range type R	-40 ... +1760 °C
Measuring range type B	+400 ... +1800 °C
After standard ASTM E988:	
Measuring range type C	0 ... +2320 °C
Smallest measuring spans	100 K

Voltage inputs

Measuring range	-18 ... +18 mV
	-36 ... +36 mV
	-72 ... +72 mV
	-144 ... +144 mV

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Multifunction Transducer

Temperature Measuring Converter

AD-VC 5B GVF

Technical specifications

Current output 20 mA

Output range	0 ... 20,4 mA
Resolution	10 Bit
Accuracy	20 µA
Max. burden	500 Ohm
Residual ripple	20 µAss

Voltage output 10 V

Output range	0 ... 10,2 V
Resolution	10 Bit
Accuracy	10 mV
Min. burden	5 kOhm
Residual ripple	10 mVss

Werden Stromausgang und Spannungsausgang gleichzeitig benutzt, dürfen die beiden Kreise nicht verbunden werden.

Relay outputs A..D

Max switching voltage	AC 250 V AC
Max switching current AC	2 A AC
Max switching voltage	DC 50 V DC
Max switching current DC	2 A DC

Transmission behaviour

Sampling rate	1 measure/s
Linearity error	0,2 % of full scale
Temperature influence	+/-100 ppm/K of full scale

Supply

Supply voltage	50 ... 253 V AC 20 .. 253 V DC
Max power consumption at 24V DC	2,6 W
Max power consumption at 230V AC	5 VA

Housing

Dimension	BxHxT 33x110x134 mm
Manner of fastening	DIN rail mounting 35mm, EN 50022
Type of protection	IP 20
Connection method	detachable terminal clamp, 5 mm grid
Wire cross section	max. 2,5 mm^2
Weight	ca. 200 g

Environmental conditions

Permissible ambient temperature	-10 ... +60 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

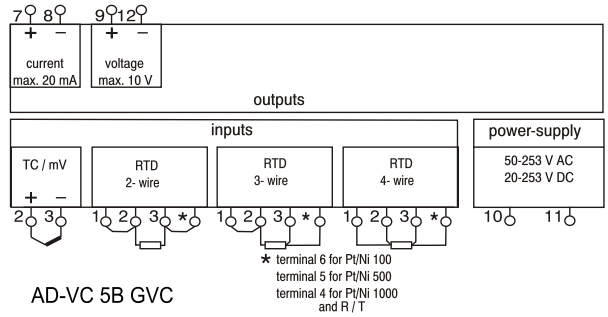
Product family standard	EN 61326-1
Discharge static electricity, ESD	IEC 61000-4-2
Electromagnetic fields [1]	IEC 61000-4-3
Fast transients, burst	IEC 61000-4-4
Impulse voltage, surge	IEC 61000-4-5
Route controlled HF-signals	IEC 61000-4-6
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)] During electromagnetic disturbance minor changes in output signal are possible.

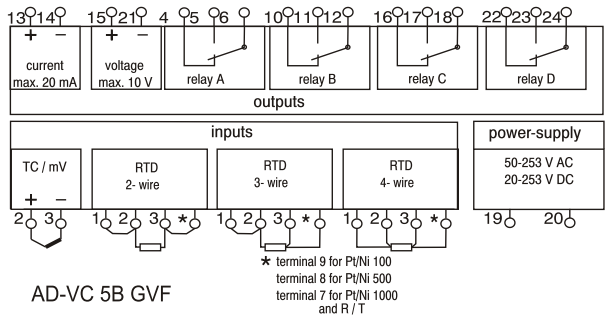
Galvanic isolation, test voltages

Input to output	2,5 kV, 1min
Input/output to auxiliary voltages	4 kV, 1min
Outputs together	no galvanic isolation
Input to the programming interface	no galvanic isolation

Block and wiring diagram

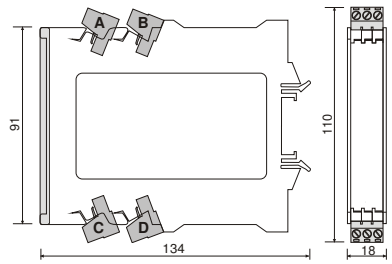


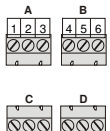
AD-VC 5B GVC



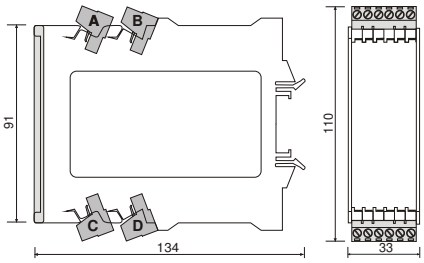
AD-VC 5B GVF

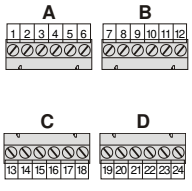
Dimensions





GVC





GVF

Multifunction Transducer

AD-VC 4S FE

Description

The digital multi-function measuring transformer of series VarioCheck AD-VC 4S FE are freely programmable digital measuring transformer with two analogue outputs and up to 4 limiting value relays. Extensive standard equipment and additional options solve almost all imaginable tasks of a modern evaluation. The input of all characteristics directly on the device, or use the configuration software „AD-Studio“. VarioCheck AD-VC 4S fulfils all tasks of a universal and secure measuring value recording through integral function modules such as limiting value messages, freely adjustable hysteresis, selectable relay functions, time-delayed switching, automatic or manual simulation modus, free linearizing curves and a wide range of supply voltage.

Specific characteristics

- Bipolar voltage inputs
- Unipolar current input
- Supply of 2-/3-wire transmitter
- Potentiometer input
- Current and voltage output, differently scalable and can be utilised simultaneously
- Error message with missing or defective sensor at measuring range 4-20 mA
- Backlite LCD for display of different operating modes
- Freely definable scaling of the quantity to be measured through stating range, decimal point position and unit from the list or defined unit.
- Zoom function, expanded scale, linearizing, inverse modus
- Learning Mode Range
- Automatic or manual simulation operation
- Monitoring of the measuring signal with up to 4 freely adjustable limiting values
- Slave pointer function (saving min. and max. value)
- Locking the parameterizing via edit lock
- Non-volatile saving of all set parameter
- Menu languages switchable to: German, English, French, Italian
- Pluggable and codable terminal strips

Business data

Order number

AD-VC 4S FE-R0	without relay
AD-VC 4S FE-R2	two relays
AD-VC 4S FE-R4	four relays

Technical specifications

Input current

Measuring range	0 ... + 20 mA
Accuracy	~ 21 µA
Input resistance	54 Ohm

Voltage input 10V

Measuring range	-10 ... + 10 V
Accuracy	~ 21 mV
Input resistance	100 kOhm

Voltage input 5V

Measuring range	-5 ... + 5 V
Accuracy	~ 11 mV
Input resistance	100 kOhm

Voltage input 1V

Measuring range	-1 ... + 1 V
Accuracy	~ 2,5 mV
Input resistance	100 kOhm

Voltage input 100mV

Measuring range	-100 ... + 100 mV
Accuracy	~ 0,3 mV
Input resistance	100 kOhm

Potentiometer input

Connection method	3-wire system
Max. Resistance	100 Ohm ... 10 kOhm

Transmitter supply

Off-load voltage	~ 23 V
Voltage at 20mA	~ 21 V
Current limit	~ 50 mA

Output current

Max. output range	0 ... 20 mA
Accuracy	~ 20 µA
Max. burden	500 Ohm
Residual ripple	20 µAss

Output voltage

Variants	R2, R4
Max. output range	0 ... 10 V
Accuracy	~ 10 mV
Min. burden	10 kOhm
Residual ripple	10 mVss

Resolution

Input	10 bit
Output	10 bit

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Multifunction Transducer

AD-VC 4S FE

Technical specifications

Relay outputs A...D

Contacts R2 / R4	2 changeover contact / 4 changeover contact
Max. AC-breaking capacity	250 V AC, 2 A AC, 50Hz
Max. DC-breaking capacity	50 V DC, 2 A DC
Switching operations	
Mechanical	10^7
AC: 230V / 2A, cos(phi)=1	$6 * 10^5$
AC: 230V / 2A, cos(phi)=0,4	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$

Display

Graphic-LCD	122x32 Pixel, background lit
Digital display	5-digit, can be configured
Display function	scaled input signal, input signal, output, limits, scaled dimension as quasi analogue bar, scaling unit

Transmission behaviour

Linearity error	< 0,2 % of full scale
Rise time	100 ms (output at 90 %)
Temperature influence	+/- 100 ppm/K of full scale

Supply

Supply voltage	20 ... 253 V DC / 50 ... 253 V AC
Max. power consumption	2,6 W / 5 VA

Housing

Manner of fastening	Panel-mount-case (DIN 43 700)
Dimensions front	IP 65
Type of protection housing	IP 20
Connector cross section	1,0 mm² Strand with wire end ferrule / 1,5 mm² one wire
Connector cross section supply	max. 2,5 mm²
Weight	~ 320 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)] During electromagnetic disturbance minor changes in output signal are possible.

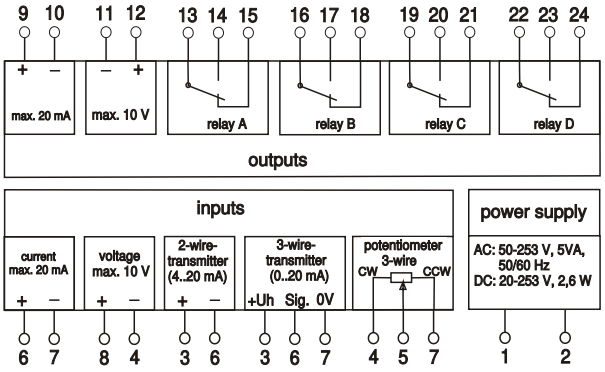
Electrical safety requirements

Product family standard	EN 61010-1

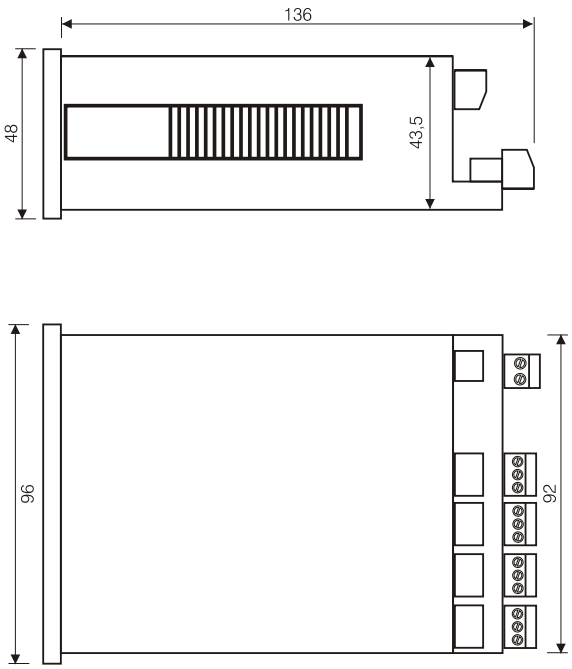
Galvanic isolation, test voltages

Input/output	2,5 kV (1 min)
Signal/auxiliary voltage	4 kV (1 min)

Block and wiring diagram



Dimensions



Indicating / Operating Module

AD-VarioControl

AD-VarioConnect

Description

The removable control modules AD-VarioControl are used to display measured values of a base device (transmitter, isolation amplifiers ...) with a relevant interface. After plugging in, which is also possible during operation of the base device without restrictions, the basic device is automatically read out and the corresponding measured value is displayed. In addition to the display function, access to the parameters and controller functions of the basic device is also possible. The parameter settings can be loaded into the control panel using the backup function and can be restored on a different base device of the same type.
Establishment of a transmitter is usually necessary only once in the operating period of a device, therefore a display and operating elements are not permanently necessary for each device. By using the AD-VarioControl in connection with compatible basic equipment, operating elements and displays on each individual device can be dispensed with. This way, the installed devices are tamper-proof and more cost-effective.
The **AD-VarioConnect** has a fieldbus interface with the protocol Modbus-RTU via RS485. All measured values of the basic units are available above this.

Application

Control device to display and configuration of DIN rail devices with optional fieldbus.

Specific characteristics

- Removeable (hot-plugged)
- Store and restore of parameters
- LCD for display of different operating modes, lit in several colours (R/Y/B)
- Menu languages switchable to: German, English
- Simulation modus
- Fieldbus interface with Modbus RTU (AD-VarioConnect)

Business data

Order number	
Control panel	AD-VarioControl
Control panel with RS485	AD-VarioConnect
Basic devices	
Frequency measuring converter	AD-FM 255 GVD
Limit-Switch	AD-MK 350 GVD
Temperature Measuring Converter	AD-MV 550 GVD
Power measurement transducer	AD-LU 320 GVD / AD-LU 325 GVD
Power measurement transducer	AD-LU 620 GVF / AD-LU 625 GVF
Isolation amplifier	AD-TV 400 GVD
Isolation amplifier	AD-TV 420 GVD
AC Isolation Amplifier	AD-TV 588 GVD
Multifunction transducer	AD-VC 1 GVD

Technical specifications

Display	
Type	LCD graphic
Dimensions (WxH)	18x13 mm
Resolution	42X56 Pixel
Lighting	RGB
Operation	
Type	3 short-stroke keys
RS485 Bus (Varioconnect)	
Protocol	Modbus-RTU
Data format (default)	19200, e, 8, 1
Max. bus users	32
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no stubs)
Cable	twisted and shielded
Supply	
Supply voltage	5 DC
Max. power consumption	0,2 W
Housing	
Dimensions (WxHxD)	20x86x14 mm
Dimensions with clamp	20x95x14 mm
Type of protection	IP 20
Weight	20 g
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Galvanic isolation, test voltages (VarioConnect)	
RS485-bus to basic device	1,5 kV

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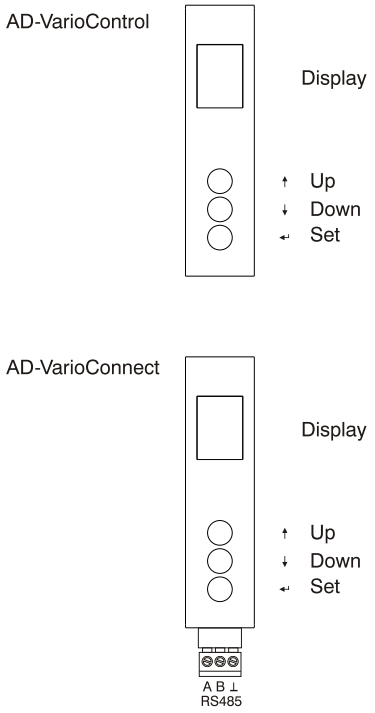
Indicating / Operating Module

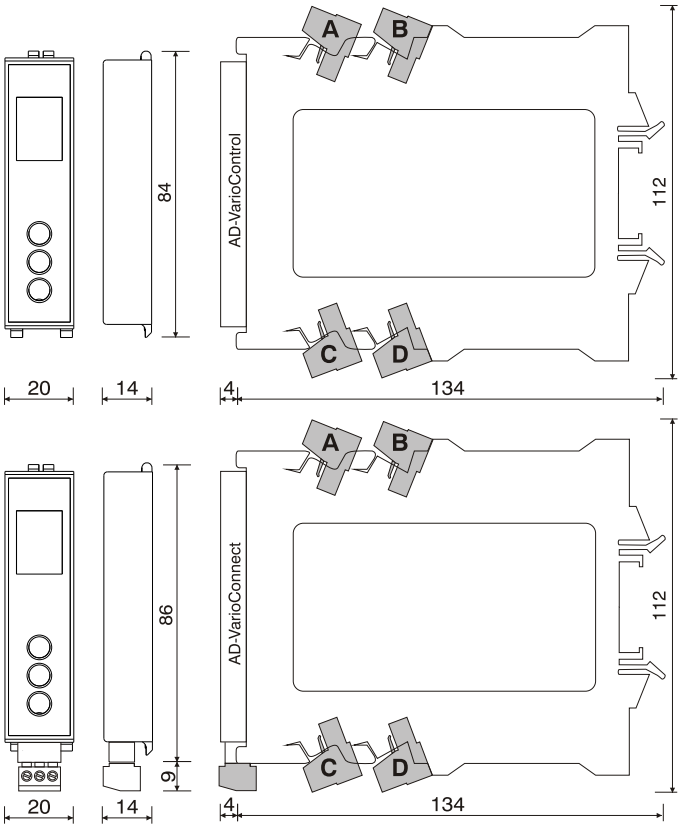
AD-VarioControl

AD-VarioConnect

Block and wiring diagram



Dimensions



Isolation Amplifier

AD-TV 400 GVD

Description

The isolation amplifier AD-TV 400 GVD serves the galvanic separation of analogue signals and of transmitter signals. When a 2-wire transmitter is connected, this will be supplied directly via a galvanically separated and current-limited supply voltage. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating panel AD-VarioControl or via the programming software AD-Studio. The wide bipolar input measuring range makes this buffer amplifier into the universal type for almost all applications in the area of standard signals and beyond. Due to its current-sinking output, transmitter signals can also be separated or converted. All supply ranges are covered with the wide range power pack.

Application

Amplification, transformation and electrical isolation of current or voltage signals

Specific characteristics

- bipolar current input (+/- 0,5 mA bis +/- 50 mA)
- bipolar voltage input (+/- 1 V bis +/- 100 V)
- Power supply for 2- / 3-wire transmitters
- bipolar current or voltage output
- current sink output
- Operating module as an accessory
- 23 mm narrow housing with detachable terminal clamp

Business data

Order number	
Isolation amplifier	AD-TV 400 GVD
Accessory (optional)	
Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current	
Measuring range	-50 ... + 50 mA DC
Input resistance	40 Ohm
Input voltage	
Measuring range	-100 ... + 100 V DC
Input resistance	1 MOhm
Transmitter supply	
Off-load voltage	24,5 V
Voltage at 20mA	19,5 V
Current limit	~ 25 mA
Output current	
Max. output range	-21,5 ... 21,5 mA DC
Max. burden	400 Ohm
Residual ripple	40 µAss
Output voltage	
Max. output range	-10,5 ... 10,5 V DC
Min. burden	10 kOhm
Residual ripple	30 mVss
Current sink output	
Current sink	0/4 ... 20 mA DC
Max. voltage to be applied	35 V DC
Resolution	
Input	16 bit
Output	12 bit
Transmission behaviour	
Linearity error	0,2 % of full scale
Rise time	200 ms (output auf 90 %)
Temperature influence	+/- 100 ppm/K of full scale
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	4 VA / 2,4 W
Housing	
Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

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Isolation Amplifier

AD-TV 400 GVD

Technical specifications

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

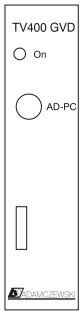
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	3,75 kV (1 min)
Signal/auxiliary voltage	4 kV (1 min)

Display and operating elements

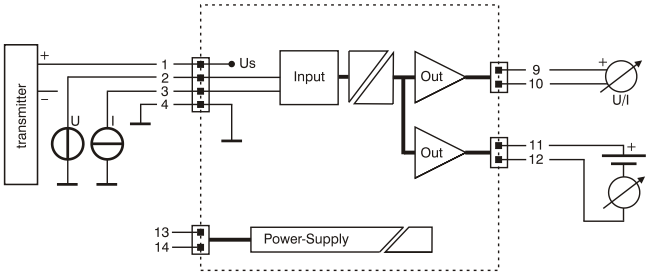


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits

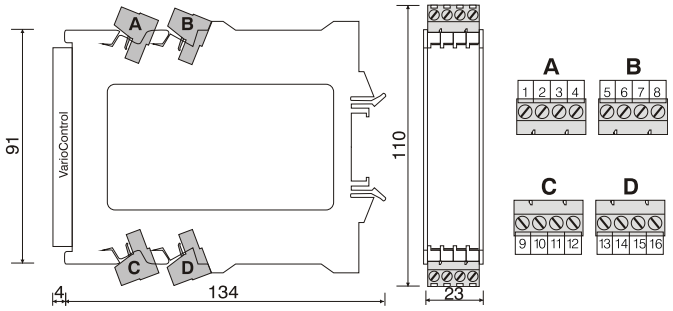
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-TV 400 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40805	2	Scaled input		7	1	0
40809	2	Input signal	mA / V	7	1	0
40909	2	Output signal 1	mA / V	7	1	1
40911	2	Output signal 2	mA / V	7	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Isolation Amplifier

AD-TV 420 GVD

Description

The isolation amplifier AD-TV 420 GVD serves the galvanic separation of analogue signals and of transmitter signals. When a 2-wire transmitter is connected, this will be supplied directly via a galvanically separated and current-limited supply voltage. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating panel AD-VarioControl or via the programming software AD-Studio. The wide bipolar input measuring range makes this buffer amplifier into the universal type for almost all applications in the area of standard signals and beyond. All supply ranges are covered with the wide range power pack.

Application

Amplification, transformation and electrical isolation of current or voltage signals

Specific characteristics

- bipolar current input (+/- 0,5 mA bis +/- 50 mA)
- bipolar voltage input (+/- 1 V bis +/- 100 V)
- Power supply for 2- / 3-wire transmitters
- 2 bipolar current or voltage output
- Operating module as an accessory
- 23 mm narrow housing with detachable terminal clamp

Business data

Order number	
Isolation amplifier	AD-TV 420 GVD
Accessory (optional)	
Operating module	AD-VarioControl / AD-VarioConnect
USB programming adapter	AD-Variopass
Configuration software	70|AD-Studio
Test	
Modbus Protokoll	http://www.modbus.org/specs.php|Protokoll-Spezifikation der Modbus Organisation
GTC	agb.pdf|Adamczewski AGB

Technical specifications

Input current	
Measuring range	-50 ... + 50 mA DC
Input resistance	40 Ohm
Input voltage	
Measuring range	-100 ... + 100 V DC
Input resistance	1 MOhm
Transmitter supply	
Off-load voltage	24,5 V
Voltage at 20mA	19,5 V
Current limit	~ 25 mA
Current outputs	
Max. output range	-21,5 ... 21,5 mA DC
Max. burden	400 Ohm
Residual ripple	40 µAss
Voltage outputs	
Max. output range	-10,5 ... 10,5 V DC
Min. burden	10 kOhm
Residual ripple	30 mVss
Resolution	
Input	16 bit
Output	12 bit
Transmission behaviour	
Linearity error	0,2 % of full scale
Rise time	200 ms (output auf 90 %)
Temperature influence	+/- 100 ppm/K of full scale
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	4,4 VA / 2,8 W
Housing	
Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

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Isolation Amplifier

AD-TV 420 GVD

Technical specifications

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

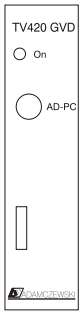
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	3,51 kV (1 min)
Signal/auxiliary voltage	3,75 kV (1 min)

Display and operating elements

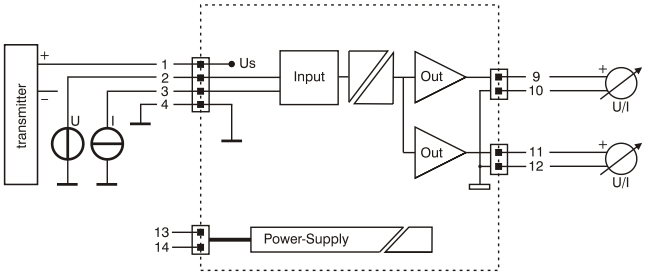


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits

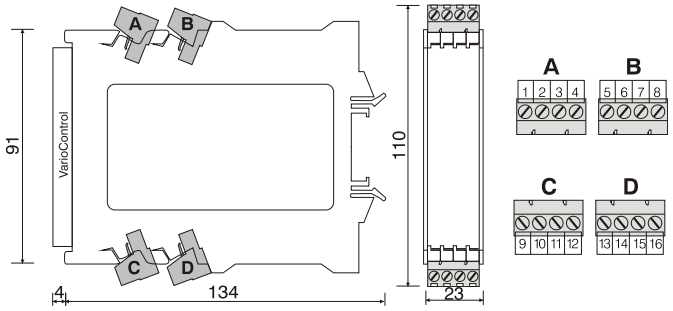
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-TV 420 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40805	2	Scaled input		7	1	0
40809	2	Input signal	mA / V	7	1	0
40909	2	Output signal 1	mA / V	7	1	1
40911	2	Output signal 2	mA / V	7	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

AC Isolation Amplifier

AC-Isolation Amplifier/Limit Switch

AD-TV 588 GVD

Description

The AD-TV 588 GVD is used for measuring the rms value of alternating current via a built-in current transformer up to 5A or via an external clamp on / split core current transformer up to 600A. The detected current is outputted as a galvanically isolated standard current signal in the range 0 to 20 mA and as a standard voltage signal in the range 0 to 10 volts. An additional relay output can indicate a limit value or a window. All parameters such as range, output range, relay functions, limiting values, etc. can be freely set via the configuration software.

Application

Measuring the current of single-phase loads up to 600A. Monitoring of current consumption to certain limits with hysteresis threshold by limit function. Monitoring a certain range of the current consumption by window function.

Specific characteristics

- Detection of the rms value of alternating currents up to 600A
- Current and voltage output can be used simultaneously
- Relay output, NO
- Wide range power supply. Supply with 24V DC or 230V AC available
- External clamp on/split core current transformers as accessory available
- Configuration information, such as limits, input current, etc. can be adjusted by the customer via configuration software or be specified when ordering
- Operating module as an accessory

Business data

Order number	
AC Isolation Amplifier	AD-TV 588 GVD
Accessory (optional)	
Split core current transformer	AD-KSW 5/50/100/200/400/600 A AC
Display/control module	AD-VarioControl, VarioConnect
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current directly	
Measuring range 1 A	0 ... 1 A AC
Measuring range 5 A	0 ... 5 A AC
Remark	DO NOT CONFUSE THE INPUT OF THE CLAMP ON CURRENT TRANSFORMER.
Current input via Clamp on Current Transformer	
Measuring range, Re, Terminals	0 ... 1,66 mA AC, 200 Ohm, 5/6
Measuring range, Re, Terminals	0 ... 16,6 mA AC, 20 Ohm, 6/7
Measuring range, Re, Terminals	0 ... 33,3 mA AC, 10 Ohm, 7/8 (alle AD-KSW XXX)
Measuring range, Re, Terminals	0 ... 66,6 mA AC, 5 Ohm, 8/1
All current inputs	
Rated frequency	50 Hz
Frequency range	40 ... 400 Hz
Sampling	2 kHz
All signal outputs	
Simultaneous use	Yes. Minus (terminals 10/12) may not be connected.
Bit width D/A converter (PWM)	11 Bit
Output current	
Maximum output range	0 ... 20 mA
Resolution	~10 uA
Max. burden	500 Ohm
Output voltage	
Maximum output range	0 ... 10 V
Resolution	~5 mV
Min. burden	1 kOhm
Relay output	
Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	closing contact
Switching operations mechanical	10.000.000
At 230V/2A AC, cos(phi)=1	600.000
At 230V/2A AC, cos(phi)=0,4	200.000
At 24V/1 A DC	200.000
Transmission behaviour	
Maximum linearity error	0,5 % of full scale
Rise time 0..90%	200 ms
Temperature influence	+/- 100 ppm/K
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	3 VA / 1,5 W

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AC Isolation Amplifier

AC-Isolation Amplifier/Limit Switch

AD-TV 588 GVD

Technical specifications

Housing

Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Bolting torque screw terminals	0,5 Nm
Weight	~120 g

Environmental conditions

Operation	-10 ... 50 °C
Storage, transport	-10 ... 60 °C

EMC

Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1

Galvanic isolation, test voltages

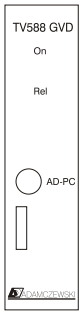
Input/output	4 kV, 1 min
Input, output/supply	4 kV, 1 min

Notifications

Operation	green LED. Blinks when signal outside range
Relay	red LED. Lit when relay is energized

[1)]During electromagnetic disturbance minor changes in output signal are possible.

Display and operating elements

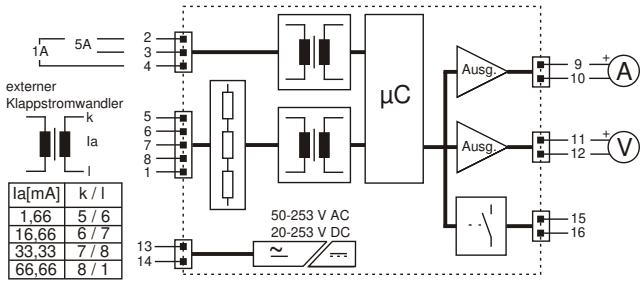


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits
Rel: LED for relay in red
on - relay activated

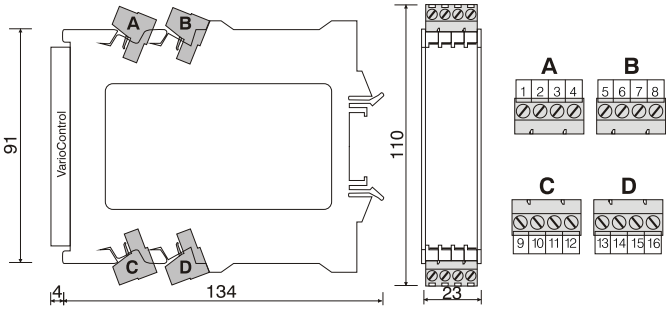
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus/RTU Communication

The optional AD-VarioConnect operating module is required for communication via Modbus/RTU. It has an RS-485 interface. The data format is 19200,e,8,1. The slave address is 1. These settings can be changed using the AD-VarioConnect operating module. The following data can be communicated.

Start address	Number of registers	Name	Unit	Data type	read	write
40701	2	Scaled input	A AC	float	1	0
40801	2	Output signal current	mA	float	1	1
40803	2	Output signal voltage	V	float	1	1

Use of the Adamczewski AD-KSW XXX folding current transformers

All AD-KSW XXX folding current transformers provide an output current of 33.33 mA regardless of the input current. Therefore, when using these transformers, ALWAYS use input terminals 7/8.

Multifunction Transducer

Temperature Measuring Converter

AD-MV 550 GVD

Description

The digital temperature measuring transformer AD-MV 550 GVD serves the galvanic separation and transformation of resistance transmitter or thermocouples to an impressed output signal (i.e. 0-20 mA). All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional control panel AD-VarioControl or via the programming software AD-Studio. Due to its current-sinking output, transmitter signals can also be galvanic separated or transformed. The wide range power pack covers all supply regions.

Specific characteristics

- Resistance thermometer inputs, types Pt/Ni 100, Pt/Ni 500, Pt/Ni 1000
- Thermocouples inputs, types J, T, K, E, N, S, R, B, C or inputs a mV/T-characteristic curve. Selectable internal or external reference junction
- A bipolar mV-Voltage input. Free linearizing curves possible.
- bipolar current or voltage output
- current sink output
- Operating module as an accessory
- 23 mm narrow housing with detachable terminal clamp

Business data

Order number

Temperature Measuring Converter	AD-MV 550 GVD

Accessory (optional)

Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Resistance thermometer inputs Pt100, Pt500, Pt1000 to DIN EN 60751

Measuring range	-200 ... +850 °C
Connection method	2-, 3- oder 4-wire system
Accuracy	0,5 K
Smallest measuring spans	20 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	
Pt100	1 mA
Pt500, Pt1000	210 µA

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Resistance thermometer inputs Ni100, Ni500, Ni1000 to DIN EN 43760

Measuring range	-60 ... +230 °C
Connection method	2-, 3- oder 4-wire system
Accuracy	0,5 K
Smallest measuring spans	20 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	
Ni100	1 mA
Ni500, Ni1000	210 µA

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Thermocouples

Comparative place:	
Internal	measurement with LM35 in the device connecting terminals
External	Cold junction temperature selectable by parameters
Measuring range type J	-200 ... +1200 °C
To DIN EN 60584:	
Measuring range type T	-200 ... +400 °C
Measuring range type K	-200 ... +1360 °C
Measuring range type E	-200 ... +1000 °C
Measuring range type N	-200 ... +1300 °C
Measuring range type S	-40 ... +1760 °C
Measuring range type R	-40 ... +1760 °C
Measuring range type B	+400 ... +1800 °C
After standard ASTM E988:	
Measuring range type C	0 ... +2320 °C
Smallest measuring spans	100 K

Voltage inputs

Measuring range	-18 ... +18 mV
	-36 ... +36 mV
	-72 ... +72 mV
	-144 ... +144 mV

Printed 23.08.2022 We reserve the right for technical changes.

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Multifunction Transducer

Temperature Measuring Converter AD-MV 550 GVD

Technical specifications

Output current

Max. output range	-21,5 ... 21,5 mA DC
Max. burden	400 Ohm
Residual ripple	40 µAss

Output voltage

Max. output range	-10,5 ... 10,5 V DC
Min. burden	10 kOhm
Residual ripple	30 mVss

Current sink output

Current sink	0/4 ... 20 mA DC
Max. voltage to be applied	35 V DC

Resolution

Input	16 bit
Output	12 bit

Transmission behaviour

Linearity error	0,2 % of full scale
Rise time	600 ms (output auf 90 %)
Temperature influence	+/- 100 ppm/K of full scale

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	2,4 VA / 1,2 W

Housing

Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)] During electromagnetic disturbance minor changes in output signal are possible.

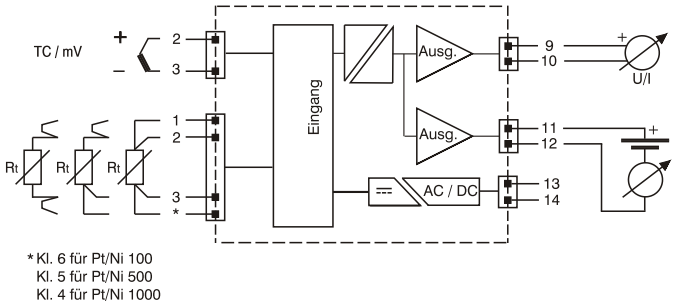
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

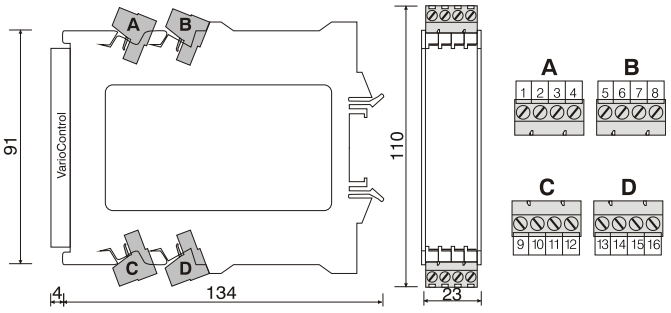
Input/output	2,5 kV (1 min)
Signal/auxiliary voltage	4 kV (1 min)

Block and wiring diagram



* Kl. 6 für Pt/Ni 100
Kl. 5 für Pt/Ni 500
Kl. 4 für Pt/Ni 1000

Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.

The Modbus master can read out the individual registers of the AD-MB 550 GVD via the addresses.

The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40801	2	Input signal	Ohm / mV	7	1	0
40803	2	Cold-junction temperature	°C	7	1	0
40805	2	Scaled input	°C / …	7	1	0
40905	2	Output signal 2	mA	7	1	1
40907	2	Output signal 1	mA / V	7	1	0

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Limit Switch

Vario - Limit Switch

AD-MK 350 GVD

Description

The limit switch AD-MK 350 GVD serves the switching of limiting values on analogue signals, transmitter signals and resistance thermometer. If a 2-wire transmitter is connected, it will be supplied directly through a galvanic separated and current limited supply voltage. The device has analogue inputs for current, voltage and resistance thermometer, which can be utilised alternatively. The AD-MK 350 GVD can switch maximally two independent limiting values with its two potential-free change-over contacts. The switching thresholds and operating modes can be freely parameterized. This can be carried out via the optional control panel AD-VarioControl or via the programming software AD-Studio. The status of the relevant relay is indicated via LED at the front or at the operating module AD-VarioControl.

Application

Switching limit values to active analog signals, 2- / 3-wire transmitters, and resistance thermometers, e.g. Flows, heights or temperatures.

Specific characteristics

- bipolar current input (+/- 0.5 mA to +/- 50 mA)
- bipolar voltage input (+/- 1 V to +/- 100 V)
- power supply of 2- / 3-wire transmitters
- two potential-free change-over contacts
- operating module as an accessory
- 23mm narrow housing with detachable terminal clamp

Business data

Order number

Vario - Limit Switch	AD-MK 350 GVD

Accessory (optional)

Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current

Measuring range	-50 ... + 50 mA DC
Input resistance	40 Ohm
Resolution	16 Bit
Accuracy	0,1 % of full scale

Input voltage

Measuring range	-100 ... + 100 V DC
Input resistance	1 MOhm
Resolution	16 Bit
Accuracy	0,1 % of full scale

Transmitter supply

Off-load voltage	24,5 V
Voltage at 20mA	17,5 V
Current limit	~ 25 mA

Resistance thermometer inputs Pt100, Pt500, Pt1000 to DIN EN 60751

Measuring range	-200 ... +850 °C
Connection method	2-, 3- oder 4-wire system
Resolution	16 Bit
Accuracy	0,6 K
Smallest measuring spans	20 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	310 µA

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Resistance thermometer inputs Ni100, Ni500, Ni1000 to DIN EN 43760

Measuring range	-60 ... +230 °C
Connection method	2-, 3- oder 4-wire system
Resolution	16 Bit
Accuracy	0,6 K
Smallest measuring spans	20 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	310 µA

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Relay outputs A/B

Contact type	potential free changeover
Max. AC-breaking capacity	250 V AC, 2 A AC, 50Hz
Max. DC-breaking capacity	50 V DC, 2 A DC
Switching operations	
Mechanical	10^7
AC: 230V / 2A, cos(phi)=1	$6 * 10^5$
AC: 230V / 2A, cos(phi)=0,4	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$

Transmission behaviour

Rise time	500 ms (output auf 90 %)
Temperature influence	+/- 100 ppm/K of full scale

Printed 23.08.2022 We reserve the right for technical changes.

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Limit Switch

Vario - Limit Switch

AD-MK 350 GVD

Technical specifications

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	4 VA / 2,4 W

Housing

Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)] During electromagnetic disturbance minor changes in output signal are possible.

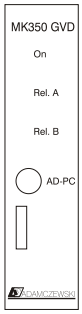
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	2,5 kV (1 min)
Signal/auxiliary voltage	3 kV (1 min)

Display and operating elements

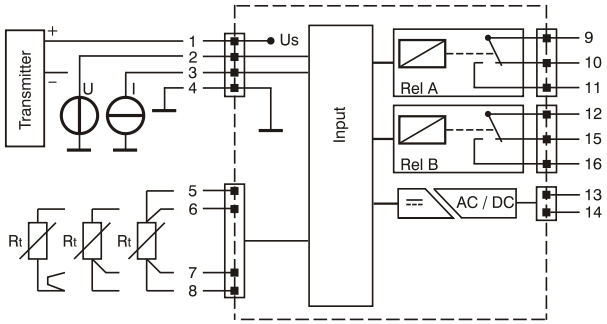


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits
Rel: two LEDs for relays A and B in red
on - relay activated

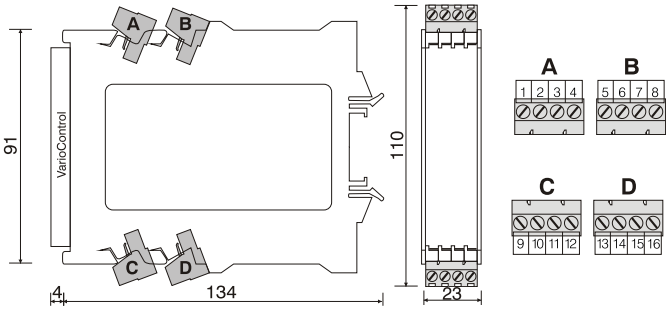
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-MK 350 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40607	2	Input signal	mA / V / Ohm	7	1	0
40609	2	Scaled input	°C / ?	7	1	0

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Frequency Converter

AD-FM 255 GVD

AD-FM 255 GVD-O

Description

The frequency measuring converter AD-FM 255 GVD supplies an initiator or a contact and transforms its impulse sequence to a proportional impressed analogue signal. The output signal is independent from the connected load up to a maximum value. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating panel AD-VarioControl or via the programming software AD-Studio. Input, output and the supply voltage are separated from each other galvanically with high isolation.

Application

The main area of application is the through-flow measuring at water meters, further applications are energy consumption measuring etc.

Specific characteristics

- Inputs: NAMUR, contact, open collector, 3-conductor Opto, 24V activ
- Outputs: current and voltage
- Digital output: Relay or semiconductor (pulse or limit value function)
- Operating module VarioControl as an accessory
- Programming via configuration software

Business data

Order number

AD-FM 255 GVD	relay output
AD-FM 255 GVD-O	semiconductor output

Accessory (optional)

Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass /AD-Studio

Technical specifications

Digital input	
Input	NAMUR (EN 60947-5-6), reed contact, open-collector, 3-lead opto-transmitter or 24V active
Input frequency	min. 0 ... 10 mHz; max. 0 ... 10 kHz
Frequency generator supply	active: 8V / 8mA
Kontaktentprellung (activatable)	40 ms
Output current	
Output range	0 ... 20 mA
Max. burden	400 Ohm
Residual ripple	< 50 µAss
Output voltage	
Output range	0 ... 10 V
Min. burden	10 kOhm
Residual ripple	<20 µVss
Accuracy	
Unit	<0,3%
Temperature influence	<100 ppm / K
Response time	approx. 70 ms
Relay output	
Contact type	potential-free changeover
Max. AC-breaking capacity	250 V AC, 2 A AC, 50Hz
Max. DC-breaking capacity	50 V DC, 2 A DC
Switching operations	
Mechanical	10^7
AC: 230V / 2A, cos(phi)=1	$6 * 10^5$
AC: 230V / 2A, cos(phi)=0,4	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$
Semiconductor output (optional)	
Max switching voltage	30 V DC
Max. switching current	50 mA DC
Voltage drop	< 1 V
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	3,7 VA / 2,1 W
Housing	
Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 140 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Frequency Converter

AD-FM 255 GVD

AD-FM 255 GVD-O

Technical specifications

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
	In a critical EMC environment, shielded encoder cables are recommended.

[1)]During electromagnetic disturbance minor changes in output signal are possible.

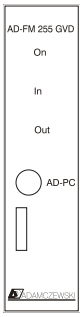
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

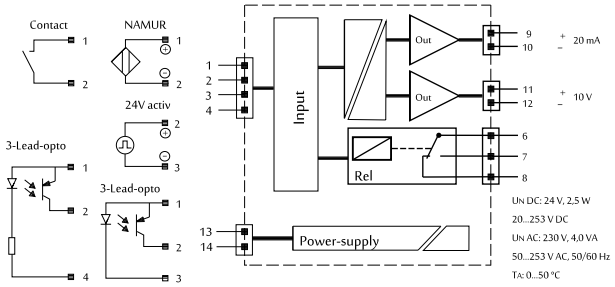
Input/output	2 kV RMS (1 min.)
Signal/auxiliary voltage	3 kV RMS (1 min.)

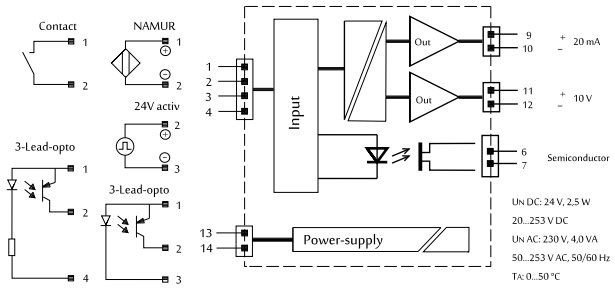
Display and operating elements



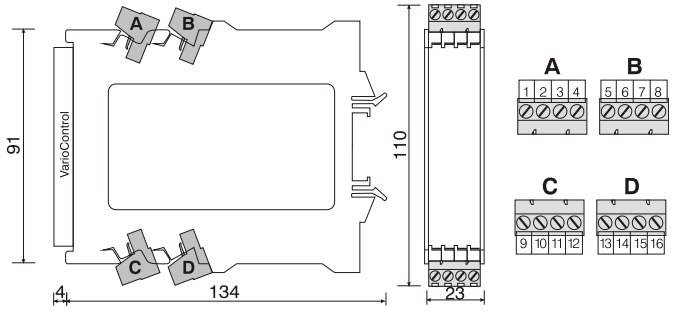
On: LED for the power indicator in green
lights up - normal operation
flashing - signal failure, signal outside range limits
In: LED for input pulse signal
0 ... 7 Hz - according to signal
>7 Hz - 7 Hz flashing **Out**: LED for the relays / semiconductor
lights up - relay energized
AD-PC: Communication interface for configuration by a PC
Communication interface VarioControl

Block and wiring diagram





Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-FM 255 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40801	2	Input frequency	Hz	float	1	0
40803	2	Scaled input		float	1	0
40805	2	Input percentage	%	float	1	0
40901	2	Output signal voltage	V	float	1	1
40903	2	Output signal current	mA	float	1	1

Power Measurement

AD-LU 320 GVD

Description

The digital power measuring transducer AD-LU 320 GVD measures all quantities of the power-network (current, voltage, energy, harmonics, phase angle, active power, reactive power, apparent power) and converts these measuring values onto two freely scalable analogue outputs. The unit is therefore optimal suitable for integration in energy management systems. For measuring of high voltages or high currents, external transformers can be connected in series at any time. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating modul AD-VarioControl or via the programming software AD-Studio. The LEDs at the front signals the operating condition. The compact type of construction and the high performance ability with simultaneous low energy consumption allows usage in almost any application.

Application

Typical usage in plant, machines or energy management systems for balancing and determination of energy distribution.

Specific characteristics

- Measurement of a phase
- Measuring quantities: active power, reactive power, apparent power, currents and voltages, frequency, power factor, harmonics (active power), energy metering
- current and voltage output
- Counters for active power (consuption and infeed), reactive power (inductive and capacitive) and apparent power
- 23 mm narrow housing with detachable terminal clamp
- Operating module AD-VarioControl as an accessory

Business data

Order number

AD-LU 320 GVD

Accessory (optional)

Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current	
Measuring ranges	0 ... 1 A AC; 0 ... 5 A AC
Max. measurable harmonic	40
Input voltage	
Measuring range	10 ... 253 V AC
Input resistance	> 1 MOhm
Output current	
Output range	0/4 ... 20 mA
Max. load	400 Ohm
Resolution	11 Bit
Residual ripple	25 µAss
Output voltage	
Output range	0/2 ... 10 V
Min. load	10 kOhm
Resolution	11 Bit
Residual ripple	20 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC / DC	230 V AC / 24 V DC
Voltage range DC	20 ... 253 V DC
Power consumption AC / DC	3,4 VA / 1,8 W
Power consumption with operating module AC / DC	3,6 VA / 2,0 W
Transmission behaviour	
Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 0,5 s (0...90 %, 100...10 %)

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Power Measurement

AD-LU 320 GVD

Technical specifications

Housing

Dimensions (WxHxD)	23x110x134mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Skinning length	6 mm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1] During checking, slight signal deviations are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Input to analog outputs / power-supply	4 kV, 50 Hz (1 min.)
Power-supply to analog out	3 kV, 50 Hz (1 min.)

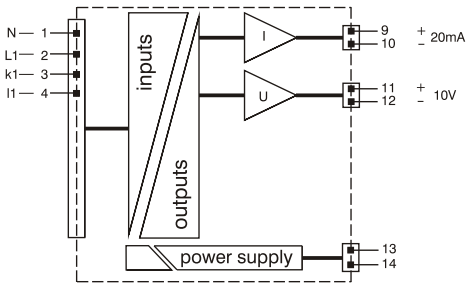
Protection circuits

Input	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current
Analog outputs	electrical surge protection

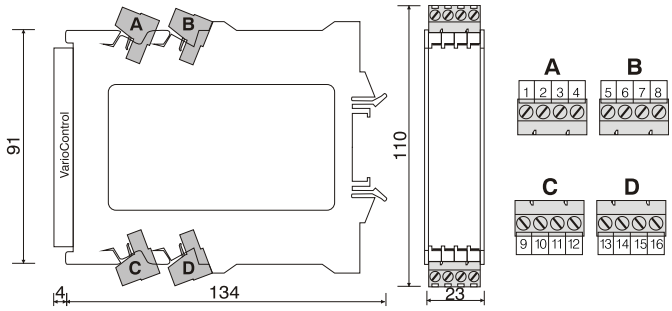
Display and operating elements

On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits

Block and wiring diagram



Dimensions



Circuit examples

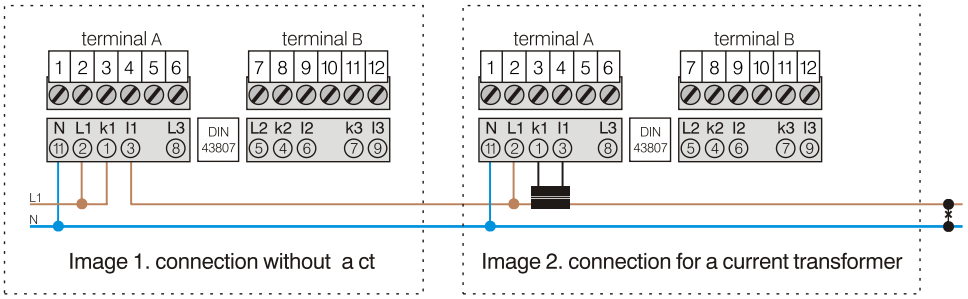


Image 1. connection without a ct

Image 2. connection for a current transformer

Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-LU 320 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40202	1	digital output A		3	1	1
40203	1	digital output B		3	1	1
40204	1	digital output A LED		3	1	1
40205	1	digital output B LED		3	1	1
40501	2	active power total	kW	7	1	0
40503	2	active power total L1	kW	7	1	0
40509	2	total reactive power	kvar	7	1	0
40511	2	reactive power L1	kvar	7	1	0
40517	2	total apparent power	kVA	7	1	0
40519	2	apparent power L1	kVA	7	1	0
40525	2	total power factor		7	1	0
40527	2	power factor in L1		7	1	0
40533	2	total active fundamental power	kW	7	1	0
40535	2	active fundamental power L1	kW	7	1	0
40541	2	total active harmonic power	kW	7	1	0
40543	2	active harmonic power L1	kW	7	1	0
40549	2	voltage L1 / N	V	7	1	0
40555	2	current N line (calculated)	A	7	1	0
40557	2	current in L1	A	7	1	0
40563	2	voltage peak L1	V	7	1	0
40569	2	current peak L1	A	7	1	0
40575	2	frequency	Hz	7	1	0
40585	2	phase angle Psi L1	°	7	1	0
40801	2	output current	mA	7	1	0
40803	2	output voltage	V	7	1	0
Counter:						
44003	2	counter kWh - consuption	kWh	5	1	1
44005	2	counter kWh - infeed	kWh	5	1	1
44007	2	counter kVarh - inductiv	kVarh	5	1	1
44009	2	counter kVarh - capacitiv	kVarh	5	1	1
44011	2	counter kVAh - apparent energy	kVAh	5	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Power Measurement

AD-LU 325 GVD

Description

The digital power measuring transducer AD-LU 325 GVD measures all quantities of the power-network (current, voltage, energy, harmonics, phase angle, active power, reactive power, apparent power) and converts these measuring values onto two freely scalable analogue outputs. The unit is therefore optimal suitable for integration in energy management systems. The current is measured via additionally available split-core current transformers. For measuring of high voltages, external transformers can be connected in series at any time. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating modul AD-VarioControl or via the programming software AD-Studio. The LEDs at the front signals the operating condition. The compact type of construction and the high performance ability with simultaneous low energy consumption allows usage in almost any application.

Application

Typical usage in plant, machines or energy management systems for balancing and determination of energy distribution.

Specific characteristics

- Measurement of a phase
- Current measurement via split-core current transformers up to 600 A
- Measuring quantities: effective power, reactive power, apparent power, currents and voltages, frequency, power factor, harmonics (active power), energy metering
- current and voltage output
- Counters for active power (consuption and infeed), reactive power (inductive and capacitive) and apparent power
- 23 mm narrow housing with detachable terminal clamp
- Operating module AD-VarioControl as an accessory

Business data

Order number

AD-LU 325 GVD

Accessory (optional)

AD-split core current transformer	5/50/100/200/400/600 A AC
Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current

Measuring ranges	0 ... 0,05 A AC from split core current transformer
Max. measurable harmonic	40

Input voltage

Measuring range	10 ... 253 V AC
Input resistance	> 1 MOhm

Output current

Output range	0/4 ... 20 mA
Max. load	400 Ohm
Resolution	11 Bit
Residual ripple	25 µAss

Output voltage

Output range	0/2 ... 10 V
Min. load	10 kOhm
Resolution	11 Bit
Residual ripple	20 mVss

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC / DC	230 V AC / 24 V DC
Voltage range DC	20 ... 253 V DC
Power consumption AC / DC	3,4 VA / 1,8 W
Power consumption with operating module AC / DC	3,6 VA / 2,0 W

Transmission behaviour

Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 0,5 s (0...90 %, 100...10 %)

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Power Measurement

AD-LU 325 GVD

Technical specifications

Housing

Dimensions (WxHxD)	23x110x134mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Skinning length	6 mm
Weight	~ 145 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1] During checking, slight signal deviations are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Input to analog outputs / power-supply	4 kV, 50 Hz (1 min.)
Power-supply to analog out	3 kV, 50 Hz (1 min.)

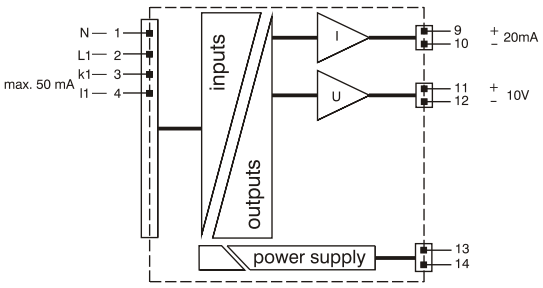
Protection circuits

Input	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current
Analog outputs	electrical surge protection

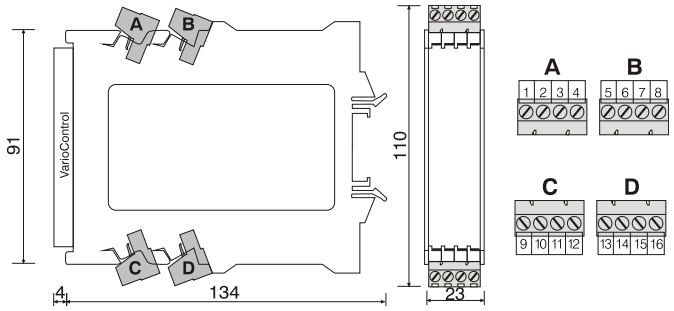
Display and operating elements

On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits

Block and wiring diagram



Dimensions



Circuit examples

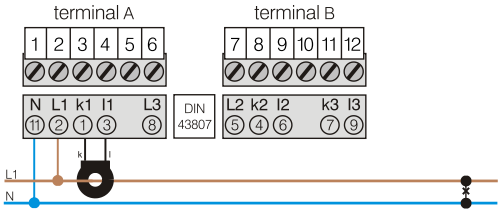


Image 1. connection for a current transformer

Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-LU 325 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40202	1	digital output A		3	1	1
40203	1	digital output B		3	1	1
40204	1	digital output A LED		3	1	1
40205	1	digital output B LED		3	1	1
40501	2	active power total	kW	7	1	0
40503	2	active power total L1	kW	7	1	0
40509	2	total reactive power	kvar	7	1	0
40511	2	reactive power L1	kvar	7	1	0
40517	2	total apparent power	kVA	7	1	0
40519	2	apparent power L1	kVA	7	1	0
40525	2	total power factor		7	1	0
40527	2	power factor in L1		7	1	0
40533	2	total active fundamental power	kW	7	1	0
40535	2	active fundamental power L1	kW	7	1	0
40541	2	total active harmonic power	kW	7	1	0
40543	2	active harmonic power L1	kW	7	1	0
40549	2	voltage L1 / N	V	7	1	0
40555	2	current N line (calculated)	A	7	1	0
40557	2	current in L1	A	7	1	0
40563	2	voltage peak L1	V	7	1	0
40569	2	current peak L1	A	7	1	0
40575	2	frequency	Hz	7	1	0
40585	2	phase angle Psi L1	°	7	1	0
40801	2	output current	mA	7	1	0
40803	2	output voltage	V	7	1	0
Counter:						
44003	2	counter kWh - consuption	kWh	5	1	1
44005	2	counter kWh - infeed	kWh	5	1	1
44007	2	counter kVarh - inductiv	kVarh	5	1	1
44009	2	counter kVarh - capacitiv	kVarh	5	1	1
44011	2	counter kVAh - apparent energy	kVAh	5	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Power Measurement

AD-LU 620 GVF

Description

The digital power measuring transducer AD-LU 620 GVF measures all quantities of the three-phase network (current, voltage, energy, harmonics, phase angle, active power, reactive power, apparent power) and converts these measuring values onto two freely scalable analogue outputs. With the integral relay and transistor output, the switching of limiting values or the output of energy pulses is possible. The unit is therefore optimal suitable for integration in energy management systems. For measuring of high voltages or high currents, external transformers can be connected in series at any time. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating modul AD-VarioControl or via the programming software AD-Studio. The LEDs at the front signals the operating condition and the relay-status. The compact type of construction and the high performance ability with simultaneous low energy consumption allows usage in almost any application.

Application

Typical usage in plant, machines or energy management systems for balancing and determination of energy distribution.

Specific characteristics

- Connection of 3 phases with neutral, any load
- Measuring quantities: effective power, reactive power, apparent power, currents and voltages, frequency, power factor, harmonics, energy metering
- current and voltage output
- relay or transistor output
- Counters for active power (consuption and infeed), reactive power (inductive and capacitive) and apparent power
- 33 mm narrow housing with detachable terminal clamp
- Operating module AD-VarioControl as an accessory

Business data

Order number

AD-LU 620 GVF

Accessory (optional)

Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Current-inputs (I1...I3)	
Measuring ranges	0 ... 1 A AC; 0 ... 5 A AC
Max. measurable harmonic	40
Voltage-inputs (L1...L3)	
Measuring range	10 ... 253 V AC
Input resistance	> 1 MOhm
Output current	
Output range	0/4 ... 20 mA
Max. load	400 Ohm
Resolution	11 Bit
Residual ripple	25 µAss
Output voltage	
Output range	0/2 ... 10 V
Min. load	10 kOhm
Resolution	11 Bit
Residual ripple	20 mVss
Semiconductor output	
Maximum switching load DC	30 V, 50 mA
Pulse length min ... max	50 ms ... 10000 ms
Relay output	
Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	potential-free changeover
Switching operations mechanical	$1 * 10^7$
At 230V/2A AC, cos(phi)=1	$6 * 10^5$
At 230V/2A AC, cos(phi)=0,4	$2 * 10^5$
At 24V/2A DC	$2 * 10^5$
Pulse length min ... max	500 ms ... 10000 ms
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC / DC	230 V AC / 24 V DC
Voltage range DC	20 ... 253 V DC
Power consumption AC / DC	4,6 VA / 2,4 W
Power consumption with operating module AC / DC	4,8 VA / 2,6 W
Transmission behaviour	
Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 0,5 s

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Power Measurement

AD-LU 620 GVF

Technical specifications

Housing

Dimensions (WxHxD)	33x110x134mm
With operating module (bxhxt)	33x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Skinning length	6 mm
Weight	~ 190 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1] During checking, slight signal deviations are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

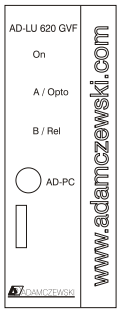
Galvanic isolation, test voltages

Input to outputs / power-supply	4 kV, 50 Hz (1 min.)
Power-supply to outputs	3 kV, 50 Hz (1 min.)
Relay contacts to outputs	3 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current
Analog outputs	electrical surge protection

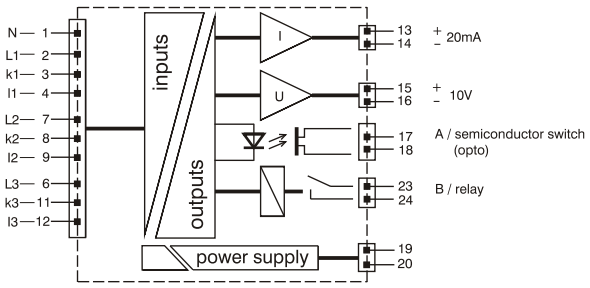
Display and operating elements



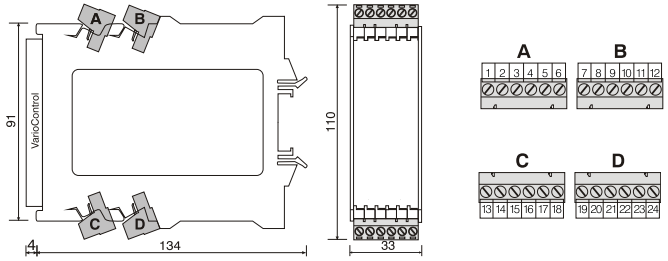
On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits
A / **Opto**: LED for semiconductor switch
on - activated
B / **rel**: LED for relays
on - activated
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

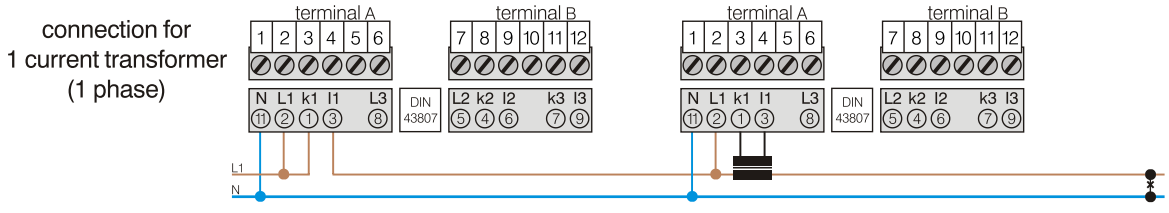
Block and wiring diagram

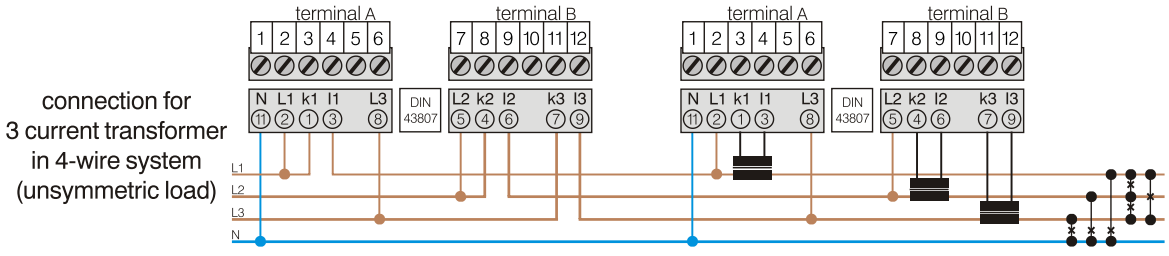


Dimensions



Circuit examples





Power Measurement

AD-LU 620 GVF

Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.

The Modbus master can read out the individual registers of the AD-LU 620 GVF via the addresses.

The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40202	1	digital output A		3	1	1
40203	1	digital output B		3	1	1
40204	1	digital output A LED		3	1	1
40205	1	digital output B LED		3	1	1
40501	2	active power total	kW	7	1	0
40503	2	active power total L1	kW	7	1	0
40505	2	active power total L2	kW	7	1	0
40507	2	active power total L3	kW	7	1	0
40509	2	total reactive power	kvar	7	1	0
40511	2	reactive power L1	kvar	7	1	0
40513	2	reactive power L2	kvar	7	1	0
40515	2	reactive power L3	kvar	7	1	0
40517	2	total apparent power	kVA	7	1	0
40519	2	apparent power L1	kVA	7	1	0
40521	2	apparent power L2	kVA	7	1	0
40523	2	apparent power L3	kVA	7	1	0
40525	2	total power factor		7	1	0
40527	2	power factor in L1		7	1	0
40529	2	power factor in L2		7	1	0
40531	2	power factor in L3		7	1	0
40533	2	total active fundamental power	kW	7	1	0
40535	2	active fundamental power L1	kW	7	1	0
40537	2	active fundamental power L2	kW	7	1	0
40539	2	active fundamental power L3	kW	7	1	0
40541	2	total active harmonic power	kW	7	1	0
40543	2	active harmonic power L1	kW	7	1	0
40545	2	active harmonic power L2	kW	7	1	0
40547	2	active harmonic power L3	kW	7	1	0
40549	2	voltage L1 / N	V	7	1	0
40551	2	voltage L2 / N	V	7	1	0
40553	2	voltage L3 / N	V	7	1	0
40555	2	current N line (calculated)	A	7	1	0
40557	2	current in L1	A	7	1	0
40559	2	current in L2	A	7	1	0
40561	2	current in L3	A	7	1	0
40563	2	voltage peak L1	V	7	1	0
40565	2	voltage peak L2	V	7	1	0
40567	2	voltage peak L3	V	7	1	0
40569	2	current peak L1	A	7	1	0
40571	2	current peak L2	A	7	1	0
40573	2	current peak L3	A	7	1	0
40575	2	frequency	Hz	7	1	0
40577	2	phase angle Phi L1	°	7	1	0
40579	2	phase angle Phi L2	°	7	1	0
40581	2	phase angle Phi L3	°	7	1	0
40583	2	temperature	°C	7	1	0
40585	2	phase angle Psi L1	°	7	1	0
40587	2	phase angle Psi L2	°	7	1	0
40589	2	phase angle Psi L3	°	7	1	0
40801	2	output current	mA	7	1	0
40803	2	output voltage	V	7	1	0
Counter:						
44003	2	counter kWh - consuption	kWh	5	1	1
44005	2	counter kWh - infeed	kWh	5	1	1
44007	2	counter kVarh - inductiv	kVarh	5	1	1
44009	2	counter kVarh - capacitiv	kVarh	5	1	1
44011	2	counter kVAh - apparent energy	kVAh	5	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Power Measurement

AD-LU 625 GVF

Description

The digital power measuring transducer AD-LU 625 GVF measures all quantities of the three-phase network (current, voltage, energy, harmonics, phase angle, active power, reactive power, apparent power) and converts these measuring values onto two freely scalable analogue outputs. With the integral relay and transistor output, the switching of limiting values or the output of energy pulses is possible. The unit is therefore optimal suitable for integration in energy management systems. The current is measured via additionally available split-core current transformers. For measuring of high voltages, external transformers can be connected in series at any time. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating modul AD-VarioControl or via the programming software AD-Studio. The LEDs at the front signals the operating condition and the relay-status. The compact type of construction and the high performance ability with simultaneous low energy consumption allows usage in almost any application.

Application

Typical usage in plant, machines or energy management systems for balancing and determination of energy distribution.

Specific characteristics

- Connection of 3 phases with neutral, any load
- Current measurement via split-core current transformers up to 600 A
- Measuring quantities: effective power, reactive power, apparent power, currents and voltages, frequency, power factor, harmonics, energy metering
- current and voltage output
- relay or transistor output
- Counters for active power (consuption and infeed), reactive power (inductive and capacitive) and apparent power
- 33 mm narrow housing with detachable terminal clamp
- Operating module AD-VarioControl as an accessory

Business data

Order number

AD-LU 625 GVF

Accessory (optional)

AD-split core current transformer	5/50/100/200/400/600 A AC
Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Current-inputs (I1...I3)

Measuring ranges	0 ... 0,05 A AC from split core current transformer
Max. measurable harmonic	40

Voltage-inputs (L1...L3)

Measuring range	10 ... 253 V AC
Input resistance	> 1 MOhm

Output current

Output range	0/4 ... 20 mA
Max. load	400 Ohm
Resolution	11 Bit
Residual ripple	25 µAss

Output voltage

Output range	0/2 ... 10 V
Min. load	10 kOhm
Resolution	11 Bit
Residual ripple	20 mVss

Semiconductor output

Maximum switching load DC	30 V, 50 mA
Pulse length min ... max	50 ms ... 10000 ms

Relay output

Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	potential-free changeover
Switching operations mechanical	$1 * 10^7$
At 230V/2A AC, cos(phi)=1	$6 * 10^5$
At 230V/2A AC, cos(phi)=0,4	$2 * 10^5$
At 24V/2A DC	$2 * 10^5$
Pulse length min ... max	500 ms ... 10000 ms

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC / DC	230 V AC / 24 V DC
Voltage range DC	20 ... 253 V DC
Power consumption AC / DC	4,6 VA / 2,4 W
Power consumption with operating module AC / DC	4,8 VA / 2,6 W

Transmission behaviour

Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 0,5 s

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Power Measurement

AD-LU 625 GVF

Technical specifications

Housing

Dimensions (WxHxD)	33x110x134mm
With operating module (bxhxt)	33x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Skinning length	6 mm
Weight	~ 180 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1] During checking, slight signal deviations are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

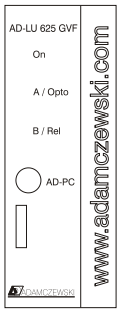
Galvanic isolation, test voltages

Input to outputs / power-supply	4 kV, 50 Hz (1 min.)
Power-supply to outputs	3 kV, 50 Hz (1 min.)
Relay contacts to outputs	3 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current
Analog outputs	electrical surge protection

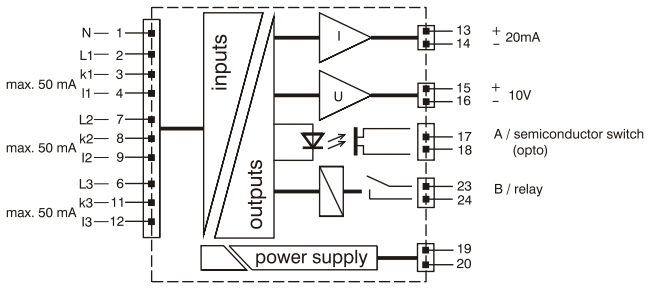
Display and operating elements



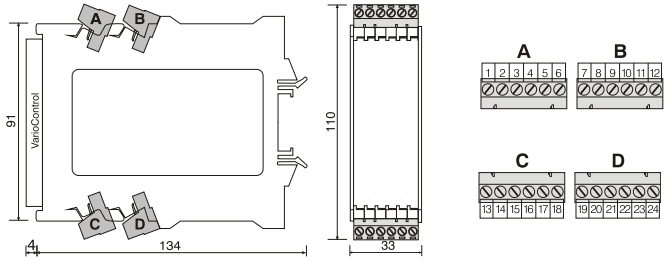
On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits
A / **Opto**: LED for semiconductor switch
on - activated
B / **rel**: LED for relays
on - activated
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

Block and wiring diagram

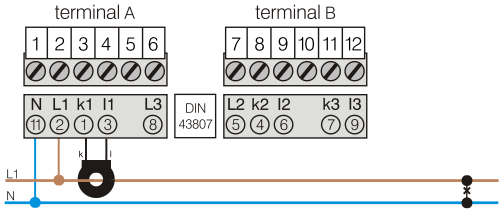


Dimensions

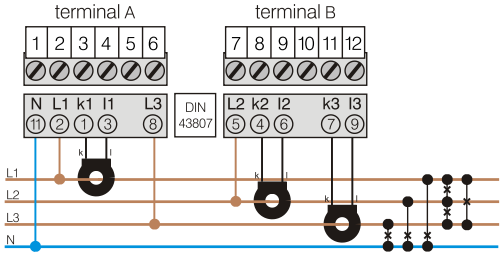


Circuit examples

connection for
1 current transformer
(1 phase)



connection for
3 current transformer
in 4-wire system
(unsymmetric load)



Power Measurement

AD-LU 625 GVF

Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.

The Modbus master can read out the individual registers of the AD-LU 625 GVF via the addresses.

The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40202	1	digital output A		3	1	1
40203	1	digital output B		3	1	1
40204	1	digital output A LED		3	1	1
40205	1	digital output B LED		3	1	1
40501	2	active power total	kW	7	1	0
40503	2	active power total L1	kW	7	1	0
40505	2	active power total L2	kW	7	1	0
40507	2	active power total L3	kW	7	1	0
40509	2	total reactive power	kvar	7	1	0
40511	2	reactive power L1	kvar	7	1	0
40513	2	reactive power L2	kvar	7	1	0
40515	2	reactive power L3	kvar	7	1	0
40517	2	total apparent power	kVA	7	1	0
40519	2	apparent power L1	kVA	7	1	0
40521	2	apparent power L2	kVA	7	1	0
40523	2	apparent power L3	kVA	7	1	0
40525	2	total power factor		7	1	0
40527	2	power factor in L1		7	1	0
40529	2	power factor in L2		7	1	0
40531	2	power factor in L3		7	1	0
40533	2	total active fundamental power	kW	7	1	0
40535	2	active fundamental power L1	kW	7	1	0
40537	2	active fundamental power L2	kW	7	1	0
40539	2	active fundamental power L3	kW	7	1	0
40541	2	total active harmonic power	kW	7	1	0
40543	2	active harmonic power L1	kW	7	1	0
40545	2	active harmonic power L2	kW	7	1	0
40547	2	active harmonic power L3	kW	7	1	0
40549	2	voltage L1 / N	V	7	1	0
40551	2	voltage L2 / N	V	7	1	0
40553	2	voltage L3 / N	V	7	1	0
40555	2	current N line (calculated)	A	7	1	0
40557	2	current in L1	A	7	1	0
40559	2	current in L2	A	7	1	0
40561	2	current in L3	A	7	1	0
40563	2	voltage peak L1	V	7	1	0
40565	2	voltage peak L2	V	7	1	0
40567	2	voltage peak L3	V	7	1	0
40569	2	current peak L1	A	7	1	0
40571	2	current peak L2	A	7	1	0
40573	2	current peak L3	A	7	1	0
40575	2	frequency	Hz	7	1	0
40577	2	phase angle Phi L1	°	7	1	0
40579	2	phase angle Phi L2	°	7	1	0
40581	2	phase angle Phi L3	°	7	1	0
40583	2	temperature	°C	7	1	0
40585	2	phase angle Psi L1	°	7	1	0
40587	2	phase angle Psi L2	°	7	1	0
40589	2	phase angle Psi L3	°	7	1	0
40801	2	output current	mA	7	1	0
40803	2	output voltage	V	7	1	0
Counter:						
44003	2	counter kWh - consuption	kWh	5	1	1
44005	2	counter kWh - infeed	kWh	5	1	1
44007	2	counter kVarh - inductiv	kVarh	5	1	1
44009	2	counter kVarh - capacitiv	kVarh	5	1	1
44011	2	counter kVAh - apparent energy	kVAh	5	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Multifunction Transducer

AD-VC 1 GVD

Description

The digital multi-function measuring transformers of series VarioCheck AD-VC 1 are freely programmable digital measuring transducers with two analogue outputs and up to 2 limiting value relays. Extensive standard equipment and additional options solve almost all imaginable tasks of a modern evaluation. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating modul AD-VarioControl or via the programming software AD-Studio. VarioCheck AD-VC 1 fulfils all tasks of a universal and secure measuring value recording through integral function modules such as limiting value messages, freely adjustable hysteresis, selectable relay functions, time-delayed switching, automatic or manual simulation modus, free linearizing curves and a wide range of supply voltage.

Specific characteristics

- bipolar current input
- bipolar mV voltage input
- voltage input
- Power supply for 2-wire transmitters
- Thermocouples inputs, types J, T, K, E, N, S, R, B, C; internal or external reference junction
- Resistance thermometer inputs, types Pt/Ni 100, Pt/Ni 500, Pt/Ni 1000
- Resistance, Potentiometer input
- Sensor error detection for thermocouples and resistance thermometers
- Input of a characteristic curve possible
- Automatic or manual simulation operation
- 2 bipolar current or voltage output
- 23 mm narrow housing with detachable terminal clamp
- Operating module AD-VarioControl as an accessory

Business data

Order number	
AD-VC1 GVD-R0	without relay
AD-VC1 GVD-R2	two relays
Accessory (optional)	
Operating module	AD-VarioControl
Control panel with RS-485	AD-VarioConnect
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current	
Measuring range	-24 ... + 24 mA DC
Input resistance	20 Ohm
Basic accuracy	4 µA
Transmitter supply	
Off-load voltage	24,0 V
Voltage at 20mA	18,0 V
Current limit	~ 25 mA
Input voltage	
Measuring ranges	0 ... + 12 V DC
Input resistance	1 MOhm
Basic accuracy	1 mV
Input voltage mV	
Measuring ranges	-15 ... +15 mV -30 ... +30 mV -60 ... +60 mV -125 ... +125 mV -250 ... +250 mV
Input resistance	1 MOhm
Basic accuracy	20 µV
Thermocouples	
Comparative place:	
Internal	measurement with sensor in the device connecting terminals
External	Cold junction temperature selectable by parameters
To DIN EN 60584:	
measuring range type J	-200 ... +1200 °C
measuring range type T	-200 ... +400 °C
measuring range type K	-200 ... +1360 °C
measuring range type E	-200 ... +1000 °C
measuring range type N	-200 ... +1300 °C
basic accuracy	1 K
To DIN EN 60584:	
measuring range type S	-40 ... +1760 °C
measuring range type R	-40 ... +1760 °C
measuring range type B	+400 ... +1800 °C
basic accuracy	2 K
After standard ASTM E988:	
measuring range type C	0 ... +2320 °C
basic accuracy	2 K

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Multifunction Transducer

AD-VC 1 GVD

Technical specifications

Resistance input

Resistance thermometer inputs DIN EN 60751: Pt100, Pt500 and Pt1000 DIN 43760: Ni100, Ni500 and Ni1000

measuring range Pt	-200 ... +850 °C
measuring range Ni	-60 ... +230 °C
smallest measuring spans	20 K
short circuit detection	< 20 Ohm
basic accuracy	0,2 K
Linear resistance	
measuring range	0 ... 4000 Ohm
basic accuracy	0,1 Ohm
Connection method	2-, 3- oder 4-wire system
Sensor supply	100 µA
Max line resistance [1)]	50 Ohm/cable

[1] Bei 2-Leiter geht der Leitungswiderstand als Offset in die Messung ein.

Potentiometer input

Connection method	3-wire system
Max. Resistance	50 Ohm ... 100 kOhm
Sensor supply	<=500µA

Current outputs

Max. output range	-21,5 ... 21,5 mA DC
Max. burden	400 Ohm
Residual ripple	20 µAss

Voltage outputs

Max. output range	-10,5 ... 10,5 V DC
Min. burden	10 kOhm
Residual ripple	10 mVss

Relay outputs A/B

Contact type	potential free changeover
Max. AC-breaking capacity	250 V AC, 2 A AC, 50Hz
Max. DC-breaking capacity	50 V DC, 2 A DC
Switching operations	
Mechanical	10^7
AC: 230V / 2A, cos(phi)=1	$6 * 10^5$
AC: 230V / 2A, cos(phi)=0,4	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$

Transmission behaviour

Linearity error	< 0,2 % of the measuring range
Rise time	500 ms (0...90 %, 100...10 %)
Rise time (temperature input)	< 1s (0...90 %, 100...10 %)
Temperature influence	+/- 100 ppm/K of the measuring range

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Voltage range DC	20 ... 253 V DC
Nominal voltage AC / DC	230 V AC / 24 V DC
Power consumption AC / DC	5,2 VA / 3,2 W
Power consumption with operating module AC / DC	5,4 VA / 3,6 W

Housing

Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

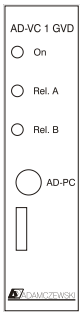
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

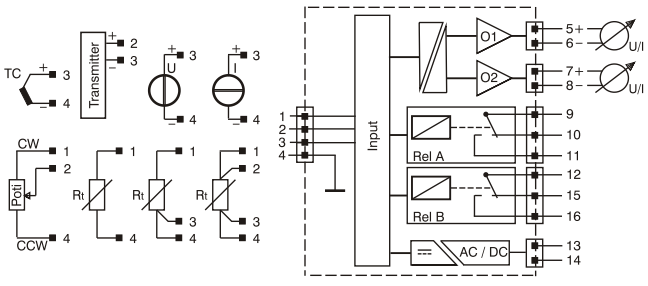
Input to output	2,5 kV (1 min)
In-/output to auxiliary voltage	4 kV (1 min)

Display and operating elements

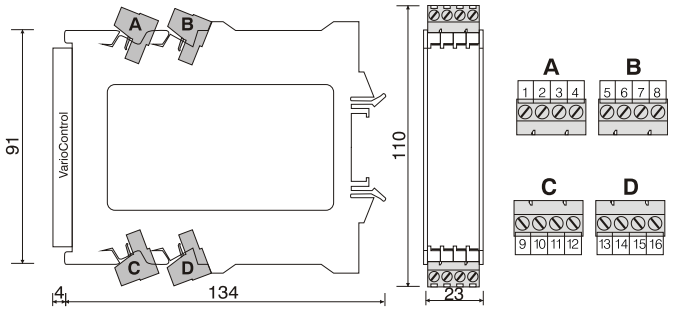


On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits
Rel: two LEDs for relays A and B in red
on - relay activated
AD-PC: Communication interface for configuration by a PC
Communication interface for VarioControl

Block and wiring diagram



Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-VC 1 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40101	2	Input signal	InUnit	7	1	0
40103	2	Cold-junction temperature	°C	7	1	0
40301	2	Output signal 1	OutUnit	7	1	1
40303	2	Output signal 2	OutUnit	7	1	1
40601	1	Relay state A		3	1	1
40602	1	Relay state B		3	1	1
40801	2	Scaled input	ScUnit	7	1	0

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Indicator

AD-MM 400 FE

Description

The Monitor module AD-MM 400 FE is a display and control unit for front panel mounting. The device can be used as master or slave. As a master, the device reads the displayed values of devices that are connected via the RS485 interface with the AD-MM 400 FE. The display values are polled at a certain time frame. The display values can be any data such as measured values, output values, digital inputs or outputs or various counters for energy or amounts. In addition to the display function, the AD-MM 400 FE can configure the connected devices via the menu. As a slave, the device can also be used as pure display device, where the display values are then sent from a master to the AD-MM 400.

Application

Display measurements in a graphic display. Scroll through multiple views. Configuration of connected devices via their menu.

Specific characteristics

- Connection in the master operation of up to 32 slaves.
- Scroll up to 10 different user-configurable displays.
- Display of up to 4 values per display.
- Freely configurable labeling of the displays and values.
- Convenient configuration of the displays via PC software AD-Studio.
- Connection of several AD-MM 400 FE on a bus in slave mode.

Business data

Order number	AD-MM 400 FE

Technical specifications

Supply

Supply voltage	20 ... 253 V AC/DC
Max. power consumption	1,0W / 2,0VA

Housing

Dimensions (WxHxD)	96x96x63 mm
Front panel cut out	92x92 mm
Protection class panel	IP 54
Protection class connection	IP 20
Connection method	detachable terminal clamp
Manner of fastening	Panel-mount-case
Weight	205 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1

Interface 1

Standard	RS-485
Protocol	Modbus-RTU
Max. attendance	32
Max. length of bus	100 m
Bus termination	120 Ohm (both sites of the bus)
Wiring	bus topology

Interface 2

Standard	UART, proprietary
Function	configuration

Display

Type	3,5" TFT
Resolution	320x240 Pixel

Operation

Type	3 short-stroke keys

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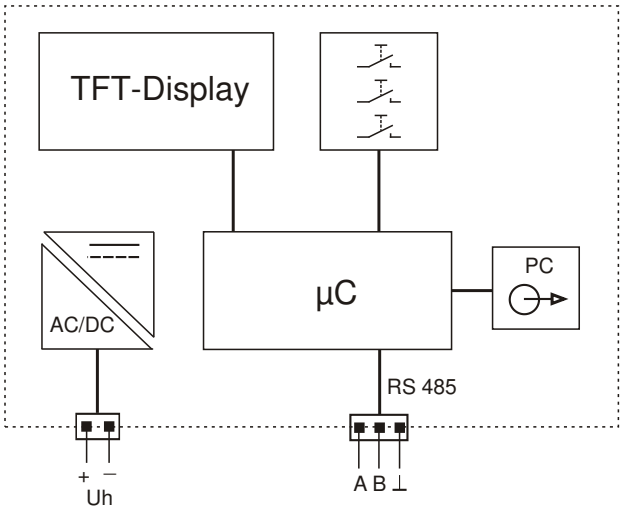
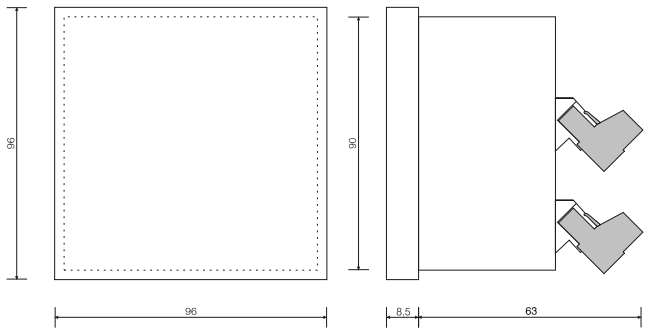
Indicator

AD-MM 400 FE

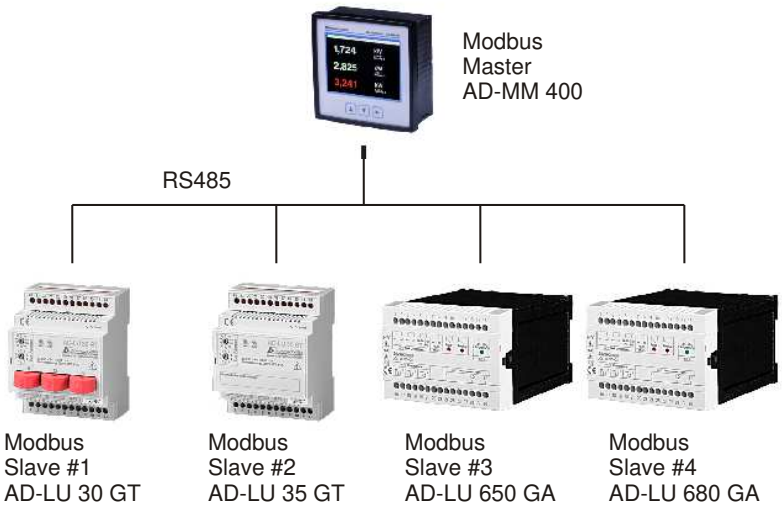
Block and wiring diagram

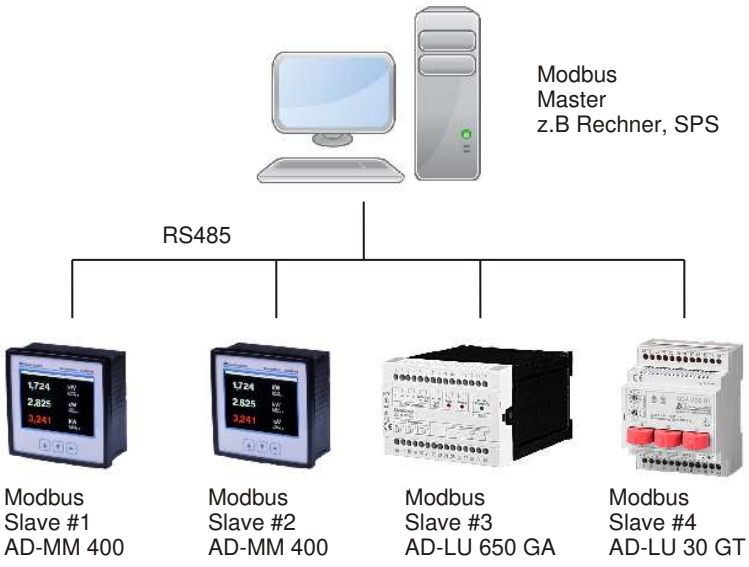


Dimensions



Circuit examples





Indicator

Data Logger

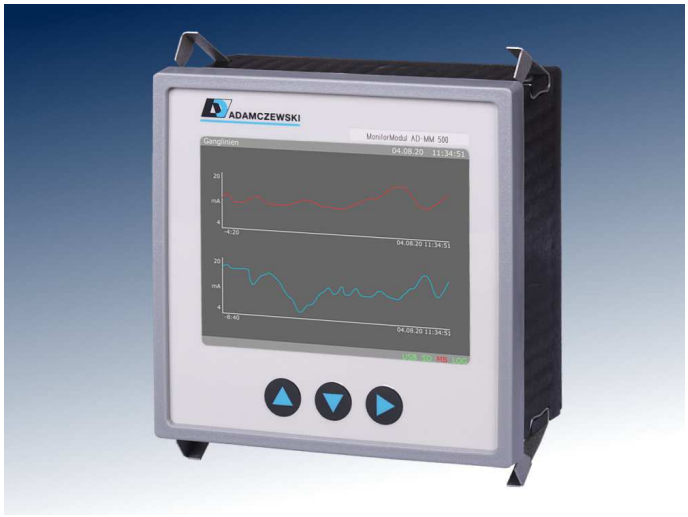
AD-MM 500 FE

Description

The AD-MM 500 FE monitor module is a display device, control unit and data logger for front panel installation. The AD-MM 500 FE always works as a Modbus master. It collects the values that are to be displayed or logged cyclically from one or more Modbus slaves. The values can be any data such as measured values, output values, digital inputs or outputs or various counters for energy or quantities. The display is done by freely configurable display elements such as numeric display, bar graphs, time diagrams, drag pointers, LEDs, etc. In addition to the display function, the AD-MM 500 FE can also configure connected devices from ADAMCZEWSKI. To do this, you can navigate in the menu of the connected device and configure the desired parameter. The logged data is saved on an internal micro SD card. They can be picked up at any time with a USB stick.

Application

Display measurements in a graphic display. Scroll through multiple views. Configuration of connected devices via their menu. Log the data for later evaluation.



Specific characteristics

- Connection in the master operation of up to 32 slaves.
- Scroll up to 10 different user-configurable displays.
- Display of up to 4 values per display.
- Freely configurable labeling of the displays and values.
- Convenient configuration of the displays via PC software AD-Studio.
- Connection of several AD-MM 400 on a bus in slave mode.

Business data

Order number	AD-MM 500 FE

Technical specifications

Supply

Supply voltage	20 ... 253 V DC
Supply voltage	50 ... 253 V AC
Max. power consumption	2,0W / 4,0VA

Housing

Dimensions (WxHxD)	96x96x63 mm
Front panel cut out	92x92 mm
Protection class panel	IP 54
Protection class connection	IP 20
Connection method	detachable terminal clamp
Manner of fastening	Panel-mount-case
Weight	350 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
Pollution degree	2

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1

RS485-interface

Connection	3-pin socket 3.81mm grid
Standard	RS-485
Function	Modbus-Master
Protocol	Modbus-RTU
Max. attendance	32
Max. length of bus	100m - twisted, shielded cable
Bus termination	120 Ohm (both sites of the bus)

Configuration interface

Connection	3.5mm jack socket
Standard	UART, proprietary
Function	configuration

Network interface

Connection	RJ45 socket
Standard	Ethernet
Function	Reserve for future expansions

USB interface

Connection	Type A socket for USB stick
Standard	USB 1.0, 2.0
Function	Data transfer

Display

Type	3,5" TFT
Resolution	320x240 Pixel

Operation

Type	3 short-stroke keys

Data logger

Internal memory size	2 GB (andere auf Anfrage)
Internal storage medium	µSD, single level cell
Sampling interval	1s ... ~18h
Max. channels	32
Data format	*.csv

Printed 23.08.2022 We reserve the right for technical changes.

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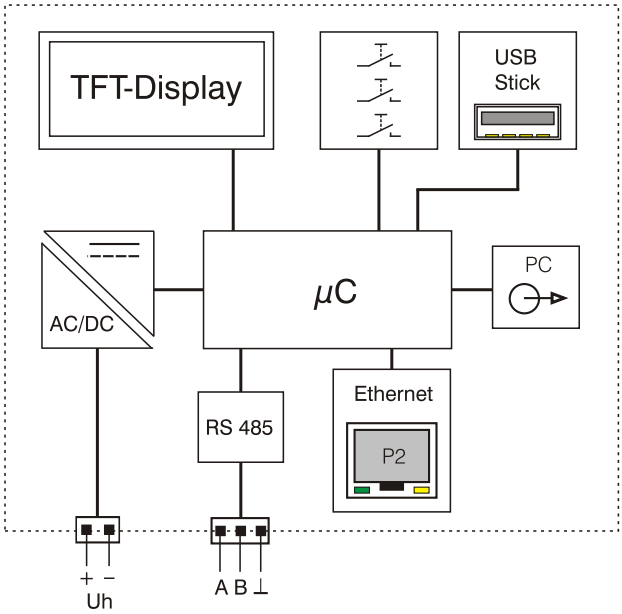
Indicator

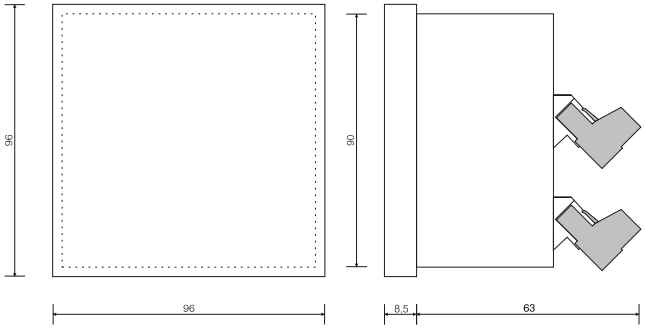
Data Logger

AD-MM 500 FE

Block and wiring diagram



Dimensions



Indicator

VarioShow

AD-VS 8 A1
AD-VS 8 A4
AD-VS 8 A8

Description

The VarioShow AD-VS 8 serves the visualisation of up to 8 analogue signals which can be initialized independently. Each display channel has a current input and a voltage input and can be sized completely freely. There are the most diverse types of indication, amongst others a drag pointer function (display of the highest and lowest values) and a linearization over 24 x/y points, to show volume above the height, for instance. The physical dimension can be selected from a table. The measuring value is illustrated as a number or with a quasi-analogue bar. All parameter can also be operated or saved via a PC (AD-Studio).

Application

Display of up to 8 independent analogue input signals in freely scalable dimension and unit.

Specific characteristics

- Wide range power supply
- scalable analog displays
- graphic display of measured values
- presettable counters
- rolling channel display
- Drag pointer function
- free linearization tables
- definable channel names
- predefined unit list

Business data

Order number

AD-VS 8 A1
AD-VS 8 A4
AD-VS 8 A8

Technical specifications

Current inputs	
Range	0 ... 20 mA
Input resistance	120 Ohm
Voltage inputs	
Range	0 ... 10 V
Input resistance	100 kOhm
Counter	
Range	0 ... 20 mA; 0 ... 10 ... 24 V
Input resistance	I: 120 Ohm; U: 100 kOhm
Switching thresholds	adjustable
Frequency	< 2 Hz
Display	
Graphic-LCD	122x32 Pixel, background lit
Digital display	5-digit, can be configured
Accuracy	
Unit	0,3%
Resolution	10 Bit
Temperature influence	< 100 ppm / K
Update rate	1 s
Supply	
Supply voltage	20 ... 253 V DC / 50 ... 253 V AC
Max. power consumption	2 W / 4 VA
Interface	
Software	AD-Studio
Connection cable	Klinkenkabel
Converter	AD-Vario-Pass-3
Protocol	AD-UART
Data format	19200, e, 8, 1
Housing	
Dimensions (WxHxD)	96 x 48 x 136 mm³
Type of protection	IP 20
Connection method	Pluggable screw terminal
Terminals, wire cross section	1,0 mm² Strand with wire end ferrule / 1,5 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 280 g
Manner of fastening	panel-mounting
Environmental conditions	
Ambient temperature	-10 ... +50 °C
Storage and transport	-10 ... +70 °C (no condensation)

Printed 23.08.2022 We reserve the right for technical changes.

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Indicator

VarioShow

AD-VS 8 A1
AD-VS 8 A4
AD-VS 8 A8

Technical specifications

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1 In a critical EMC environment, shielded encoder cables are recommended.

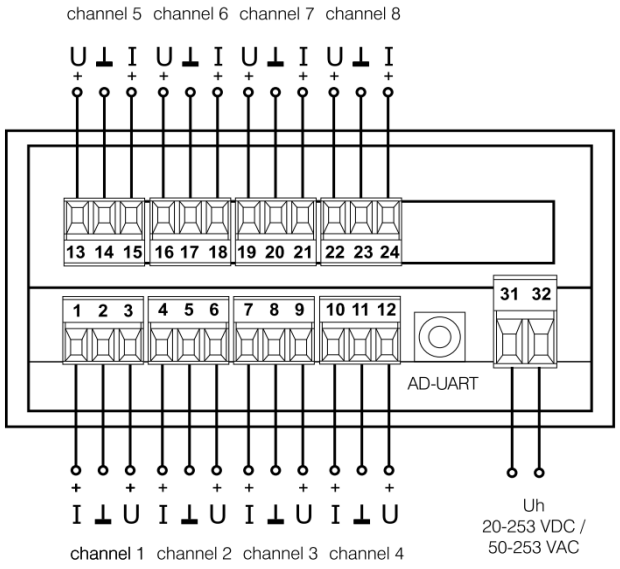
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

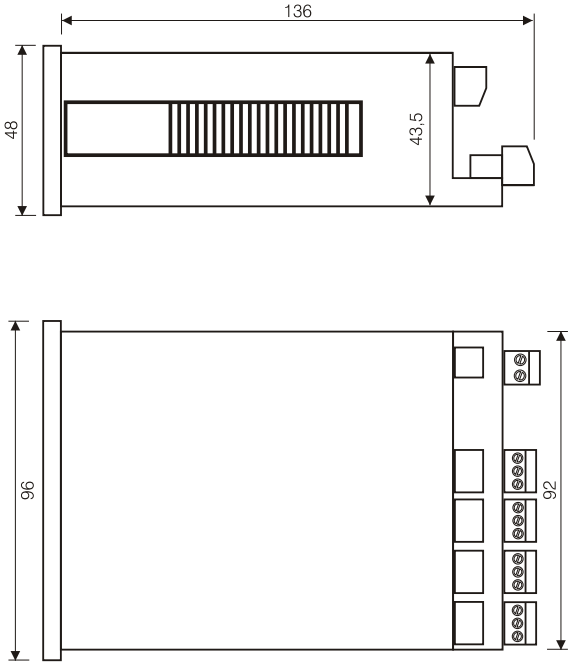
Galvanic isolation, test voltages

Input	no separation
Signal/auxiliary voltage	3 kV RMS 50 Hz (1 min.)

Block and wiring diagram



Dimensions



Indicator

Data Logger

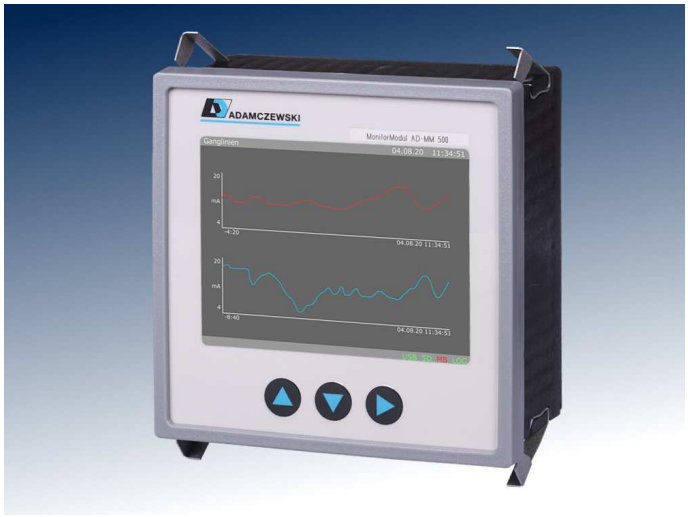
AD-MM 500 FE

Description

The AD-MM 500 FE monitor module is a display device, control unit and data logger for front panel installation. The AD-MM 500 FE always works as a Modbus master. It collects the values that are to be displayed or logged cyclically from one or more Modbus slaves. The values can be any data such as measured values, output values, digital inputs or outputs or various counters for energy or quantities. The display is done by freely configurable display elements such as numeric display, bar graphs, time diagrams, drag pointers, LEDs, etc. In addition to the display function, the AD-MM 500 FE can also configure connected devices from ADAMCZEWSKI. To do this, you can navigate in the menu of the connected device and configure the desired parameter. The logged data is saved on an internal micro SD card. They can be picked up at any time with a USB stick.

Application

Display measurements in a graphic display. Scroll through multiple views. Configuration of connected devices via their menu. Log the data for later evaluation.



Specific characteristics

- Connection in the master operation of up to 32 slaves.
- Scroll up to 10 different user-configurable displays.
- Display of up to 4 values per display.
- Freely configurable labeling of the displays and values.
- Convenient configuration of the displays via PC software AD-Studio.
- Connection of several AD-MM 400 on a bus in slave mode.

Business data

Order number	AD-MM 500 FE

Technical specifications

Supply

Supply voltage	20 ... 253 V DC
Supply voltage	50 ... 253 V AC
Max. power consumption	2,0W / 4,0VA

Housing

Dimensions (WxHxD)	96x96x63 mm
Front panel cut out	92x92 mm
Protection class panel	IP 54
Protection class connection	IP 20
Connection method	detachable terminal clamp
Manner of fastening	Panel-mount-case
Weight	350 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
Pollution degree	2

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1

RS485-interface

Connection	3-pin socket 3.81mm grid
Standard	RS-485
Function	Modbus-Master
Protocol	Modbus-RTU
Max. attendance	32
Max. length of bus	100m - twisted, shielded cable
Bus termination	120 Ohm (both sites of the bus)

Configuration interface

Connection	3.5mm jack socket
Standard	UART, proprietary
Function	configuration

Network interface

Connection	RJ45 socket
Standard	Ethernet
Function	Reserve for future expansions

USB interface

Connection	Type A socket for USB stick
Standard	USB 1.0, 2.0
Function	Data transfer

Display

Type	3,5" TFT
Resolution	320x240 Pixel

Operation

Type	3 short-stroke keys

Data logger

Internal memory size	2 GB (andere auf Anfrage)
Internal storage medium	µSD, single level cell
Sampling interval	1s ... ~18h
Max. channels	32
Data format	*.csv

Printed 23.08.2022 We reserve the right for technical changes.

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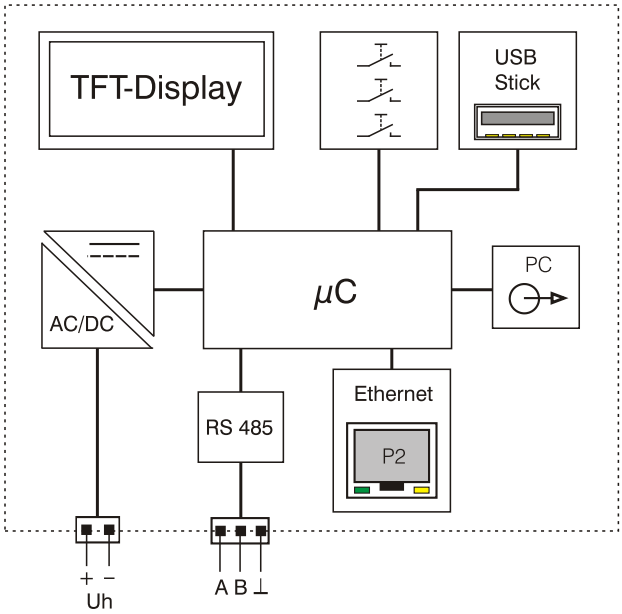
Indicator

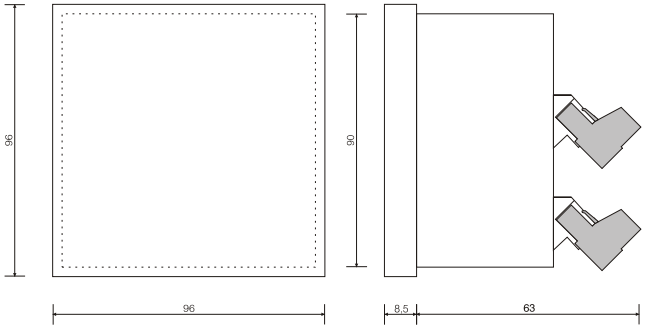
Data Logger

AD-MM 500 FE

Block and wiring diagram



Dimensions



Indicator

Data Logger

AD-VL 500 FE

Description

The AD-VL 500 FE monitor module is a display unit and data logger for front panel installation. It has up to 8 analogue standard signal inputs. The inputs can be configured as current or voltage inputs. Counter values can be derived simultaneously from the analogue signals by means of adjustable switching thresholds. A scaled measured value display with freely definable units is possible. The display is done by freely configurable display elements such as numeric display, bar graph, time diagram, drag pointer, LEDs, etc. The unit is supplied with predefined standard display windows. All signals can be logged cyclically in the unit's own memory. The logged data are stored as daily files on an internal micro SD card. They can be retrieved at any time with a USB stick or downloaded via the network interface. The unit can be configured either via the integrated web server of the network interface or via the configuration software AD-Studio. The configuration software is available free of charge on the ADAMCZEWSKI website. The various interfaces (RS485/LAN) make it easy to integrate the device into your own data networks in order to read out measurement data in real time.

Application

Display of freely definable values on a graphic display. Scrolling through several display types. Visual signal monitoring with web browser. Logging of data for later evaluation.

Specific characteristics

- 40 configurable display elements.
- All properties of the display elements such as colour, size, position, labelling and type are configurable.
- 10 configurable displays with 1...12 display elements per display.
- Integrated web server.
- Convenient configuration of the displays via PC software AD-Studio.
- Buffered real-time clock.
- Interface protocols: Modbus-RTU, Modbus-TCP

Business data

Order number

AD-VL 500 FE

Technical specifications

Current inputs	
Range	0 ... 20 mA
Resolution	14 bit
Input resistance	50 Ohm
Voltage inputs	
Range	0 ... 10 V
Resolution	14 bit
Input resistance	100 kOhm
Counter	
Range	0 ... 20 mA; 0 ... 10 ... 24 V
Input resistance	I: 50 Ohm; U: 100 kOhm
Frequency	< 0,5 Hz
Supply	
Supply voltage	20 ... 253 V DC
Supply voltage	50 ... 253 V AC
Max. power consumption	3,0W / 5,0VA
Housing	
Dimensions (WxHxD)	96x96x63 mm
Front panel cut out	92x92 mm
Protection class panel	IP 54
Protection class connection	IP 20
Connection method	detachable terminal clamp
Manner of fastening	Panel-mount-case
Weight	350 g
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
Pollution degree	2
EMC	
Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
RS485-interface	
Connection	3-polige Buchse 3,81mm
Standard	RS-485
Protocol	Modbus-RTU
Function	Konfiguration, Modbus-Slave
Max. length of bus	100m - twisted, shielded cable
Bus termination	120 Ohm (both sites of the bus)
Configuration interface	
Connection	3.5mm jack socket
Standard	AD-PC (UART), proprietary
Function	configuration
Network interface	
Connection	RJ45 socket
Standard	Ethernet, 10/100 Mbit/s
Protocol	HTTP, Modbus-TCP
Function	Web server, configuration, download
USB interface	
Connection	Type A socket for USB stick
Standard	USB 1.0, 2.0
Function	Data transfer

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Indicator

Data Logger

AD-VL 500 FE

Technical specifications

Display

Type	3,5 TFT
Resolution	320x240 Pixel

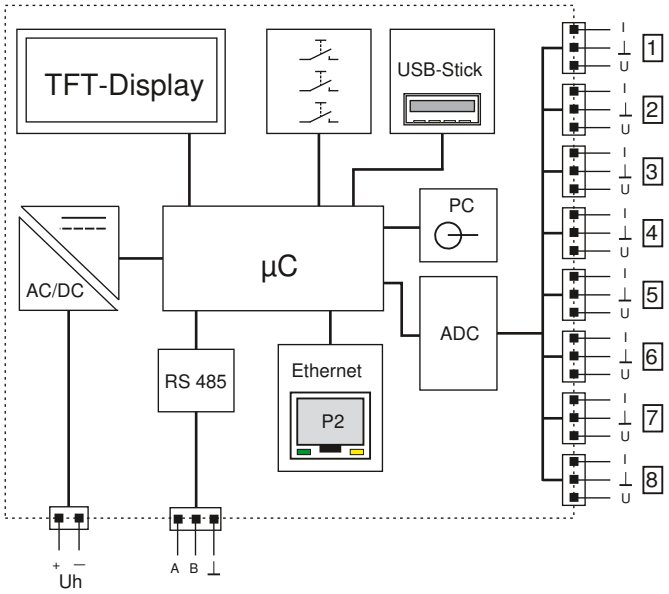
Operation

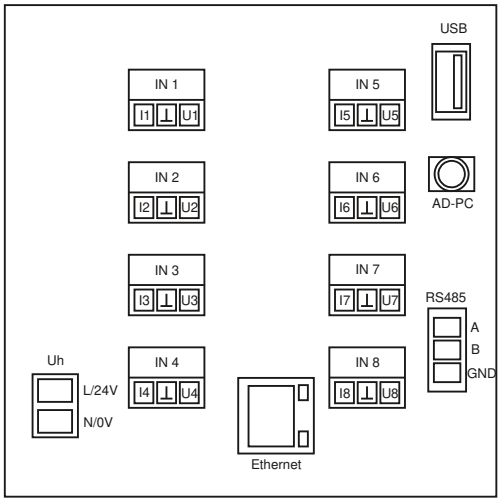
Type	3 short-stroke keys

Data logger

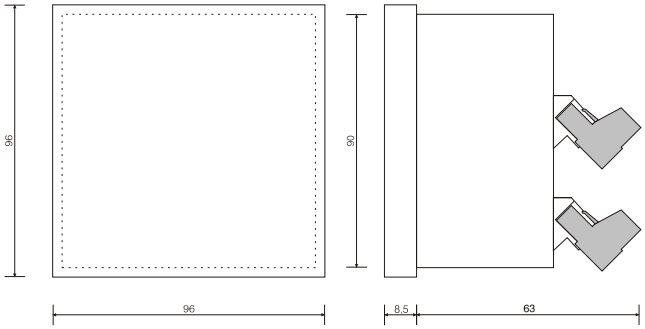
Internal memory size	2 GB
Internal storage medium	µSD, single level cell
Sampling interval	1s ... ~18h
Max. channels	32
Data format	*.csv (Text)

Block and wiring diagram





Dimensions



Indicator

VarioLog

AD-VL 8 A1
AD-VL 8 A4
AD-VL 8 A8

Description

The VarioLog AD-VL 8 is used for the visualization of up to 8 independently parameterizable analog signals with simultaneous data logger function of all channels. Each channel has a current/voltage input and can be freely scaled. There are different types of display, including a trailing indicator function (display of the highest and lowest value). Several linearization functions and a table with 24 x/y points enable signal adaptation to non-linear signal sources, e.g. to display volume versus height. A scale display unit can be selected from a list. A measured value is displayed as a number and can also be represented by a quasi-analog bar. All parameters can optionally be programmed and archived via PC (AD Studio). The recorded measured values can be recorded for each channel in freely adjustable storage cycles on an SD memory card. In addition, trigger thresholds are possible for starting the storage function, with one channel triggering any other channel.

Application

Display of up to 8 independent analogue input signals in freely scalable dimension and unit.

Specific characteristics

- Wide range power supply
- scalable analog displays
- graphic display of measured values
- presettable counters
- rolling channel display
- Drag pointer function
- free linearization tables
- definable channel names
- predefined unit list

Business data

Order number

AD-VL 8 A1
AD-VL 8 A4
AD-VL 8 A8

Technical specifications

Current inputs	
Range	0 ... 20 mA
Input resistance	120 Ohm
Voltage inputs	
Range	0 ... 10 V
Input resistance	100 kOhm
Counter	
Range	0 ... 20 mA; 0 ... 10 ... 24 V
Input resistance	I: 120 Ohm; U: 100 kOhm
Switching thresholds	adjustable
Frequency	< 2 Hz
Display	
Graphic-LCD	122x32 Pixel, background lit
Digital display	5-digit, can be configured
Accuracy	
Unit	0,3%
Resolution	10 Bit
Temperature influence	< 100 ppm / K
Update rate	1 s
Supply	
Supply voltage	20 ... 253 V DC / 50 ... 253 V AC
Max. power consumption	2 W / 4 VA
Interface	
Software	AD-Studio
Connection cable	Klinkenkabel
Converter	AD-Vario-Pass-3
Protocol	AD-UART
Data format	19200, e, 8, 1
Data logger	
Storage medium	SD- oder MMC-Card <= 2GB
Disk formatting	FAT, FAT12, FAT16
Log files	daily files, text
Housing	
Dimensions (WxHxD)	96 x 48 x 136 mm³
Type of protection	IP 20
Connection method	Pluggable screw terminal
Terminals, wire cross section	1,0 mm² Strand with wire end ferrule / 1,5 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 280 g
Manner of fastening	panel-mounting
Environmental conditions	
Ambient temperature	-10 ... +50 °C
Storage and transport	-10 ... +70 °C (no condensation)

Printed 23.08.2022 We reserve the right for technical changes.

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Indicator

VarioLog

AD-VL 8 A1
AD-VL 8 A4
AD-VL 8 A8

Technical specifications

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1 In a critical EMC environment, shielded encoder cables are recommended.

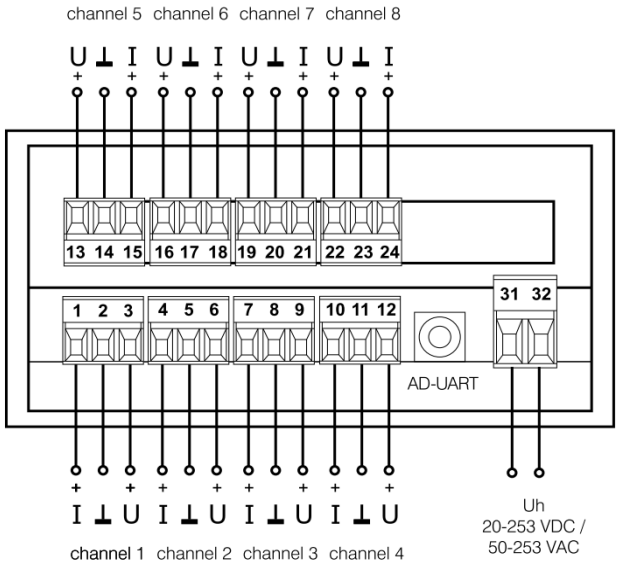
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

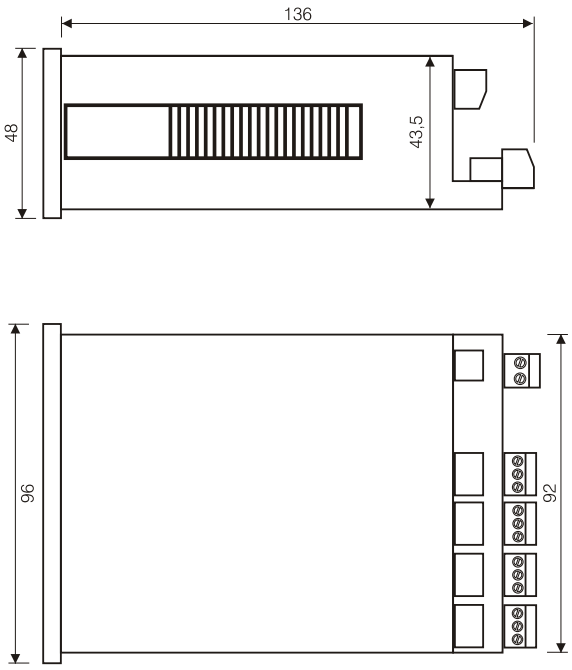
Galvanic isolation, test voltages

Input	no separation
Signal/auxiliary voltage	3 kV RMS 50 Hz (1 min.)

Block and wiring diagram



Dimensions



Power Measurement Transducer

AD-LU 10 GT

Description

The digital power measuring transducer AD-LU 10 GT measures all quantities of the power-network (current, voltage, energy, harmonics, phase angle, active power, reactive power, apparent power …) and converts these measuring values onto one freely scalable analogue output (20 mA). In addition, the device also has a transistor output for S0 pulses or for reporting limit values. The unit is therefore optimal suitable for integration in energy management systems. One phase ore balanced 3- or 4-wire systems can be measured. The AD-LU 10 GT is supplied via its measuring voltage L1. The current measuring is carried out via the bar-type transformer mounted on the front. For measuring of high voltages or high currents, external transformers can be connected in series at any time. The AD-LU 10 GT can be read out and parameterised via the integral interface with the aid of the available AD-Studio. An LED at the front signals the operating condition. The compact type of construction and the high performance ability with simultaneous low energy consumption allows usage in almost any application.

Application

Typical usage in industrial plant, machines or energy management systems for balancing and determination of energy distribution.
Attention: This is a Class A product according to EN 55011. Additional EMC actions may be necessary when used in small businesses or in residential areas.

Specific characteristics

- compact design
- current measurement via clamp on current transfomrers
- supplied via its measuring voltage L1
- current output (mA)
- S0- or Limit-Output
- monitoring all variables of the three-phase network
- parameterization via AD-Studio

Business data

Order number

Power measurement transducer	AD-LU 10 GT

Accessory (optional)

VarioPass3	USB-Schnittstellenadapter
AD-Studio	Konfigurationssoftware

Printed 24.08.2022 We reserve the right for technical changes.

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Power Measurement Transducer AD-LU 10 GT

Technical specifications

Input current

Measuring ranges	0 ... 1 A AC; 0 ... 5 A AC; 0 ... 20 A AC
Max. conductor diameter	4,8 mm
Max. measurable harmonic	40

Input voltage

Measuring range	80 ... 253 V AC
Input resistance	> 900 kOhm

Output current

Output range	0/4 ... 20 mA
Max. load	400 Ohm
Resolution	11 Bit
Residual ripple	25 µAss

Transistor output

Max. switching load	30 V DC, 20 mA
Pulse length min ... max	50 ms ... 10000 ms

Supply

Voltage range AC	80 ... 253 V AC, 50/60 Hz (see voltage-inputs)
Nominal voltage AC	230 V AC
Power consumption	max. 4 VA

Transfer behavior - in reference to the current value

Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 0,5 s

Housing

Dimensions (WxHxD)	35,5x90x70 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. A, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT II

Galvanic isolation, test voltages

Grid side to analoge output	4 kV, 50 Hz (1 min.)
Power Supply to Transistor Output	4 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current
Analogue output	electrical surge protection

[1)] During checking, slight signal deviations are possible.

Power Measurement Transducer

AD-LU 10 GT

Block and wiring diagram

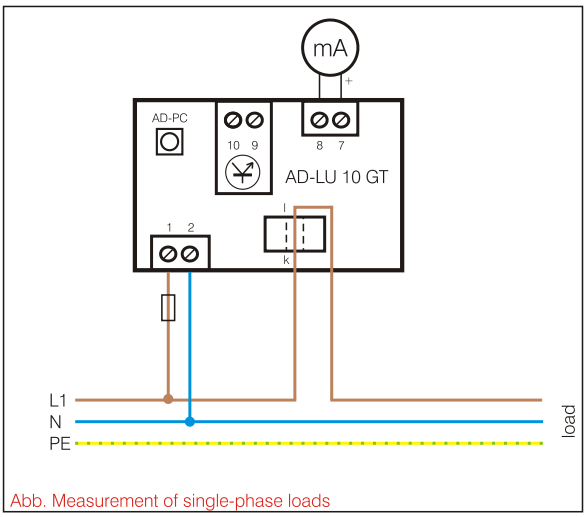


Abb. Measurement of single-phase loads

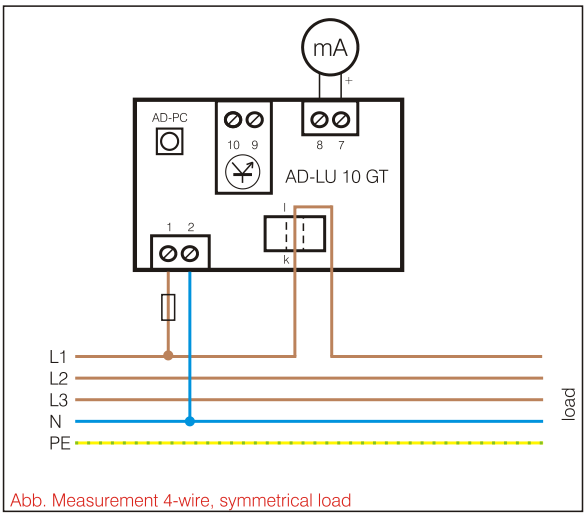


Abb. Measurement 4-wire, symmetrical load

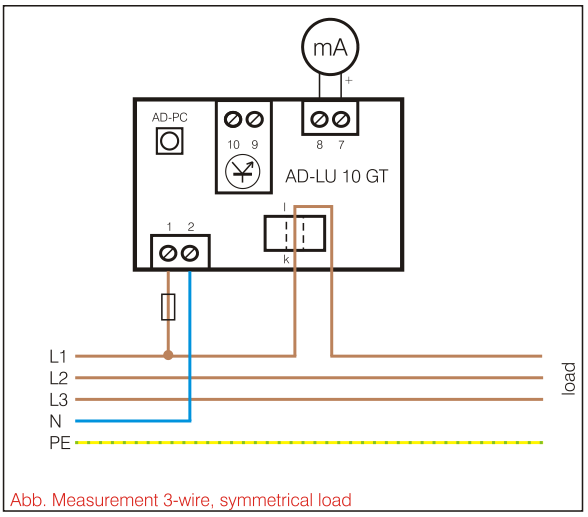
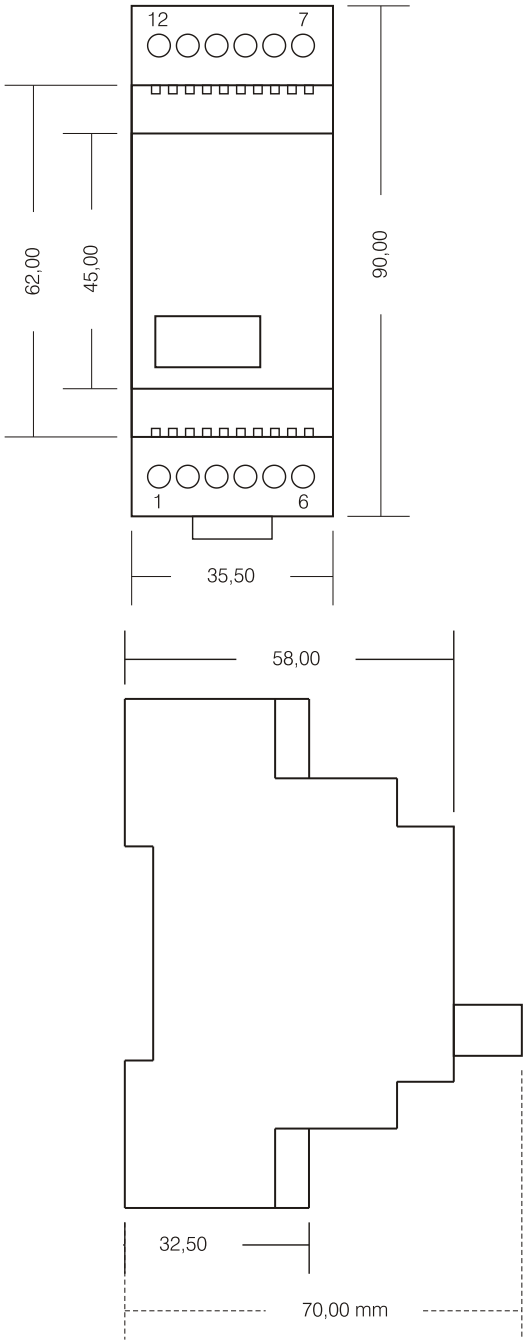


Abb. Measurement 3-wire, symmetrical load

Dimensions



Power Measurement

AD-LU 20 GT

Description

The digital power and energy meter AD-LU 20 GT measures all standard values of the three-phase system (active-, reactive-, apparent-power, voltage, currents, harmonics, power factor etc.) and provides this via an Ethernet interface. The measured values can be read out via Modbus-TCP protocol. In addition, these measured values are displayed on an integrated small WEB server. The device can also be parameterized via this WEB server. The AD-LU 20 GT is also equipped with an RS485 interface. This RS485 interface with Modbus-RTU protocol is mainly suitable for connecting an external display (AD-MM 400), but can also be used to read data or parameterize. The current is fed via the front-mounted through-current converters, which can measure up to 20 A directly. However, additional current transformers for larger currents can also be connected at any time. It is possible to measure symmetrical or unbalanced 4-wire networks and symmetrically loaded 3-wire networks. Due to the integrated, efficient wide-range power supply, the device operates in a large supply voltage range and does not heat up very much.

Application

Measurement and monitoring of all electrical characteristics in electrical systems. Detection of load profiles for energy management systems, e.g. ISO 50001. Recording the energy consumption of individual consumers. Monitoring of voltage quality variables, e.g. harmonics.

Specific characteristics

- internal current-transformer
- Ethernet-Interface
- RS485-Interface
- Counters for active, reactive and apparent energy
- Counters for purchased or fed energy

Business data

Order number

AD-LU 20 GT	power meter

Accessory

AD-MM 400	compatible display
AD-VarioPass3	USB/RS485-adapter

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Technical specifications

Current-inputs (I1...I3)

Measuring ranges	0 ... 1 A AC; 0 ... 5 A AC; 0 ... 20 A AC
Max. conductor diameter	4,8 mm

Voltage-inputs (L1...L3)

Measuring range	50 ... 253 V AC
Input resistance	ca. 950 kOhm

Ethernet-interface

Software protocol	Modbus-TCP
Standard-IP	192.168.178.99
Network mask	255.255.255.0
WEB-Server	Port 80

RS485-Bus

Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no stubs)
Cable	twisted and shielded

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz (see voltage-inputs)
Nominal voltage AC	230 V AC
Power consumption	max. 2,5 VA

Transfer behavior - in reference to the current value

Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 0,5 s

Housing

Dimensions (WxHxD)	71x90x70 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 180 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Grid side to RS485-Bus	4 kV, 50 Hz (1 min.)
Grid side to control elements	4 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
RS485-Bus	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current

[1)] During checking, slight signal deviations are possible.

Power Measurement

AD-LU 20 GT

Block and wiring diagram

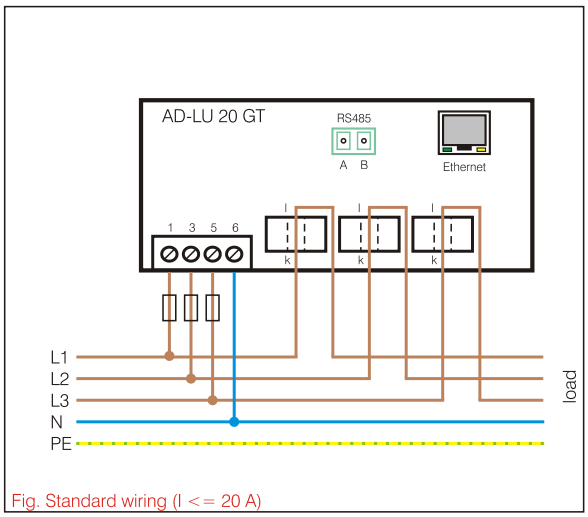


Fig. Standard wiring (I <= 20 A)

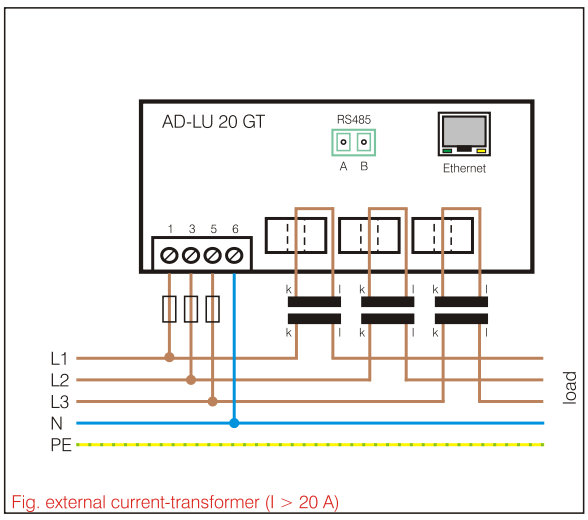


Fig. external current-transformer (I > 20 A)

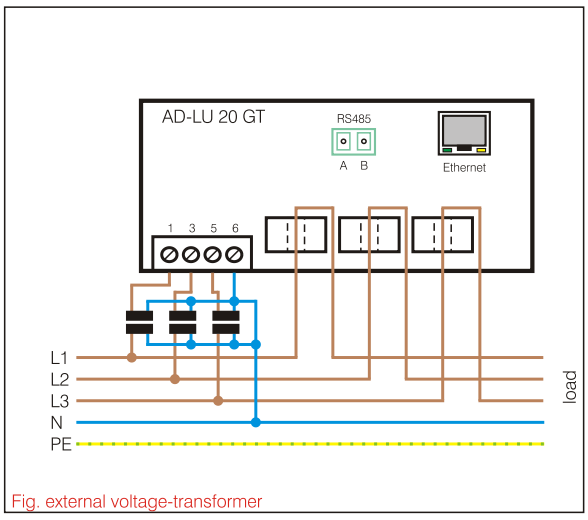
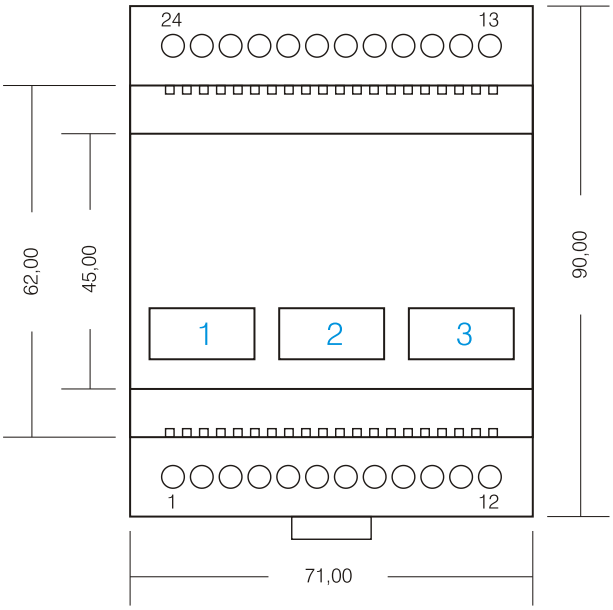
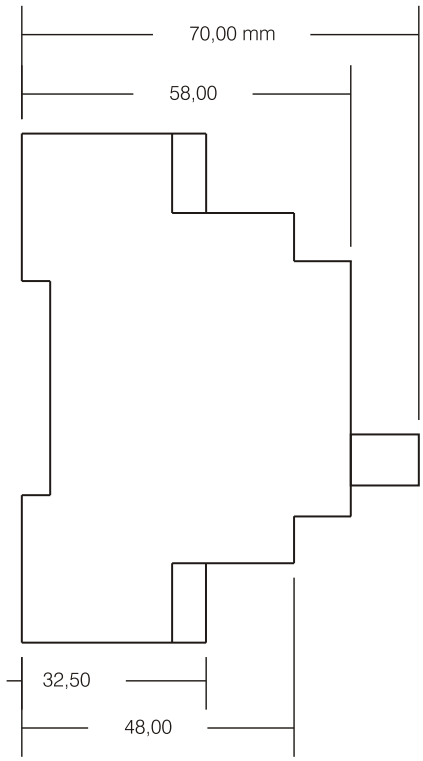


Fig. external voltage-transformer

Dimensions





Hinweis:
Für die Messung symmetrischer Lasten kann das Gerät so umparametriert werden, dass nur ein Stromwandler für die Messung notwendig ist.
In diesem Fall bitte die Strommessung mit Stromwandler 1 auf Phase L1 durchführen.

Modbus-Data

start address	no. of registers	name	unit	data type	read	write
Messwerte:						
40501	2	SCA_TOTAL_ACTIVE_POWER	kW	7	1	0
40503	2	SCA_PHASE_A_ACTIVE_POWER	kW	7	1	0
40505	2	SCA_PHASE_B_ACTIVE_POWER	kW	7	1	0
40507	2	SCA_PHASE_C_ACTIVE_POWER	kW	7	1	0
40509	2	SCA_TOTAL_REACTIVE_POWER	kvar	7	1	0
40511	2	SCA_PHASE_A_REACTIVE_POWER	kvar	7	1	0
40513	2	SCA_PHASE_B_REACTIVE_POWER	kvar	7	1	0
40515	2	SCA_PHASE_C_REACTIVE_POWER	kvar	7	1	0
40517	2	SCA_TOTAL_APPARENT_POWER	kVA	7	1	0
40519	2	SCA_PHASE_A_APPARENT_POWER	kVA	7	1	0
40521	2	SCA_PHASE_B_APPARENT_POWER	kVA	7	1	0
40523	2	SCA_PHASE_C_APPARENT_POWER	kVA	7	1	0
40525	2	SCA_TOTAL_POWER_FACTOR		7	1	0
40527	2	SCA_PHASE_A_POWER_FACTOR		7	1	0
40529	2	SCA_PHASE_B_POWER_FACTOR		7	1	0
40531	2	SCA_PHASE_C_POWER_FACTOR		7	1	0
40533	2	SCA_TOTAL_ACTIVE_FUNDAMENTAL_POWER	kW	7	1	0
40535	2	SCA_PHASE_A_ACTIVE_FUNDAMENTAL_POWER	kW	7	1	0
40537	2	SCA_PHASE_B_ACTIVE_FUNDAMENTAL_POWER	kW	7	1	0
40539	2	SCA_PHASE_C_ACTIVE_FUNDAMENTAL_POWER	kW	7	1	0
40541	2	SCA_TOTAL_ACTIVE_HARMONIC_POWER	kW	7	1	0
40543	2	SCA_PHASE_A_ACTIVE_HARMONIC_POWER	kW	7	1	0
40545	2	SCA_PHASE_B_ACTIVE_HARMONIC_POWER	kW	7	1	0
40547	2	SCA_PHASE_C_ACTIVE_HARMONIC_POWER	kW	7	1	0
40549	2	SCA_PHASE_A_VOLTAGE_RMS	V	7	1	0
40551	2	SCA_PHASE_B_VOLTAGE_RMS	V	7	1	0
40553	2	SCA_PHASE_C_VOLTAGE_RMS	V	7	1	0
40555	2	SCA_N_LINE_CALCULATED_CURRENT_RMS	A	7	1	0
40557	2	SCA_PHASE_A_CURRENT_RMS	A	7	1	0
40559	2	SCA_PHASE_B_CURRENT_RMS	A	7	1	0
40561	2	SCA_PHASE_C_CURRENT_RMS	A	7	1	0
40563	2	SCA_CHANNEL_A_VOLTAGE_PEAK	V	7	1	0
40565	2	SCA_CHANNEL_B_VOLTAGE_PEAK	V	7	1	0
40567	2	SCA_CHANNEL_C_VOLTAGE_PEAK	V	7	1	0
40569	2	SCA_CHANNEL_A_CURRENT_PEAK	A	7	1	0
40571	2	SCA_CHANNEL_B_CURRENT_PEAK	A	7	1	0
40573	2	SCA_CHANNEL_C_CURRENT_PEAK	A	7	1	0
40575	2	SCA_FREQUENCY	Hz	7	1	0
40577	2	SCA_PHASE_A_MEAN_PHASE_ANGLE	°	7	1	0
40579	2	SCA_PHASE_B_MEAN_PHASE_ANGLE	°	7	1	0
40581	2	SCA_PHASE_C_MEAN_PHASE_ANGLE	°	7	1	0
40583	2	SCA_MEASURED_TEMPERATURE	°C	7	1	0
40585	2	SCA_PHASE_A_VOLTAGE_PHASE_ANGLE	°	7	1	0
40587	2	SCA_PHASE_B_VOLTAGE_PHASE_ANGLE	°	7	1	0
40589	2	SCA_PHASE_C_VOLTAGE_PHASE_ANGLE	°	7	1	0
40591	2	SCA_IN_PHASE_AB_VOLTAGE_RMS	V	7	1	0
40593	2	SCA_IN_PHASE_BC_VOLTAGE_RMS	V	7	1	0
40595	2	SCA_IN_PHASE_CA_VOLTAGE_RMS	V	7	1	0

Modbus-Data

start address	no. of registers	name	unit	data type	read	write
List-Parameters:						
41001	1	LIST_LOAD_TYPE		3	1	1
41002	1	LIST_RS485_BAUDRATE		3	1	1
41003	1	LIST_RS485_PARITY		3	1	1
41004	1	LIST_RS485_STOPBIT		3	1	1
Data-Parameters:						
42001	2	DATAPAR_FILTER	s	7	1	1
42003	2	DATAPAR_PRIM_CURRENT	A	7	1	1
42005	2	DATAPAR_SEK_CURRENT	A	7	1	1
42007	2	DATAPAR_PRIM_VOLTAGE	V	7	1	1
42009	2	DATAPAR_SEK_VOLTAGE	V	7	1	1
42019	2	DATAPAR_LOAD_HOURS_LIMIT	%	7	1	1
Counters (full units):						
43503	2	ENERGY_KWH_TOTAL_CONSUMPTION	kWh	5	1	1
43505	2	ENERGY_KWH_TOTAL_INFEED	kWh	5	1	1
43507	2	ENERGY_KVARH_TOTAL_INDUCTIVE	kVarh	5	1	1
43509	2	ENERGY_KVARH_TOTAL_CAPACITIVE	kVarh	5	1	1
43511	2	ENERGY_KVAH_TOTAL	kVAh	5	1	1
43513	2	LOAD_HOURS	kVAh	5	1	1
Counters (tenth units):						
44103	2	ENERGY_KWH_TOTAL_CONSUMPTION	kWh	5	1	1
44105	2	ENERGY_KWH_TOTAL_INFEED	kWh	5	1	1
44107	2	ENERGY_KVARH_TOTAL_INDUCTIVE	kVarh	5	1	1
44109	2	ENERGY_KVARH_TOTAL_CAPACITIVE	kVarh	5	1	1
44111	2	ENERGY_KVAH_TOTAL	kVAh	5	1	1
44113	2	LOAD_HOURS	h	5	1	1

Legend of the data types:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Coding of the list-parameter (list index:value):

Baudrate	**0:**2400	**1:**4800	**2:**9600	**3:**14k4	**4:**19k2	**5:**28k8	**6:**38k4	**7:**57k6	**8:**76k8	**9:**115k2
Stopbit	**0:**1	**1:**2								
Parität	**0:**even	**1:**odd	**2:**none							
Lastart	**0:**beliebig	**1:**gleich								

Password assignment for WEB interface

The first time you access the configuration data via the WEB interface of the device, a password request appears. At this point, the password for accessing the configuration can be set via the WEB interface. If the password input field remains "empty" the first time it is accessed, the device has no password protection and can always be accessed with an empty password. If a password is entered, this password applies to access. To change the password, the password must be reset via the WEB interface under "Factory settings".

Factory RESET without network access

If the assigned password is no longer known and access is no longer possible, the device can be reset using the following procedure.

1. Device off, LAN cable must be plugged in.
2. Switch on the power supply.
3. Wait for the LAN link LED, then immediately disconnect the LAN cable (operating LED flashes).
4. Wait 2 seconds.
5. Plug in the LAN cable again.

IP settings and password are reset (IP standard setting: IP = 192.168.178.99/255.255.255.0 / DHCP = ON):

Power Measurement

AD-LU 25 GT

Description

The digital power and energy meter AD-LU 25 GT measures all standard values of the three-phase system (active-, reactive-, apparent-power, voltage, currents, harmonics, power factor etc.) and provides this via an Ethernet interface. The measured values can be read out via Modbus-TCP protocol. In addition, these measured values are displayed on an integrated small WEB server. The device can also be parameterized via this WEB server. The AD-LU 25 GT is also equipped with an RS485 interface. This RS485 interface with Modbus-RTU protocol is mainly suitable for connecting an external display (AD-MM 400), but can also be used to read data or parameterize. The current measurement is realized by external current transformers which are available up to 600 A. Thus, also the retrofitting of existing plants is not a problem. It is possible to measure symmetrical or unbalanced 4-wire networks and symmetrically loaded 3-wire networks. Due to the integrated, efficient wide-range power supply, the device operates in a large supply voltage range and does not heat up very much.

Application

Measurement and monitoring of all electrical characteristics in electrical systems. Detection of load profiles for energy management systems, e.g. ISO 50001. Recording the energy consumption of individual consumers. Monitoring of voltage quality variables, e.g. harmonics.

Specific characteristics

- Supports external split-core-transformer
- Ethernet-Interface
- RS485-Interface
- Counters for active, reactive and apparent energy
- Counters for purchased or fed energy

Business data

Order number

AD-LU 25 GT	power meter

Accessory

AD-KSW 50	50 A split-core-transformer
AD-KSW 100	100 A split-core-transformer
AD-KSW 200	200 A split-core-transformer
AD-KSW 400	400 A split-core-transformer
AD-KSW 600	600 A split-core-transformer
AD-MM 400	compatible display
AD-VarioPass3	USB/RS485-adapter

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Technical specifications

Current-inputs (I1...I3)

Measuring ranges	0 ... 33,3 mA AC (via split-core-transformer)
Input resistance	ca. 10 Ohm

Voltage-inputs (L1...L3)

Measuring range	80 ... 253 V AC
Input resistance	ca. 950 kOhm

Ethernet-interface

Software protocol	Modbus-TCP
Standard-IP	192.168.178.99
Network mask	255.255.255.0
WEB-Server	Port 80

RS485-Bus

Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no stubs)
Cable	twisted and shielded

Supply

Voltage range AC	80 ... 253 V AC, 50/60 Hz (see voltage-inputs)
Nominal voltage AC	230 V AC
Power consumption	max. 2,5 VA

Transfer behavior - in reference to the current value

Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 0,5 s

Housing

Dimensions (WxHxD)	71x90x70 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 180 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Grid side to RS485-Bus	4 kV, 50 Hz (1 min.)
Grid side to control elements	4 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
RS485-Bus	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current

[1)] During checking, slight signal deviations are possible.

Power Measurement

AD-LU 25 GT

Block and wiring diagram

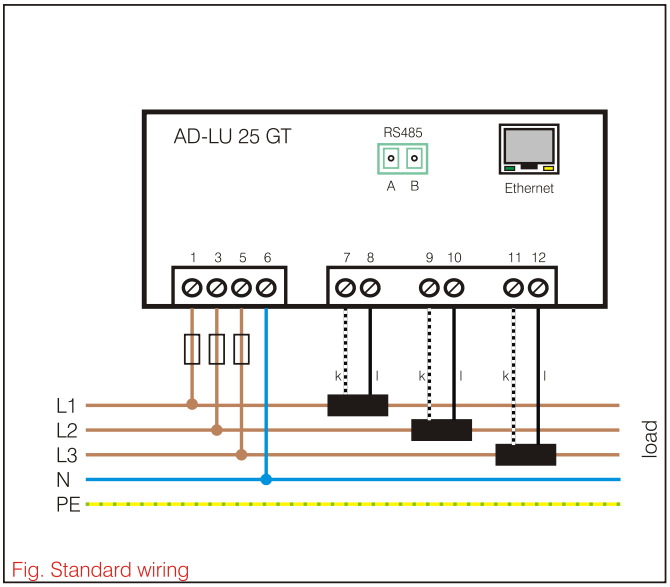


Fig. Standard wiring

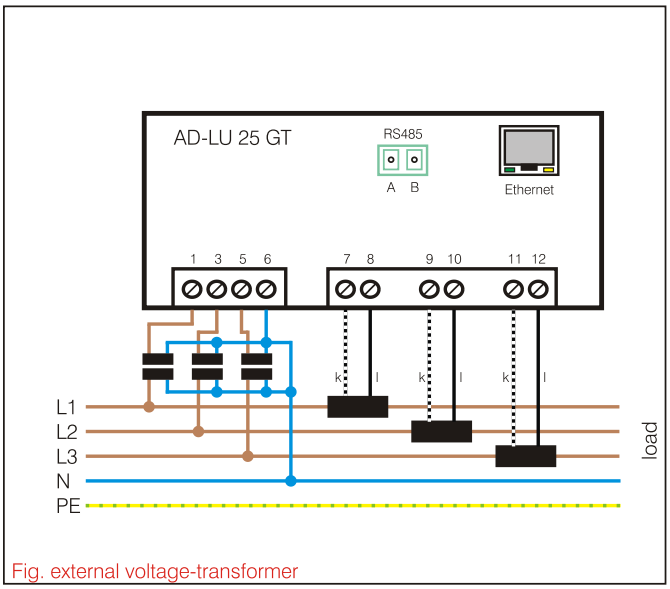
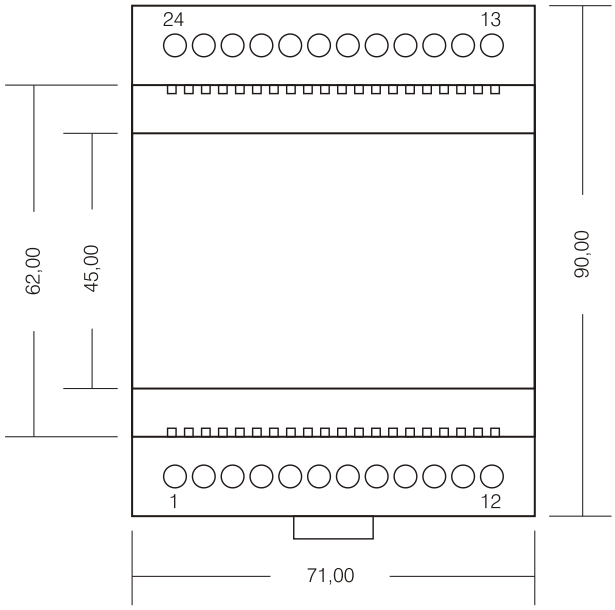
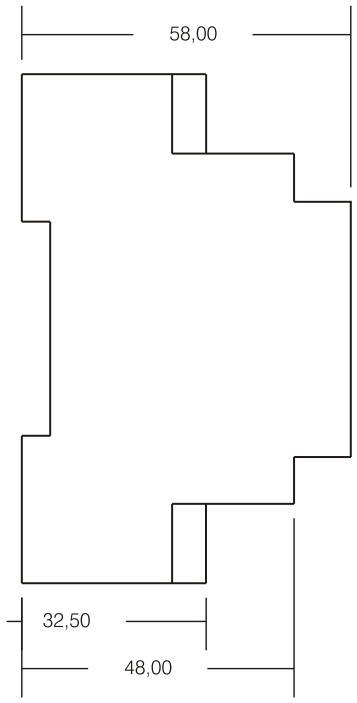


Fig. external voltage-transformer

Dimensions





Hinweis:
Für die Messung symmetrischer Lasten kann das Gerät so umparametriert werden, dass nur ein Stromwandler für die Messung notwendig ist.
In diesem Fall bitte die Strommessung mit Stromwandler 1 auf Phase L1 durchführen.

Modbus-Data

start address	no. of registers	name	unit	data type	read	write
Messwerte:						
40501	2	SCA_TOTAL_ACTIVE_POWER	kW	7	1	0
40503	2	SCA_PHASE_A_ACTIVE_POWER	kW	7	1	0
40505	2	SCA_PHASE_B_ACTIVE_POWER	kW	7	1	0
40507	2	SCA_PHASE_C_ACTIVE_POWER	kW	7	1	0
40509	2	SCA_TOTAL_REACTIVE_POWER	kvar	7	1	0
40511	2	SCA_PHASE_A_REACTIVE_POWER	kvar	7	1	0
40513	2	SCA_PHASE_B_REACTIVE_POWER	kvar	7	1	0
40515	2	SCA_PHASE_C_REACTIVE_POWER	kvar	7	1	0
40517	2	SCA_TOTAL_APPARENT_POWER	kVA	7	1	0
40519	2	SCA_PHASE_A_APPARENT_POWER	kVA	7	1	0
40521	2	SCA_PHASE_B_APPARENT_POWER	kVA	7	1	0
40523	2	SCA_PHASE_C_APPARENT_POWER	kVA	7	1	0
40525	2	SCA_TOTAL_POWER_FACTOR		7	1	0
40527	2	SCA_PHASE_A_POWER_FACTOR		7	1	0
40529	2	SCA_PHASE_B_POWER_FACTOR		7	1	0
40531	2	SCA_PHASE_C_POWER_FACTOR		7	1	0
40533	2	SCA_TOTAL_ACTIVE_FUNDAMENTAL_POWER	kW	7	1	0
40535	2	SCA_PHASE_A_ACTIVE_FUNDAMENTAL_POWER	kW	7	1	0
40537	2	SCA_PHASE_B_ACTIVE_FUNDAMENTAL_POWER	kW	7	1	0
40539	2	SCA_PHASE_C_ACTIVE_FUNDAMENTAL_POWER	kW	7	1	0
40541	2	SCA_TOTAL_ACTIVE_HARMONIC_POWER	kW	7	1	0
40543	2	SCA_PHASE_A_ACTIVE_HARMONIC_POWER	kW	7	1	0
40545	2	SCA_PHASE_B_ACTIVE_HARMONIC_POWER	kW	7	1	0
40547	2	SCA_PHASE_C_ACTIVE_HARMONIC_POWER	kW	7	1	0
40549	2	SCA_PHASE_A_VOLTAGE_RMS	V	7	1	0
40551	2	SCA_PHASE_B_VOLTAGE_RMS	V	7	1	0
40553	2	SCA_PHASE_C_VOLTAGE_RMS	V	7	1	0
40555	2	SCA_N_LINE_CALCULATED_CURRENT_RMS	A	7	1	0
40557	2	SCA_PHASE_A_CURRENT_RMS	A	7	1	0
40559	2	SCA_PHASE_B_CURRENT_RMS	A	7	1	0
40561	2	SCA_PHASE_C_CURRENT_RMS	A	7	1	0
40563	2	SCA_CHANNEL_A_VOLTAGE_PEAK	V	7	1	0
40565	2	SCA_CHANNEL_B_VOLTAGE_PEAK	V	7	1	0
40567	2	SCA_CHANNEL_C_VOLTAGE_PEAK	V	7	1	0
40569	2	SCA_CHANNEL_A_CURRENT_PEAK	A	7	1	0
40571	2	SCA_CHANNEL_B_CURRENT_PEAK	A	7	1	0
40573	2	SCA_CHANNEL_C_CURRENT_PEAK	A	7	1	0
40575	2	SCA_FREQUENCY	Hz	7	1	0
40577	2	SCA_PHASE_A_MEAN_PHASE_ANGLE	°	7	1	0
40579	2	SCA_PHASE_B_MEAN_PHASE_ANGLE	°	7	1	0
40581	2	SCA_PHASE_C_MEAN_PHASE_ANGLE	°	7	1	0
40583	2	SCA_MEASURED_TEMPERATURE	°C	7	1	0
40585	2	SCA_PHASE_A_VOLTAGE_PHASE_ANGLE	°	7	1	0
40587	2	SCA_PHASE_B_VOLTAGE_PHASE_ANGLE	°	7	1	0
40589	2	SCA_PHASE_C_VOLTAGE_PHASE_ANGLE	°	7	1	0
40591	2	SCA_IN_PHASE_AB_VOLTAGE_RMS	V	7	1	0
40593	2	SCA_IN_PHASE_BC_VOLTAGE_RMS	V	7	1	0
40595	2	SCA_IN_PHASE_CA_VOLTAGE_RMS	V	7	1	0

Modbus-Data

start address	no. of registers	name	unit	data type	read	write
List-Parameters:						
41001	1	LIST_LOAD_TYPE		3	1	1
41002	1	LIST_RS485_BAUDRATE		3	1	1
41003	1	LIST_RS485_PARITY		3	1	1
41004	1	LIST_RS485_STOPBIT		3	1	1
Data-Parameters:						
42001	2	DATAPAR_FILTER	s	7	1	1
42003	2	DATAPAR_PRIM_CURRENT	A	7	1	1
42005	2	DATAPAR_SEK_CURRENT	A	7	1	1
42007	2	DATAPAR_PRIM_VOLTAGE	V	7	1	1
42009	2	DATAPAR_SEK_VOLTAGE	V	7	1	1
42019	2	DATAPAR_LOAD_HOURS_LIMIT	%	7	1	1
Counters (full units):						
43503	2	ENERGY_KWH_TOTAL_CONSUMPTION	kWh	5	1	1
43505	2	ENERGY_KWH_TOTAL_INFEED	kWh	5	1	1
43507	2	ENERGY_KVARH_TOTAL_INDUCTIVE	kVarh	5	1	1
43509	2	ENERGY_KVARH_TOTAL_CAPACITIVE	kVarh	5	1	1
43511	2	ENERGY_KVAH_TOTAL	kVAh	5	1	1
43513	2	LOAD_HOURS	h	5	1	1
Counters (tenth units):						
44103	2	ENERGY_KWH_TOTAL_CONSUMPTION	kWh	5	1	1
44105	2	ENERGY_KWH_TOTAL_INFEED	kWh	5	1	1
44107	2	ENERGY_KVARH_TOTAL_INDUCTIVE	kVarh	5	1	1
44109	2	ENERGY_KVARH_TOTAL_CAPACITIVE	kVarh	5	1	1
44111	2	ENERGY_KVAH_TOTAL	kVAh	5	1	1
44113	2	LOAD_HOURS	kVAh	5	1	1

Legend of the data types:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Coding of the list-parameter (list index:value):

Baudrate	**0:**2400	**1:**4800	**2:**9600	**3:**14k4	**4:**19k2	**5:**28k8	**6:**38k4	**7:**57k6	**8:**76k8	**9:**115k2
Stopbit	**0:**1	**1:**2								
Parität	**0:**even	**1:**odd	**2:**none							
Lastart	**0:**beliebig	**1:**gleich								

Password assignment for WEB interface

The first time you access the configuration data via the WEB interface of the device, a password request appears. At this point, the password for accessing the configuration can be set via the WEB interface. If the password input field remains "empty" the first time it is accessed, the device has no password protection and can always be accessed with an empty password. If a password is entered, this password applies to access. To change the password, the password must be reset via the WEB interface under "Factory settings".

Factory RESET without network access

If the assigned password is no longer known and access is no longer possible, the device can be reset using the following procedure.

1. Device off, LAN cable must be plugged in.
2. Switch on the power supply.
3. Wait for the LAN link LED, then immediately disconnect the LAN cable (operating LED flashes).
4. Wait 2 seconds.
5. Plug in the LAN cable again.

IP settings and password are reset (IP standard setting: IP = 192.168.178.99/255.255.255.0 / DHCP = ON):

Power Measurement

AD-LU 30 GT

Description

The digital power measuring converter AD-LU 30 GT measures all magnitudes of the three-phase network (current, voltage, energy, effective power, reactive power and apparent power..) and makes this data available via a RS485 bus. The unit is therefore optimally suitable for integration in energy management systems. 3- or 4-conductor networks can be measured. 4-wire networks can be loaded balanced or unbalanced, whereby 3-wire networks can only be measured balanced. The AD-LU 30 GT supplies itself via its measuring voltage L1. The current measuring is carried out with the bushing transformer mounted at the front. For measuring high voltages or currents, external converters can be fitted in series at any time. A Modbus-RTU protocol is run via the RS485 bus interface, whereby the AD-LU 30 GT represents a Modbus slave. The bus address is set via the rotary coding switch mounted at the front, this way several of these measuring units can be switched at one bus and can be interrogated from one central point. The AD-LU 30 GT can also be read and parameterized via the available AD-Studio. Two LEDs at the front signal the operating condition and the RS485 data traffic. The compact type of construction and the high performance ability, with simultaneous low energy consumption, allows usage in almost any application.

Application

A typical usage is in energy management systems for balancing and determining the energy distribution.

Specific characteristics

- current measurement through current transformer
- power supply by measuring voltages
- address setting via rotary coding switch
- recording of all sizes of the three-phase system
- parameter setting via AD-Studio

Business data

Order number

AD-LU 30 GT	digital power meter

Accessory

AD-MM 400	TFT-Display

Technical specifications

Current-inputs (I1...I3)

Measuring ranges	0 ... 1 A AC; 0 ... 5 A AC; 0 ... 20 A AC
Max. conductor diameter	4,8 mm

Voltage-inputs (L1...L3)

Measuring range	80 ... 253 V AC
Input resistance	ca. 500 kOhm

RS485-Bus

Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no stubs)
Cable	twisted and shielded

Supply

Voltage range AC	80 ... 253 V AC, 50/60 Hz (see voltage-inputs)
Nominal voltage AC	230 V AC
Power consumption	max. 3 VA

Transfer behavior - in reference to the current value

Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 2 s

Housing

Dimensions (WxHxD)	71x90x70 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 170 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Grid side to RS485-Bus	4 kV, 50 Hz (1 min.)
Grid side to control elements	4 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
RS485-Bus	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current

[1] During checking, slight signal deviations are possible.

Printed 24.08.2022 We reserve the right for technical changes.

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Power Measurement

AD-LU 30 GT

Block and wiring diagram

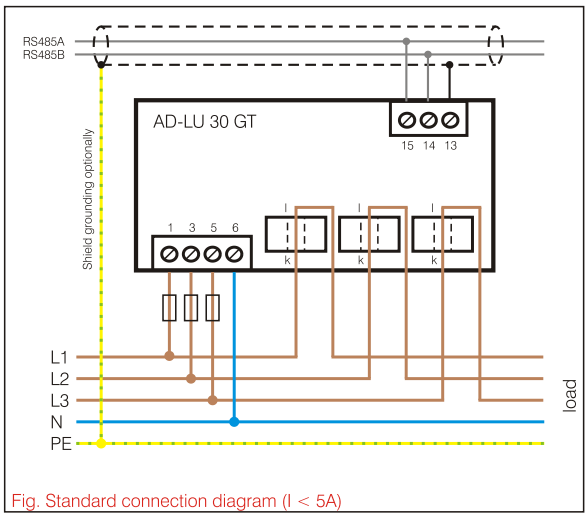


Fig. Standard connection diagram (I < 5A)

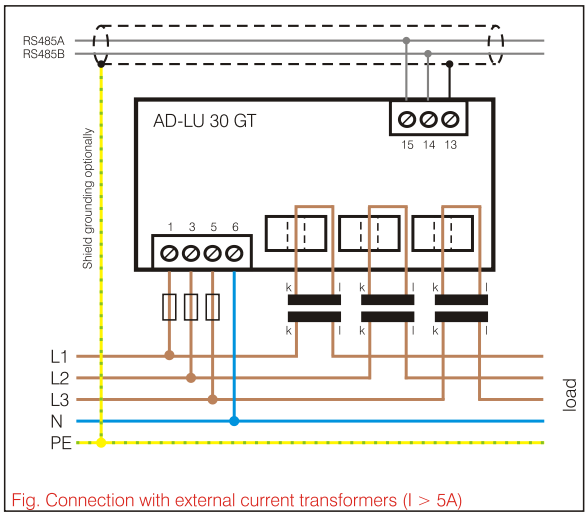


Fig. Connection with external current transformers (I > 5A)

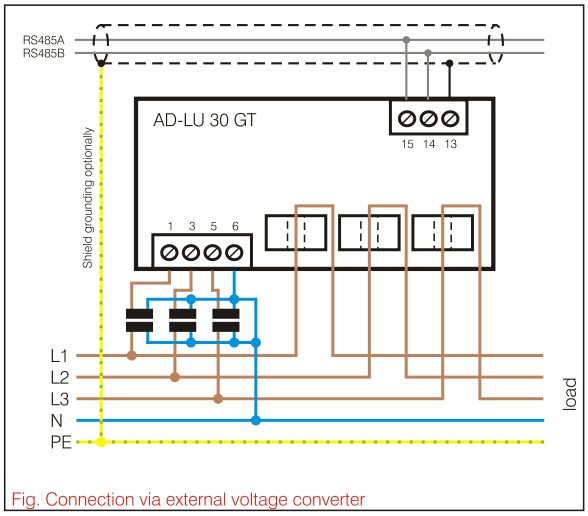
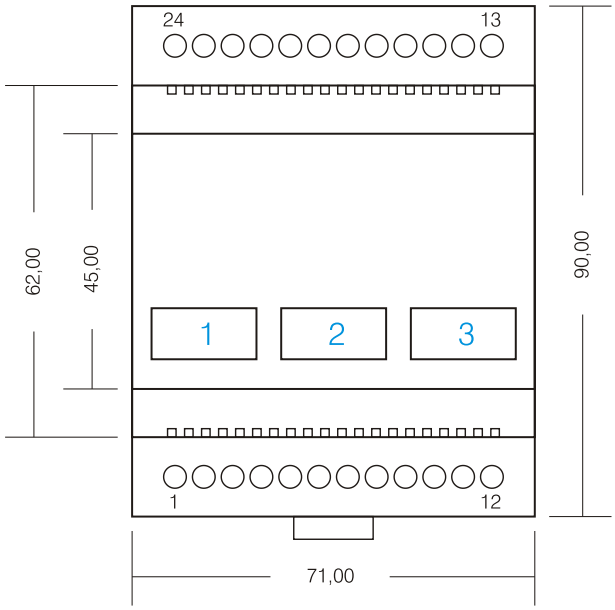
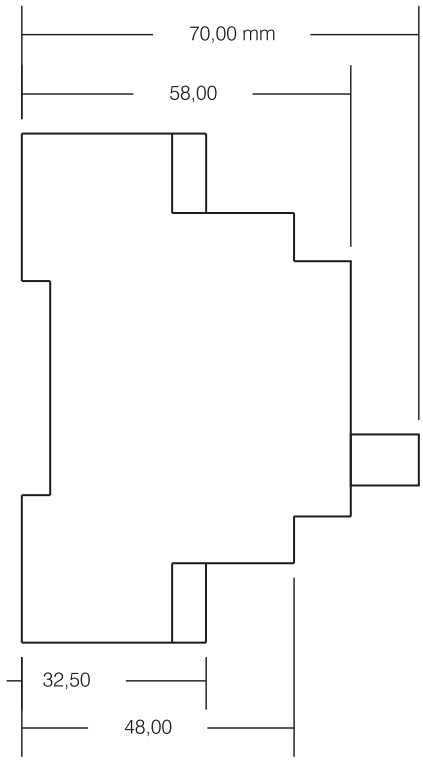


Fig. Connection via external voltage converter

Dimensions





Hinweis:
Für die Messung symmetrischer Lasten kann das Gerät so umparametriert werden, dass nur ein Stromwandler für die Messung notwendig ist.
In diesem Fall bitte die Strommessung mit Stromwandler 1 auf Phase L1 durchführen.

Power Measurement

AD-LU 30 GT

Modbus Communication

The AD-LU 30 GT has a RS485 bus interface on which the Modbus RTU protocol is used. About this bus interface all measured data of the unit can be read out.
The default standard data format is 19200,e,8,1. Adaptation to a different data format is always possible.

data rate: 19200 baud (bits/s)	**parity:** even	**data bit:** 8	**stop bit:** 1

The bus address is set at the front mounted rotary switches. The address 0 is prohibited for bus. However, on this zero position the device always using the standard data format (19200, e, 8,1). The position 0 therefore represents a service position, can be used for example at incorrect parameterization.

The AD-LU 30 GT supports two Modbus functions. These are the functions **"Read Holding Registers" (0x03) and "Write Multiple Registers" (0x10) . The function "Read Holding Registers" data can be read from the device and data is written with "Write Multiple Registers". The individual register width is 16 bits.**
Please refer to the Modbus specification for a detailed description of the Modbus communication. This is freely available online, but can also be obtained from the Adamczewski homepage.

The following Modbus data are accessible via the RS485 bus:

start address	no. of registers	name	unit	data type	read	write
measurement reading:						
40801	2	active power L1	kW	7	1	0
40803	2	active power L2	kW	7	1	0
40805	2	active power L3	kW	7	1	0
40807	2	reactive power L1	kVar	7	1	0
40809	2	reactive power L2	kVar	7	1	0
40811	2	reactive power L3	kVar	7	1	0
40813	2	apparent power L1	kVA	7	1	0
40815	2	apparent power L2	kVA	7	1	0
40817	2	apparent power L3	kVA	7	1	0
40819	2	current L1	A	7	1	0
40821	2	current L2	A	7	1	0
40823	2	current L3	A	7	1	0
40825	2	voltage L1	V	7	1	0
40827	2	voltage L2	V	7	1	0
40829	2	voltage L3	V	7	1	0
40831	2	frequency	Hz	7	1	0
40833	2	total active power	kW	7	1	0
40835	2	total reactive power	kVar	7	1	0
40837	2	total apparent power	kVA	7	1	0
40839	2	power factor L1		7	1	0
40841	2	power factor L2		7	1	0
40843	2	power factor L3		7	1	0
40845	2	total power factor		7	1	0
List-parameters:						
42001	1	BAUDRATE	baud	3	1	1
42002	1	STOPBIT		3	1	1
42003	1	PARITY		3	1	1
42004	1	LOAD TYPE		3	1	1
Data-parameters:						
43001	2	FILTER	s	7	1	1
43003	2	PRIM_current	A	7	1	1
43005	2	SEC_current	A	7	1	1
43007	2	PRIM_voltage	V	7	1	1
43009	2	SEC_voltage	V	7	1	1
43011	2	MIN_load	%	7	1	1
Counters:						
43505	2	total energy KWH EXTRAKT	kWh	5	1	1
43507	2	total energy KWH INFEED	kWh	5	1	1
43509	2	total energy KVARH INDUCTIVE	kVarh	5	1	1
43511	2	total energy KVARH CAPACITIVE	kVarh	5	1	1
43513	2	total energy KVAH	kVAh	5	1	1
44001	2	counter operation hours	h	5	1	1
44013	2	counter load hours	h	5	1	1

Legend of the data types:

U08: 1	S08: 2	U16: 3	S16: 4	U32: 5	S32: 6	float: 7

Coding of the list-parameter (list index:value):

Baudrate	0:2400	1:4800	2:9600	3:14k4	4:19k2	5:28k8	6:38k4	7:57k6	8:76k8	9:115k2
Stopbit	0:1	1:2								
Parität	0:even	1:odd	2:none							
load type	0:unbal.	1:bal.								

Power Measurement

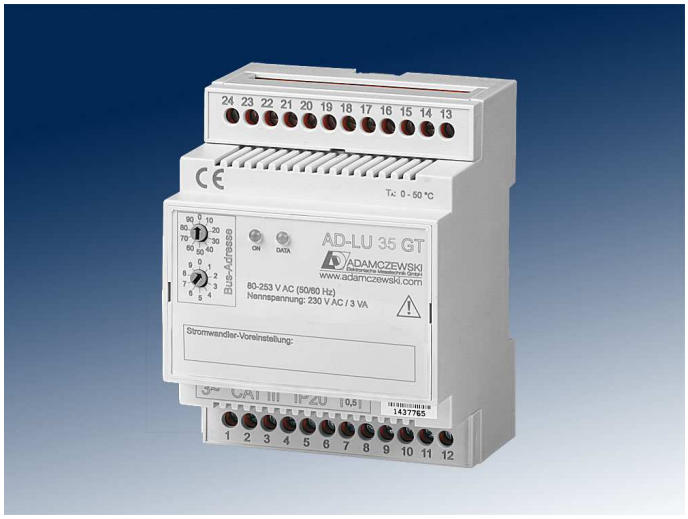
AD-LU 35 GT

Description

The digital power measuring converter AD-LU 35 GT measures all magnitudes of the three-phase network (current, voltage, energy, effective power, reactive power and apparent power..) and makes this data available via a RS485 bus. The unit is therefore optimally suitable for integration in energy management systems. 3- or 4-conductor networks can be measured. 4-wire networks can be loaded balanced or unbalanced, whereby 3-wire networks can only be measured balanced. The AD-LU 35 GT supplies itself via its measuring voltage L1. The current measurement takes place via additional external Split-Core-Transformer. The device is therefore ideal for retrofitting if no space is available. For measuring high voltages or currents, external converters can be fitted in series at any time. A Modbus-RTU protocol is run via the RS485 bus interface, whereby the AD-LU 35 GT represents a Modbus slave. The bus address is set via the rotary coding switch mounted at the front, this way several of these measuring units can be switched at one bus and can be interrogated from one central point. The AD-LU 35 GT can also be read and parameterized via the available AD-Studio. Two LEDs at the front signal the operating condition and the RS485 data traffic. The compact type of construction and the high performance ability, with simultaneous low energy consumption, allows usage in almost any application.

Application

A typical usage is in energy management systems for balancing and determining the energy distribution. Due to the measurement via an external current transformer, the unit can be retrofitted without problems in any system without interruption.



Specific characteristics

- compact size
- current measurement through external split current transformer
- power supply by measuring voltages
- address setting via rotary coding switch
- recording of all sizes of the three-phase system
- parameter setting via AD-Studio

Business data

Order number

AD-LU 35 GT	digital power meter

Accessory

AD-MM 400	TFT-Display
50A-Split-Core-Transformer	50 A AC primary / 33,3 mA AC secundary
100A-Split-Core-Transformer	100 A AC primary / 33,3 mA AC secundary
200A-Split-Core-Transformer	200 A AC primary / 33,3 mA AC secundary
400A-Split-Core-Transformer	400 A AC primary / 33,3 mA AC secundary
600A-Split-Core-Transformer	600 A AC primary / 33,3 mA AC secundary
VarioPass	RS485 to USB converter
AD-NetGw 100 GT	RS485 to Ethernet converter (Modbus-TCP)

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Technical specifications

Current-inputs (I1...I3)	
Measuring ranges	0 ... 33,3 mA AC (over split-core-transformer)
Input resistance	ca. 10 Ohm
Voltage-inputs (L1...L3)	
Measuring range	80 ... 253 V AC
Input resistance	ca. 500 kOhm
RS485-Bus	
Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no stubs)
Cable	twisted and shielded
Supply	
Voltage range AC	80 ... 253 V AC, 50/60 Hz (see voltage-inputs)
Nominal voltage AC	230 V AC
Power consumption	max. 3 VA
Transfer behavior - in reference to the current value	
Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 2 s
Housing	
Dimensions (WxHxD)	71x90x70 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 170 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III
Galvanic isolation, test voltages	
Grid side to RS485-Bus	4 kV, 50 Hz (1 min.)
Grid side to control elements	4 kV, 50 Hz (1 min.)
Protection circuits	
Input	electrical surge protection
RS485-Bus	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current

[1)] During checking, slight signal deviations are possible.

Power Measurement

AD-LU 35 GT

Block and wiring diagram

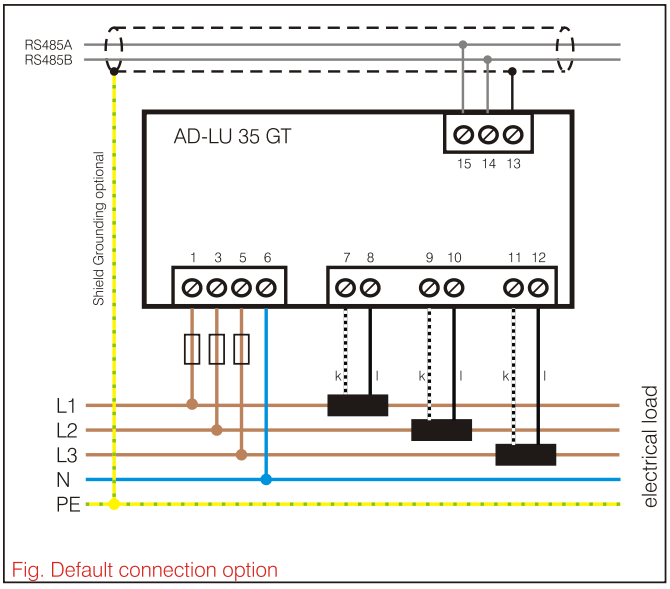


Fig. Default connection option

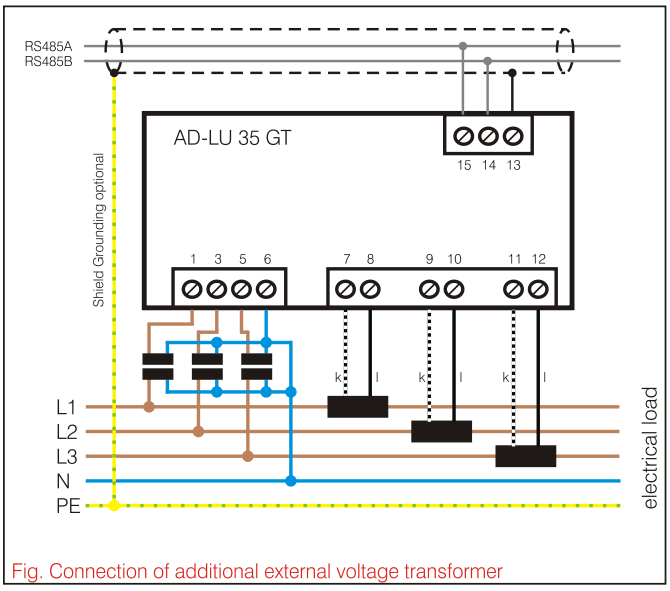
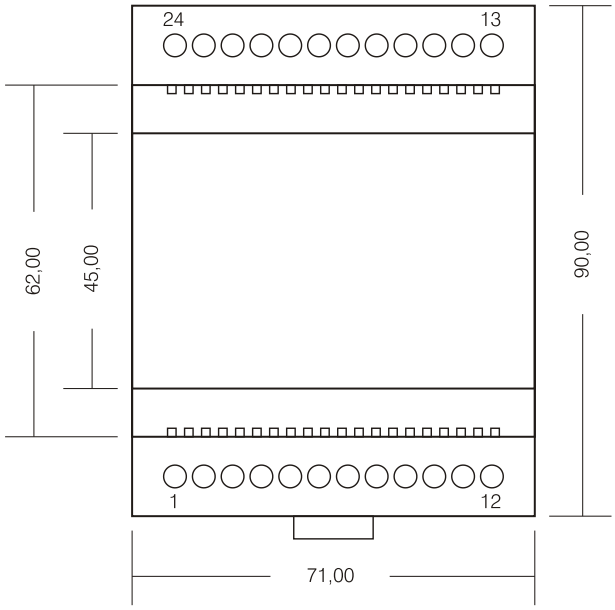
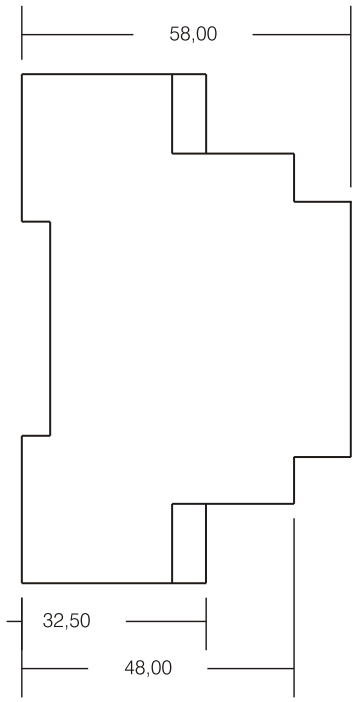


Fig. Connection of additional external voltage transformer

Dimensions





Hinweis:
Für die Messung symmetrischer Lasten kann das Gerät so umparametriert werden, dass nur ein Stromwandler für die Messung notwendig ist.
In diesem Fall bitte die Strommessung mit Stromwandler 1 auf Phase L1 durchführen.

Power Measurement

AD-LU 35 GT

Modbus Communication

The AD-LU 35 GT has a RS485 bus interface on which the Modbus RTU protocol is used. About this bus interface all measured data of the unit can be read out.
The default standard data format is 19200,e,8,1. Adaptation to a different data format is always possible.

data rate: 19200 baud (bits/s)	**parity:** even	**data bit:** 8	**stop bit:** 1

The bus address is set at the front mounted rotary switches. The address 0 is prohibited for bus. However, on this zero position the device always using the standard data format (19200, e, 8,1). The position 0 therefore represents a service position, can be used for example at incorrect parameterization.

The AD-LU 35 GT supports two Modbus functions. These are the functions **"Read Holding Registers" (0x03) and "Write Multiple Registers" (0x10) . The function "Read Holding Registers" data can be read from the device and data is written with "Write Multiple Registers". The individual register width is 16 bits.**
Please refer to the Modbus specification for a detailed description of the Modbus communication. This is freely available online, but can also be obtained from the Adamczewski homepage.

The following Modbus data are accessible via the RS485 bus:

start address	no. of registers	name	unit	data type	read	write
measurement reading:						
40801	2	active power L1	kW	7	1	0
40803	2	active power L2	kW	7	1	0
40805	2	active power L3	kW	7	1	0
40807	2	reactive power L1	kVar	7	1	0
40809	2	reactive power L2	kVar	7	1	0
40811	2	reactive power L3	kVar	7	1	0
40813	2	apparent power L1	kVA	7	1	0
40815	2	apparent power L2	kVA	7	1	0
40817	2	apparent power L3	kVA	7	1	0
40819	2	current L1	A	7	1	0
40821	2	current L2	A	7	1	0
40823	2	current L3	A	7	1	0
40825	2	voltage L1	V	7	1	0
40827	2	voltage L2	V	7	1	0
40829	2	voltage L3	V	7	1	0
40831	2	frequency	Hz	7	1	0
40833	2	total active power	kW	7	1	0
40835	2	total reactive power	kVar	7	1	0
40837	2	total apparent power	kVA	7	1	0
40839	2	power factor L1		7	1	0
40841	2	power factor L2		7	1	0
40843	2	power factor L3		7	1	0
40845	2	total power factor		7	1	0
List-parameters:						
42001	1	BAUDRATE	baud	3	1	1
42002	1	STOPBIT		3	1	1
42003	1	PARITY		3	1	1
42004	1	LOAD TYPE		3	1	1
Data-parameters:						
43001	2	FILTER	s	7	1	1
43003	2	PRIM_current	A	7	1	1
43005	2	SEC_current	A	7	1	1
43007	2	PRIM_voltage	V	7	1	1
43009	2	SEC_voltage	V	7	1	1
43011	2	MIN_load	%	7	1	1
Counters:						
43505	2	total energy KWH EXTRAKT	kWh	5	1	1
43507	2	total energy KWH INFEED	kWh	5	1	1
43509	2	total energy KVARH INDUCTIVE	kVarh	5	1	1
43511	2	total energy KVARH CAPACITIVE	kVarh	5	1	1
43513	2	total energy KVAH	kVAh	5	1	1
44001	2	counter operation hours	h	5	1	1
44013	2	counter load hours	h	5	1	1

Legend of the data types:

U08: 1	S08: 2	U16: 3	S16: 4	U32: 5	S32: 6	float: 7

Coding of the list-parameter (list index:value):

Baudrate	0:2400	1:4800	2:9600	3:14k4	4:19k2	5:28k8	6:38k4	7:57k6	8:76k8	9:115k2
Stopbit	0:1	1:2								
Parität	0:even	1:odd	2:none							
load type	0:unbal.	1:bal.								

Power Measurement

AD-LU 40 GT AD-LU 40S GT

Description

The digital power converter AD-LU 40 GT measures all values of the three-phase power grid such as current, voltage, energy, active, reactive, apparent power and frequency and makes this data available via a fieldbus. The device is therefore ideally suited for integration into energy management systems. The ProfiNet variant contains a 2-port switch for direct forwarding to the next device. 3- or 4-wire networks can be measured. 4-wire networks may have balanced or unbalanced load. 3-wire networks must have balanced load. The AD-LU 40 GT is powered by its measuring voltage L1. However, a variant with separate supply terminals and wide-range power supply is also available (AD-LU 40-S GT). The current measurement takes place via the throughput converters attached to the front. For the measurement of higher voltages or currents, external converters can be connected at any time. LEDs on the front panel signal the operating state and the data traffic. The compact design and the high performance combined with low energy consumption allow it to be used in almost any application. In addition, the device has a front-sided RS485 interface to which, for example, the TFT display AD-MM 400 can be connected. Thus, without any great effort, all measured values can be displayed.

Application

Measurement and monitoring of all electrical characteristics in electrical systems. Detection of load profiles for energy management systems, e.g. ISO 50001. Recording the energy consumption of individual consumers. Monitoring of voltage quality variables, e.g. Harmonics.
Attention: This is a Class A product according to EN 55011. Additional EMC actions may be necessary when used in small businesses or in residential areas.

Specific characteristics

- Connection of 4-wire systems of any load
- Measurement of currents, voltages, power, power factors, frequency, harmonics
- Low power loss during current measurement thanks to integrated through-current transformers
- Counters for applied and feedback energies
- Counters for inductive and capacitive reactive power
- Fieldbus interface for PROFINET or PROFIBUS
- RS485 interface for connecting a TFT display

Business data

Order number

AD-LU 40 GT-PN	PROFINET
AD-LU 40S GT-PN	PROFINET, with separate supply terminals
AD-LU 40 GT-PB	PROFIBUS
AD-LU 40S GT-PB	PROFIBUS, with separate supply terminals

Accessory

AD-MM 400	TFT display for front panel installation

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Power Measurement

AD-LU 40 GT AD-LU 40S GT

Technical specifications

Current-inputs (I1...I3)

Measuring ranges	0 ... 1 A AC; 0 ... 5 A AC; 0 ... 20 A AC
Max. conductor diameter	4,8 mm
Max. measurable harmonic	40

Voltage-inputs (L1...L3)

Measuring range	80 ... 253 V AC (AD-LU 40 GT) 0 ... 253 V AC (AD-LU 40S GT)
Input resistance	ca. 970 kOhm

PROFINET

Ethernet	2 Port Switch
Protocol specification	PROFINET IO
Default IP-address	0.0.0.0

PROFIBUS

Address setting	BCD-switches 00 ... 99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no stubs)
Cable	twisted and shielded

RS485-Bus

Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no spur lines)
Cable	twisted and shielded
Address setting	BCD-switches 00...99

Supply

Voltage range AC	80 ... 253 V AC, 50/60 Hz (see voltage-inputs)
Nominal voltage AC	230 V AC
Power consumption	max. 4 VA

Supply (-S)

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Voltage range DC	20 ... 253 V DC
Nominal voltage AC/DC	230 V AC / 24 V DC
Input power AC/DC	max. 4 VA / 3 W

Measure

Basic accuracy	
Temperature influence	80 ppm/K
Sampling interval	200 ms

Housing

Dimensions (WxHxD)	105x90x83 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Weight	ca. 210 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. A, Gr. 1

[1] During checking, slight signal deviations are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Grid side zu bus	4 kV, 50 Hz (1 min.)
Grid side to control elements	4 kV, 50 Hz (1 min.)

Power Measurement

AD-LU 40 GT AD-LU 40S GT

Block and wiring diagram

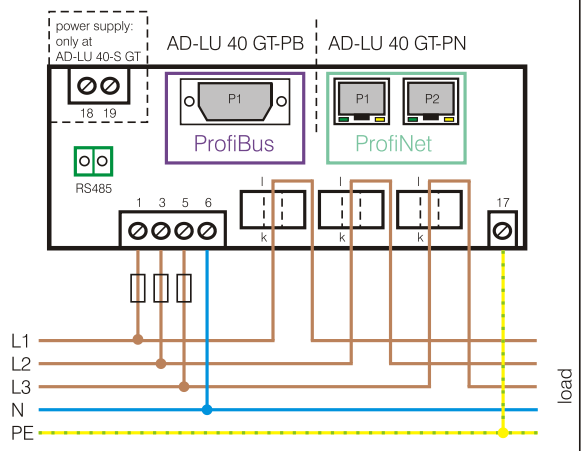


Fig. Standard connection diagram (I <= 20 A)

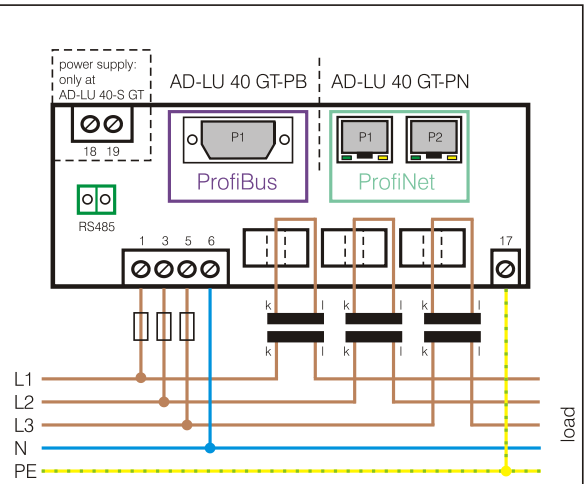


Fig. Connection with external current transformers (I > 20 A)

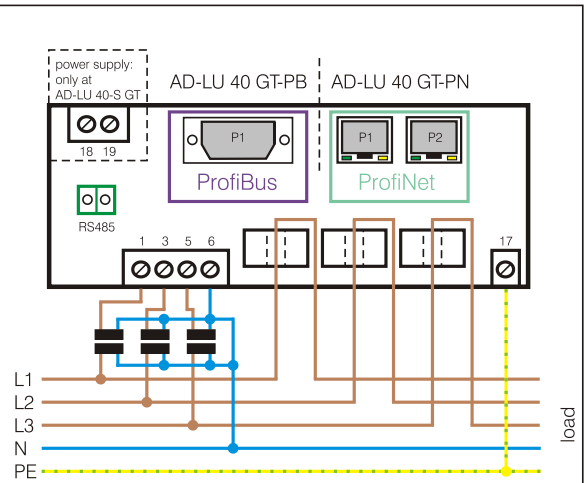
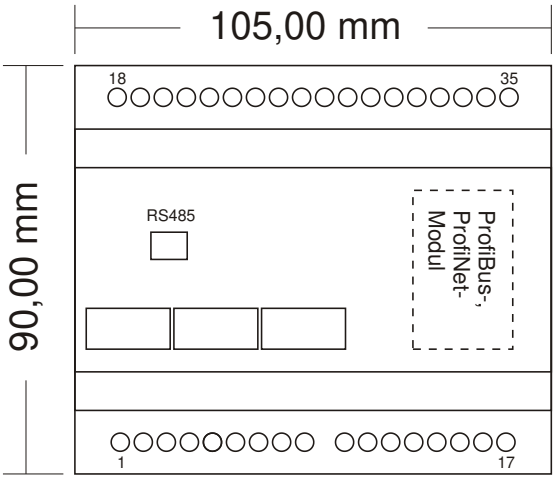
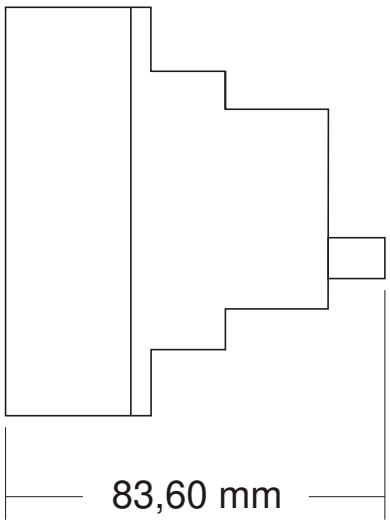


Fig. Connection via external voltage converter

Dimensions





Explanations:

PROFINET: NS-Led (Netzwork Status):
The NS-LED signals the network status.

LED Status:	Description:	Comments
off	Offline	- no Power - no connection with IO-Controller
green	Online RUN	- connection with IO-Controller established - IO-Controller in RUN Status
green - 1 flash	Online STOP	- connection with IO-Controller established - IO-Controller in STOP Status - IO-data bad - IRT synchronization not finished
grün - blinking	link mode	- Uses by engineering tools to identify the node on the network
red	fatal event	- Major internal error
rot - 1 flash	station name error	- Station name not set
rot - 2 flash	IP-Address error	- IP-address not set
rot - 3 flash	configuratio error	- Expected identification differs from real identification

PROFINET: MS-Led (Modul Status):
The MS-LED signals the status of the ProfiNet module in the power meter.

LED Status:	Description:	Comments
off	not initialized	- Nor power or module in "SETUP" or "NW-INIT" state
green	normal operation	- Modul has shifted from "NW-INIT" state
green - 1 flash	diagnostic event	- diagnostic event present
red	exception error or fatal event	- Device in state EXCEPTION or major internal error
alternating red/green	firmwareupdate	- Do not power off the modul - turning the module off during this phase could cause permanent damage

PROFIBUS: OP-Led (Operation Mode):
The OP-Led signals the operation mode.

LED Status:	Description:	Comments
off	Offline / no power	
green	Online, data exchange	
green - flashing	Online, clear	
rot - 1 flash	Parameterization error	- See "Parameterization Data Handling" in Profibus specification
rot - 2 flash	Configuration error	- See "Profibus Configuration Error" in Profibus specification

PROFIBUS: ST-Led (Status):
The ST-Led signals the status of the device.

LED Status:	Description:	Comments
off	Not initialized	- Not initialized jet
green	initialized	- Initialization completed successfully
green - flashing	initialized, diagnostic events present	Extended diagnostic bit is set
rot	Exception error	- Exception error detected

Power Measurement

AD-LU 40 GT AD-LU 40S GT

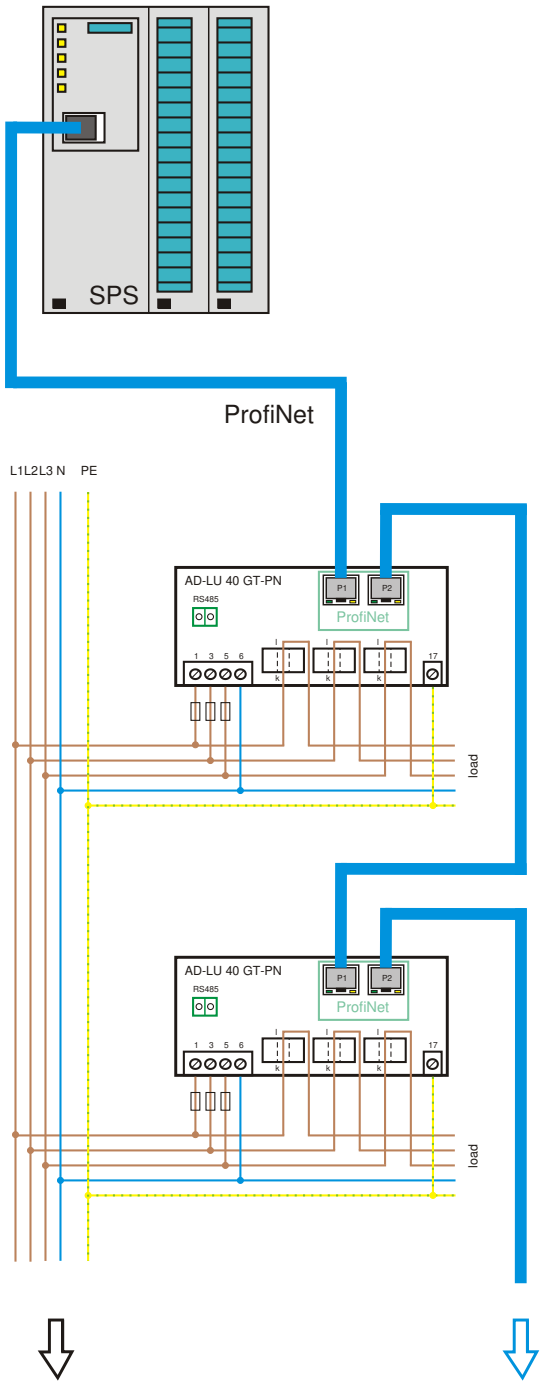
Modbus-Data (RS485-bus)

address	count register	name	unit	type	read	write
Messwerte:						
40801	2	TOTAL_ACTIVE_POWER	kW	float	1	0
40803	2	PHASE_A_ACTIVE_POWER	kW	float	1	0
40805	2	PHASE_B_ACTIVE_POWER	kW	float	1	0
40807	2	PHASE_C_ACTIVE_POWER	kW	float	1	0
40809	2	TOTAL_REACTIVE_POWER	kvar	float	1	0
40811	2	PHASE_A_REACTIVE_POWER	kvar	float	1	0
40813	2	PHASE_B_REACTIVE_POWER	kvar	float	1	0
40815	2	PHASE_C_REACTIVE_POWER	kvar	float	1	0
40817	2	TOTAL_APPARENT_POWER	kVA	float	1	0
40819	2	PHASE_A_APPARENT_POWER	kVA	float	1	0
40821	2	PHASE_B_APPARENT_POWER	kVA	float	1	0
40823	2	PHASE_C_APPARENT_POWER	kVA	float	1	0
40825	2	TOTAL_POWER_FACTOR		float	1	0
40827	2	PHASE_A_POWER_FACTOR		float	1	0
40829	2	PHASE_B_POWER_FACTOR		float	1	0
40831	2	PHASE_C_POWER_FACTOR		float	1	0
40833	2	TOTAL_ACTIVE_FUNDAMENTAL_POWER	kW	float	1	0
40835	2	PHASE_A_ACTIVE_FUNDAMENTAL_POWER	kW	float	1	0
40837	2	PHASE_B_ACTIVE_FUNDAMENTAL_POWER	kW	float	1	0
40839	2	PHASE_C_ACTIVE_FUNDAMENTAL_POWER	kW	float	1	0
40841	2	TOTAL_ACTIVE_HARMONIC_POWER	kW	float	1	0
40843	2	PHASE_A_ACTIVE_HARMONIC_POWER	kW	float	1	0
40845	2	PHASE_B_ACTIVE_HARMONIC_POWER	kW	float	1	0
40847	2	PHASE_C_ACTIVE_HARMONIC_POWER	kW	float	1	0
40849	2	PHASE_A_VOLTAGE_RMS	V	float	1	0
40851	2	PHASE_B_VOLTAGE_RMS	V	float	1	0
40853	2	PHASE_C_VOLTAGE_RMS	V	float	1	0
40855	2	N_LINE_CALCULATED_CURRENT_RMS	A	float	1	0
40857	2	PHASE_A_CURRENT_RMS	A	float	1	0
40859	2	PHASE_B_CURRENT_RMS	A	float	1	0
40861	2	PHASE_C_CURRENT_RMS	A	float	1	0
40863	2	CHANNEL_A_VOLTAGE_PEAK	V	float	1	0
40865	2	CHANNEL_B_VOLTAGE_PEAK	V	float	1	0
40867	2	CHANNEL_C_VOLTAGE_PEAK	V	float	1	0
40869	2	CHANNEL_A_CURRENT_PEAK	A	float	1	0
40871	2	CHANNEL_B_CURRENT_PEAK	A	float	1	0
40873	2	CHANNEL_C_CURRENT_PEAK	A	float	1	0
40875	2	FREQUENCY	Hz	float	1	0
40877	2	PHASE_A_MEAN_PHASE_ANGLE	°	float	1	0
40879	2	PHASE_B_MEAN_PHASE_ANGLE	°	float	1	0
40881	2	PHASE_C_MEAN_PHASE_ANGLE	°	float	1	0
40883	2	MEASURED_TEMPERATURE	°C	float	1	0
40885	2	PHASE_A_VOLTAGE_PHASE_ANGLE	°	float	1	0
40887	2	PHASE_B_VOLTAGE_PHASE_ANGLE	°	float	1	0
40889	2	PHASE_C_VOLTAGE_PHASE_ANGLE	°	float	1	0
40891	2	PHASE_AB_VOLTAGE_RMS	V	float	1	0
40893	2	PHASE_BC_VOLTAGE_RMS	V	float	1	0
40895	2	PHASE_CA_VOLTAGE_RMS	V	float	1	0
Zähler:						
44009	2	ENERGY_KWH_TOTAL_CONSUMPTION	kWh	U32	1	1
44011	2	ENERGY_KWH_TOTAL_INFEED	kWh	U32	1	1
44013	2	ENERGY_KVARH_TOTAL_INDUCTIVE	kVarh	U32	1	1
44015	2	ENERGY_KVARH_TOTAL_CAPACITIVE	kVarh	U32	1	1
44017	2	ENERGY_KVAH_TOTAL	kVAh	U32	1	1
44019	2	WORKING HOURS	kVAh	U32	1	1
44021	2	LOAD HOURS	kVAh	U32	1	1

Power Measurement

AD-LU 40 GT AD-LU 40S GT

Circuit examples



ProfiNet/ProfiBus Data

P Total [kW]	float	4 Byte	Read
P L1 [kW]	float	4 Byte	Read
P L2 [kW]	float	4 Byte	Read
P L3 [kW]	float	4 Byte	Read
Q Total [kvar]	float	4 Byte	Read
Q L1 [kvar]	float	4 Byte	Read
Q L2 [kvar]	float	4 Byte	Read
Q L3 [kvar]	float	4 Byte	Read
S Total [kVA]	float	4 Byte	Read
S L1 [kVA]	float	4 Byte	Read
S L2 [kVA]	float	4 Byte	Read
S L3 [kVA]	float	4 Byte	Read
Power Factor Total	float	4 Byte	Read
Power Factor L1	float	4 Byte	Read
Power Factor L2	float	4 Byte	Read
Power Factor L3	float	4 Byte	Read
P Fundamental Total [kW]	float	4 Byte	Read
P Fundamental L1[kW]	float	4 Byte	Read
P Fundamental L2[kW]	float	4 Byte	Read
P Fundamental L3[kW]	float	4 Byte	Read
P Harmonic Total [kW]	float	4 Byte	Read
P Harmonic L1 [kW]	float	4 Byte	Read
P Harmonic L2 [kW]	float	4 Byte	Read
P Harmonic L3 [kW]	float	4 Byte	Read
U L1 [V]	float	4 Byte	Read
U L2 [V]	float	4 Byte	Read
U L3 [V]	float	4 Byte	Read
Calculated I N-LINE [A]	float	4 Byte	Read
I L1 [A]	float	4 Byte	Read
I L2 [A]	float	4 Byte	Read
I L3 [A]	float	4 Byte	Read
Peak U L1 [V]	float	4 Byte	Read
Peak U L2 [V]	float	4 Byte	Read
Peak U L3 [V]	float	4 Byte	Read
Peak I L1 [A]	float	4 Byte	Read
Peak I L2 [A]	float	4 Byte	Read
Peak I L3 [A]	float	4 Byte	Read
Frequency [Hz]	float	4 Byte	Read
Angle I L1 [°]	float	4 Byte	Read
Angle I L2 [°]	float	4 Byte	Read
Angle I L3 [°]	float	4 Byte	Read
Angle U L1 [°]	float	4 Byte	Read
Angle U L2 [°]	float	4 Byte	Read
Angle U L3 [°]	float	4 Byte	Read
Counter total extract [kWh]	dword	4 Byte	Read
Counter total feed [kWh]	dword	4 Byte	Read
Counter total ind [kvarh]	dword	4 Byte	Read
Counter total cap [kVarh]	dword	4 Byte	Read
Counter total apparent power [kVAh]	dword	4 Byte	Read
Counter working hours [h]	dword	4 Byte	Read
Param I PRIM [A]	float	4 Byte	Read/Write
Param I SEC [A]	float	4 Byte	Read/Write
Param U PRIM [V]	float	4 Byte	Read/Write
Param U SEC [V]	float	4 Byte	Read/Write
Control Word (*1)	word	2 Byte	Write
Status Word (*2)	word	2 Byte	Read
Serial Number	dword	4 Byte	Read
Firmware Version	word	2 Byte	Read
Language	word	2 Byte	Read

(*1)	Bit 15	Bit 14	Bit 13	Bit 12	Bit 1	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Control Word	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Counter Reset	Softw. Reset

(*2)	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Status Word	—	—	—	—	—	—	—	—	—	High Temp.	I3 Overfl.	I2 Overfl.	I1 Overfl.	L3 Error	L2 Error	L1 Error

Power Measurement

AD-LU 45 GT AD-LU 45S GT

Description

The digital power converter AD-LU 45 GT measures all values of the three-phase power grid such as current, voltage, energy, active, reactive, apparent power and frequency and makes this data available via a fieldbus. The device is therefore ideally suited for integration into energy management systems. The ProfiNet variant contains a 2-port switch for direct forwarding to the next device. 3- or 4-wire networks can be measured. 4-wire networks may have balanced or unbalanced load. 3-wire networks must have balanced load. The AD-LU 45 GT is powered by its measuring voltage L1. However, a variant with separate supply terminals and wide-range power supply is also available (AD-LU 45-S GT).The current measurement takes place via external split-core current transformers, which can be mounted on the wire to be measured without cutting. For the measurement of higher voltages, external converters can be connected at any time. LEDs on the front panel signal the operating state and the data traffic. The compact design and the high performance combined with low energy consumption allow it to be used in almost any application. In addition, the device has a front-sided RS485 interface to which, for example, the TFT display AD-MM 400 can be connected. Somit können ohne großen Aufwand auch vor alle Messwerte angezeigt werden. Thus, without any great effort, all measured values can be displayed.

Application

Measurement and monitoring of all electrical characteristics in electrical systems. Detection of load profiles for energy management systems, e.g. ISO 50001. Recording the energy consumption of individual consumers. Monitoring of voltage quality variables, e.g. Harmonics.
Attention: This is a Class A product according to EN 55011. Additional EMC actions may be necessary when used in small businesses or in residential areas.

Specific characteristics

- Measurement of currents, voltages, power, power factors, frequency, harmonics
- Connection to external spli-core transformers
- Counters for aktive, reactive and apparent energy
- Fieldbus interface for PROFINET or PROFIBUS
- RS485 interface for connecting a TFT display

Business data

Order number

AD-LU 45 GT-PN	PROFINET
AD-LU 45-S GT-PN	PROFINET, with separate supply terminals
AD-LU 45 GT-PB	PROFIBUS
AD-LU 45-S GT-PB	PROFIBUS, with separate supply terminals

Accessory

AD-KSW 50/100/200/400/600	split core current transformer 50/100/200/400/600 A
AD-MM 400	TFT display for front panel installation

Printed 31.01.2023 We reserve the right for technical changes.

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Fax +49 (0)7046-7678
www.adamczewski.com

Power Measurement

AD-LU 45 GT AD-LU 45S GT

Technical specifications

Current-inputs (I1...I3)

Measuring ranges	0 ... 33,3 mA (over split-core-transformer)
Input resistance	ca. 10 Ohm
Max. measurable harmonic	40

Voltage-inputs (L1...L3)

Measuring range	80 ... 253 V AC (AD-LU 40 GT) 0 ... 253 V AC (AD-LU 40S GT)
Input resistance	ca. 970 kOhm

PROFINET

Ethernet	2 Port Switch
Protocol specification	PROFINET IO
Default IP-address	0.0.0.0

PROFIBUS

Address setting	BCD-switches 00...99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no stubs)
Cable	twisted and shielded

RS485-Bus

Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no spur lines)
Cable	twisted and shielded
Address setting	BCD-switches 00...99

Supply

Voltage range AC	80 ... 253 V AC, 50/60 Hz (see voltage-inputs)
Nominal voltage AC	230 V AC
Power consumption	max. 4 VA

Supply (-S)

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Voltage range DC	20 ... 253 V DC
Nominal voltage AC/DC	230 V AC / 24 V DC
Input power AC/DC	max. 4 VA / 3 W

Measure

Basic accuracy	
Temperature influence	80 ppm/K
Sampling interval	200 ms

Housing

Dimensions (WxHxD)	105x90x71 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Weight	~ 210 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

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Product family standard	EN 61010-1
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Pollution degree	2
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Measurement category	CAT III

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Grid side zu bus	4 kV, 50 Hz (1 min.)
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Power Measurement

AD-LU 45 GT AD-LU 45S GT

Block and wiring diagram

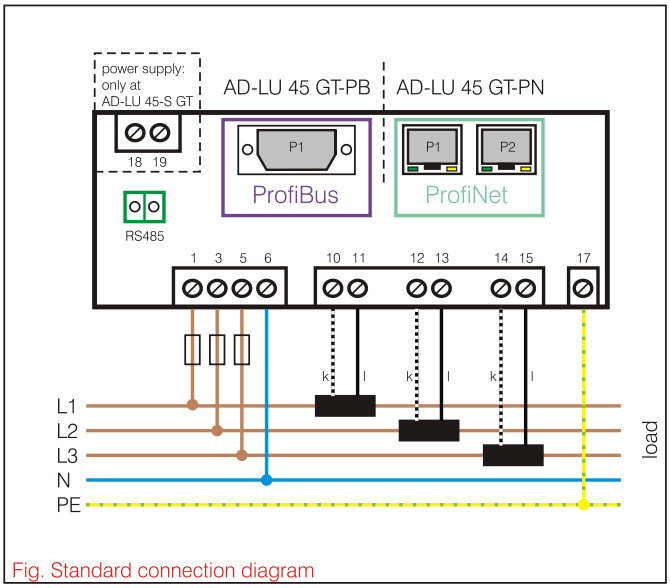


Fig. Standard connection diagram

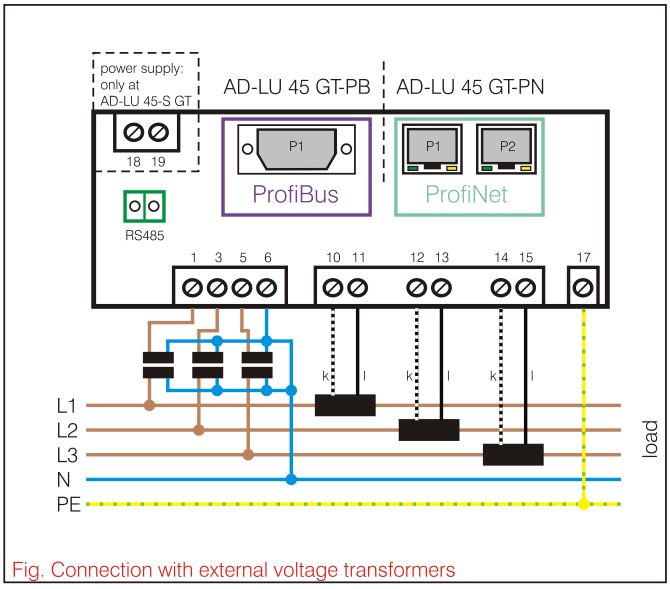
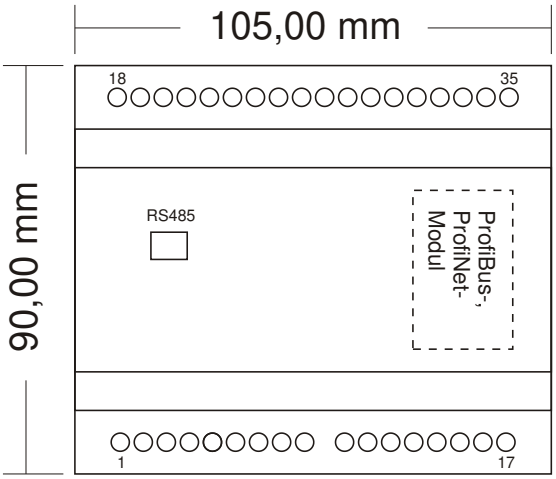
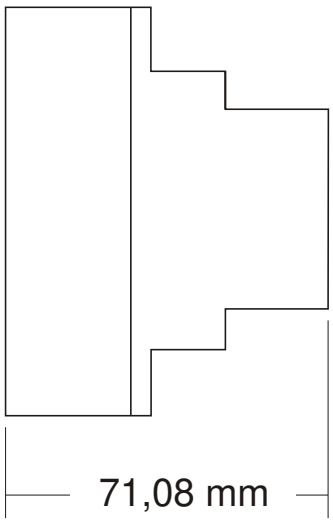


Fig. Connection with external voltage transformers

Dimensions





Explanations:

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rot - 2 flash	IP-Address error	- IP-address not set
rot - 3 flash	configuratio error	- Expected identification differs from real identification

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The MS-LED signals the status of the ProfiNet module in the power meter.

LED Status:	Description:	Comments
off	not initialized	- Nor power or module in "SETUP" or "NW-INIT" state
green	normal operation	- Modul has shifted from "NW-INIT" state
green - 1 flash	diagnostic event	- diagnostic event present
red	exception error or fatal event	- Device in state EXCEPTION or major internal error
alternating red/green	firmwareupdate	- Do not power off the modul - turning the module off during this phase could cause permanent damage

PROFIBUS: OP-Led (Operation Mode):
The OP-Led signals the operation mode.

LED Status:	Description:	Comments
off	Offline / no power	
green	Online, data exchange	
green - flashing	Online, clear	
rot - 1 flash	Parameterization error	- See "Parameterization Data Handling" in Profibus specification
rot - 2 flash	Configuration error	- See "Profibus Configuration Error" in Profibus specification

PROFIBUS: ST-Led (Status):
The ST-Led signals the status of the device.

LED Status:	Description:	Comments
off	Not initialized	- Not initialized jet
green	initialized	- Initialization completed successfully
green - flashing	initialized, diagnostic events present	Extended diagnostic bit is set
rot	Exception error	- Exception error detected

Power Measurement

AD-LU 45 GT AD-LU 45S GT

Modbus-Data (RS485-bus)

address	count register	name	unit	type	read	write
Messwerte:						
40801	2	TOTAL_ACTIVE_POWER	kW	float	1	0
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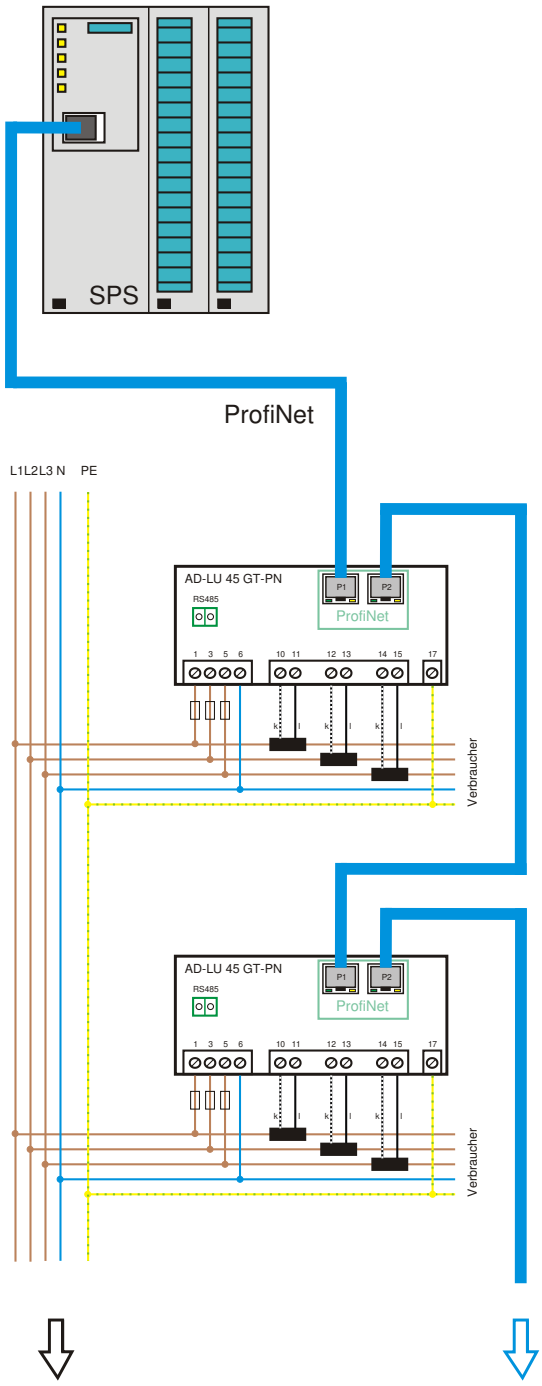
40805	2	PHASE_B_ACTIVE_POWER	kW	float	1	0
40807	2	PHASE_C_ACTIVE_POWER	kW	float	1	0
40809	2	TOTAL_REACTIVE_POWER	kvar	float	1	0
40811	2	PHASE_A_REACTIVE_POWER	kvar	float	1	0
40813	2	PHASE_B_REACTIVE_POWER	kvar	float	1	0
40815	2	PHASE_C_REACTIVE_POWER	kvar	float	1	0
40817	2	TOTAL_APPARENT_POWER	kVA	float	1	0
40819	2	PHASE_A_APPARENT_POWER	kVA	float	1	0
40821	2	PHASE_B_APPARENT_POWER	kVA	float	1	0
40823	2	PHASE_C_APPARENT_POWER	kVA	float	1	0
40825	2	TOTAL_POWER_FACTOR		float	1	0
40827	2	PHASE_A_POWER_FACTOR		float	1	0
40829	2	PHASE_B_POWER_FACTOR		float	1	0
40831	2	PHASE_C_POWER_FACTOR		float	1	0
40833	2	TOTAL_ACTIVE_FUNDAMENTAL_POWER	kW	float	1	0
40835	2	PHASE_A_ACTIVE_FUNDAMENTAL_POWER	kW	float	1	0
40837	2	PHASE_B_ACTIVE_FUNDAMENTAL_POWER	kW	float	1	0
40839	2	PHASE_C_ACTIVE_FUNDAMENTAL_POWER	kW	float	1	0
40841	2	TOTAL_ACTIVE_HARMONIC_POWER	kW	float	1	0
40843	2	PHASE_A_ACTIVE_HARMONIC_POWER	kW	float	1	0
40845	2	PHASE_B_ACTIVE_HARMONIC_POWER	kW	float	1	0
40847	2	PHASE_C_ACTIVE_HARMONIC_POWER	kW	float	1	0
40849	2	PHASE_A_VOLTAGE_RMS	V	float	1	0
40851	2	PHASE_B_VOLTAGE_RMS	V	float	1	0
40853	2	PHASE_C_VOLTAGE_RMS	V	float	1	0
40855	2	N_LINE_CALCULATED_CURRENT_RMS	A	float	1	0
40857	2	PHASE_A_CURRENT_RMS	A	float	1	0
40859	2	PHASE_B_CURRENT_RMS	A	float	1	0
40861	2	PHASE_C_CURRENT_RMS	A	float	1	0
40863	2	CHANNEL_A_VOLTAGE_PEAK	V	float	1	0
40865	2	CHANNEL_B_VOLTAGE_PEAK	V	float	1	0
40867	2	CHANNEL_C_VOLTAGE_PEAK	V	float	1	0
40869	2	CHANNEL_A_CURRENT_PEAK	A	float	1	0
40871	2	CHANNEL_B_CURRENT_PEAK	A	float	1	0
40873	2	CHANNEL_C_CURRENT_PEAK	A	float	1	0
40875	2	FREQUENCY	Hz	float	1	0
40877	2	PHASE_A_MEAN_PHASE_ANGLE	°	float	1	0
40879	2	PHASE_B_MEAN_PHASE_ANGLE	°	float	1	0
40881	2	PHASE_C_MEAN_PHASE_ANGLE	°	float	1	0
40883	2	MEASURED_TEMPERATURE	°C	float	1	0
40885	2	PHASE_A_VOLTAGE_PHASE_ANGLE	°	float	1	0
40887	2	PHASE_B_VOLTAGE_PHASE_ANGLE	°	float	1	0
40889	2	PHASE_C_VOLTAGE_PHASE_ANGLE	°	float	1	0
40891	2	PHASE_AB_VOLTAGE_RMS	V	float	1	0
40893	2	PHASE_BC_VOLTAGE_RMS	V	float	1	0
40895	2	PHASE_CA_VOLTAGE_RMS	V	float	1	0
Zähler:						
44009	2	ENERGY_KWH_TOTAL_CONSUMPTION	kWh	U32	1	1
44011	2	ENERGY_KWH_TOTAL_INFEED	kWh	U32	1	1
44013	2	ENERGY_KVARH_TOTAL_INDUCTIVE	kVarh	U32	1	1
44015	2	ENERGY_KVARH_TOTAL_CAPACITIVE	kVarh	U32	1	1
44017	2	ENERGY_KVAH_TOTAL	kVAh	U32	1	1
44019	2	WORKING HOURS	kVAh	U32	1	1
44021	2	LOAD HOURS	kVAh	U32	1	1

Power Measurement

AD-LU 45 GT AD-LU 45S GT

Circuit examples



ProfiNet/ProfiBus Data

P Total [kW]	float	4 Byte	Read
P L1 [kW]	float	4 Byte	Read
P L2 [kW]	float	4 Byte	Read
P L3 [kW]	float	4 Byte	Read
Q Total [kvar]	float	4 Byte	Read
Q L1 [kvar]	float	4 Byte	Read
Q L2 [kvar]	float	4 Byte	Read
Q L3 [kvar]	float	4 Byte	Read
S Total [kVA]	float	4 Byte	Read
S L1 [kVA]	float	4 Byte	Read
S L2 [kVA]	float	4 Byte	Read
S L3 [kVA]	float	4 Byte	Read
Power Factor Total	float	4 Byte	Read
Power Factor L1	float	4 Byte	Read
Power Factor L2	float	4 Byte	Read
Power Factor L3	float	4 Byte	Read
P Fundamental Total [kW]	float	4 Byte	Read
P Fundamental L1[kW]	float	4 Byte	Read
P Fundamental L2[kW]	float	4 Byte	Read
P Fundamental L3[kW]	float	4 Byte	Read
P Harmonic Total [kW]	float	4 Byte	Read
P Harmonic L1 [kW]	float	4 Byte	Read
P Harmonic L2 [kW]	float	4 Byte	Read
P Harmonic L3 [kW]	float	4 Byte	Read
U L1 [V]	float	4 Byte	Read
U L2 [V]	float	4 Byte	Read
U L3 [V]	float	4 Byte	Read
Calculated I N-LINE [A]	float	4 Byte	Read
I L1 [A]	float	4 Byte	Read
I L2 [A]	float	4 Byte	Read
I L3 [A]	float	4 Byte	Read
Peak U L1 [V]	float	4 Byte	Read
Peak U L2 [V]	float	4 Byte	Read
Peak U L3 [V]	float	4 Byte	Read
Peak I L1 [A]	float	4 Byte	Read
Peak I L2 [A]	float	4 Byte	Read
Peak I L3 [A]	float	4 Byte	Read
Frequency [Hz]	float	4 Byte	Read
Angle I L1 [°]	float	4 Byte	Read
Angle I L2 [°]	float	4 Byte	Read
Angle I L3 [°]	float	4 Byte	Read
Angle U L1 [°]	float	4 Byte	Read
Angle U L2 [°]	float	4 Byte	Read
Angle U L3 [°]	float	4 Byte	Read
Counter total extract [kWh]	dword	4 Byte	Read
Counter total feed [kWh]	dword	4 Byte	Read
Counter total ind [kvarh]	dword	4 Byte	Read
Counter total cap [kVarh]	dword	4 Byte	Read
Counter total apparent power [kVAh]	dword	4 Byte	Read
Counter working hours [h]	dword	4 Byte	Read
Param I PRIM [A]	float	4 Byte	Read/Write
Param I SEC [A]	float	4 Byte	Read/Write
Param U PRIM [V]	float	4 Byte	Read/Write
Param U SEC [V]	float	4 Byte	Read/Write
Control Word (*1)	word	2 Byte	Write
Status Word (*2)	word	2 Byte	Read
Serial Number	dword	4 Byte	Read
Firmware Version	word	2 Byte	Read
Language	word	2 Byte	Read

(*1)	Bit 15	Bit 14	Bit 13	Bit 12	Bit 1	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Control Word	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Counter Reset	Softw. Reset

(*2)	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Status Word	—	—	—	—	—	—	—	—	—	High Temp.	I3 Overfl.	I2 Overfl.	I1 Overfl.	L3 Error	L2 Error	L1 Error

Power Measurement Transducer

AD-LU 50 GT

Description

The digital power measuring transducer AD-LU 50 GT measures all quantities of the three-phase network (current, voltage, energy, harmonics, phase angle, active power, reactive power, apparent power …) and converts these measuring values onto two freely scalable analogue outputs (20 mA / 10 V). The unit is therefore optimal suitable for integration in energy management systems. 3- or 4-wire systems can be measured. 4-wire networks can be loaded balanced or unbalanced, whereby 3-wire networks can only be measured balanced. The AD-LU 50 GT is supplied via its measuring voltage L1. The current measuring is carried out via the bar-type transformer mounted on the front. For measuring of high voltages or high currents, external transformers can be connected in series at any time. The AD-LU 50 GT can be read out and parameterised via the integral interface with the aid of the available AD-Studio. An LED at the front signals the operating condition. The compact type of construction and the high performance ability with simultaneous low energy consumption allows usage in almost any application.

Application

Typical usage in plant, machines or energy management systems for balancing and determination of energy distribution.

Specific characteristics

- compact design
- current measurement via clamp on current transfomrers
- supplied via its measuring voltage L1
- current and voltage output
- monitoring all variables of the three-phase network
- parameterization via AD-Studio

Business data

Order number

Power measurement transducer	AD-LU 50 GT

Accessory (optional)

VarioPass3	USB-Schnittstellenadapter
AD-Studio	Konfigurationssoftware

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Power Measurement Transducer AD-LU 50 GT

Technical specifications

Current-inputs (I1...I3)

Measuring ranges	0 ... 1 A AC; 0 ... 5 A AC; 0 ... 20 A AC
Max. conductor diameter	4,8 mm
Max. measurable harmonic	40

Voltage-inputs (L1...L3)

Measuring range	80 ... 253 V AC
Input resistance	> 900 kOhm

Output current

Output range	0/4 ... 20 mA
Max. load	400 Ohm
Resolution	11 Bit
Residual ripple	25 µAss

Output voltage

Output range	0/2 ... 10 V
Min. load	10 kOhm
Resolution	11 Bit
Residual ripple	30 mVss

Supply

Voltage range AC	80 ... 253 V AC, 50/60 Hz (see voltage-inputs)
Nominal voltage AC	230 V AC
Power consumption	max. 3,9 VA

Transfer behavior - in reference to the current value

Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 0,5 s

Housing

Dimensions (WxHxD)	71x90x70 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 170 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Power supply to analog outputs	4 kV, 50 Hz (1 min.)
Power supply to relay	4 kV, 50 Hz (1 min.)
Relay to analog outputs	4 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current
Analog outputs	electrical surge protection

[1)] During checking, slight signal deviations are possible.

Power Measurement Transducer AD-LU 50 GT

Block and wiring diagram

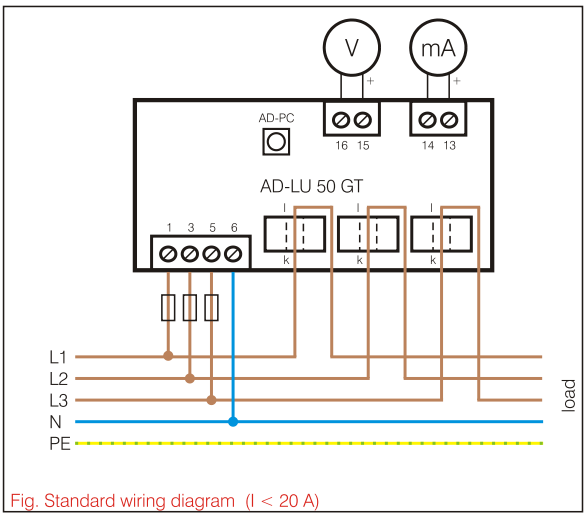


Fig. Standard wiring diagram (I < 20 A)

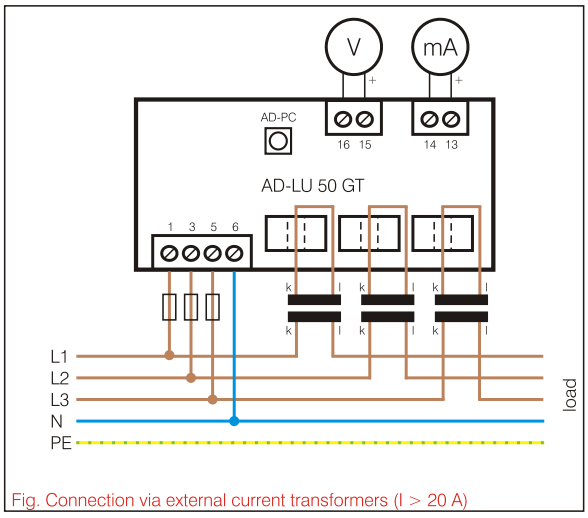


Fig. Connection via external current transformers (I > 20 A)

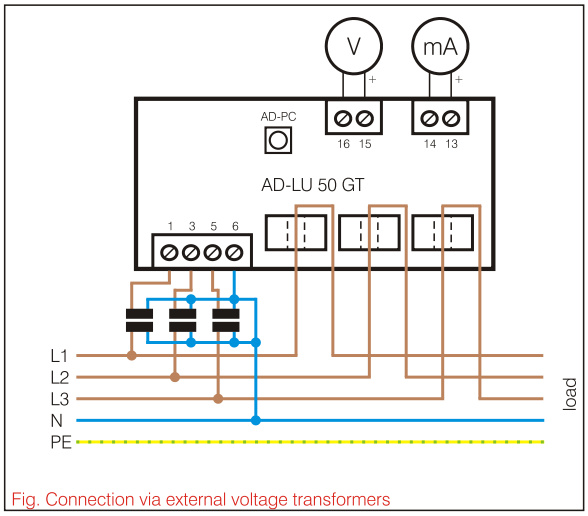
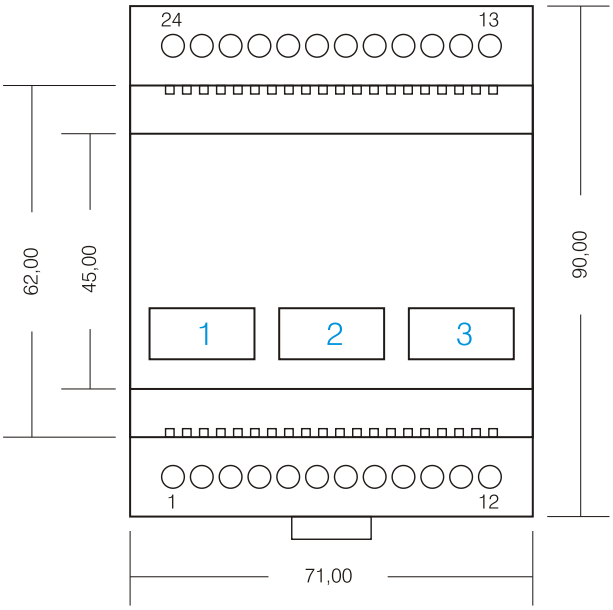
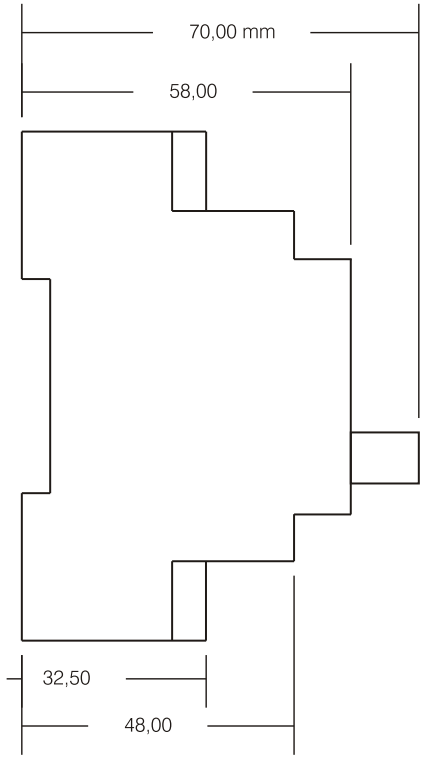


Fig. Connection via external voltage transformers

Dimensions





Hinweis:
Für die Messung symmetrischer Lasten kann das Gerät so umparametriert werden, dass nur ein Stromwandler für die Messung notwendig ist.
In diesem Fall bitte die Strommessung mit Stromwandler 1 auf Phase L1 durchführen.

Power Measurement Transducer

AD-LU 55 GT

Description

The digital power measuring transducer AD-LU 55 GT measures all quantities of the three-phase network (current, voltage, energy, harmonics, phase angle, active power, reactive power, apparent power …) and converts these measuring values onto two freely scalable analogue outputs (20 mA / 10 V). The unit is therefore optimal suitable for integration in energy management systems. 3- or 4-wire systems can be measured. 4-wire networks can be loaded balanced or unbalanced, whereby 3-wire networks can only be measured balanced. The AD-LU 55 GT is supplied via its measuring voltage L1. The current measuring is carried out via extrenal split-core-current-transformer. For measuring of high voltages, external transformers can be connected in series at any time. The AD-LU 55 GT can be read out and parameterised via the integral interface with the aid of the available AD-Studio. An LED at the front signals the operating condition. The compact type of construction and the high performance ability with simultaneous low energy consumption allows usage in almost any application.

Application

Typical usage in plant, machines or energy management systems for balancing and determination of energy distribution.

Specific characteristics

- compact design
- current measurement via split-core-current-transfomrers
- supplied via its measuring voltage L1
- current and voltage output
- monitoring all variables of the three-phase network
- parameterization via AD-Studio

Business data

Order number	
AD-LU 55 GT	power measurement transducer
Accessory	
AD-KSW 50	split core current transformer 50 A
AD-KSW 100	split core current transformer 100 A
AD-KSW 200	split core current transformer 200 A
AD-KSW 400	split core current transformer 400 A
AD-KSW 600	split core current transformer 600 A
Accessory (optional)	
VarioPass3	USB-inetrface adapter
AD-Studio	configuration software

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Power Measurement Transducer AD-LU 55 GT

Technical specifications

Current-inputs (I1...I3)

Measuring range (via split-core-transformer)	0 ... 33,3 mA AC
Input resistance	ca. 10 Ohm
Max. measurable harmonic	40

Voltage-inputs (L1...L3)

Measuring range	80 ... 253 V AC
Input resistance	> 900 kOhm

Output current

Output range	0/4 ... 20 mA
Max. load	400 Ohm
Resolution	11 Bit
Residual ripple	25 µAss

Output voltage

Output range	0/2 ... 10 V
Min. load	10 kOhm
Resolution	11 Bit
Residual ripple	30 mVss

Supply

Voltage range AC	80 ... 253 V AC, 50/60 Hz (see voltage-inputs)
Nominal voltage AC	230 V AC
Power consumption	max. 3,9 VA

Transfer behavior - in reference to the current value

Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 0,5 s

Housing

Dimensions (WxHxD)	71x90x70 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 170 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Power supply to analog outputs	4 kV, 50 Hz (1 min.)
Power supply to relay	4 kV, 50 Hz (1 min.)
Relay to analog outputs	4 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current
Analog outputs	electrical surge protection

[1)] During checking, slight signal deviations are possible.

Power Measurement Transducer

AD-LU 55 GT

Block and wiring diagram

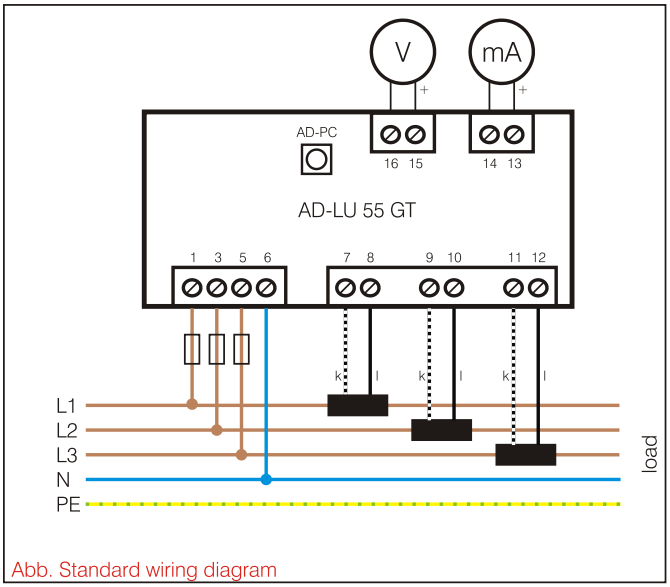


Abb. Standard wiring diagram

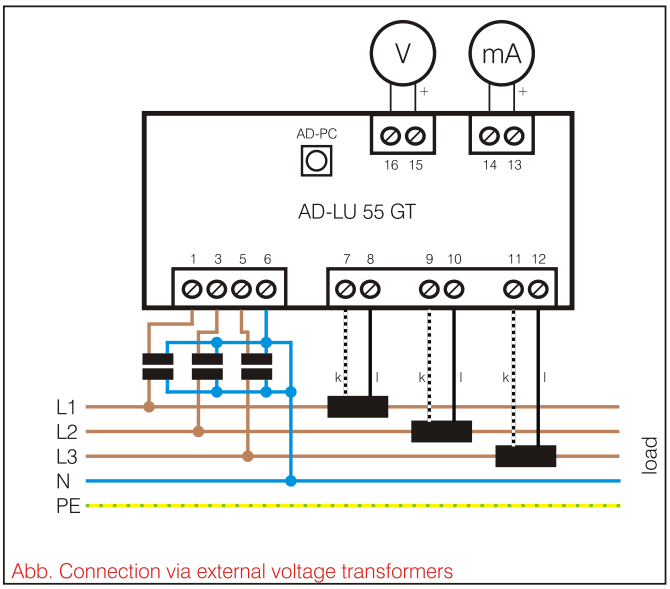
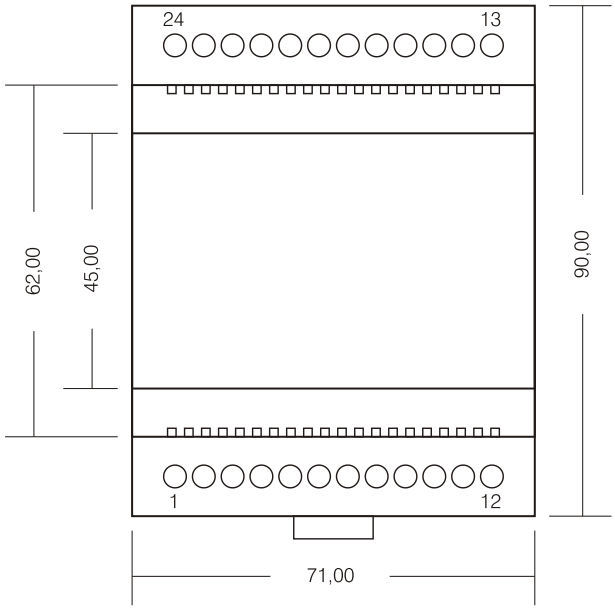
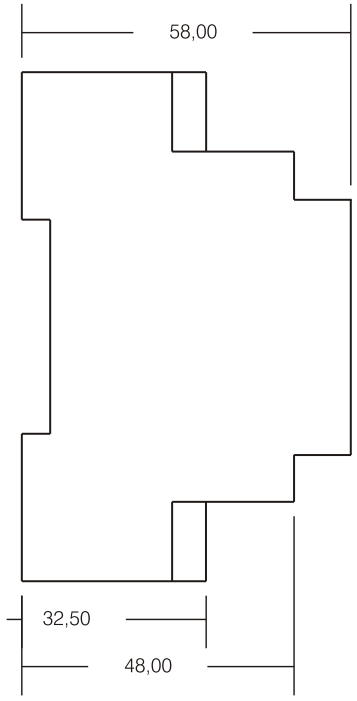


Abb. Connection via external voltage transformers

Dimensions





Hinweis:
Für die Messung symmetrischer Lasten kann das Gerät so umparametriert werden, dass nur ein Stromwandler für die Messung notwendig ist.
In diesem Fall bitte die Strommessung mit Stromwandler 1 auf Phase L1 durchführen.

Power Measurement

AD-LU 60 FE

Description

The AD-LU 60 FE is a measuring and indicator device for front panel fitting. It covers all measuring values in the three-phase network with neutral conductor. The current measuring is carried out via bushing current transformer at the device. The measuring values are shown on a graphic TFT display in colour and are distributed to different indicators. They can be leafed through manually or time-controlled automatic. A basic variant as purely indicator device and variants with modbus interface and digital outputs for counts or limiting values. Device parameterizing can be carried out via a menu at the device itself or via the optional RS-485 interface.

Application

Monitoring and indication of power in the units. Message if limiting values are exceeded, pulse output for energy count, interrogation of measuring values and counters via modbus.

Specific characteristics

- Connection of 3 phases with neutral, any load
- Measurement of P1, P2, P3, Ptot, Q1, Q2, Q3, Qtot, S1, S2, S3, Stot, I1, I2, I3, U1 U2, U3, F, PF1, PF2, PF3, PFtot, harmonics
- Low power loss in the current measurement by integrated through current transformer
- Display of measured values on a graphic TFT display
- Counter for the total absorbed / backfed active energy and inductive / capacitive reactive power
- Two switching output optocouplers with configurable functions as limit or S0 (device variants D, -DB)
- RS-485 interface with Modbus-RTU to read out the measured values and to configure the device parameters (device variants -B, -DB)

Business data

Order number

AD-LU 60 FE	Grundgerät
AD-LU 60 FE-D	2 Open Collector Ausgänge
AD-LU 60 FE-B	Modbus-RTU
AD-LU 60 FE-DB	2 Open Collector Ausgänge, Modbus RTU

Technical specifications

Current inputs

Measuring ranges	0 ... 1/5/20 A AC
Maximum wire diameter	4,8 mm²

Voltage inputs/supply

Nominal voltage	230 V AC
Rated frequency	50 Hz
Frequency range	40 ... 100 Hz
Measuring range	80 ... 253 V AC
Max. power consumption	4 VA

RS485 interface (-B, -DB)

Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	32
Max. length of bus	500 m (no stubs)
Cable	twisted and shielded

Optocoupler outputs (-D, -DB)

Max switching voltage, switching current	30 V DC, 50 mA DC

Display

Type	TFT
Resolution	320x240 Pixel

Accuracy

Class	0,5
Temperature influence	100 ppm/K

Housing

Dimensions (WxHxD)	96x96x64 mm
Front panel cut out (bxh)	92x92 mm
Dimensions front	IP 54
Type of protection housing	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Weight	250 g
Manner of fastening	panel-mounting

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Grid side to RS485-Bus	4 kV, 50 Hz (1 min.)
Grid side to control elements	4 kV, 50 Hz (1 min.)

Protection circuits

Voltage inputs	PTC resistor
RS485-Bus	electrical surge protection
Optocoupler outputs	electrical surge protection

[1] During checking, slight signal deviations are possible.

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Power Measurement

AD-LU 60 FE

Block and wiring diagram

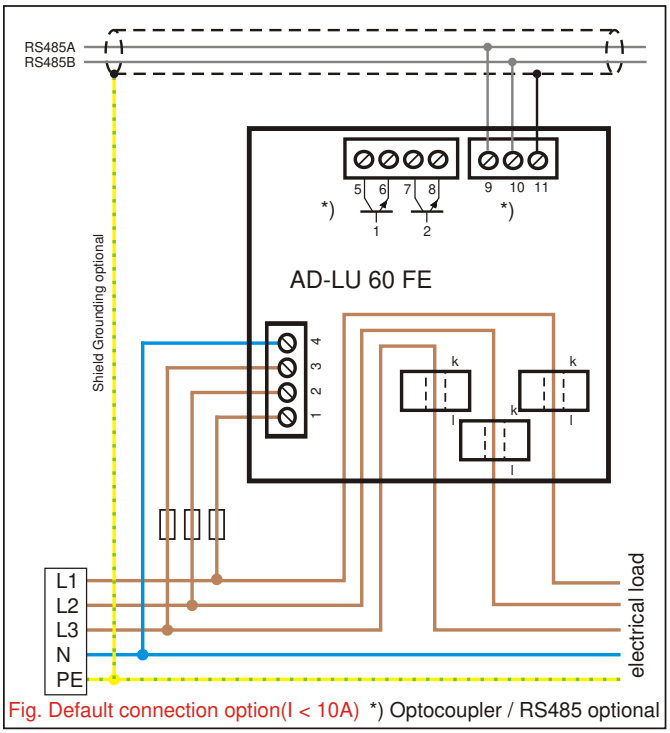
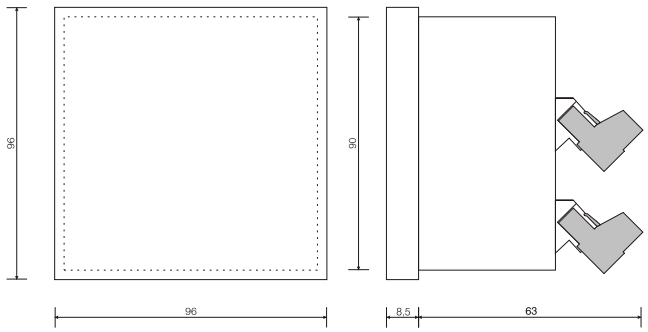


Fig. Default connection option(I < 10A) *) Optocoupler / RS485 optional

Dimensions



Power Measurement

AD-LU 70 FE

Description

The digital power converter AD-LU 70 FE measures all values of the three-phase power grid such as current, voltage, energy, active, reactive, apparent power and frequency and makes this data available via a fieldbus. The device is therefore ideally suited for integration into energy management systems. The AD-LU 70 FE is powered by its measuring voltage L1. The current measurement takes place via the current transformer with passing-through hole attached to the back side. For the measurement of higher voltages or currents, external transformer must be used.

Application

Measurement and monitoring of all electrical characteristics in electrical systems. Detection of load profiles for energy management systems, e.g. ISO 50001. Recording the energy consumption of individual consumers.
Attention: This is a Class A product according to EN 55011. Additional EMC actions may be necessary when used in small businesses or in residential areas.

Specific characteristics

- Connection of 4-wire systems of any load
- Measurement of currents, voltages, power, power factors, frequency
- Low power loss during current measurement thanks to integrated through-current transformers
- Counters for applied and feedback energies
- Counters for inductive and capacitive reactive power
- Fieldbus interface for PROFINET or PROFIBUS

Business data

Order number

AD-LU 70 FE-PN	PROFINET
AD-LU 70 FE-PB	PROFIBUS

Technical specifications

Current inputs

Measuring ranges	0 ... 1/5/20 A AC
Maximum wire diameter	4,8 mm²

Voltage inputs/supply

Nominal voltage	230 V AC
Rated frequency	50 Hz
Frequency range	40 ... 100 Hz
Measuring range	80 ... 253 V AC
Max. power consumption L1	4 VA
Input resistance L2, L3	970 kOhm

Optocoupler outputs

Maximum switching voltage	30 V DC
Maximum switching current	50 mA DC

PROFINET

Ethernet	2 Port Switch
Protocol specification	PROFINET IO
Default IP-address	0.0.0.0

PROFIBUS

Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no stubs)
Cable	twisted and shielded

Display

Type	TFT
Resolution	320x240 Pixel

Accuracy

Class	0,5
Temperature influence	100 ppm/K

Housing

Dimensions (WxHxD)	96x96x123 mm
Front panel cut out (bxh)	92x92 mm
Protection Front/Case	IP54/IP20
Connection method	Pluggable screw terminal
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Weight	250 g
Manner of fastening	panel-mounting

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. A, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Grid - PROFINET/PROFIBUS	4 kV, 50 Hz (1 min.)
Grid - Digital outputs	4 kV, 50 Hz (1 min.)

[1] During checking, slight signal deviations are possible.

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Power Measurement

AD-LU 70 FE

Block and wiring diagram

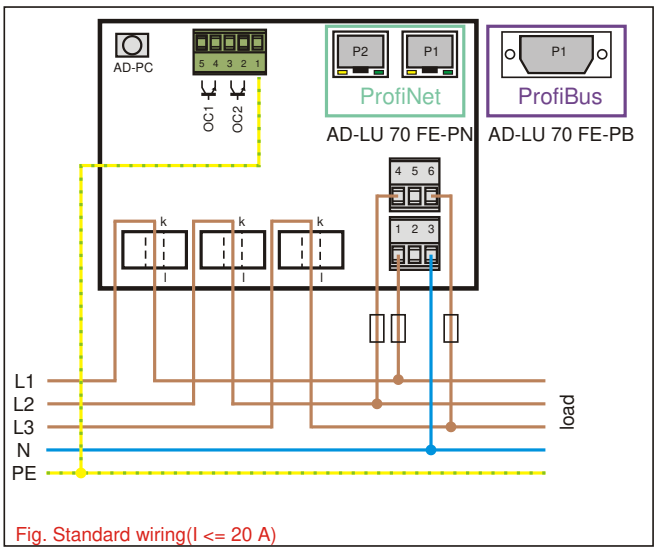


Fig. Standard wiring(I <= 20 A)

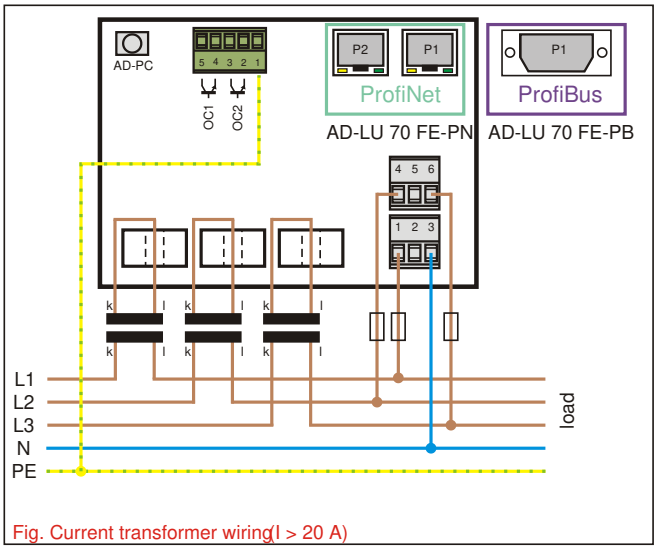


Fig. Current transformer wiring(I > 20 A)

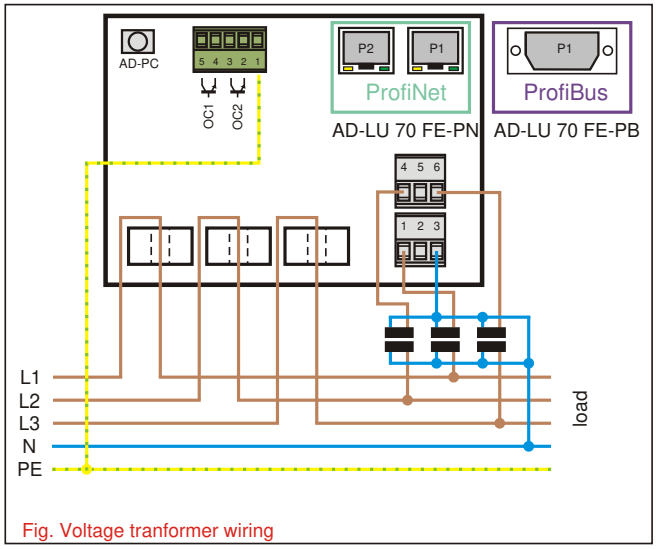
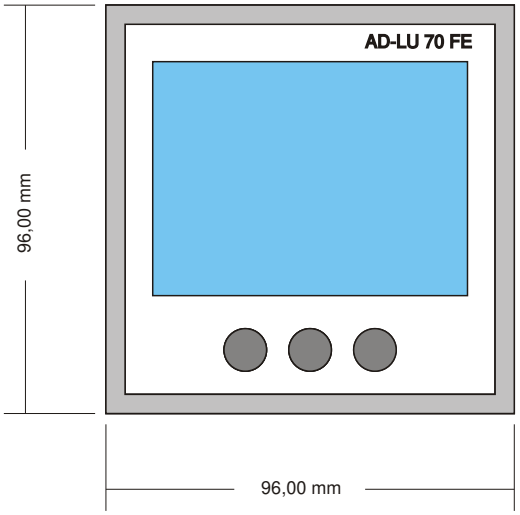
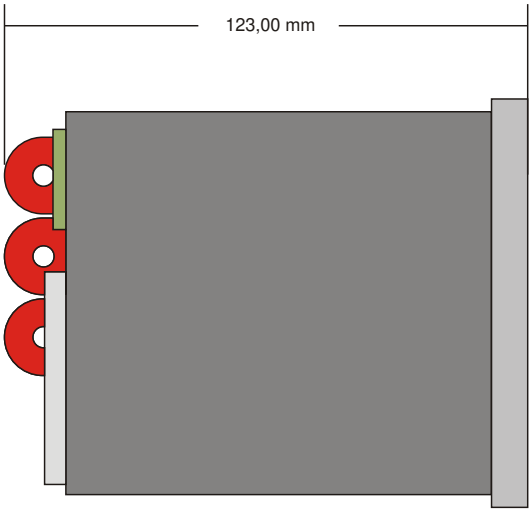


Fig. Voltage tranformer wiring

Dimensions





Power Measurement Transducer

AD-LU 610 GT

Description

The digital power measuring transducer AD-LU 610 GT measures all quantities of the three-phase network (current, voltage, energy, harmonics, phase angle, active power, reactive power, apparent power etc.) and converts these measuring values onto two freely scalable analogue outputs (20 mA / 10 V). With the integral relay, the switching of limiting values or the output of energy pulses is possible. For output of more frequent energy pulses, the AD-LU 610 GT is alternatively also available with transistor output. The unit is therefore optimal suitable for integration in energy management systems. 3- or 4-wire systems can be measured. 4-wire networks can be loaded balanced or unbalanced, whereby 3-wire networks can only be measured balanced. The AD-LU 610 GT is supplied via its measuring voltage L1. The current measuring is carried out via the bar-type transformer mounted on the front. For measuring of high voltages or high currents, external transformers can be connected in series at any time. The AD-LU 610 GT can be read out and parameterised via the integral RS485-interface with the aid of the available AD-Studio. A 96x96 mm TFT display module can also be connected to this interface. The LEDs at the front signals the operating condition, the RS485-data and the relay-status. The compact type of construction and the high performance ability with simultaneous low energy consumption allows usage in almost any application.

Application

Typical usage in plant, machines or energy management systems for balancing and determination of energy distribution.

Specific characteristics

- compact design
- current measurement via clamp on current transfomrers
- supplied via its measuring voltage L1
- current and voltage output
- relay or transistor output
- monitoring all variables of the three-phase network
- parameterization via AD-Studio
- RS485 interface
- TFT-Display AD-MM 400 connectable

Business data

Order number

Relay output	AD-LU 610 GT
Transistor output	AD-LU 610 GTO

Accessory (optional)

VarioPass3	USB-inetrface adapter
AD-Studio	configuration software
AD-MM 400	TFT-Display

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Power Measurement Transducer AD-LU 610 GT

Technical specifications

Current-inputs (I1...I3)

Measuring ranges	0 ... 1 A AC; 0 ... 5 A AC; 0 ... 20 A AC
Max. conductor diameter	4,8 mm
Max. measurable harmonic	40

Voltage-inputs (L1...L3)

Measuring range	80 ... 253 V AC
Input resistance	> 900 kOhm

Output current

Output range	0/4 ... 20 mA
Max. load	400 Ohm
Resolution	11 Bit
Residual ripple	25 µAss

Output voltage

Output range	0/2 ... 10 V
Min. load	10 kOhm
Resolution	11 Bit
Residual ripple	30 mVss

Relay output

Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	potential-free changeover
Switching operations mechanical	10000000
At 230V/2A AC, cos(phi)=1	600000
At 230V/2A AC, cos(phi)=0,4	200000
At 24V/2A DC	200000
Pulse length min ... max	500 ms ... 10000 ms

Alternative: transistor output

Maximum switching load DC	30 V, 50 mA
Pulse length min ... max	50 ms ... 10000 ms

Supply

Voltage range AC	80 ... 253 V AC, 50/60 Hz (see voltage-inputs)
Nominal voltage AC	230 V AC
Power consumption	max. 4,7 VA

RS485-Bus

Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Address switch	0...9 (0: service position)
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no stubs)
Cable	verdrillt und geschirmt

Transmission behavior - reference to full scale value

Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 0,5 s

Housing

Dimensions (WxHxD)	71x90x70 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 170 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Power supply to analog outputs	4 kV, 50 Hz (1 min.)
Power supply to relay	4 kV, 50 Hz (1 min.)
Relay to analog outputs	4 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current
Analog outputs	electrical surge protection

[1] During checking, slight signal deviations are possible.

Power Measurement Transducer AD-LU 610 GT

Block and wiring diagram

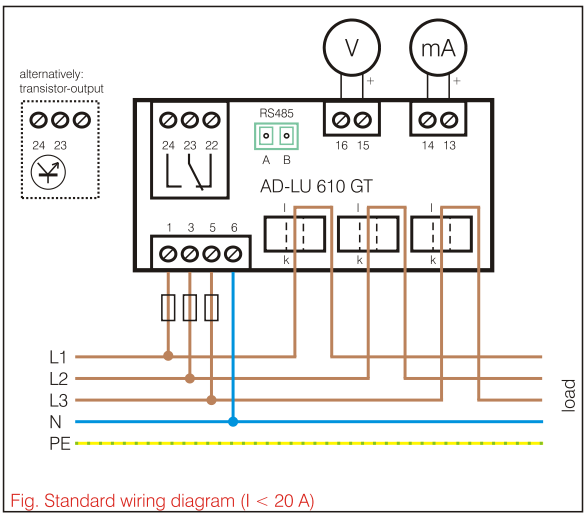


Fig. Standard wiring diagram (I < 20 A)

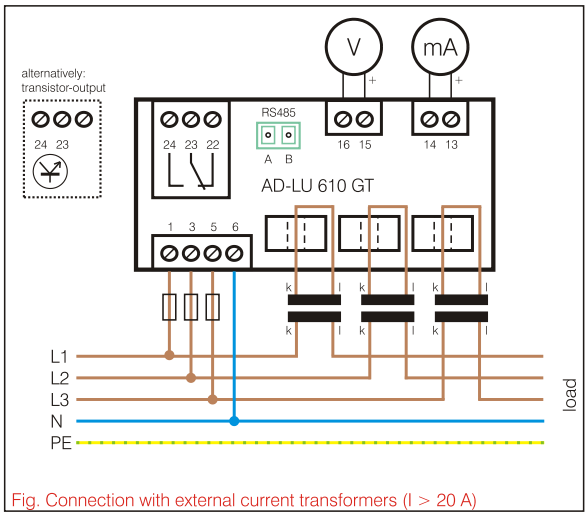


Fig. Connection with external current transformers (I > 20 A)

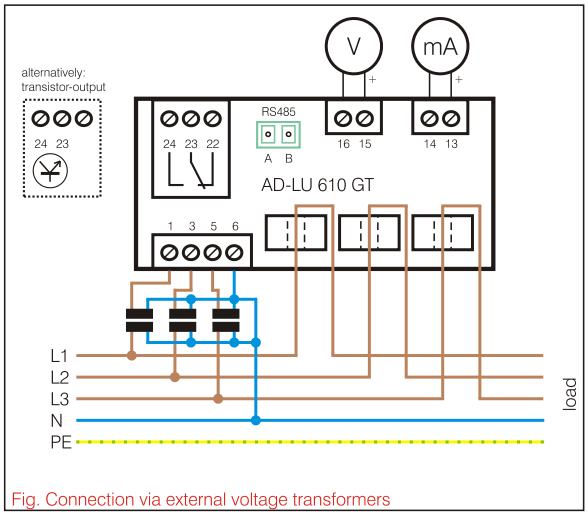
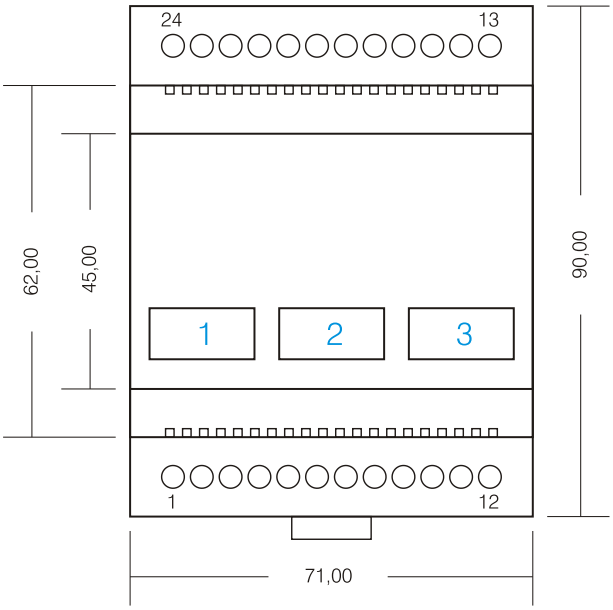
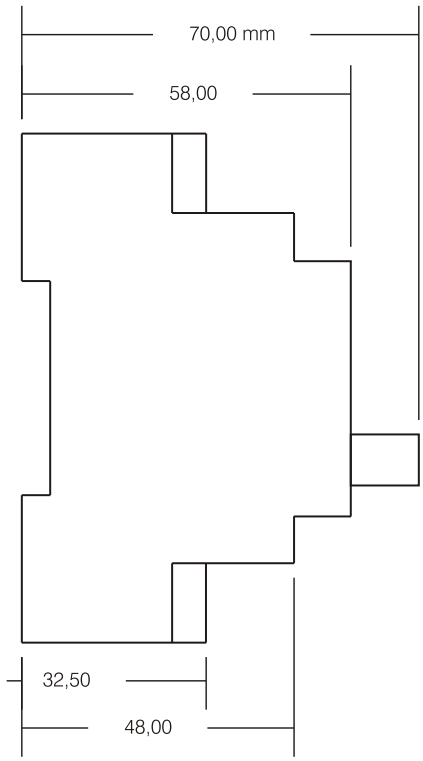


Fig. Connection via external voltage transformers

Dimensions





Hinweis:
Für die Messung symmetrischer Lasten kann das Gerät so umparametriert werden, dass nur ein Stromwandler für die Messung notwendig ist.
In diesem Fall bitte die Strommessung mit Stromwandler 1 auf Phase L1 durchführen.

Power Measurement Transducer AD-LU 610 GT

Modbus Communication

The AD-LU 610 GT has a RS485 bus interface on which the Modbus RTU protocol is used. About this bus interface all measured data of the unit can be read out.
The default standard data format is 19200,e,8,1. Adaptation to a different data format is always possible.

data rate: 19200 baud (bits/s)	**parity:** even	**data bit:** 8	**stop bit:** 1

The bus address is set at the front mounted rotary switches. The address 0 is prohibited for bus application. However, on this zero position the device always uses the standard data format (19200, e, 8,1). The position 0 therefore represents a service position, can be used for example at incorrect parameterization.

The AD-LU 610 GT supports two Modbus functions. These are the functions **"Read Holding Registers" (0x03)** and **"Write Multiple Registers" (0x10)** . The function **"Read Holding Registers"** data can be read from the device and data is written with **"Write Multiple Registers"** . The individual register width is 16 bits.
Please refer to the Modbus specification for a detailed description of the Modbus communication. This is freely available online, but can also be obtained from the Adamczewski homepage.

The following Modbus data are accessible via the RS485 bus:

start address	no. of registers	name	unit	data type	read	write
Messwerte:						
40501	2	SCA_TOTAL_ACTIVE_POWER	kW	7	1	0
40503	2	SCA_PHASE_A_ACTIVE_POWER	kW	7	1	0
40505	2	SCA_PHASE_B_ACTIVE_POWER	kW	7	1	0
40507	2	SCA_PHASE_C_ACTIVE_POWER	kW	7	1	0
40509	2	SCA_TOTAL_REACTIVE_POWER	kvar	7	1	0
40511	2	SCA_PHASE_A_REACTIVE_POWER	kvar	7	1	0
40513	2	SCA_PHASE_B_REACTIVE_POWER	kvar	7	1	0
40515	2	SCA_PHASE_C_REACTIVE_POWER	kvar	7	1	0
40517	2	SCA_TOTAL_APPARENT_POWER	kVA	7	1	0
40519	2	SCA_PHASE_A_APPARENT_POWER	kVA	7	1	0
40521	2	SCA_PHASE_B_APPARENT_POWER	kVA	7	1	0
40523	2	SCA_PHASE_C_APPARENT_POWER	kVA	7	1	0
40525	2	SCA_TOTAL_POWER_FACTOR		7	1	0
40527	2	SCA_PHASE_A_POWER_FACTOR		7	1	0
40529	2	SCA_PHASE_B_POWER_FACTOR		7	1	0
40531	2	SCA_PHASE_C_POWER_FACTOR		7	1	0
40533	2	SCA_TOTAL_ACTIVE_FUNDAMENTAL_POWER	kW	7	1	0
40535	2	SCA_PHASE_A_ACTIVE_FUNDAMENTAL_POWER	kW	7	1	0
40537	2	SCA_PHASE_B_ACTIVE_FUNDAMENTAL_POWER	kW	7	1	0
40539	2	SCA_PHASE_C_ACTIVE_FUNDAMENTAL_POWER	kW	7	1	0
40541	2	SCA_TOTAL_ACTIVE_HARMONIC_POWER	kW	7	1	0
40543	2	SCA_PHASE_A_ACTIVE_HARMONIC_POWER	kW	7	1	0
40545	2	SCA_PHASE_B_ACTIVE_HARMONIC_POWER	kW	7	1	0
40547	2	SCA_PHASE_C_ACTIVE_HARMONIC_POWER	kW	7	1	0
40549	2	SCA_PHASE_A_VOLTAGE_RMS	V	7	1	0
40551	2	SCA_PHASE_B_VOLTAGE_RMS	V	7	1	0
40553	2	SCA_PHASE_C_VOLTAGE_RMS	V	7	1	0
40555	2	SCA_N_LINE_CALCULATED_CURRENT_RMS	A	7	1	0
40557	2	SCA_PHASE_A_CURRENT_RMS	A	7	1	0
40559	2	SCA_PHASE_B_CURRENT_RMS	A	7	1	0
40561	2	SCA_PHASE_C_CURRENT_RMS	A	7	1	0
40563	2	SCA_CHANNEL_A_VOLTAGE_PEAK	V	7	1	0
40565	2	SCA_CHANNEL_B_VOLTAGE_PEAK	V	7	1	0
40567	2	SCA_CHANNEL_C_VOLTAGE_PEAK	V	7	1	0
40569	2	SCA_CHANNEL_A_CURRENT_PEAK	A	7	1	0
40571	2	SCA_CHANNEL_B_CURRENT_PEAK	A	7	1	0
40573	2	SCA_CHANNEL_C_CURRENT_PEAK	A	7	1	0
40575	2	SCA_FREQUENCY	Hz	7	1	0
40577	2	SCA_PHASE_A_MEAN_PHASE_ANGLE	°	7	1	0
40579	2	SCA_PHASE_B_MEAN_PHASE_ANGLE	°	7	1	0
40581	2	SCA_PHASE_C_MEAN_PHASE_ANGLE	°	7	1	0
40583	2	SCA_MEASURED_TEMPERATURE	°C	7	1	0
40585	2	SCA_PHASE_A_VOLTAGE_PHASE_ANGLE	°	7	1	0
40587	2	SCA_PHASE_B_VOLTAGE_PHASE_ANGLE	°	7	1	0
40589	2	SCA_PHASE_C_VOLTAGE_PHASE_ANGLE	°	7	1	0
40591	2	SCA_VOLATGE L1 L2	V	7	1	0
40593	2	SCA_VOLATGE L2 L3	V	7	1	0
40595	2	SCA_VOLATGE L3 L1	V	7	1	0

Power Measurement Transducer AD-LU 610 GT

Modbus-Data

start address	register count	name	unit	type	read	write
List-parameters:						
41001	1	LIST_LOADTYPE		3	1	1
41003	1	LIST_BAUDRATE		3	1	1
41004	1	LIST_STOPBIT		3	1	1
41005	1	LIST_PARITY		3	1	1
41006	1	LIST_MEASSUREMENT_ASSIGNMENT_IOUT		3	1	1
41007	1	LIST_MEASSUREMENT_ASSIGNMENT_UOUT		3	1	1
41008	1	LIST_RELAY_FUNCTION		3	1	1
41009	1	LIST_MEASSUREMENT_ASSIGNMENT_REL_S0		3	1	1
41010	1	LIST_MEASSUREMENT_ASSIGNMENT_REL_LIMIT		3	1	1
41011	1	LIST_RELAIS_WORKING_TYPE		3	1	1
Data-parameters:						
41501	2	DATA_FILTER	s	7	1	1
41503	2	DATA_PRIMARY_CURRENT	A	7	1	1
41505	2	DATA_SECUNARY_CURRENT	A	7	1	1
41507	2	DATA_PRIMARY_VOLTAGE	V	7	1	1
41509	2	DATA_SECUNDARY_VOLTAGE	V	7	1	1
41511	2	DATA_REL_SWITCH_ON_TIME	V	7	1	1
41513	2	DATA_REL_SWITCH_OFF_TIME	V	7	1	1
41515	2	DATA_REL_S0_PULSE_VALUE	V	7	1	1
41517	2	DATA_REL_PULSE_LENGHT	V	7	1	1
Counter:						
43503	2	COUNTER_KWH_TOTAL_CONSUPTION	kWh	5	1	1
43505	2	COUNTER_KWH_TOTAL_INFEED	kWh	5	1	1
43507	2	COUNTER_KVARH_TOTAL_INDUCTIVE	kVarh	5	1	1
43509	2	COUNTER_KVARH_TOTAL_CAPACITIVE	kVarh	5	1	1
43511	2	COUNTER_KVAH_TOTAL	kVAh	5	1	1

Legend of the Datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Encoding of the list-parameters (list index:value):

load type	**0:**unequal	**1:**equal								
baudrate	**0:**2400	**1:**4800	**2:**9600	**3:**14k4	**4:**19k2	**5:**28k8	**6:**38k4	**7:**57k6	**8:**76k8	**9:**115k2
stopbit	**0:**1	**1:**2								
parity	**0:**even	**1:**odd	**2:**none							
meass. assignm. Iout	Index corresponds to measured value list: starting from 0									
meass. assignm. Uout	Index corresponds to measured value list: starting from 0									
relay function	**0:**limit.	**1:**S0	**2:**window	**3:**energy -direction						
meass. assign. Rel S0	**0:**Ptot C.	**1:**Ptot I.	**2:**Qtot L	**3:**Qtot C	**4:**Stot					
meass. assign. Rel limit	Index corresponds to measured value list: starting from 0									
working type Rel	**0:**work	**1:**rest								

Power Measurement

AD-LU 320 GVD

Description

The digital power measuring transducer AD-LU 320 GVD measures all quantities of the power-network (current, voltage, energy, harmonics, phase angle, active power, reactive power, apparent power) and converts these measuring values onto two freely scalable analogue outputs. The unit is therefore optimal suitable for integration in energy management systems. For measuring of high voltages or high currents, external transformers can be connected in series at any time. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating modul AD-VarioControl or via the programming software AD-Studio. The LEDs at the front signals the operating condition. The compact type of construction and the high performance ability with simultaneous low energy consumption allows usage in almost any application.

Application

Typical usage in plant, machines or energy management systems for balancing and determination of energy distribution.

Specific characteristics

- Measurement of a phase
- Measuring quantities: active power, reactive power, apparent power, currents and voltages, frequency, power factor, harmonics (active power), energy metering
- current and voltage output
- Counters for active power (consuption and infeed), reactive power (inductive and capacitive) and apparent power
- 23 mm narrow housing with detachable terminal clamp
- Operating module AD-VarioControl as an accessory

Business data

Order number

AD-LU 320 GVD

Accessory (optional)

Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current	
Measuring ranges	0 ... 1 A AC; 0 ... 5 A AC
Max. measurable harmonic	40
Input voltage	
Measuring range	10 ... 253 V AC
Input resistance	> 1 MOhm
Output current	
Output range	0/4 ... 20 mA
Max. load	400 Ohm
Resolution	11 Bit
Residual ripple	25 µAss
Output voltage	
Output range	0/2 ... 10 V
Min. load	10 kOhm
Resolution	11 Bit
Residual ripple	20 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC / DC	230 V AC / 24 V DC
Voltage range DC	20 ... 253 V DC
Power consumption AC / DC	3,4 VA / 1,8 W
Power consumption with operating module AC / DC	3,6 VA / 2,0 W
Transmission behaviour	
Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 0,5 s (0...90 %, 100...10 %)

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Power Measurement

AD-LU 320 GVD

Technical specifications

Housing

Dimensions (WxHxD)	23x110x134mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Skinning length	6 mm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1] During checking, slight signal deviations are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Input to analog outputs / power-supply	4 kV, 50 Hz (1 min.)
Power-supply to analog out	3 kV, 50 Hz (1 min.)

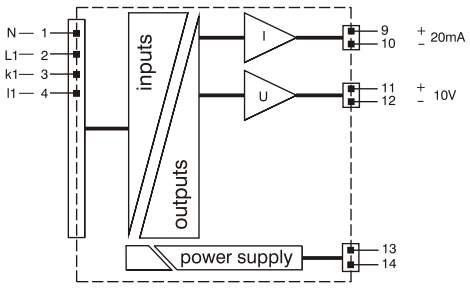
Protection circuits

Input	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current
Analog outputs	electrical surge protection

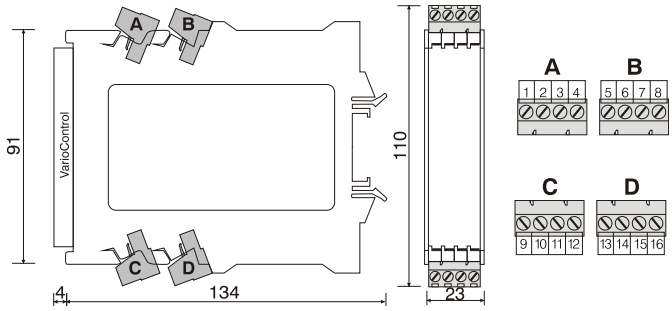
Display and operating elements

On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits

Block and wiring diagram



Dimensions



Circuit examples

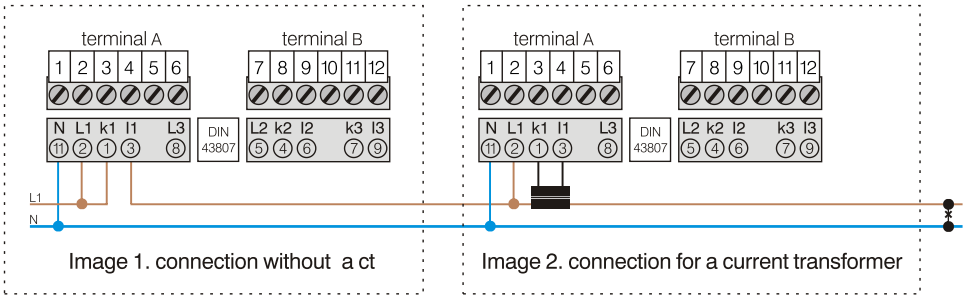


Image 1. connection without a ct

Image 2. connection for a current transformer

Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-LU 320 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40202	1	digital output A		3	1	1
40203	1	digital output B		3	1	1
40204	1	digital output A LED		3	1	1
40205	1	digital output B LED		3	1	1
40501	2	active power total	kW	7	1	0
40503	2	active power total L1	kW	7	1	0
40509	2	total reactive power	kvar	7	1	0
40511	2	reactive power L1	kvar	7	1	0
40517	2	total apparent power	kVA	7	1	0
40519	2	apparent power L1	kVA	7	1	0
40525	2	total power factor		7	1	0
40527	2	power factor in L1		7	1	0
40533	2	total active fundamental power	kW	7	1	0
40535	2	active fundamental power L1	kW	7	1	0
40541	2	total active harmonic power	kW	7	1	0
40543	2	active harmonic power L1	kW	7	1	0
40549	2	voltage L1 / N	V	7	1	0
40555	2	current N line (calculated)	A	7	1	0
40557	2	current in L1	A	7	1	0
40563	2	voltage peak L1	V	7	1	0
40569	2	current peak L1	A	7	1	0
40575	2	frequency	Hz	7	1	0
40585	2	phase angle Psi L1	°	7	1	0
40801	2	output current	mA	7	1	0
40803	2	output voltage	V	7	1	0
Counter:						
44003	2	counter kWh - consuption	kWh	5	1	1
44005	2	counter kWh - infeed	kWh	5	1	1
44007	2	counter kVarh - inductiv	kVarh	5	1	1
44009	2	counter kVarh - capacitiv	kVarh	5	1	1
44011	2	counter kVAh - apparent energy	kVAh	5	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Power Measurement

AD-LU 325 GVD

Description

The digital power measuring transducer AD-LU 325 GVD measures all quantities of the power-network (current, voltage, energy, harmonics, phase angle, active power, reactive power, apparent power) and converts these measuring values onto two freely scalable analogue outputs. The unit is therefore optimal suitable for integration in energy management systems. The current is measured via additionally available split-core current transformers. For measuring of high voltages, external transformers can be connected in series at any time. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating modul AD-VarioControl or via the programming software AD-Studio. The LEDs at the front signals the operating condition. The compact type of construction and the high performance ability with simultaneous low energy consumption allows usage in almost any application.

Application

Typical usage in plant, machines or energy management systems for balancing and determination of energy distribution.

Specific characteristics

- Measurement of a phase
- Current measurement via split-core current transformers up to 600 A
- Measuring quantities: effective power, reactive power, apparent power, currents and voltages, frequency, power factor, harmonics (active power), energy metering
- current and voltage output
- Counters for active power (consuption and infeed), reactive power (inductive and capacitive) and apparent power
- 23 mm narrow housing with detachable terminal clamp
- Operating module AD-VarioControl as an accessory

Business data

Order number

AD-LU 325 GVD

Accessory (optional)

AD-split core current transformer	5/50/100/200/400/600 A AC
Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Input current

Measuring ranges	0 ... 0,05 A AC from split core current transformer
Max. measurable harmonic	40

Input voltage

Measuring range	10 ... 253 V AC
Input resistance	> 1 MOhm

Output current

Output range	0/4 ... 20 mA
Max. load	400 Ohm
Resolution	11 Bit
Residual ripple	25 µAss

Output voltage

Output range	0/2 ... 10 V
Min. load	10 kOhm
Resolution	11 Bit
Residual ripple	20 mVss

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC / DC	230 V AC / 24 V DC
Voltage range DC	20 ... 253 V DC
Power consumption AC / DC	3,4 VA / 1,8 W
Power consumption with operating module AC / DC	3,6 VA / 2,0 W

Transmission behaviour

Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 0,5 s (0...90 %, 100...10 %)

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Power Measurement

AD-LU 325 GVD

Technical specifications

Housing

Dimensions (WxHxD)	23x110x134mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Skinning length	6 mm
Weight	~ 145 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1] During checking, slight signal deviations are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Input to analog outputs / power-supply	4 kV, 50 Hz (1 min.)
Power-supply to analog out	3 kV, 50 Hz (1 min.)

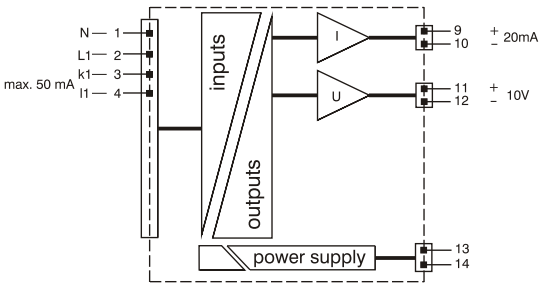
Protection circuits

Input	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current
Analog outputs	electrical surge protection

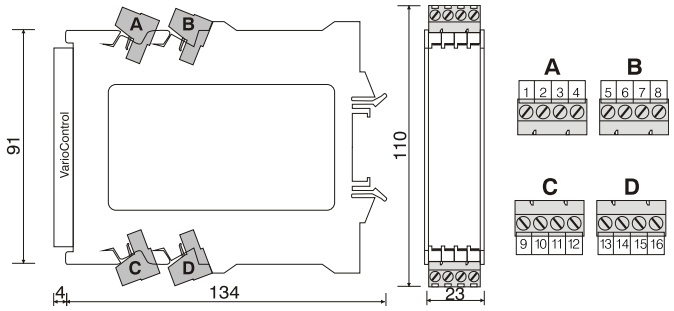
Display and operating elements

On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits

Block and wiring diagram



Dimensions



Circuit examples

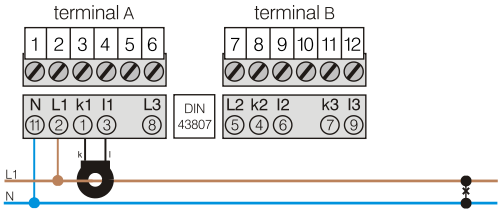


Image 1. connection for a current transformer

Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-LU 325 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40202	1	digital output A		3	1	1
40203	1	digital output B		3	1	1
40204	1	digital output A LED		3	1	1
40205	1	digital output B LED		3	1	1
40501	2	active power total	kW	7	1	0
40503	2	active power total L1	kW	7	1	0
40509	2	total reactive power	kvar	7	1	0
40511	2	reactive power L1	kvar	7	1	0
40517	2	total apparent power	kVA	7	1	0
40519	2	apparent power L1	kVA	7	1	0
40525	2	total power factor		7	1	0
40527	2	power factor in L1		7	1	0
40533	2	total active fundamental power	kW	7	1	0
40535	2	active fundamental power L1	kW	7	1	0
40541	2	total active harmonic power	kW	7	1	0
40543	2	active harmonic power L1	kW	7	1	0
40549	2	voltage L1 / N	V	7	1	0
40555	2	current N line (calculated)	A	7	1	0
40557	2	current in L1	A	7	1	0
40563	2	voltage peak L1	V	7	1	0
40569	2	current peak L1	A	7	1	0
40575	2	frequency	Hz	7	1	0
40585	2	phase angle Psi L1	°	7	1	0
40801	2	output current	mA	7	1	0
40803	2	output voltage	V	7	1	0
Counter:						
44003	2	counter kWh - consuption	kWh	5	1	1
44005	2	counter kWh - infeed	kWh	5	1	1
44007	2	counter kVarh - inductiv	kVarh	5	1	1
44009	2	counter kVarh - capacitiv	kVarh	5	1	1
44011	2	counter kVAh - apparent energy	kVAh	5	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Power Measurement

AD-LU 620 GVF

Description

The digital power measuring transducer AD-LU 620 GVF measures all quantities of the three-phase network (current, voltage, energy, harmonics, phase angle, active power, reactive power, apparent power) and converts these measuring values onto two freely scalable analogue outputs. With the integral relay and transistor output, the switching of limiting values or the output of energy pulses is possible. The unit is therefore optimal suitable for integration in energy management systems. For measuring of high voltages or high currents, external transformers can be connected in series at any time. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating modul AD-VarioControl or via the programming software AD-Studio. The LEDs at the front signals the operating condition and the relay-status. The compact type of construction and the high performance ability with simultaneous low energy consumption allows usage in almost any application.

Application

Typical usage in plant, machines or energy management systems for balancing and determination of energy distribution.

Specific characteristics

- Connection of 3 phases with neutral, any load
- Measuring quantities: effective power, reactive power, apparent power, currents and voltages, frequency, power factor, harmonics, energy metering
- current and voltage output
- relay or transistor output
- Counters for active power (consuption and infeed), reactive power (inductive and capacitive) and apparent power
- 33 mm narrow housing with detachable terminal clamp
- Operating module AD-VarioControl as an accessory

Business data

Order number

AD-LU 620 GVF

Accessory (optional)

Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Current-inputs (I1...I3)	
Measuring ranges	0 ... 1 A AC; 0 ... 5 A AC
Max. measurable harmonic	40
Voltage-inputs (L1...L3)	
Measuring range	10 ... 253 V AC
Input resistance	> 1 MOhm
Output current	
Output range	0/4 ... 20 mA
Max. load	400 Ohm
Resolution	11 Bit
Residual ripple	25 µAss
Output voltage	
Output range	0/2 ... 10 V
Min. load	10 kOhm
Resolution	11 Bit
Residual ripple	20 mVss
Semiconductor output	
Maximum switching load DC	30 V, 50 mA
Pulse length min ... max	50 ms ... 10000 ms
Relay output	
Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	potential-free changeover
Switching operations mechanical	$1 * 10^7$
At 230V/2A AC, cos(phi)=1	$6 * 10^5$
At 230V/2A AC, cos(phi)=0,4	$2 * 10^5$
At 24V/2A DC	$2 * 10^5$
Pulse length min ... max	500 ms ... 10000 ms
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC / DC	230 V AC / 24 V DC
Voltage range DC	20 ... 253 V DC
Power consumption AC / DC	4,6 VA / 2,4 W
Power consumption with operating module AC / DC	4,8 VA / 2,6 W
Transmission behaviour	
Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 0,5 s

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Power Measurement

AD-LU 620 GVF

Technical specifications

Housing

Dimensions (WxHxD)	33x110x134mm
With operating module (bxhxt)	33x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Skinning length	6 mm
Weight	~ 190 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1] During checking, slight signal deviations are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

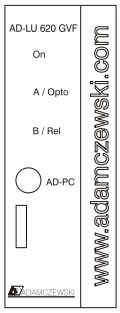
Galvanic isolation, test voltages

Input to outputs / power-supply	4 kV, 50 Hz (1 min.)
Power-supply to outputs	3 kV, 50 Hz (1 min.)
Relay contacts to outputs	3 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current
Analog outputs	electrical surge protection

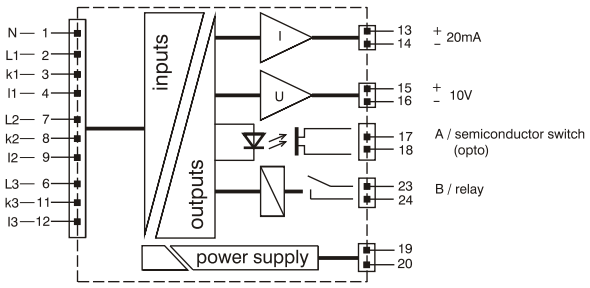
Display and operating elements



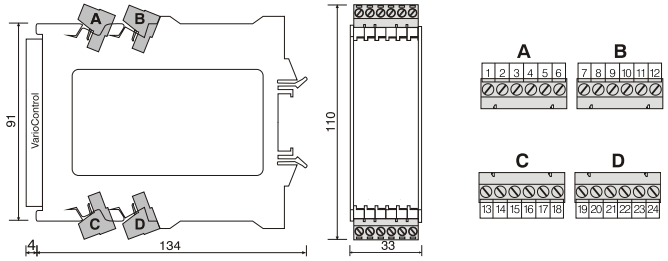
On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits
A / **Opto**: LED for semiconductor switch
on - activated
B / **rel**: LED for relays
on - activated
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

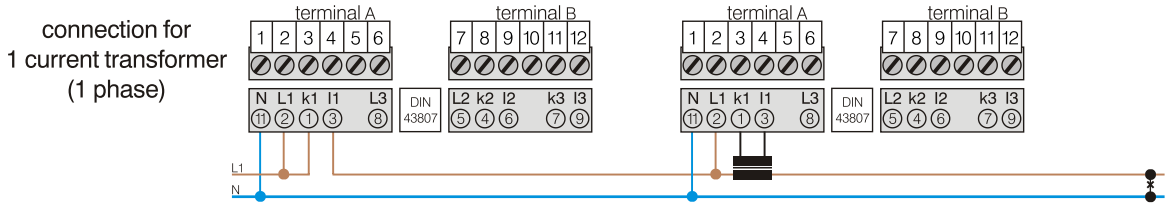
Block and wiring diagram

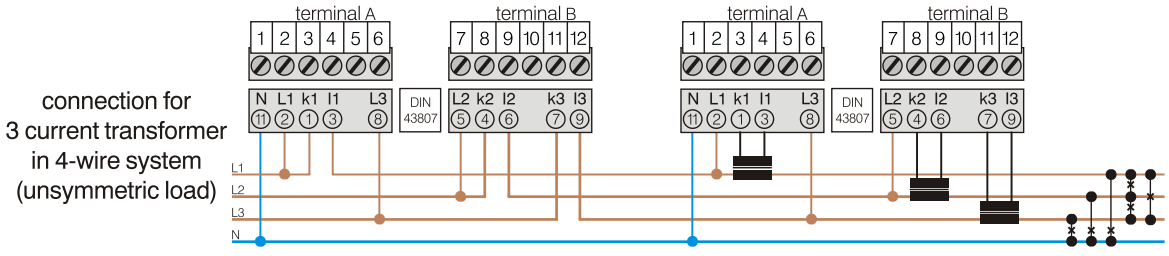


Dimensions



Circuit examples





Power Measurement

AD-LU 620 GVF

Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.

The Modbus master can read out the individual registers of the AD-LU 620 GVF via the addresses.

The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40202	1	digital output A		3	1	1
40203	1	digital output B		3	1	1
40204	1	digital output A LED		3	1	1
40205	1	digital output B LED		3	1	1
40501	2	active power total	kW	7	1	0
40503	2	active power total L1	kW	7	1	0
40505	2	active power total L2	kW	7	1	0
40507	2	active power total L3	kW	7	1	0
40509	2	total reactive power	kvar	7	1	0
40511	2	reactive power L1	kvar	7	1	0
40513	2	reactive power L2	kvar	7	1	0
40515	2	reactive power L3	kvar	7	1	0
40517	2	total apparent power	kVA	7	1	0
40519	2	apparent power L1	kVA	7	1	0
40521	2	apparent power L2	kVA	7	1	0
40523	2	apparent power L3	kVA	7	1	0
40525	2	total power factor		7	1	0
40527	2	power factor in L1		7	1	0
40529	2	power factor in L2		7	1	0
40531	2	power factor in L3		7	1	0
40533	2	total active fundamental power	kW	7	1	0
40535	2	active fundamental power L1	kW	7	1	0
40537	2	active fundamental power L2	kW	7	1	0
40539	2	active fundamental power L3	kW	7	1	0
40541	2	total active harmonic power	kW	7	1	0
40543	2	active harmonic power L1	kW	7	1	0
40545	2	active harmonic power L2	kW	7	1	0
40547	2	active harmonic power L3	kW	7	1	0
40549	2	voltage L1 / N	V	7	1	0
40551	2	voltage L2 / N	V	7	1	0
40553	2	voltage L3 / N	V	7	1	0
40555	2	current N line (calculated)	A	7	1	0
40557	2	current in L1	A	7	1	0
40559	2	current in L2	A	7	1	0
40561	2	current in L3	A	7	1	0
40563	2	voltage peak L1	V	7	1	0
40565	2	voltage peak L2	V	7	1	0
40567	2	voltage peak L3	V	7	1	0
40569	2	current peak L1	A	7	1	0
40571	2	current peak L2	A	7	1	0
40573	2	current peak L3	A	7	1	0
40575	2	frequency	Hz	7	1	0
40577	2	phase angle Phi L1	°	7	1	0
40579	2	phase angle Phi L2	°	7	1	0
40581	2	phase angle Phi L3	°	7	1	0
40583	2	temperature	°C	7	1	0
40585	2	phase angle Psi L1	°	7	1	0
40587	2	phase angle Psi L2	°	7	1	0
40589	2	phase angle Psi L3	°	7	1	0
40801	2	output current	mA	7	1	0
40803	2	output voltage	V	7	1	0
Counter:						
44003	2	counter kWh - consuption	kWh	5	1	1
44005	2	counter kWh - infeed	kWh	5	1	1
44007	2	counter kVarh - inductiv	kVarh	5	1	1
44009	2	counter kVarh - capacitiv	kVarh	5	1	1
44011	2	counter kVAh - apparent energy	kVAh	5	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Power Measurement

AD-LU 625 GVF

Description

The digital power measuring transducer AD-LU 625 GVF measures all quantities of the three-phase network (current, voltage, energy, harmonics, phase angle, active power, reactive power, apparent power) and converts these measuring values onto two freely scalable analogue outputs. With the integral relay and transistor output, the switching of limiting values or the output of energy pulses is possible. The unit is therefore optimal suitable for integration in energy management systems. The current is measured via additionally available split-core current transformers. For measuring of high voltages, external transformers can be connected in series at any time. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating modul AD-VarioControl or via the programming software AD-Studio. The LEDs at the front signals the operating condition and the relay-status. The compact type of construction and the high performance ability with simultaneous low energy consumption allows usage in almost any application.

Application

Typical usage in plant, machines or energy management systems for balancing and determination of energy distribution.

Specific characteristics

- Connection of 3 phases with neutral, any load
- Current measurement via split-core current transformers up to 600 A
- Measuring quantities: effective power, reactive power, apparent power, currents and voltages, frequency, power factor, harmonics, energy metering
- current and voltage output
- relay or transistor output
- Counters for active power (consuption and infeed), reactive power (inductive and capacitive) and apparent power
- 33 mm narrow housing with detachable terminal clamp
- Operating module AD-VarioControl as an accessory

Business data

Order number

AD-LU 625 GVF

Accessory (optional)

AD-split core current transformer	5/50/100/200/400/600 A AC
Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass
Configuration software	AD-Studio

Technical specifications

Current-inputs (I1...I3)

Measuring ranges	0 ... 0,05 A AC from split core current transformer
Max. measurable harmonic	40

Voltage-inputs (L1...L3)

Measuring range	10 ... 253 V AC
Input resistance	> 1 MOhm

Output current

Output range	0/4 ... 20 mA
Max. load	400 Ohm
Resolution	11 Bit
Residual ripple	25 µAss

Output voltage

Output range	0/2 ... 10 V
Min. load	10 kOhm
Resolution	11 Bit
Residual ripple	20 mVss

Semiconductor output

Maximum switching load DC	30 V, 50 mA
Pulse length min ... max	50 ms ... 10000 ms

Relay output

Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	potential-free changeover
Switching operations mechanical	$1 * 10^7$
At 230V/2A AC, cos(phi)=1	$6 * 10^5$
At 230V/2A AC, cos(phi)=0,4	$2 * 10^5$
At 24V/2A DC	$2 * 10^5$
Pulse length min ... max	500 ms ... 10000 ms

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC / DC	230 V AC / 24 V DC
Voltage range DC	20 ... 253 V DC
Power consumption AC / DC	4,6 VA / 2,4 W
Power consumption with operating module AC / DC	4,8 VA / 2,6 W

Transmission behaviour

Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 0,5 s

Printed 23.08.2022 We reserve the right for technical changes.

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Power Measurement

AD-LU 625 GVF

Technical specifications

Housing

Dimensions (WxHxD)	33x110x134mm
With operating module (bxhxt)	33x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Skinning length	6 mm
Weight	~ 180 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1] During checking, slight signal deviations are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

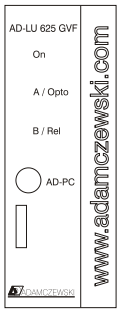
Galvanic isolation, test voltages

Input to outputs / power-supply	4 kV, 50 Hz (1 min.)
Power-supply to outputs	3 kV, 50 Hz (1 min.)
Relay contacts to outputs	3 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current
Analog outputs	electrical surge protection

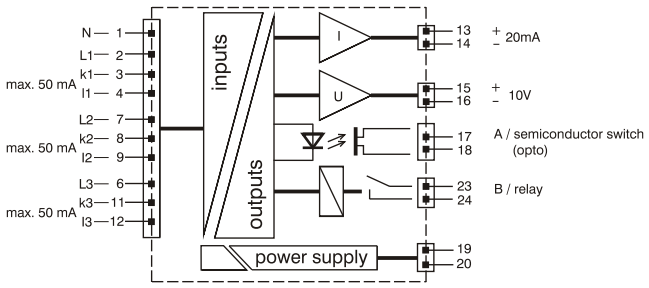
Display and operating elements



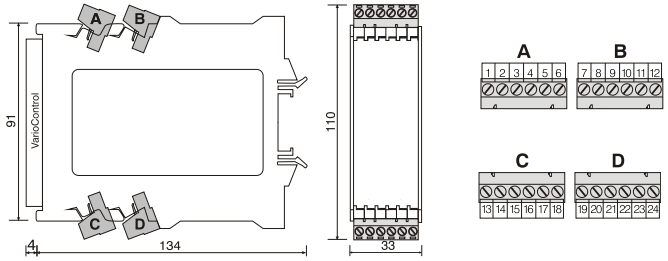
On: LED for operating display in green
on - normal operation
flashing - Signal failure, signal outside range limits
A / **Opto**: LED for semiconductor switch
on - activated
B / **rel**: LED for relays
on - activated
AD-PC: Communication interface for configuration by a PC

Communication interface for VarioControl

Block and wiring diagram

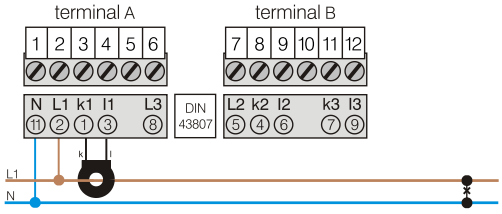


Dimensions

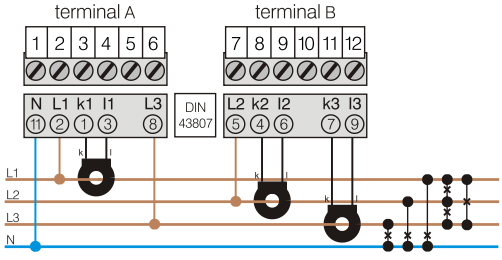


Circuit examples

connection for
1 current transformer
(1 phase)



connection for
3 current transformer
in 4-wire system
(unsymmetric load)



Power Measurement

AD-LU 625 GVF

Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.

The Modbus master can read out the individual registers of the AD-LU 625 GVF via the addresses.

The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40202	1	digital output A		3	1	1
40203	1	digital output B		3	1	1
40204	1	digital output A LED		3	1	1
40205	1	digital output B LED		3	1	1
40501	2	active power total	kW	7	1	0
40503	2	active power total L1	kW	7	1	0
40505	2	active power total L2	kW	7	1	0
40507	2	active power total L3	kW	7	1	0
40509	2	total reactive power	kvar	7	1	0
40511	2	reactive power L1	kvar	7	1	0
40513	2	reactive power L2	kvar	7	1	0
40515	2	reactive power L3	kvar	7	1	0
40517	2	total apparent power	kVA	7	1	0
40519	2	apparent power L1	kVA	7	1	0
40521	2	apparent power L2	kVA	7	1	0
40523	2	apparent power L3	kVA	7	1	0
40525	2	total power factor		7	1	0
40527	2	power factor in L1		7	1	0
40529	2	power factor in L2		7	1	0
40531	2	power factor in L3		7	1	0
40533	2	total active fundamental power	kW	7	1	0
40535	2	active fundamental power L1	kW	7	1	0
40537	2	active fundamental power L2	kW	7	1	0
40539	2	active fundamental power L3	kW	7	1	0
40541	2	total active harmonic power	kW	7	1	0
40543	2	active harmonic power L1	kW	7	1	0
40545	2	active harmonic power L2	kW	7	1	0
40547	2	active harmonic power L3	kW	7	1	0
40549	2	voltage L1 / N	V	7	1	0
40551	2	voltage L2 / N	V	7	1	0
40553	2	voltage L3 / N	V	7	1	0
40555	2	current N line (calculated)	A	7	1	0
40557	2	current in L1	A	7	1	0
40559	2	current in L2	A	7	1	0
40561	2	current in L3	A	7	1	0
40563	2	voltage peak L1	V	7	1	0
40565	2	voltage peak L2	V	7	1	0
40567	2	voltage peak L3	V	7	1	0
40569	2	current peak L1	A	7	1	0
40571	2	current peak L2	A	7	1	0
40573	2	current peak L3	A	7	1	0
40575	2	frequency	Hz	7	1	0
40577	2	phase angle Phi L1	°	7	1	0
40579	2	phase angle Phi L2	°	7	1	0
40581	2	phase angle Phi L3	°	7	1	0
40583	2	temperature	°C	7	1	0
40585	2	phase angle Psi L1	°	7	1	0
40587	2	phase angle Psi L2	°	7	1	0
40589	2	phase angle Psi L3	°	7	1	0
40801	2	output current	mA	7	1	0
40803	2	output voltage	V	7	1	0
Counter:						
44003	2	counter kWh - consuption	kWh	5	1	1
44005	2	counter kWh - infeed	kWh	5	1	1
44007	2	counter kVarh - inductiv	kVarh	5	1	1
44009	2	counter kVarh - capacitiv	kVarh	5	1	1
44011	2	counter kVAh - apparent energy	kVAh	5	1	1

Legend of the datatypes:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

Power Measurement

AD-LU 650 GT

Description

The AD-LU 650 GT is a digital measuring transducers for the acquisition of all measured variables in the three-phase network. In addition to the fundamental oscillations, the harmonics up to the 32nd harmonic are also measured for currents and voltages. In addition to the three phase currents, the current in the neutral conductor can also be measured. Any measured variable can be assigned to each analog output. Each digital output can be assigned its own function such as limit value monitoring or pulse output for an energy meter. All measured data can be read out via the Modbus-RTU interface. With an optional display device such as the AD-MM 400 FE or the AD-MM 500 FE, the data can be displayed and the device can be configured if necessary.

Application

Transducer for a maximum of any 4 three-phase current quantities. Limiting value indicator for monitoring of a maximum of 2 three-phase current quantities. Registration of all relevant measuring quantities of the three-phase current network and supply of the measuring quantities via a modbus interface.

Specific characteristics

- Measuring quantities: effective power, reactive power, apparent power, currents and voltages, frequency, power factor, energy metering
- Four bipolar analogue outputs as current output or voltage output, configurable per software
- Two switching outputs as relay or opto-coupler. Functions: limiting value, window, trend, S0, monitor
- Meter for effective energy, reactive energy and apparent energy
- Values for each phase and they can be polled as sum
- Output of up to four measuring quantities of the three-phase current network such as effective power, current, voltage or frequency
- Indication of the power fed back into the network is possible via analogue output and/or switching output
- Connection configurations: single-phase, three-phase current with/without neutral conductor, equally/unequally loaded
- All measuring quantities can be read out via modbus
- All measuring ranges, output ranges and device functions can be configured per software with a PC programme.

Business data

Order number

AD-LU 650 GT	Integrierte Ringkernstromwandler

Accessory

USB programming adapter	VarioPass

Technical specifications

Spannungseingänge L1, L2, L3 gegen N

Nominal voltage	230 V AC
Maximale Spannung	300 V AC
Input resistance	1 MOhm
Peak load	600 V AC, 1s

Current inputs

Number	4 (L1, L2, L3 und N)
Nennstrombereich	0 ... 20 A AC
Strommessung	Integrierte Ringkernstromwandler

Analog outputs

Number	4
Type	Strom oder Spannung, per Software konfigurierbar

Current outputs

Maximum output range	-21 ... 21 mA
Max. burden	400 Ohm
Max. residual ripple	40 µAss

Voltage outputs

Maximum output range	-10,5 ... 10,5 V
Min. burden	10 kOhm
Max. residual ripple	20 mVss

Digitalausgänge

Number	3
Type	Optisch, MOS-Relais
Maximum switching voltage	60 V AC/DC
Maximum switching current	550 mA AC/DC

Accuracy

Accuracy class	0,5%
Temperature influence	< 200 ppm/K
Frequency influence	~0,2 %, 40 ... 60 Hz
Influence of phase angle	~0,2 %, 40 ... 60 Hz
Response time	~500 ms, 10 ... 90 %
Auflösung Strom	1 mA
Auflösung Spannung	10 mV

Communication interface

Physical	RS-485
Parameter	19200, 8, 1 , even
Protocol	Modbus RTU

Supply

DC	21 ... 253 V DC, 3,5 W
AC	50 ... 253 V AC, 6 VA

Preliminary

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Technical specifications

Housing

Type of protection	IP 20
Connection method	screw clamp
Cross section fine wire	2,5 mm^2
Cross section one wire	4 mm^2
Mounting	DIN rail mounting
Weight	~400 g

Environmental conditions

Operating temperature	-10 ... 50 °C
Storage, transport	-25 ... 80 °C

Electromagnetic compatibility

Product family standard	EN 61326-1
Emission	EN 55011, CISPR11 Cl. B, Gr. 1

During an interference effect slight signal deviations are possible.

Electrical safety requirements

Product family standard	EN 60688
Overvoltage category	III
Pollution degree	2
Isolation-voltage	500 V AC
Test voltage input/output	5 kV RMS, 1 Min.
Test voltage output/supply	4 kV RMS, 1 Min.
Prüfspannung Eingang/Versorgung	5 kV RMS, 1 Min.

preliminary

Power Measurement

AD-LU 650 GT

Block and wiring diagram

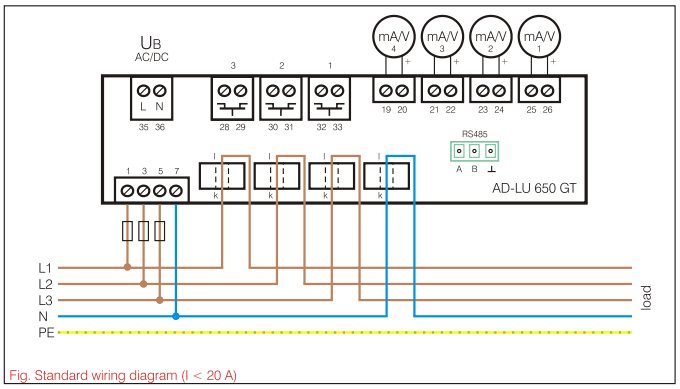


Fig. Standard wiring diagram (I < 20 A)

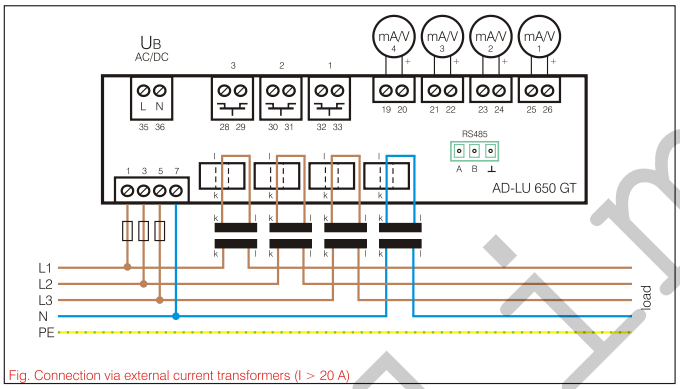


Fig. Connection via external current transformers (I > 20 A)

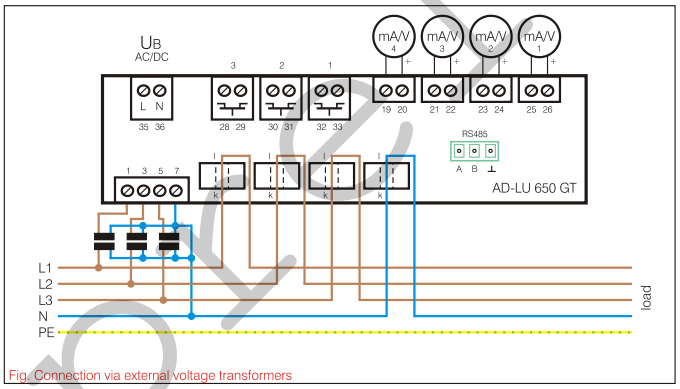
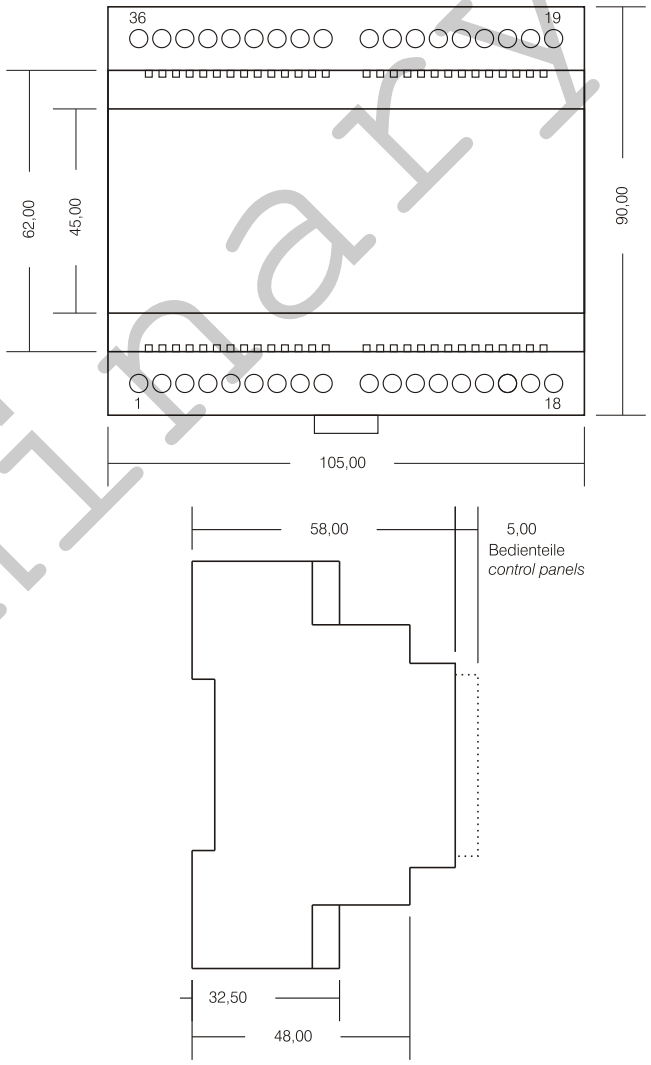


Fig. Connection via external voltage transformers

Dimensions



preliminary

Power Measurement

AD-LU 655 GT

Description

The AD-LU 655 GT is a digital measuring transducer for the acquisition of all measured variables in the three-phase network. Currents are detected via external folding current transformers. In addition to the fundamental oscillations, the harmonics up to the 32nd harmonic are also measured for currents and voltages. In addition to the three phase currents, the current in the neutral conductor can also be measured. Any measured variable can be assigned to each analog output. Each digital output can be assigned its own function such as limit value monitoring or pulse output for an energy meter. All measured data can be read out via the Modbus-RTU interface. With an optional display device such as the AD-MM 400 FE or the AD-MM 500 FE, the data can be displayed and the device can be configured if necessary.

Application

Transducer for a maximum of any 4 three-phase current quantities. Limiting value indicator for monitoring of a maximum of 2 three-phase current quantities. Registration of all relevant measuring quantities of the three-phase current network and supply of the measuring quantities via a modbus interface.

Business data

Order number

AD-LU 655 GT	Messumformer, externe Klappstromwandler

Accessory

USB programming adapter	VarioPass

Technical specifications

Spannungseingänge L1, L2, L3 gegen N

Nominal voltage	230 V AC
Maximale Spannung	300 V AC
Input resistance	1 MOhm
Peak load	600 V AC, 1s

Current inputs

Number	4 (L1, L2, L3 und N)
Nennstrombereich	0 ... 33,3 mA AC
Strommessung	Externe Klappstromwandler
Input resistance	~10 Ohm

Analog outputs

Number	4
Type	Strom oder Spannung, per Software konfigurierbar

Current outputs

Maximum output range	-21 ... 21 mA
Max. burden	400 Ohm
Max. residual ripple	40 µAss

Voltage outputs

Maximum output range	-10,5 ... 10,5 V
Min. burden	10 kOhm
Max. residual ripple	20 mVss

Digitalausgänge

Number	3
Type	Optisch, MOS-Relais
Maximum switching voltage	60 V AC/DC
Maximum switching current	550 mA AC/DC

Accuracy

Accuracy class	0,5%
Temperature influence	< 200 ppm/K
Frequency influence	~0,2 %, 40 ... 60 Hz
Influence of phase angle	~0,2 %, 40 ... 60 Hz
Response time	~500 ms, 10 ... 90 %

Communication interface

Physical	RS-485
Parameter	19200, 8, 1 , even
Protocol	Modbus RTU

Supply

DC	21 ... 253 V DC, 3,5 W
AC	50 ... 253 V AC, 6 VA

preliminary

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Power Measurement

AD-LU 655 GT

Technical specifications

Housing

Type of protection	IP 20
Connection method	screw clamp
Cross section fine wire	2,5 mm^2
Cross section one wire	4 mm^2
Mounting	DIN rail mounting
Weight	~400 g

Environmental conditions

Operating temperature	-10 ... 50 °C
Storage, transport	-25 ... 80 °C

Electromagnetic compatibility

Product family standard	EN 61326-1
Emission	EN 55011, CISPR11 Cl. B, Gr. 1

During an interference effect slight signal deviations are possible.

Electrical safety requirements

Product family standard	EN 60688
Overvoltage category	III
Pollution degree	2
Isolation-voltage	500 V AC
Test voltage input/output	5 kV RMS, 1 Min.
Test voltage output/supply	4 kV RMS, 1 Min.
Prüfspannung Eingang/Versorgung	5 kV RMS, 1 Min.

Block and wiring diagram

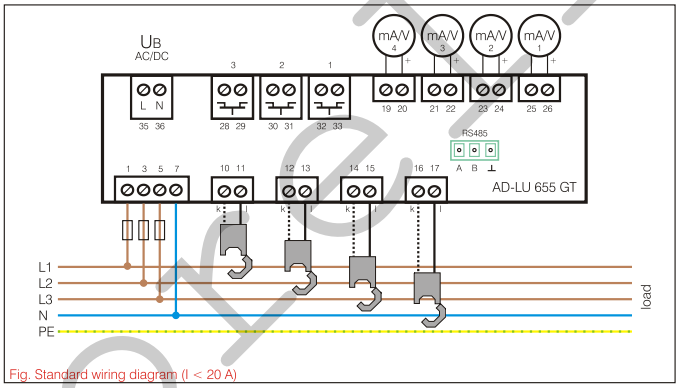


Fig. Standard wiring diagram (I < 20 A)

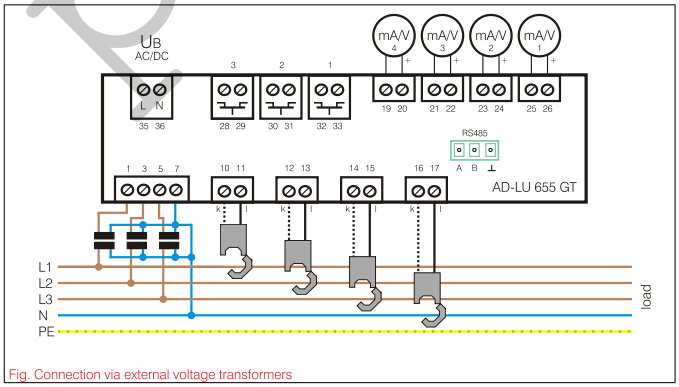
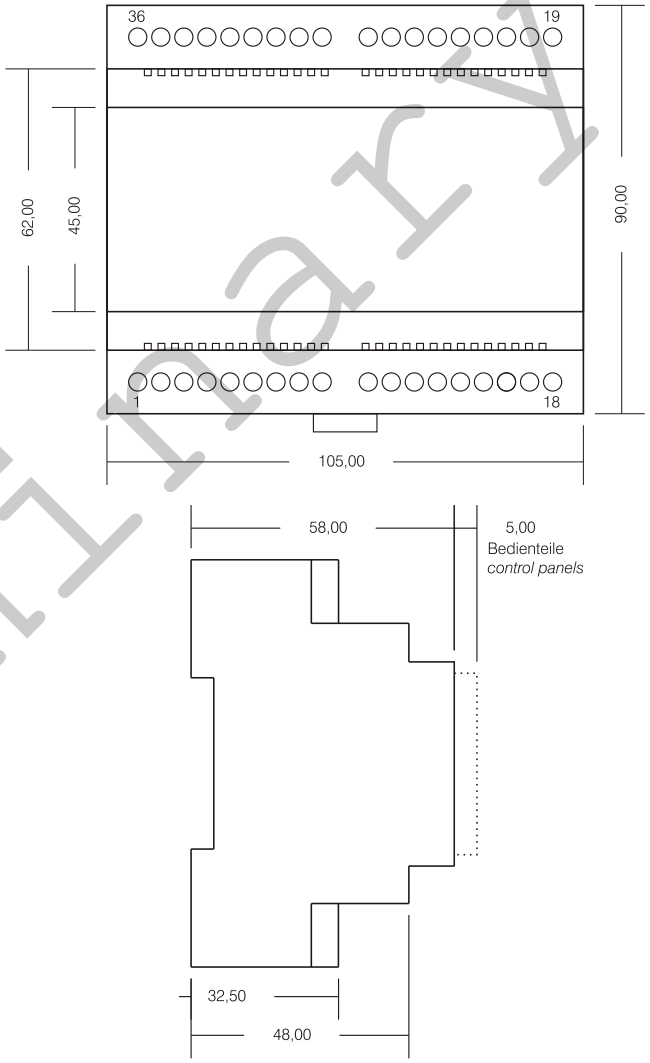


Fig. Connection via external voltage transformers

Dimensions

preliminary



preliminary

Power Measurement

AD-LU 650 GA

Description

The AD-LU 650 GA is a programmable transmitter for measuring all parameters such as power, voltage, current or frequency in the mains. The mains system can be single-phase or three-phase. Any measured quantity can be allocated to each analogue outlet. The measuring ranges can be configured in wide ranges. Filters, which can be individually parameterized, supplement the adaption possibilities of the measuring task. Each switching output can be assigned to a specific function. Possible functions include, for example, Limit or pulse output for energy metering.

Application

Transducer for a maximum of any 4 three-phase current quantities. Limiting value indicator for monitoring of a maximum of 2 three-phase current quantities. Registration of all relevant measuring quantities of the three-phase current network and supply of the measuring quantities via a modbus interface.

Specific characteristics

- Measuring quantities: effective power, reactive power, apparent power, currents and voltages, frequency, power factor, energy metering
- Four bipolar analogue outputs as current output or voltage output, configurable per software
- Two switching outputs as relay or opto-coupler. Functions: limiting value, window, trend, S0, monitor
- Meter for effective energy, reactive energy and apparent energy
- Values for each phase and they can be polled as sum
- Output of up to four measuring quantities of the three-phase current network such as effective power, current, voltage or frequency
- Indication of the power fed back into the network is possible via analogue output and/or switching output
- Connection configurations: single-phase, three-phase current with/without neutral conductor, equally/unequally loaded
- All measuring quantities can be read out via modbus
- All measuring ranges, output ranges and device functions can be configured per software with a PC programme.

Business data

Order information

AD-LU 650 GA	
Preconfigured	optional
Optocoupler outputs	optional

please enter the options when ordering in clear text.

Technical specifications

Voltage inputs

U1N, U2N, U3N Nominal	230 V AC
U1N, U2N, U3N Max	300 V AC
Current consumption per phase	0,5 mA AC
Peak load	600 V AC, 1s

Current inputs

Rated current I1, I2, I3	0 ... 1 A AC, 0 ... 5 A AC
Peak load	100 A AC, 1s
Continuous load	6 A AC
Input resistance per phase	~20 mOhm

Analog outputs

Number	4
Current or voltage configurable	

Current outputs

Max. residual ripple	40 µAss
Max. burden	400 Ohm
Maximum output range	-21 ... 21 mA

Voltage outputs

Max. residual ripple	20 mVss
Min. burden	10 kOhm
Maximum output range	-10,5 ... 10,5 V

Contact outputs

Closing contact	2
Switching capacity AC	250 V AC, 2A, 50Hz
Switching capacity DC	50 V DC, 2A

Optocoupler outputs

Switching capacity DC	30 V DC, 50 mA DC

Accuracy

Accuracy class	0,5%
Temperature influence	< 200 ppm/K
Frequency influence	~0,2 %, 40 ... 60 Hz
Influence of phase angle	~0,2 %, 40 ... 60 Hz
Response time	~500 ms, 10 ... 90 %

Communication interface

Physical	RS-485
Parameter	19200, 8, 1 , even
Protocol	Modbus RTU

Supply

DC	20 ... 253 V DC, 5 W
AC	50 ... 253 V AC, 9 VA

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Power Measurement

AD-LU 650 GA

Technical specifications

Housing

Type of protection	IP 20
Connection method	screw clamp
Cross section fine wire	2,5 mm^2
Cross section one wire	4 mm^2
Mounting	DIN rail mounting
Weight	~450 g

Environmental conditions

Operating temperature	-10 ... 50 °C
Storage, transport	-25 ... 80 °C

Electromagnetic compatibility

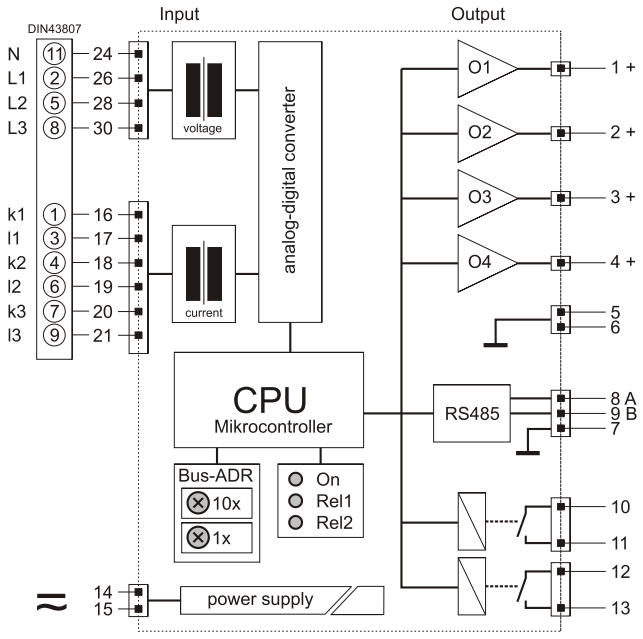
Product family standard	EN 61326-1
Emission	EN 55011, CISPR11 Cl. B, Gr. 1

During an interference effect slight signal deviations are possible.

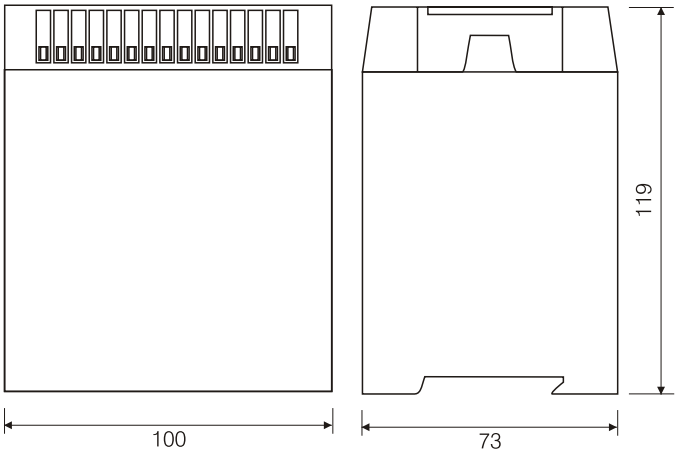
Electrical safety requirements

Product family standard	EN 60688
Overvoltage category	III
Pollution degree	2
Isolation-voltage	500 V AC
Test voltage input/output	5 kV RMS, 1 Min.
Test voltage output/supply	4 kV RMS, 1 Min.

Block and wiring diagram

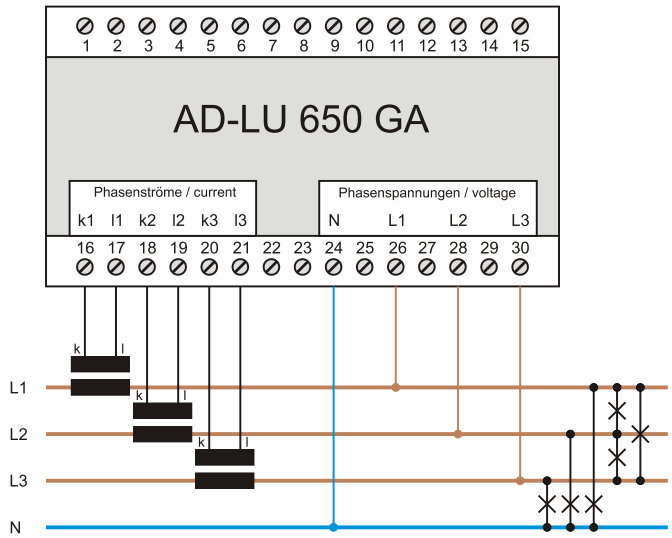


Dimensions

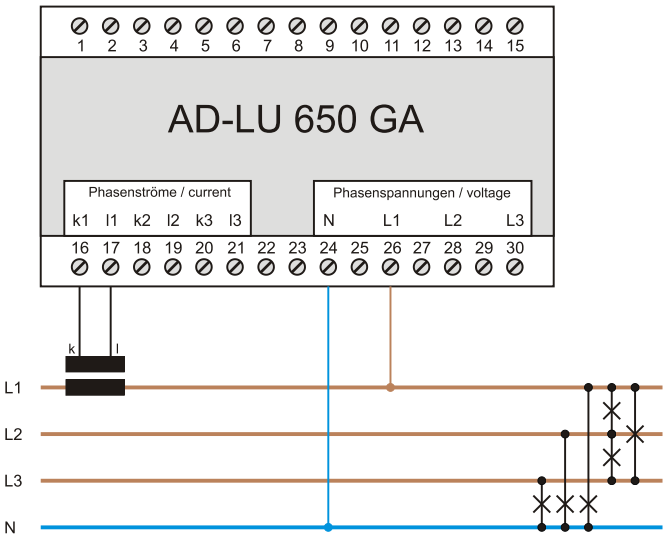


Circuit examples

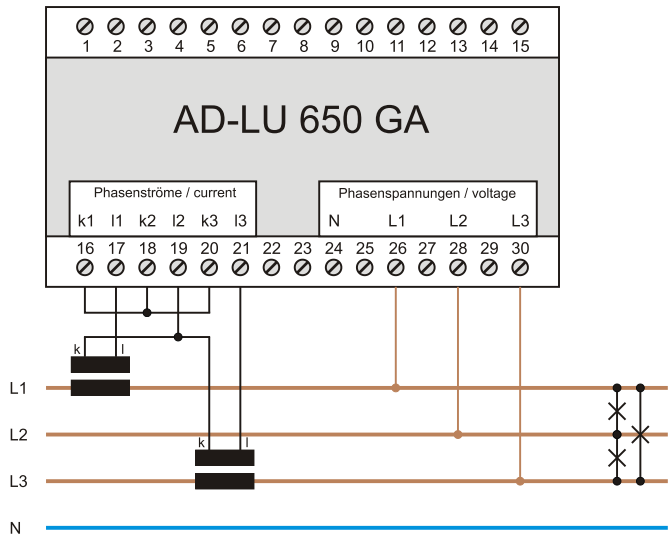
3 Phasen, 4 Leiter, ungleiche Last
3 phases, 4 wire, unbalanced load



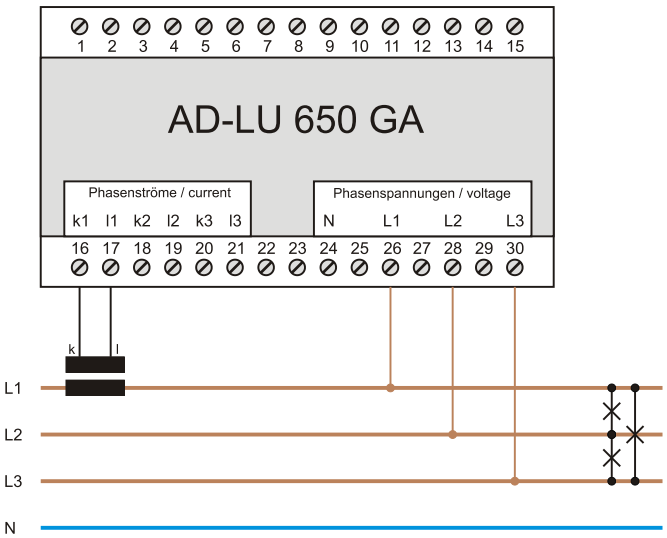
3 Phasen, 4 Leiter, gleiche Last
3 phases, 4 wire, balanced load



3 Phasen, 3 Leiter, ungleiche Last
3 phases, 3 wire, unbalanced load



3 Phasen, 3 Leiter, gleiche Last
3 phases, 3 wire, balanced load



Power Measurement

AD-LU 680 GA

Description

The AD-LU 680 GA is a programmable transmitter for measuring all parameters such as power, voltage, current or frequency in the mains. The currents are registered via external clamp-on current transformer. Any measured quantity can be allocated to each analogue outlet. The measuring ranges can be configured in wide ranges. Filters, which can be individually parameterized, supplement the adaption possibilities of the measuring task. Each switching output can be assigned to a specific function. Possible functions include, for example, Limit or pulse output for energy metering.

Application

Measurement and analog output of up to 4 signals in a three-phase mains. Easy recording of currents by external clamp-on current transformer CT. Limit indicators for monitoring of up to 2 signals in a three-phase mains. Analogue front-end for energy management systems. Registration of all relevant measuring quantities of the three-phase current network and supply of the measuring quantities via a modbus interface.

Specific characteristics

- Measuring quantities: effective power, reactive power, apparent power, currents and voltages, frequency, power factor, energy metering
- The currents are registered via external clamp-on current transformer.
- Four bipolar analogue outputs as current output or voltage output, configurable per software
- Two switching outputs as relay or opto-coupler. Functions: limiting value, window, trend, S0, monitor
- Meter for effective energy, reactive energy and apparent energy
- Values for each phase and they can be polled as sum
- Output of up to four measuring quantities of the three-phase current network such as effective power, current, voltage or frequency
- Indication of the power fed back into the network is possible via analogue output and/or switching output
- Connection configurations: single-phase, three-phase current with/without neutral conductor, equally/unequally loaded
- All measuring quantities can be read out via modbus
- All measuring ranges, output ranges and device functions can be configured per software with a PC programme.

Business data

Order number

AD-LU 680 GA	
Preconfigured	optional
Optocoupler outputs	optional

Current transformers, not included

KSW 50	50A / 33,3mA
KSW 100	100A / 33,3mA
KSW 200	200A / 33,3mA
KSW 400	400A / 33,3mA
KSW 600	600A / 33,3mA

Please order the required CTs with the product.

Technical specifications

Voltage inputs

U1N, U2N, U3N Nominal	230 V AC
U1N, U2N, U3N Max	300 V AC
Current consumption per phase	0,5 mA AC
Peak load	600 V AC, 1s

Current inputs

ATTENTION! DO NOT CONNECT CTs WITH 1/5A.	
Rated current I1, I2, I3	0 ... 33,3 mA AC
Peak load	700 mA AC, 1s
Continuous load	100 mA AC
Input resistance per phase	~10 Ohm

Analog outputs

Number	4
Current or voltage configurable	

Current outputs

Max. residual ripple	40 µAss
Max. burden	400 Ohm
Maximum output range	-21 ... 21 mA

Voltage outputs

Max. residual ripple	20 mVss
Min. burden	10 kOhm
Maximum output range	-10,5 ... 10,5 V

Contact outputs

Closing contact	2
Switching capacity AC	250 V AC, 2A, 50Hz
Switching capacity DC	50 V DC, 2A

Optocoupler outputs

Switching capacity DC	30 V DC, 50 mA DC

Accuracy

Accuracy class	0,5%
Temperature influence	< 200 ppm/K
Frequency influence	~0,2 %, 40 ... 60 Hz
Influence of phase angle	~0,2 %, 40 ... 60 Hz
Response time	~500 ms, 10 ... 90 %

Communication interface

Physical	RS-485
Parameter	19200, 8, 1 , even
Protocol	Modbus RTU

Printed 23.08.2022 We reserve the right for technical changes.

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Power Measurement

AD-LU 680 GA

Technical specifications

Supply

DC	20 ... 253 V DC, 5 W
AC	50 ... 253 V AC, 9 VA

Housing

Type of protection	IP 20
Connection method	screw clamp
Cross section fine wire	2,5 mm^2
Cross section one wire	4 mm^2
Mounting	DIN rail mounting
Weight	~450 g

Environmental conditions

Operating temperature	-10 ... 50 °C
Storage, transport	-25 ... 80 °C

Electromagnetic compatibility

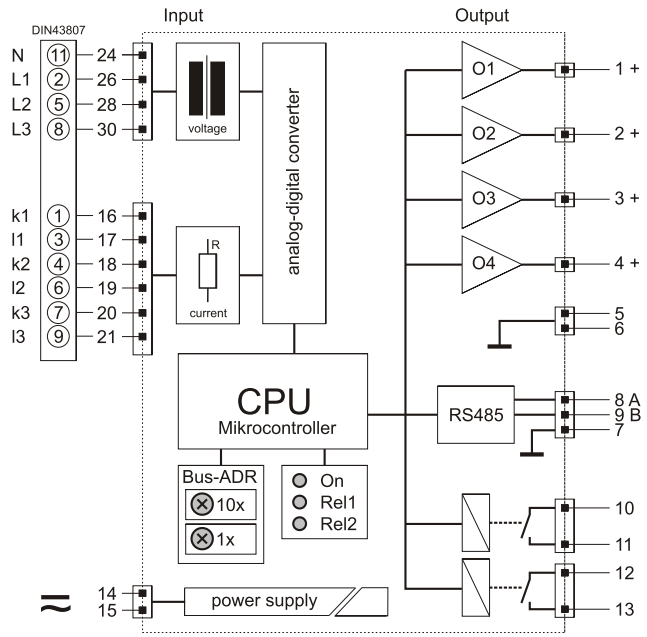
Product family standard	EN 61326-1
Emission	EN 55011, CISPR11 Cl. B, Gr. 1

During an interference effect slight signal deviations are possible.

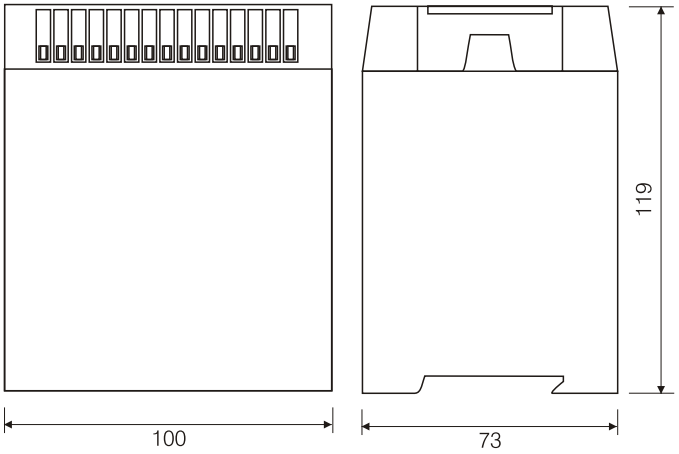
Electrical safety requirements

Product family standard	EN 60688
Overvoltage category	III
Pollution degree	2
Isolation-voltage	500 V AC
Test voltage input/output	5 kV RMS, 1 Min.
Test voltage output/supply	4 kV RMS, 1 Min.

Block and wiring diagram

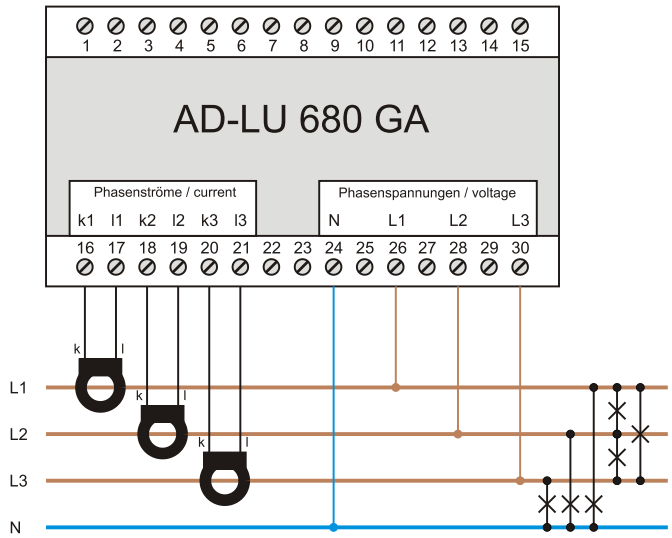


Dimensions

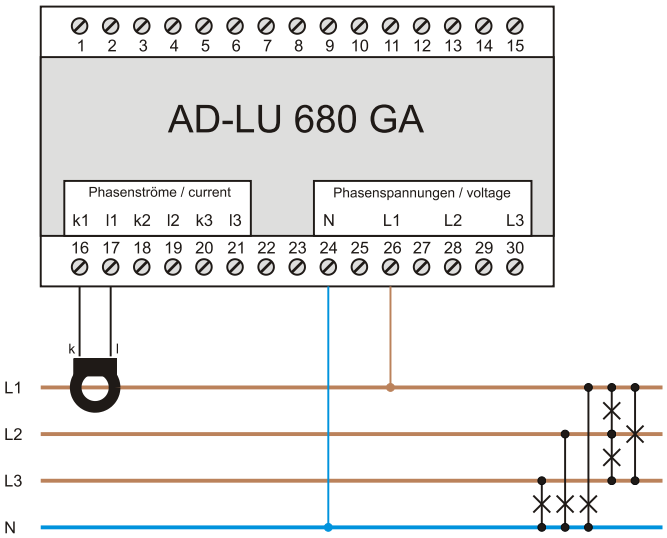


Circuit examples

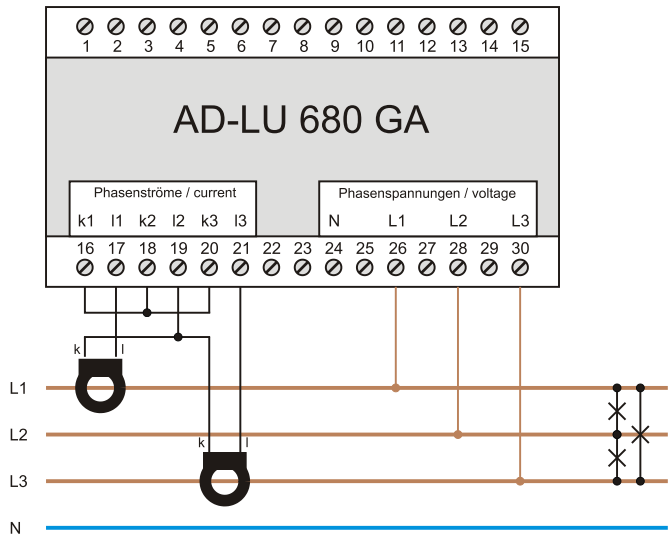
3 Phasen, 4 Leiter, ungleiche Last
3 phases, 4 wire, unbalanced load



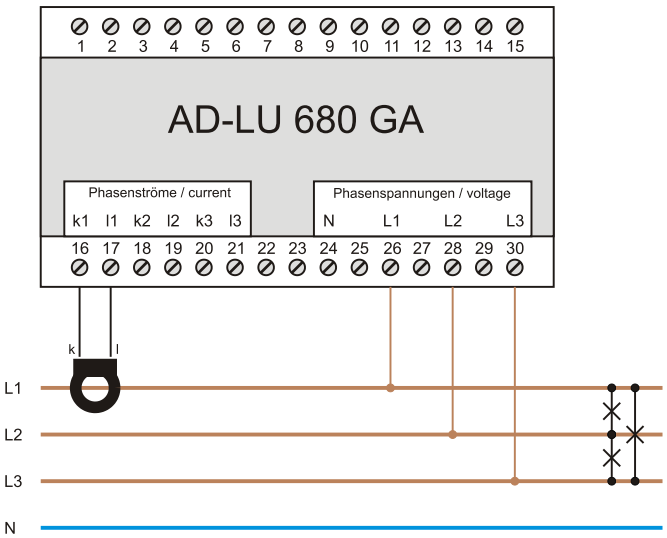
3 Phasen, 4 Leiter, gleiche Last
3 phases, 4 wire, balanced load



3 Phasen, 3 Leiter, ungleiche Last
3 phases, 3 wire, unbalanced load



3 Phasen, 3 Leiter, gleiche Last
3 phases, 3 wire, balanced load



Power Measurement

Power Measurement Transducer

AD-LU 410 GA

Description

Especially in power plant operations but also in many other switchgear areas, active power for the optimization and control of processes must be continuously measured. The power converter AD-LU 410 GA is always adapted to the individual case by means of plant-specific adaptations. The nominal voltage, the power to be measured and the desired output signal are required by the customer. The exact power values are available as standard signal for further processing.

Application

Measurement of the active power in switchgear, power plants, voltage distributions and transformation into an analog standard signal.

Specific characteristics

- Plug and play installation due to customer-specific production
- Fast response time due to analog multipliers
- Measurement of active power in 3- and 4-wire grids
- Measurement of symmetrical or asymmetrical load
- Measurement of active power fed back into the grid
- Analog output also bipolar possible
- Separate auxiliary voltage with wide range power supply

Business data

Order number

AD-LU 410 GA	Input, Output customized

Required customer data

Connection method	3-wire or 4-wire
Nominal voltage	Phase/Delta [V]
Voltage Transformers	Primary/secondary voltage [V/V]
Current Transformers	Primary/secondary current [A/A]
Type of load	symmetric or unsymmetric load
Measuring range	Begin ... End [kW]
Output signal	Current or voltage
Output range	Begin ... End [V, mA]
Order Help	http://www.adamczewski.com/download/de/lu410hilfe.pdf

Technical specifications

Voltage inputs

Rated frequency	50/60 Hz
Nominal Voltage Phase/Delta	230/400 V AC
Max. Voltage Phase/Delta	300/520 V AC
Current consumption per phase	0,5 mA AC
Permanent Overload	120% of nominal voltage
Peak load	600 V AC, 1s

Current inputs

Rated current I1, I2, I3	0 ... 1 A AC, 0 ... 5 A AC
Peak load	100 A AC, 1s
Continuous load	6 A AC
Permanent Overload	120% of nominal current
Input resistance per phase	~20 mOhm

Output

Type	Current or voltage, to be specified when ordering

Output current

Max. burden	500 Ohm
Maximum output range	-22 ... 22 mA (500 Ohm)

Output voltage

Min. burden	10 kOhm
Maximum output range	-12 ... 12 V (10kOhm)

Accuracy

Accuracy class	0,5
Temperature influence	~60 ppm/K
Frequency influence	200 ppm/Hz (40 ... 60 Hz)
Response time	~800 ms (0 ... 90 %)

Supply

DC	20 ... 253 V DC, 1,5 W
AC	50 ... 253 V AC, 3 VA

Housing

Protection class connection	IP20
Type of protection housing	IP40
Connection method	screw clamp
Cross section fine wire	2,5 mm^2
Cross section one wire	4 mm^2
Max. torque of terminals	0,8 Nm
Mounting	DIN rail mounting
Weight	~450 g

Environmental conditions

Operating temperature	-10 ... 60 °C
Storage, transport	-25 ... 80 °C

Electromagnetic compatibility

Product family standard	EN 61326-1
Emission	EN 55011, CISPR11 Cl. B, Gr. 1

During an interference effect slight signal deviations are possible.

Printed 24.08.2022 We reserve the right for technical changes.

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Power Measurement Transducer

AD-LU 410 GA

Technical specifications

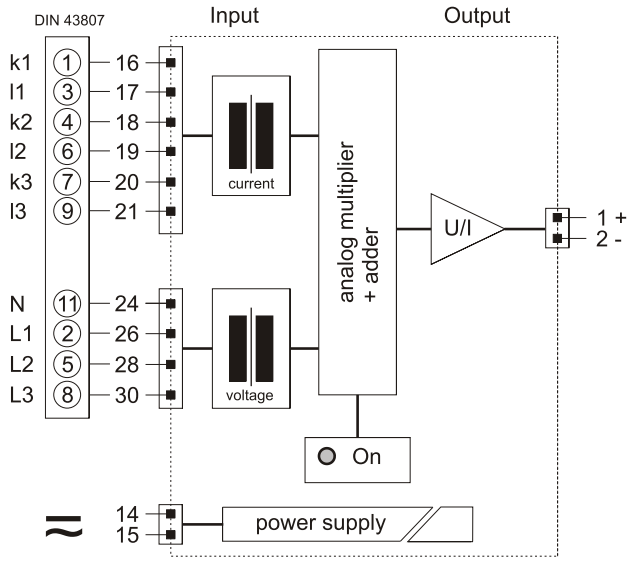
Electrical safety requirements

Overvoltage category	III
Measurement category	CAT III
Pollution degree	2
Test voltage input/output	5 kV RMS, 1 Min.
Testvoltage output/supply	4 kV RMS, 1 Min.

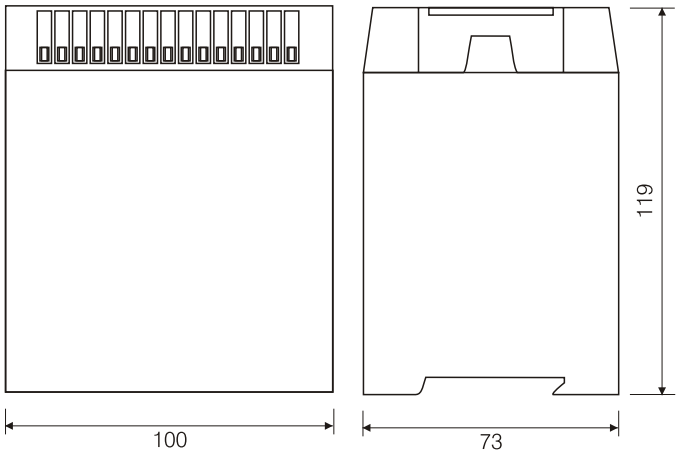
Product standards

Product family standard	EN 60688

Block and wiring diagram

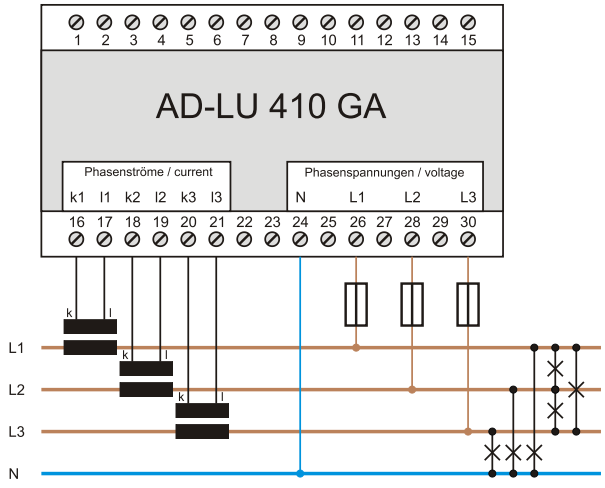


Dimensions

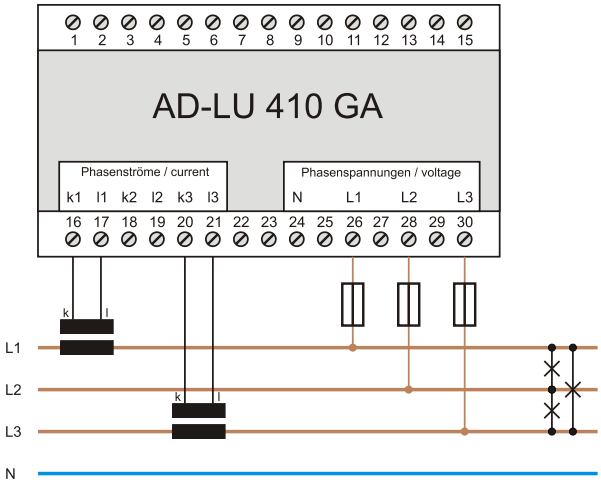


Circuit examples

3 Phasen, 4 Leiter, ungleiche Last
3 phases, 4 wire, unbalanced load



3 Phasen, 3 Leiter, ungleiche Last
3 phases, 3 wire, unbalanced load



Monitoring Devices

Three-phase Voltage Monitor

AD-UW 60 GT

Description

The three-phase voltage monitor AD-UW 60 GT monitors all three phases in the three-phase system for overvoltage, undervoltage, phase sequence and phase symmetry. If one or more faults occur, the quiescent current relay will fail. The state of the three phases and the error state is indicated by LEDs. The device is powered by the measuring voltage, therefore the wiring of a separate supply is eliminated. The switching points for overvoltage, undervoltage and switching delay can be set quickly via separate trimmers.

Application

AC motors, Overhead cranes, Trolleys, Goods lifts, Conveyor belts

Specific characteristics

- Setting the limits for undervoltage, overvoltage and switching delay via the front panel
- Check all relevant sizes for a wide variety of purposes
- Display of the phase voltages by green LEDs
- Display of the relay by orange LED
- No separate power supply necessary therefore less wiring effort
- Relay is energized in the good range

Business data

Order number

AD-UW 60 GT

Technical specifications

Voltage inputs/supply	
Nominal voltage	230 V AC, 50 Hz
Connection method	3 phases + neutral conductor
Auxiliary voltage	all three phases
Measurement and supply range	150 ... 253 V AC
Max. power consumption	4 VA
Setting ranges	
Undervoltage	170 ... 229 V AC
Overvoltage	231 ... 250 V AC
Delay	0,1 ... 10 s
Response values	
Asymmetry	10 % of nominal voltage
Hysteresis	10 % overvoltage - undervoltage
Phase loss	~ 10 % der Nennspannung
Timing	
Start delay	1 s
Sampling period	50 ms
Notifications	
L1, L2, L3 (green)	on: Voltage OK Blinking: Error, Delay is running Off: Error
Relais (orange)	On: Relay tightened, everything OK Blinking: Relay dropped, error
Relay output	
Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	potential-free changeover
Galvanic isolation, test voltages	
Mains side to relay output	4 kV, 50 Hz (1 min.)
Housing	
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Type of protection	IP 20
Connection method	screw clamp
Bolting torque terminals	0,6 Nm
Weight	~ 150 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	III
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. A [2], Gr. 1

[1] During checking, slight signal deviations are possible.

[2] Warning: This device is not intended to be used in residential areas and can not ensure adequate protection of radio communications in such environments

Printed 28.10.2022 We reserve the right for technical changes.

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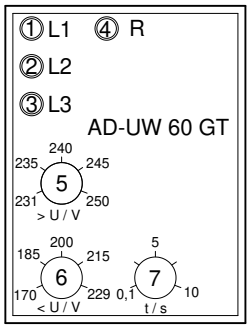
Monitoring Devices

Three-phase Voltage Monitor

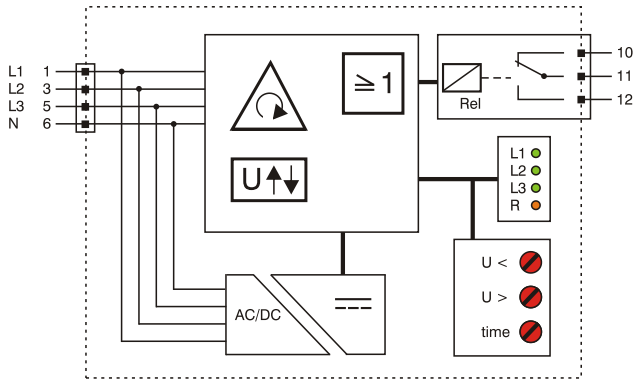
AD-UW 60 GT

Display and operating elements

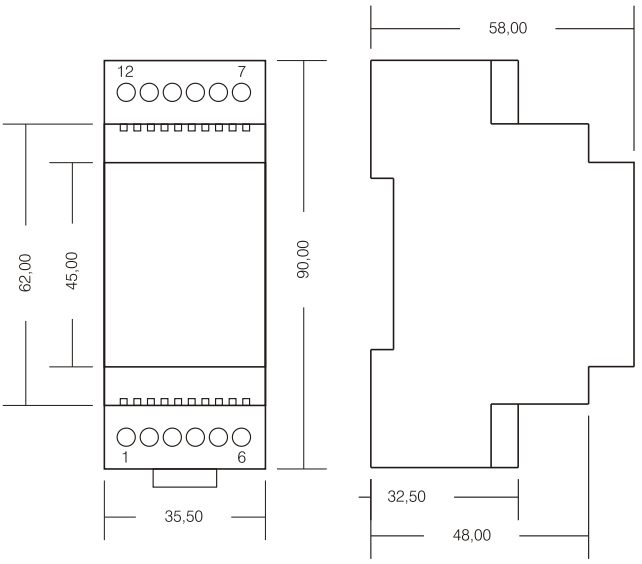


1 Status voltage in L1
2 Status voltage in L2
3 Status voltage in L3
4 Relay state
5 Setting for overvoltage
6 Setting for undervoltage
7 Setting for switching delay

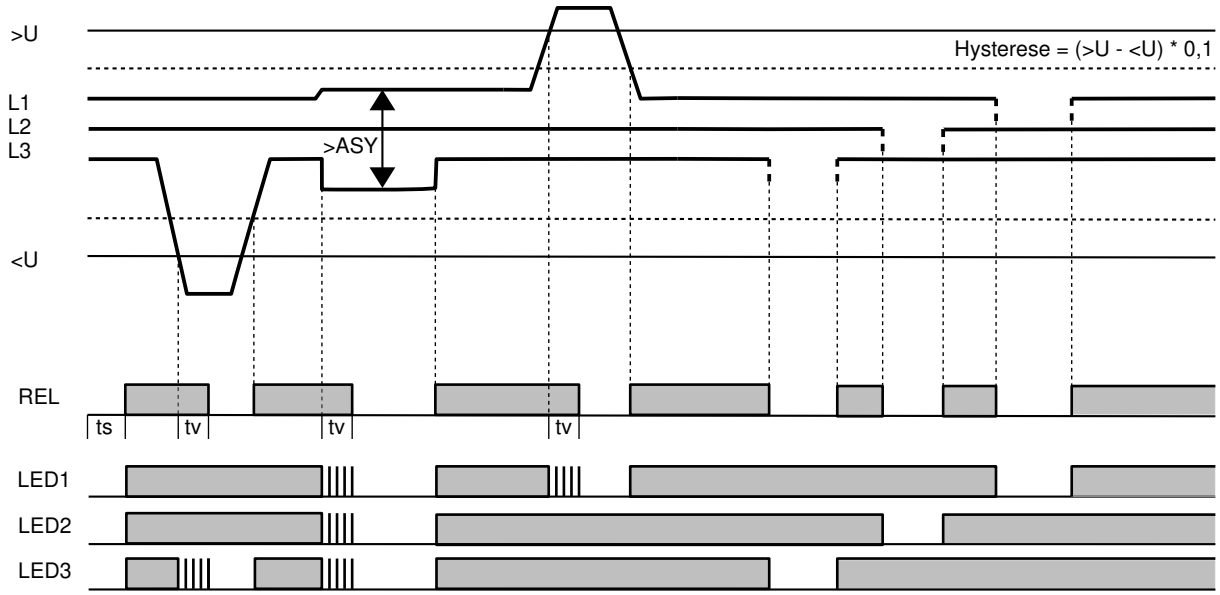
Block and wiring diagram



Dimensions



Diagrams



Power Measurement

Load Monitoring

AD-LW 110 GS

Description

The AD-LW 110 GS monitors the load condition of inductive loads. The main application is asynchronous motors in the 1- or 3-phase network, the load of which is greatly changed. The device makes an evaluation of the cos-phi value and an undervoltage monitoring. Exceeding the set limit values triggers a contact. The switching states are indicated on the front side by LEDs. The measuring principle for the cos-phi is based on the evaluation of the phase shift between voltage and current in one phase. The actual measured variable is therefore the phase angle between voltage and current. The setting value of the cos-phi or of the phase angle is therefore only correct for sinusoidal quantities. The phase shift is almost inverse to the load. A cos-phi of 0 (= 90 °) thus corresponds to a low load while a cos-phi of 1 (= 0 °) corresponds to a large load. An external current transformer can be connected to the current input of the device. Thanks to the integrated, efficient switching power supply, operation is possible in a wide supply voltage range.

Application

Load monitoring of asynchronous machines, e.g. Pumps and drives.

Specific characteristics

- Connection of external current transformer possible
- Wide range power supply
- Limits can be set via potentiometer
- 2 potential-free normally open contacts
- LED display of the relay states

Business data

Order number	AD-LW 110 GS

Technical specifications

Current input (L1)	
Measuring range	0 ... 1/5 A AC (alternatively)
Permanent overload	50 %
Short-term overload 3 s	100 %
Voltage input (L1, L2, L3)	
Measuring range	180 ... 253 V
Input resistance	1 MOhm
Relay outputs	
Maximum switching load AC	230 V, 1 A
Maximum switching load DC	50 V, 1 A
Contact construction	closing contact
Switching operations mechanical	10000000
At 230V/1 A AC, cos(phi)=1	600000
At 230V/1 A AC, cos(phi)=0,4	200000
At 24V/1 A DC	200000
Switching hysteresis	3 % of the measuring range
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	4 VA / 2,5 W
Transmission behaviour	
Basic accuracy	< 2 %
Temperature influence	100 ppm/K
Response time	~ 50 ms
Housing	
Dimensions (WxHxD)	23x78x103 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 120 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Input / relay output	4 kV, 50 Hz (1 min.)
Power supply / relay output	4 kV, 50 Hz (1 min.)
Relay 1 / relay 2	2 kV, 50 Hz (1 min.)
Protection circuits	
Input	electrical surge protection
Power supply	electrical surge protection

[1] During checking, slight signal deviations are possible.

Printed 23.08.2022 We reserve the right for technical changes.

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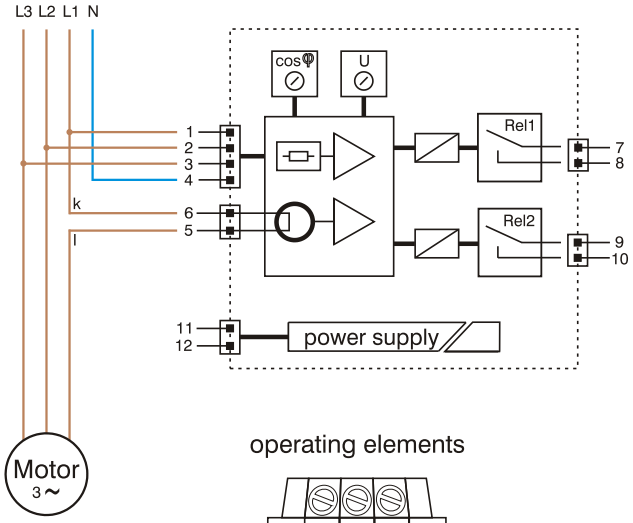
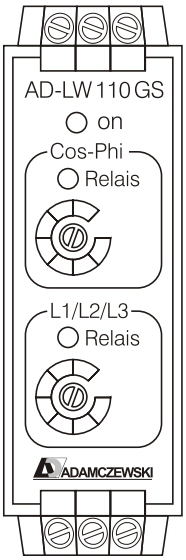
Load Monitoring

AD-LW 110 GS

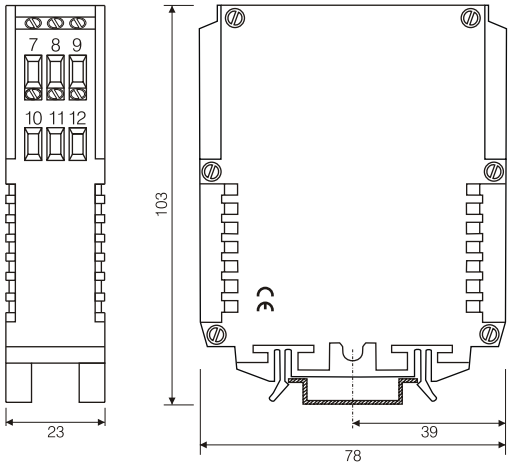
Block and wiring diagram



operating elements



Dimensions



Power Measurement

Split Core Current Transformer

AD-KSW xx SO

Description

With the clamp on current transformers AD-KSW50, AD-KSW100, AD-KSW200, AD-KSW400 and AD-KSW600 high currents can be measured without contact in connection with the power measurement devices from the Adamczewski GmbH. There are transformers for the range up to 600 A AC available. By their small size they can be easily mounted on the current carrying conductors and can therefore be mounted easily to existing systems without disconnecting the main cable. The secondary side mA-currents are not critical and can be wired over several meters. By the internal voltage limitation there are no high voltages on the secondary side possible.

Application

Measurement of high currents, power or energy in plants or buildings in connection with the measurement technology from the Adamczewski GmbH.

Specific characteristics

- non-contact measurement of high currents
- no disconnection of the main cable during installation
- uncritical mA-signals at the secondary side of the transformer

Business data

Order number

AD-KSW 50 SO	50 A AC primary current
AD-KSW 100 SO	100 A AC primary current
AD-KSW 200 SO	200 A AC primary current
AD-KSW 400 SO	400 A AC primary current
AD-KSW 600 SO	600 A AC primary current

Power measurement transducer

AD-LU 25 GT	power measurement transducer

Compatible transducer

AD-LU 35 GT	power measurement transducer
AD-LU 55 GT	power measurement transducer
AD-LU 680 GA	power measurement transducer

Technical specifications

Max. primary conductor diameter

AD-KSW50	23 mm
AD-KSW100	23 mm
AD-KSW200	23 mm
AD-KSW400	35 mm
AD-KSW600	35 mm

Primary current

AD-KSW50	0 ... 50 A AC
AD-KSW100	0 ... 100 A AC
AD-KSW200	0 ... 200 A AC
AD-KSW400	0 ... 400 A AC
AD-KSW600	0 ... 600 A AC

Secondary current

All transformer types	0 ... 33 mA AC

Nominal load

All transformer types	7 Ohm

Dimension

AD-KSW50	34,4 x 45 x 65,5 mm
AD-KSW100	34,4 x 45 x 65,5 mm
AD-KSW200	34,4 x 45 x 65,5 mm
AD-KSW400	38,4 x 57 x 81,5 mm
AD-KSW600	38,4 x 57 x 81,5 mm

Weight

AD-KSW50	ca. 180 g
AD-KSW100	ca. 180 g
AD-KSW200	ca. 180 g
AD-KSW400	ca. 350 g
AD-KSW600	ca. 350 g

Accuracy

All transformer types	< 0,5 %

Phase error

All transformer types	1° (primary to secondary)

Secundary wires

Connections	white: k, black: l
Cable length	ca. 50 cm

Frequency range

All transformer types	50 ... 400 Hz

Rated frequency

All transformer types	50 / 60 Hz

Isolation-voltage

All transformer types	2500 V AC (1 min) + cable insulation

Environmental conditions

Operation	-10 ... 60 °C
Storage and transport	-20 ... 70 °C (no condensation)

Certifications

All transformer types	CE, UL, RoHS

Printed 23.08.2022 We reserve the right for technical changes.

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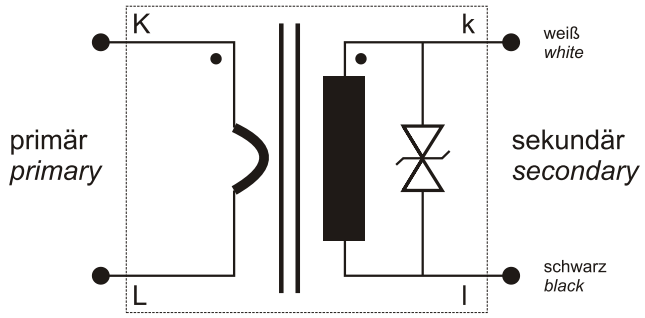
Split Core Current Transformer

AD-KSW xx SO

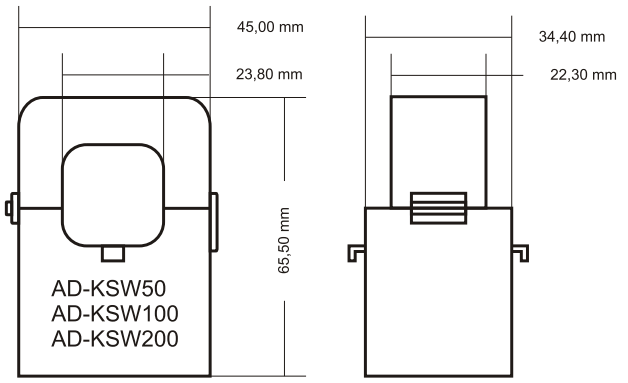
Block and wiring diagram

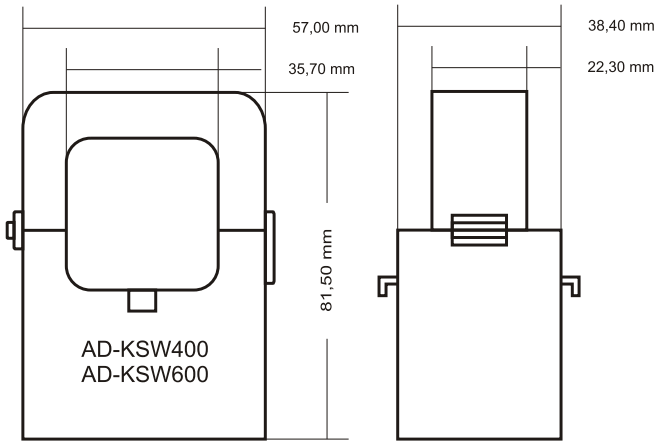


Bitte Montagerichtung beachten
K: Netzseite / Quelle
L: Verbraucherseite / Last

Please note the mounting direction
K: network side / Source
L: consumer side / load

Dimensions





Power Measurement

AD-HSH 50 WG
AD-HSH 100 WG
AD-HSH 200 WG

Description

With the AD-HSH xxx WG it is possible to mount three Adamczewski split-core current transformers AD-KSW 50 WG, AD-KSW 100 WG or AD-KSW 200 WG together on the DIN rail. The output currents (max 33.33 mA) are provided via terminals. The AD-HSH-S is supplied fully assembled, therefore the size of the folding current transformer must be specified when ordering.

Application

Mounting of split-core current transformers on the DIN rail.

Business data

Order number	AD-HSH 50 WG;AD-HSH 100 WG;AD-HSH 200 WG

Technical specifications

Housing

Dimensions (WxHxD)	134,9x77x91 mm
Type of protection	IP 20
Connection method	spring clamp terminals
Terminals, wire cross section	1,5 mm² flex wire / 2,5 mm² one wire
Weight	~ 520 g (incl. split-core transformers)
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 60 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Elevation	max. 2000 m
Safety measurement	61010-2-030
Measurement category	CAT III
Max. permanent working voltage	300 VAC

Galvanic isolation, test voltages

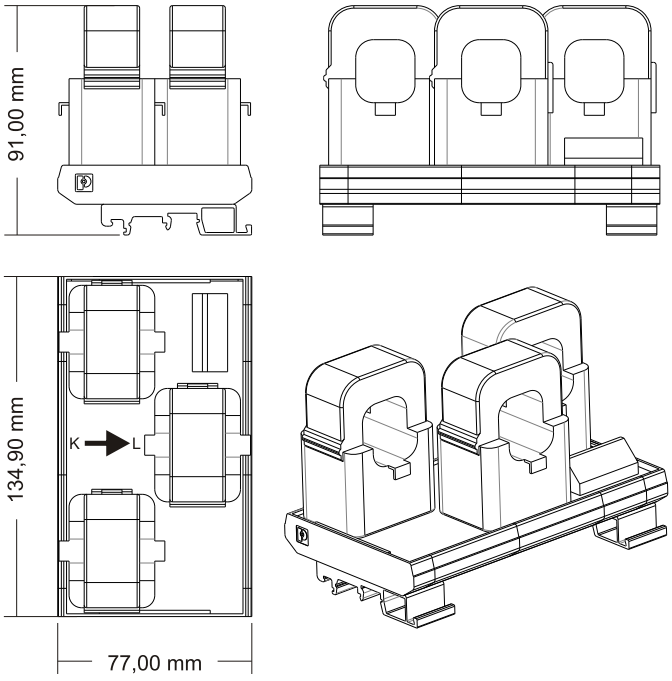
Input / output	2500 V AC (1 min) + cable insulation

Protection circuits

Output	internal voltage limitation with open secondary lines

[1] During checking, slight signal deviations are possible.

Dimensions



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Fieldbus Devices

Analog-Output-Bus-Converter

AD-AAB 20 GX

Description

The AD-AAB 20 GX provides 2-channel output of analog signals. The device communication is realized using the MODBUS RTU protocol. The analog setpoints can be set via implemented MODBUS commands.
The power supply and the RS485 bus connection are possible via the rear DIN rail connector. The device is equipped with two rotary coding switches with which the bus address can be set on the device.
The operating voltage is indicated by a green LED. The data communication is signaled with a yellow LED. An optical search function allows the localization of a single device in a network. For this purpose, the green LED is set in a time-limited flashing mode, between 1 and 255 seconds.
As well as interface settings as well as the device address can be modified during operation by means of Modbus commands. All Modbus register addresses and associated commands are listed in the document attachment.

Application

Specification of analog process signals for control purposes.

Specific characteristics

- Two analogue outputs can be used as voltage or current input
- Galvanically isolated RS485 bus interface
- Parameterizable interface settings
- Hardware switch for device address
- Galvanically isolated switching power supply
- Can be parameterized with PC via AD Studio configuration software
- Status LED for operating voltage and data communication
- Optical search function
- Modbus master mode

Business data

Order number	AD-AAB 20 GX

Accessory

Rail connector (5-pin)	Artnr: AD-GX-Connector Zur Durchschleifung von Versorgungsspannung und RS485-Bus Aufrastbar auf Tragschiene (DIN EN 50022).

Technical specifications

Current outputs

Range	0 ... 20 mA
Output load	max. 450 Ohm

Voltage outputs

Range	0 ... 10 V
Output load	min. 10 kOhm

Signal output

Channel counts (U/I)	2
Basic accuracy	< +/- 0,3 %
Temperature influence	80 ppm/K
Resolution	12 bit

Transmission behaviour

Response time	max. 15 ms

RS485-Bus

Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no spur lines)
Cable	twisted and shielded

Supply

Supply voltage	18 ... 30 V DC
Max. power consumption	1400 mW (24V DC)

Housing

Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Manner of fastening	DIN rail mounting 35mm, EN 50022
Type of protection	IP 20
Connection method	screw clamp
Bolting torque terminals	0,5 Nm
Wire cross section	max. 2,5 mm²
Weight	~ 70 g

Environmental conditions

Permissible ambient temperature	-10 ... +50 °C
Storage and transport	-10 ... +70 °C (no condensation)

EMC

Product family standard [1]	EN 61326-1
Emission [2]	EN 55011, CISPR11 Cl. A, Gr. 1

[1] During checking, slight signal deviations are possible.

[2] Warning:
This device is not intended to be used in residential areas and can not ensure adequate protection of radio reception in such environments.

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Analog-Output-Bus-Converter

AD-AAB 20 GX

Technical specifications

Electrical safety requirements

Product family standard	EN 61010-1

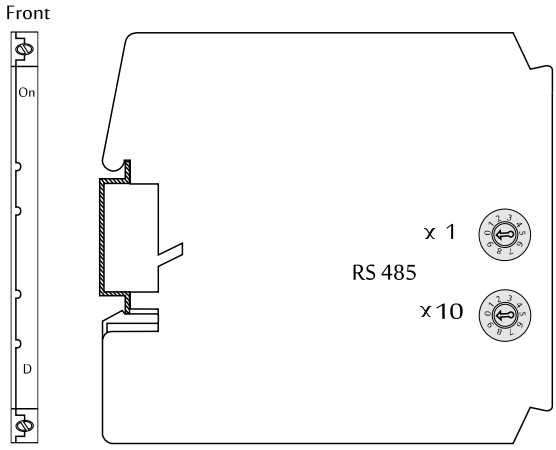
Galvanic isolation, test voltages

RS485 bus / power supply	1,5 kV, 50 Hz (1 min)
Analog output / power supply	1.5 kV, 50 Hz (1 min)
Analog output / RS485 bus	1,5 kV, 50 Hz (1 min)
Analog outputs between themselves	0,5 kV, 50 Hz (1 min)

Protection circuits

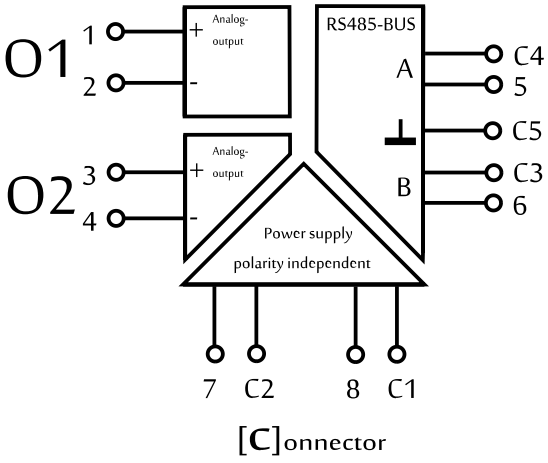
Power supply	electrical surge and reverse current protection

Display and operating elements

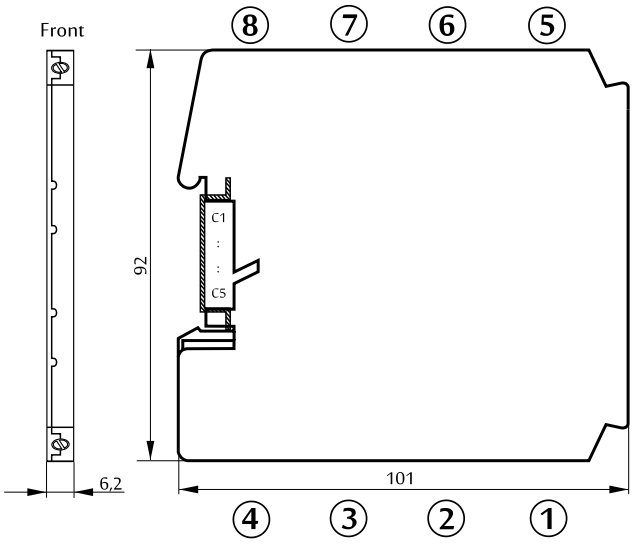


Designation	LED	Meaning
On	green	Power supply
D	yellow	RS485 Communication
RS485		Address switch(01...99)

Block and wiring diagram



Dimensions



Analog-Output-Bus-Converter AD-AAB 20 GX

Modbus Communication

The AD-AAB 20 GX contains a RS485 bus interface on which the Modbus RTU protocol is used. All control functions of the device can be executed via this bus interface. The preset standard data format is 19200,e,8,1. Adaptation to a different data format is possible at any time. The bus address (1...99) is set to the side-mounted rotary switches. The address 0 is not permitted for the bus operation. However, on this zero position the device is accessible only via the standard data format (19200, e, 8.1). The position 0 thus represents a service position, the example can be used during parameterization error.

The AD-AAB 20 GX supports two Modbus functions. These are the functions **"Read Holding Registers" (0x03)** and **"Write Holding Registers" (0x10)**. With the **"Read Holding Registers"** function data can be read from the device and written with **"Write Holding Registers"** data. The individual register width is 16 bits. Please see the Modbus specification for detailed explanations of the Modbus communication. This is online available for free and can be downloaded from the Adamczewski homepage.

The following Modbus data are accessible via the RS485 bus:

Start address	Reg. number	Name	Datatype	[Code] = Value	read	write
40501	1	Address switch	U16	1...99...247	yes	yes
40502	1	Flashing function	U16	0/1...255	yes	yes
40901	2	Analog output U1	FLOAT	0...10V	no	yes
40903	2	Analog output I1	FLOAT	0...20mA	no	yes
40905	2	Analog output U2	FLOAT	0...10V	no	yes
40907	2	Analog output I2	FLOAT	0...20mA	no	yes
40909	2	Scale out U1	FLOAT	+/- Scale value	no	yes
40911	2	Scale out I1	FLOAT	+/- Scale value	no	yes
40913	2	Scale out U2	FLOAT	+/- Scale value	no	yes
40915	2	Scale out I2	FLOAT	+/- Scale value	no	yes
44201	2	Scale begin Channel 1	FLOAT	+/- Scale range	yes	yes
44203	2	Scale begin Channel 2	FLOAT	+/- Scale range	yes	yes
44205	2	Analog begin Channel 1	FLOAT	0...100 %	yes	yes
44207	2	Analog begin Channel 2	FLOAT	0...100 %	yes	yes
44211	2	Scale end Channel 1	FLOAT	+/- Scale range	yes	yes
44213	2	Scale end Channel 2	FLOAT	+/- Scale range	yes	yes
44215	2	Analog end Channel 1	FLOAT	0...100 %	yes	yes
44217	2	Analog end Channel 2	FLOAT	0...100 %	yes	yes
42901	1	Baud rate	U16	Index, see list below	yes	yes
42902	1	Parity	U16	[0]=even; [1]=odd; [2]=no	yes	yes
42903	1	Modbus Master	U16	0/1	yes	yes
49102	1	Device reset	U16	0	no	yes
49105	6	Device type	String	AAB20GX	yes	no
49119	1	Firmware version	U16	MSB/LSB	yes	no

Coding baudrate list

index	0	1	2	3	4	5	6	7	8	9
baud	2400	4800	9600	14400	19200	28800	38400	57600	76800	115200

After changing the interface parameters, a device reset is required.

Modbus master mode

The device can even work in Modbus master mode to transfer data between any devices within an RS485 line.
For Modbus master operation, starting with Modbus register 40611, there are 37 consecutive data transfer sets, with 5 configuration registers each.

Start address	Reg. number	Name	Datatype	[Code] = Value	read	write
40611	1	Source address [1]	U16	1...98	ja	ja
40612	1	Source register [1]	U16	nnnnn	ja	ja
40613	1	Target address [1]	U16	1...99	ja	ja
40614	1	Target register [1]	U16	nnnnn	ja	ja
40615	1	Register count [1]	U16	1/2	ja	ja
40791	1	Source address [37]	U16	1...98	ja	ja
40792	1	Source register [37]	U16	nnnnn	ja	ja
40793	1	Target address [37]	U16	1...99	ja	ja
40794	1	Target register [37]	U16	nnnnn	ja	ja
40795	1	Register count [37]	U16	1/2	ja	ja

For the Modbus master mode, the parameter "Modbus master" must be activated and the address switch set to position 99.
Data transfer begins six seconds after activation or device restart.
A flashing green LED indicates a communication error.

Fieldbus Devices

Analog-Input-Bus-Converter

AD-AEB 20 GX

Description

The AD-AEB 20 GX enables 2-channel analog signal acquisition while providing digitally processed process variables. The signals are provided via an RS485 bus interface. Analog values ??and scaling values ??can be called up via implemented MODBUS commands. All settings regarding scaling or filters are made via MODBUS commands.
The power supply and the RS485 bus connection are possible via the rear DIN rail connector. The device is equipped with two rotary coding switches with which the bus address can be set on the device.
The input current shunt is automatically switched on when reading the current value. With the input signal switches (E1 / E2), each signal input can be permanently connected to the 50 Ohm terminating resistor in order to safely complete current loops even if the supply voltage fails.
The operating voltage is indicated by a green LED. The data communication is signaled by a yellow LED. Invalid measurement signals outside the defined measuring range are detected. In this case, the green LED flashes.
As well as interface settings as well as the device address can be modified during operation by means of Modbus commands. All Modbus register addresses and associated commands are listed in the document attachment.

Application

Conversion of analog process variables in digital information, already in the cabinet. Drastic reduction of wiring work.

Specific characteristics

- Two analogue inputs can be used as voltage or current input
- Adjustable filter function
- Galvanically isolated RS485 bus interface
- Parameterizable interface settings
- Hardware switch for device address
- Galvanically isolated switching power supply
- Can be parameterized with PC via AD Studio configuration software
- Status LED for operating voltage and data communication
- Visual display for invalid measuring signals
- Modbus master mode

Business data

Order number	AD-AEB 20 GX
Accessory	
Rail connector (5-pin)	AD-GX-Connector

Technical specifications

Current inputs	
Measuring range	0 ... 20 mA
Input resistance	50 Ohm
Voltage inputs	
Measuring range	0 ... 10 V
Input resistance	100 kOhm
Signal detection	
Channel counts (U/I)	2
Basic accuracy	< +/- 0,3 %
Temperature influence	80 ppm/K
Sampling rate / resolution	100 ms / 10 bit
Transmission behaviour	
Response time	max. 15 ms
RS485-Bus	
Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no spur lines)
Cable	twisted and shielded
Supply	
Supply voltage	18 ... 30 V DC
Max. power consumption	600 mW (24V DC)
Housing	
Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Manner of fastening	DIN rail mounting 35mm, EN 50022
Type of protection	IP 20
Connection method	screw clamp
Bolting torque terminals	0,5 Nm
Wire cross section	max. 2,5 mm²
Weight	~ 70 g
Environmental conditions	
Permissible ambient temperature	-10 ... +50 °C
Storage and transport	-10 ... +70 °C (no condensation)
EMC	
Product family standard [1]	EN 613261
Emission [2]	EN 55011, CISPR11 Cl. A, Gr. 1

[1] During checking, slight signal deviations are possible.

[2] Warning:
This device is not intended to be used in residential areas and can not ensure adequate protection of radio reception in such environments.

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Analog-Input-Bus-Converter

AD-AEB 20 GX

Technical specifications

Electrical safety requirements

Product family standard	EN 61010-1

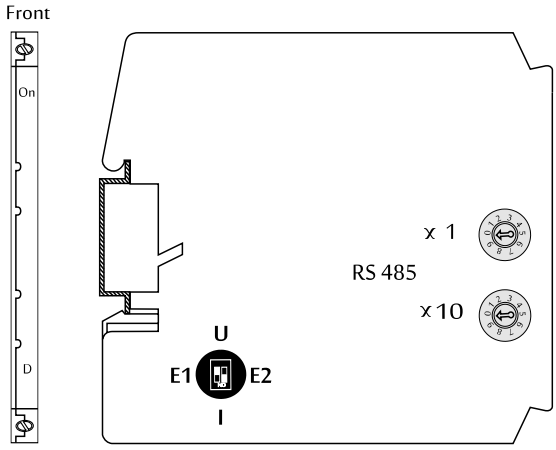
Galvanic isolation, test voltages

RS485 bus / power supply	1,5 kV, 50 Hz (1 min)
Analog inputs / power supply	1.5 kV, 50 Hz (1 min)
Analog input / RS485 bus	1,5 kV, 50 Hz (1 min)
Analog inputs between themselves	0 kV

Protection circuits

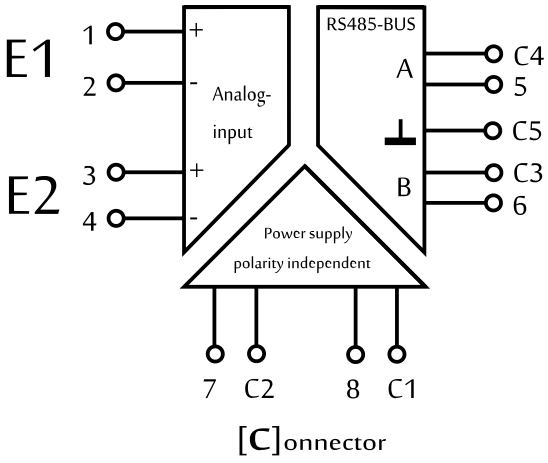
Power supply	electrical surge and reverse current protection

Display and operating elements

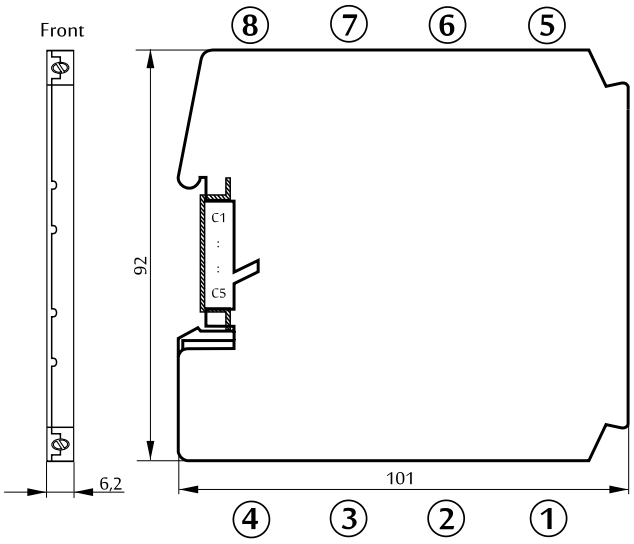


Designation	LED	Meaning
On	green	Power supply
D	yellow	RS485 Communication
RS485		Address switch(01...99)
E1		Input signal switch (U/I) channel 1
E2		Input signal switch (U/I) channel 2

Block and wiring diagram



Dimensions



Analog-Input-Bus-Converter AD-AEB 20 GX

Modbus Communication

The AD-AEB 20 GX contains a RS485 bus interface on which the Modbus RTU protocol is used. All control functions of the device can be executed via this bus interface. The preset standard data format is 19200,e,8,1. Adaptation to a different data format is possible at any time. The bus address (1...99) is set to the side-mounted rotary switches. The address 0 is not permitted for the bus operation. However, on this zero position the device is accessible only via the standard data format (19200, e, 8.1). The position 0 thus represents a service position (slaveaddress = 0), the example can be used during parameterization error.

The AD-AEB 20 GX supports two Modbus functions. These are the functions **"Read Holding Registers" (0x03)** and **"Write Holding Registers" (0x10)**. With the **"Read Holding Registers"** function data can be read from the device and written with **"Write Holding Registers"** data. The individual register width is 16 bits. Please see the Modbus specification for detailed explanations of the Modbus communication. This is online available for free and can be downloaded from the Adamczewski homepage.

The following Modbus data are accessible via the RS485 bus:

Start address	Reg. number	Name	Datatype	[Code] = Value	read	write
40501	1	Address switch	U16	1...99...247	yes	yes
40502	1	Flashing function	U16	0/1...255	yes	yes
42905	1	Signal input type 1	U16	U=0 / I=1	yes	yes
42906	1	Signal input type 2	U16	U=0 / I=1	yes	yes
40211	1	Damping U/I 1	U16	0...1000 s	yes	yes
40212	1	Damping U/I 2	U16	0...1000 s	yes	yes
43001	2	In signal begin U/I 1	FLOAT	V / mA	yes	yes
43003	2	In signal end U/I 1	FLOAT	V / mA	yes	yes
43005	2	Scale begin 1	FLOAT	-99999 ...	yes	yes
43007	2	Scale end 1	FLOAT	... 99999	yes	yes
43009	2	In signal begin U/I 2	FLOAT	V / mA	yes	yes
43011	2	In signal end U/I 2	FLOAT	V / mA	yes	yes
43013	2	Scale begin 2	FLOAT	-99999 ...	yes	yes
43015	2	Scale end 2	FLOAT	... 99999	yes	yes
40901	2	Analog intput U1	FLOAT	0...10V	yes	no
40903	2	Analog intput I1	FLOAT	0...20mA	yes	no
40905	2	Analog intput U2	FLOAT	0...10V	yes	no
40907	2	Analog intput I2	FLOAT	0...20mA	yes	no
40909	2	Scaled value 1	FLOAT	Begin ... End	yes	no
40911	2	Scaled value 2	FLOAT	Begin ... End	yes	no
42901	1	Baud rate	U16	Index, see list below	yes	yes
42902	1	Parity	U16	[0]=even; [1]=odd; [2]=no	yes	yes
42903	1	Modbus Master	U16	0/1	yes	yes
49102	1	Device reset	U16	0	no	yes
49105	6	Device type	String	AEB20GX	yes	no
49119	1	Firmware version	U16	MSB/LSB	yes	no

Coding baudrate list

index	0	1	2	3	4	5	6	7	8	9
baud	2400	4800	9600	14400	19200	28800	38400	57600	76800	115200

After changing the interface parameters, a device reset is required.

Modbus master mode

The device can even work in Modbus master mode to transfer data between any devices within an RS485 line.
For Modbus master operation, starting with Modbus register 40611, there are 38 consecutive data transfer sets, with 5 configuration registers each.

Start address	Reg. number	Name	Datatype	[Code] = Value	read	write
40611	1	Source address [1]	U16	1...99	yes	yes
40612	1	Source register [1]	U16	nnnnn	yes	yes
40613	1	Target address [1]	U16	1...98	yes	yes
40614	1	Target register [1]	U16	nnnnn	yes	yes
40615	1	Register count [1]	U16	1/2	yes	yes
40796	1	Source address [38]	U16	1...99	yes	yes
40797	1	Source register [38]	U16	nnnnn	yes	yes
40798	1	Target address [38]	U16	1...98	yes	yes
40799	1	Target register [38]	U16	nnnnn	yes	yes
40800	1	Register count [38]	U16	1/2	yes	yes

For the Modbus master mode, the parameter "Modbus master" must be activated and the address switch set to position 99.
Data transfer begins six seconds after activation or device restart.
A flashing green LED indicates a communication error.

Analog Bus Converter

AD-AEB 40 GT

Description

The AD AEB 40 GT enables a 4-channel analog signal acquisition while providing digitally processed process variables. The signals are provided via an RS485 bus interface available. Analog values and scaling values are available via implemented MODBUS commands. All settings for scaling or filter are carried out via MODBUS commands.
The operating voltage is indicated by a green LED. The data communication is signaled by a yellow LED. Invalid measurement signals outside the defined measuring range are detected. In this case, the green LED flashes.

Application

Conversion of analog process variables in digital information already in the cabinet. Drastic reduction of wiring work.

Specific characteristics

- Four analog inputs can be used as voltage or current input.
- Adjustable filter functions.
- Electrically isolated RS485 bus interface.
- Configurable interface settings.
- Front-setting the device address.
- Electrically isolated wide range power supply.
- Programmable with PC via AD-Studio configuration software.
- Double RS485 BUS connection for wire loop through.
- Status LED for operating voltage and data communication.
- Visual indication of an invalid measurement signals.

Business data

Order number	AD-AEB 40 GT

Technical specifications

Current inputs	
Measuring range	0 ... 20 mA
Input resistance	50 Ohm
Voltage inputs	
Measuring range	0 ... 10 V
Input resistance	100 kOhm
Signal detection	
Channel counts (U/I)	4
Basic accuracy	< 0,2 %
Temperature influence	80 ppm/K
Sampling rate / resolution	100 ms / 11 bit
RS485-Bus	
Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no stubs)
Cable	twisted and shielded
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Power consumption	max. 1,5 VA
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption	max. 0,5 W
Housing	
Dimensions (WxHxD)	71 x 90 x 58 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 140 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Grid side to RS485-Bus	3 kV, 50 Hz (1 min.)
Signal / supply unit	3 kV, 50 Hz (1 min.)
Signal / RS485 bus	1 kV, 50 Hz (1 min.)
Protection circuits	
Input	electrical surge protection
RS485-Bus	electrical surge protection
Power supply	electrical surge protection

[1] During checking, slight signal deviations are possible.

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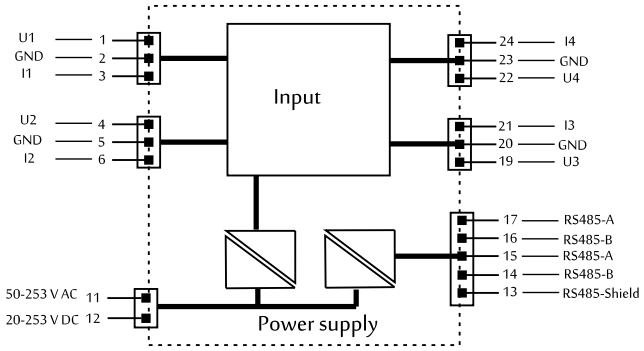
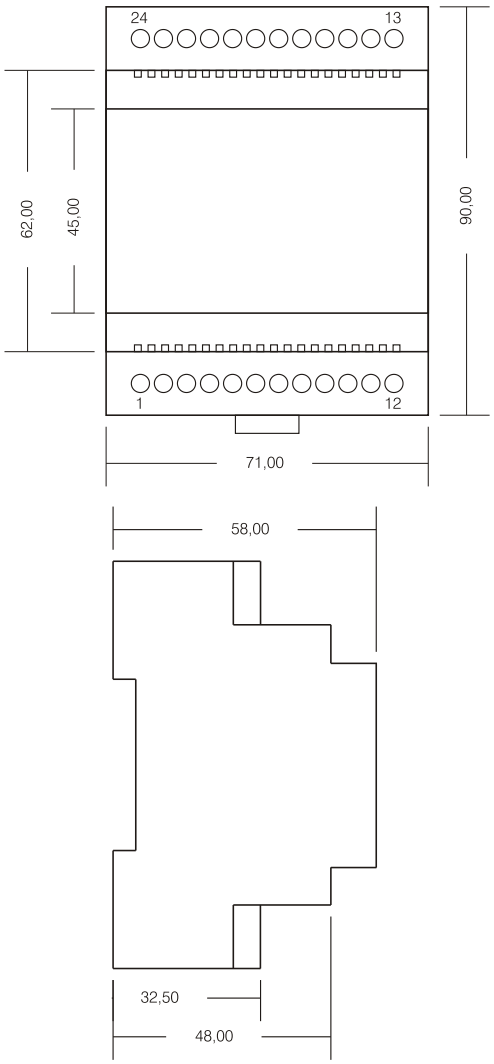
Analog Bus Converter

AD-AEB 40 GT

Block and wiring diagram



Dimensions



Analog Bus Converter

AD-AEB 40 GT

Modbus Communication

The AD-AEB 40 GT has an RS485 bus interface on which the Modbus RTU protocol is used. About this bus interface all measured data of the device can be read. The preset standard data format is 19200,e,8,1. Adaptation to a different data format is possible at any time. The bus address is set to the front-mounted rotary switches. The address 0 is not permitted for the bus operation. However, on this zero position the device only via the standard data format (19200, e, 8.1) accessible. The position 0 thus represents a service position, the example can be used during parameterization error.

The AD-AEB 40 GT supports two Modbus functions. These are the functions **"Read Holding Registers" (0x03)** and **"Write Holding Registers" (0x10)**. With the **"Read Holding Registers"** function data can be read from the device and written with **"Write Holding Registers"** data. The individual register width is 16 bits. Please see the Modbus specification for detailed explanations of the Modbus communication. This is online available for free, but can also be purchased from the Adamczewski homepage.

The following Modbus data are accessible via the RS485 bus:

Start address	Reg. number	Name	Unit	Datatype	[Code] = Value	read	write
Observations:							
40101	2	analog input channel 1	mA or V	float	0...20mA / 0...10V	yes	no
40103	2	analog input channel 2	mA or V	float	0...20mA / 0...10V	yes	no
40105	2	analog input channel 3	mA or V	float	0...20mA / 0...10V	yes	no
40107	2	analog input channel 4	mA or V	float	0...20mA / 0...10V	yes	no
40801	2	scaled value channel 1	scale unit	float	scaled value	yes	no
40803	2	scaled value channel 2	scale unit	float	scaled value	yes	no
40805	2	scaled value channel 3	scale unit	float	scaled value	yes	no
40807	2	scaled value channel 4	scale unit	float	scaled value	yes	no
Parameters:							
43073	1	signal selection channel 1	I or U	U08	[0] = I (20mA); [1] = U (10V)	yes	yes
43074	1	signal selection channel 2	I or U	U08	[0] = I (20mA); [1] = U (10V)	yes	yes
43075	1	signal selection channel 3	I or U	U08	[0] = I (20mA); [1] = U (10V)	yes	yes
43076	1	signal selection channel 4	I or U	U08	[0] = I (20mA); [1] = U (10V)	yes	yes
43001	2	range begin channel 1	mA or V	float	0...10mA / 0...5V	yes	yes
43003	2	range begin channel 2	mA or V	float	0...10mA / 0...5V	yes	yes
43005	2	range begin channel 3	mA or V	float	0...20mA / 0...5V	yes	yes
43007	2	range begin channel 4	mA or V	float	0...20mA / 0...5V	yes	yes
43033	2	range end channel 1	mA or V	float	10...20mA / 5...10V	yes	yes
43035	2	range end channel 2	mA or V	float	10...20mA / 5...10V	yes	yes
43037	2	range end channel 3	mA or V	float	10...20mA / 5...10V	yes	yes
43039	2	range end channel 4	mA or V	float	10...20mA / 5...10V	yes	yes
43065	1	filter value channel 1	seconds	U16	0...1000	yes	yes
43066	1	filter value channel 2	seconds	U16	0...1000	yes	yes
43067	1	filter value channel 3	seconds	U16	0...1000	yes	yes
43068	1	filter value channel 4	seconds	U16	0...1000	yes	yes
43017	2	scale begin channel 1	scale unit	float		yes	yes
43019	2	scale begin channel 2	scale unit	float		yes	yes
43021	2	scale begin channel 3	scale unit	float		yes	yes
43023	2	scale begin channel 4	scale unit	float		yes	yes
43049	2	scale end channel 1	scale unit	float		yes	yes
43051	2	scale end channel 2	scale unit	float		yes	yes
43053	2	scale end channel 3	scale unit	float		yes	yes
43055	2	scale end channel 4	scale unit	float		yes	yes
43132	6	scale unit channel 1	max. 6 character	string		yes	yes
43138	6	scale unit channel 2	max. 6 character	string		yes	yes
43144	6	scale unit channel 3	max. 6 character	string		yes	yes
43150	6	scale unit channel 4	max. 6 character	string		yes	yes
43084	6	measuring point channel 1	6 character	string		yes	yes
43090	6	measuring point channel 2	6 character	string		yes	yes
43096	6	measuring point channel 3	6 character	string		yes	yes
43102	6	measuring point channel 4	6 character	string		yes	yes
43081	1	baud rate	baud	U16	see list below	yes	yes
43082	1	parity		U16	[0]=even; [1]=odd; [2]=no	yes	yes
43083	1	stopbit		U16	[0] = 1 ; [1] = 2	yes	yes

Coding baudrate list

index	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
baudrate	50	110	300	600	1200	2400	4800	9600	14400	19200	28800	38400	57600	76800	115200

Fieldbus Devices

Digital-Input-Bus-Converter

AD-KEB 20 GX

Description

The two-channel AD-KEB 20 GX is used to read in digital signals that are present as a contact or active 24V signal. The respective signal state is indicated on the device by means of a red LED. Device communication takes place via the RS485 bus interface and is implemented using the MODBUS RTU protocol.
The power supply and the RS485 bus connection are possible via the rear DIN rail connector. The device is equipped with two rotary coding switches with which the bus address can be set on the device.
An optical search function allows the localization of a single device in a network. For this purpose, the green LED is set in a time-limited flashing mode, between 1 and 255 seconds.
Interface settings as well as the device address can be modified during operation by means of Modbus commands.
All Modbus register addresses and associated commands are listed in the document attachment. The presettable absolute counters continuously add incoming pulses and are saved in a non-volatile memory every hour. The current counters are reset during readout to detect subsets.

Application

Reading in digital signals in general electrical engineering, automation technology and in the water / wastewater sector.
For example: pulse counting with presettable counters or frequency measurement.

Specific characteristics

- RS485 bus / Modbus RTU protocol
- Rotary coding switch for bus address setting
- Counter function
- Frequency measurement
- Switching Power Supply
- Optical search function

Business data

Order number	AD-KEB 20 GX

Accessory

Rail connector (5-pin)	Artnr: AD-GX-Connector Zur Durchschleifung von Versorgungsspannung und RS485-Bus Aufrastbar auf Tragschiene (DIN EN 50022).

Technical specifications

Input

Input voltage	24 V DC / 3,5 mA (max. 30V)
Switching threshold	~ 17 V
Contact load	5 V / 1,5 mA

Measure

Frequency	< 2200 Hz
Gate time	1 s
Accuracy	+/- 0,3%
Counter	0...4294967295
Pulse width (counter)	> 25 ms
Counting frequency	< 20 Hz
Contact debouncing	20 ms
Counter storage	stündlich

Transmission behaviour

Response time	max. 15 ms

RS485-Bus

Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no spur lines)
Cable	twisted and shielded

Supply

Supply voltage	18 ... 30 V DC
Max. power consumption	800 mW (24V DC)

Housing

Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Manner of fastening	DIN rail mounting 35mm, EN 50022
Type of protection	IP 20
Connection method	screw clamp
Bolting torque terminals	0,5 Nm
Wire cross section	max. 2,5 mm²
Weight	~ 70 g

Environmental conditions

Permissible ambient temperature	-10 ... +50 °C
Storage and transport	-10 ... +70 °C (no condensation)

EMC

Product family standard [1]	EN 61326-1
Emission [2]	EN 55011, CISPR11 Cl. A, Gr. 1

[1] During checking, slight signal deviations are possible.

[2] Warning:
This device is not intended to be used in residential areas and can not ensure adequate protection of radio reception in such environments.

Printed 23.08.2022 We reserve the right for technical changes.

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Digital-Input-Bus-Converter

AD-KEB 20 GX

Technical specifications

Electrical safety requirements

Product family standard	EN 61010-1

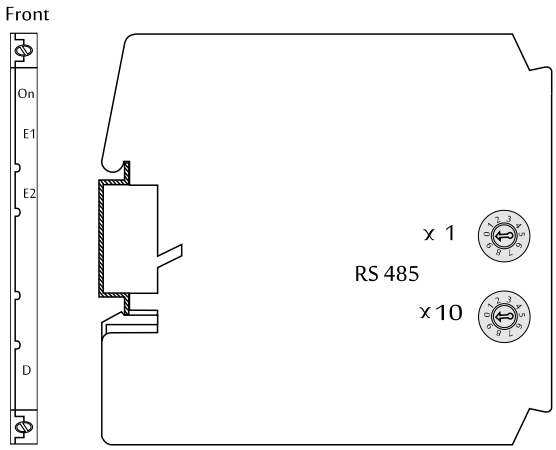
Galvanic isolation, test voltages

RS485 bus / power supply	1,5 kV, 50 Hz (1 min)
Digital input / Power supply	1.5 kV, 50 Hz (1 min)
Digital input / RS485 bus	1,5 kV, 50 Hz (1 min)
Digital input between themselves	0 kV

Protection circuits

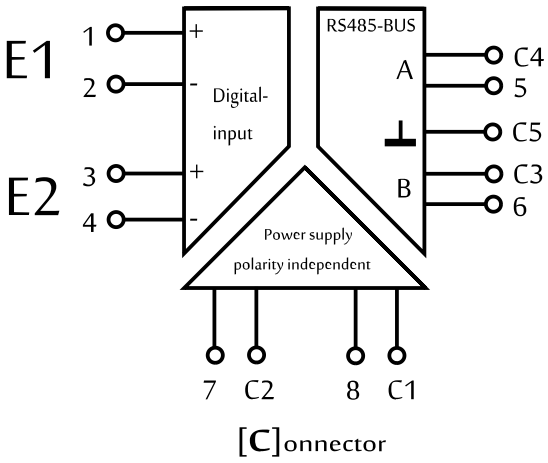
RS485-Bus	electrical surge protection
Power supply	electrical surge and reverse current protection

Display and operating elements

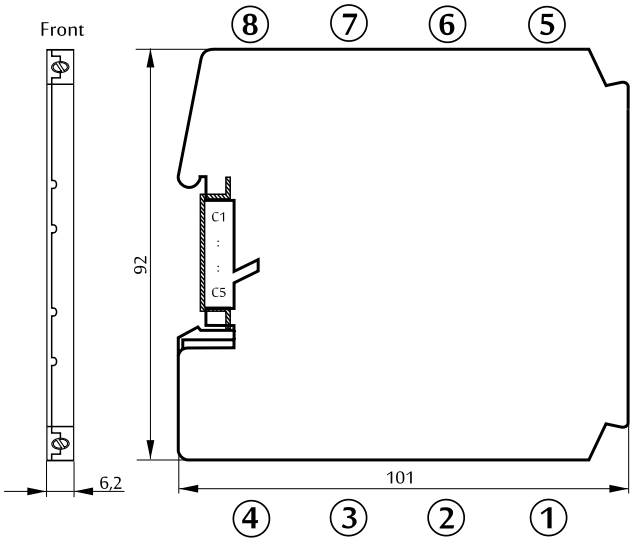


Designation	LED	Meaning
On	green	Power supply
E1	red	Input 1 state
E2	red	Input 2 state
D	yellow	RS485 Communication
RS485		Address switch(01...99)

Block and wiring diagram



Dimensions



Digital-Input-Bus-Converter AD-KEB 20 GX

Modbus Communication

The AD-KEB 20 GX contains a RS485 bus interface on which the Modbus RTU protocol is used. All control functions of the device can be executed via this bus interface. The preset standard data format is 19200,e,8,1. Adaptation to a different data format is possible at any time. The bus address (1...99) is set to the side-mounted rotary switches. The address 0 is not permitted for the bus operation. However, on this zero position the device is accessible only via the standard data format (19200, e, 8.1). The position 0 thus represents a service position, the example can be used during parameterization error.

The AD-KEB 20 GX supports two Modbus functions. These are the functions **"Read Holding Registers" (0x03)** and **"Write Holding Registers" (0x10)**. With the **"Read Holding Registers"** function data can be read from the device and written with **"Write Holding Registers"** data. The individual register width is 16 bits. Please see the Modbus specification for detailed explanations of the Modbus communication. This is online available for free and can be downloaded from the Adamczewski homepage.

The following Modbus data are accessible via the RS485 bus:

Start address	Reg. number	Name	Datatype	[Code] = Value	read	write
40501	1	Address switch	U16	1...99...247	yes	yes
40502	1	Flashing function	U16	0/1...255	yes	yes
40503	1	24V Input 1	U16	0/1	yes	no
40504	1	24V Input 2	U16	0/1	yes	no
40505	1	Input contact 1	U16	0/1	yes	no
40506	1	Input contact 2	U16	0/1	yes	no
40551	2	Input frequency 1	FLOAT	0,00...2200 Hz	yes	no
40553	2	Input frequency 2	FLOAT	0,00...2200 Hz	yes	no
42901	1	Baud rate	U16	Index, see list below	yes	yes
42902	1	Parity	U16	[0]=even; [1]=odd; [2]=no	yes	yes
42903	1	Input signal type 1	U16	[0]=aktiv; [1]=Contact	yes	yes
42904	1	Input signal type 2	U16	[0]=aktiv; [1]=Contact	yes	yes
43001	1	Debouncing 1	U16	x 20 ms	yes	yes
43002	1	Debouncing 2	U16	x 20 ms	yes	yes
47209	2	Absolutely counter 1	U32	0...4294967295	yes	yes
47211	2	Absolutely counter 2	U32	0...4294967295	yes	yes
47213	2	Currently counter 1	U32	0...4294967295	yes	no
47215	2	Currently counter 2	U32	0...4294967295	yes	no
49102	1	Device reset	U16	0	no	yes
49105	6	Device type	String	KEB20GX	yes	no
49119	1	Firmware version	U16	MSB/LSB	yes	no

Coding baudrate list

index	0	1	2	3	4	5	6	7	8	9
baud	2400	4800	9600	14400	19200	28800	38400	57600	76800	115200

After changing the interface parameters, a device reset is required.

Modbus master mode

The device can even work in Modbus master mode to transfer data between any devices within an RS485 line.
For Modbus master operation, starting with Modbus register 40611, there are 48 consecutive data transfer sets, with 5 configuration registers each.

Start address	Reg. number	Name	Datatype	[Code] = Value	read	write
40611	1	Source address [1]	U16	1...99	yes	yes
40612	1	Source register [1]	U16	nnnnn	yes	yes
40613	1	Target address [1]	U16	1...98	yes	yes
40614	1	Target register [1]	U16	nnnnn	yes	yes
40615	1	Register count [1]	U16	1/2	yes	yes
40846	1	Source address [48]	U16	1...99	yes	yes
40847	1	Source register [48]	U16	nnnnn	yes	yes
40848	1	Target address [48]	U16	1...98	yes	yes
40849	1	Target register [48]	U16	nnnnn	yes	yes
40850	1	Register count [48]	U16	1/2	yes	yes

For the Modbus master mode, the parameter "Modbus master" must be activated and the address switch set to position 99.
Data transfer begins six seconds after activation or device restart.
A flashing green LED indicates a communication error.

Fieldbus Devices

RS485-Relay Module

AD-KAB 10 GX

Description

The AD-KAB10 GX provides a remote controllable relay switching contact (changeover contact). Remote control is via the RS-485 bus interface. The device communication is realized using the MODBUS RTU protocol.
The power supply and the RS485 bus connection is possible via the rear DIN rail connector. The device is equipped with two rotary coding switches with which the bus address can be set on the device.
The static contact control is carried out with a control value 0 or 1.
A pulse output function (with 1 Hz) is triggered with a control value of 1 to 255 and can be modified or stopped at any time with other values. An optical search function allows the localization of a single device in a device network when in a cabinet several devices are on a top hat rail. For this purpose, the green LED is set in a time-limited flashing mode, between 1 and 255 seconds.
For the relay, a defined start state can be set so that when the supply voltage returns after a power failure, a system can assume the desired start state.
The interface settings as well as the device address can be modified during operation by means of Modbus commands. All Modbus register addresses and associated commands are listed in the document attachment.

Application

Remote control of consumers such as valves or motors in building automation and automation technology.

Specific characteristics

- RS485 bus / Modbus RTU protocol
- Rotary coding switch for bus address setting
- Presettable contact start state
- Potential-free contact (changer)
- Switching Power Supply
- Pulse and toggle output function
- Pulse summation (1/1000 + 1/100 + 1/10 + 1)
- Optical search function, Modbus master mode

Business data

Order number	AD-KAB 10 GX

Technical specifications

Relay

Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	changeover contact
Switching operations mechanical	10000000
At 230V/2A AC, cos(phi)=1	500000
At 24V/1 A DC	1000000

Transmission behaviour

Response time	max. 15 ms

RS485-Bus

Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no spur lines)
Cable	twisted and shielded

Supply

Supply voltage	18 ... 30 V DC
Max. power consumption	700 mW (24V DC)

Housing

Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Manner of fastening	DIN rail mounting 35mm, EN 50022
Type of protection	IP 20
Connection method	screw clamp
Bolting torque terminals	0,5 Nm
Wire cross section	max. 2,5 mm²
Weight	~ 70 g

Environmental conditions

Permissible ambient temperature	-10 ... +50 °C
Storage and transport	-10 ... +70 °C (no condensation)

EMC

Product family standard [1]	EN 61326-1
Emission [2]	EN 55011, CISPR11 Cl. A, Gr. 1

[1] During checking, slight signal deviations are possible.

[2] Warning:
This device is not intended to be used in residential areas and can not ensure adequate protection of radio reception in such environments.

Electrical safety requirements

Product family standard	EN 61010-1

Galvanic isolation, test voltages

RS485 bus / power supply	1,5 kV, 50 Hz (1 min)
Relay contact	3 kV, 50 Hz (1 min)

Protection circuits

RS485-Bus	electrical surge protection
Power supply	electrical surge and reverse current protection

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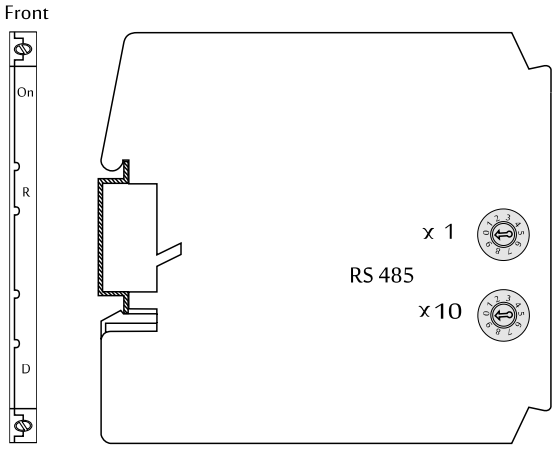
RS485-Relay Module

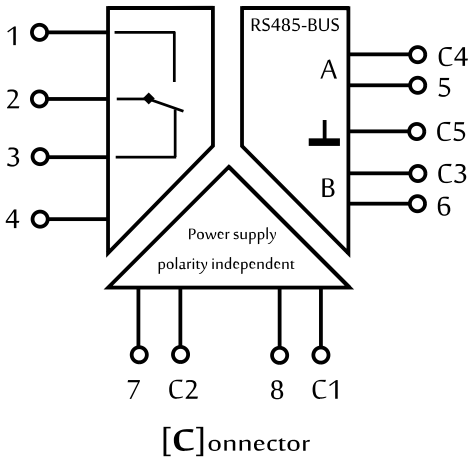
AD-KAB 10 GX

Display and operating elements

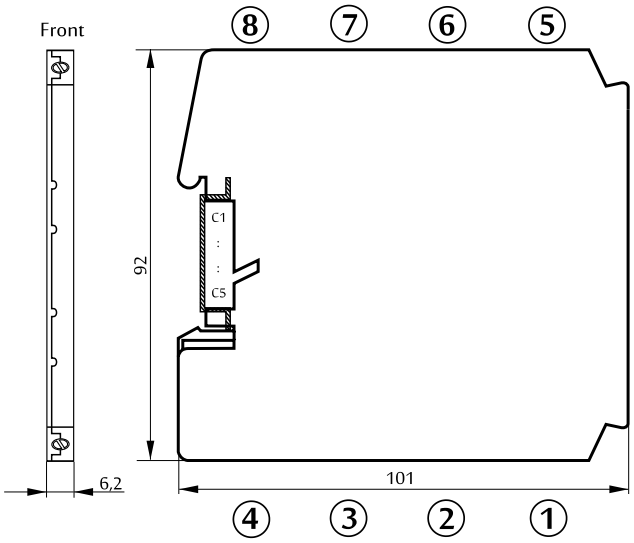


Designation	LED	Meaning
On	green	Power supply
R	red	Relay state
D	yellow	RS485 Communication
RS485		Address switch(01...99)

Block and wiring diagram



Dimensions



RS485-Relay Module

AD-KAB 10 GX

Modbus Communication

The AD-KAB 10 GX has an RS485 bus interface on which the Modbus RTU protocol is used. All control functions of the device can be executed via this bus interface. The preset standard data format is 19200,e,8,1. Adaptation to a different data format is possible at any time. The bus address (1...99) is set to the side-mounted rotary switches. The address 0 is not permitted for the bus operation. However, on this zero position the device only via the standard data format (19200, e, 8.1) accessible. The position 0 thus represents a service position, the example can be used during parameterization error.

The AD-KAB 10 GX supports two Modbus functions. These are the functions **"Read Holding Registers" (0x03)** and **"Write Holding Registers" (0x10)**. With the **"Read Holding Registers"** function data can be read from the device and written with **"Write Holding Registers"** data. The individual register width is 16 bits. Please see the Modbus specification for detailed explanations of the Modbus communication. This is online available for free, but can also be purchased from the Adamczewski homepage.

The following Modbus data are accessible via the RS485 bus:

Start address	Reg. number	Name	Datatype	[Code] = Value	read	write
40401	2	Pulse summation / 1	U32	0...4294967295	yes	yes
40403	2	Pulse summation / 10	U32	0...4294967295	yes	yes
40405	2	Pulse summation / 100	U32	0...4294967295	yes	yes
40407	2	Pulse summation / 1000	U32	0...4294967295	yes	yes
40501	1	Address switch	U16	1...99...247	yes	yes
40502	1	Output contact	U16	0/1...255	yes	yes
40503	1	Pulse output	U16	1...255	yes	yes
40504	1	Toggle relay	U16	0/1	yes	yes
40505	1	Flashing function	U16	0/1...255	yes	yes
40901	2	Scaling value	float	float	no	yes
44201	2	OFF limit	float	float	yes	yes
44211	2	ON limit	float	float	yes	yes
47215	2	Switching cycles	U32	0...	yes	no
49102	1	Device reset	U16	0	no	yes
49105	6	Device type	String	KAB10GX	yes	no
49119	1	Firmware version	U16	MSB/LSB	yes	no
42901	1	Baud rate	U16	index, see list below	yes	yes
42902	1	Parity	U16	[0]=even; [1]=odd; [2]=no	yes	yes
42903	1	Modbus Master	U16	0/1	yes	yes
42904	1	Relay start up state	U16	0/1	yes	yes

Coding baudrate list

index	0	1	2	3	4	5	6	7	8	9
baud	2400	4800	9600	14400	19200	28800	38400	57600	76800	115200

After changing the interface parameters, a device reset is required.

Modbus master mode

The device can even work in Modbus master mode to transfer data between any devices within an RS485 line.
For Modbus master operation, starting with Modbus register 40611, there are 48 consecutive data transfer sets, with 5 configuration registers each.

Start address	Reg. number	Name	Datatype	[Code] = Value	read	write
40611	1	Source address [1]	U16	1...98	yes	yes
40612	1	Source register [1]	U16	nnnnn	yes	yes
40613	1	Target address [1]	U16	1...99	yes	yes
40614	1	Target register [1]	U16	nnnnn	yes	yes
40615	1	Register count [1]	U16	1/2	yes	yes
40846	1	Source address [48]	U16	1...98	yes	yes
40847	1	Source register [48]	U16	nnnnn	yes	yes
40848	1	Target address [48]	U16	1...99	yes	yes
40849	1	Target register [48]	U16	nnnnn	yes	yes
40850	1	Register count [48]	U16	1/2	yes	yes

For the Modbus master mode, the parameter "Modbus master" must be activated and the address switch set to position 99.
Data transfer begins six seconds after activation or device restart.
A flashing green LED indicates a communication error.

Fieldbus Devices

RS485-Relay Module

AD-KAB 40 GT

AD-KAB 80 GT

Description

With the RS485 relay modules AD-KAB 40 GT and AD-KAB 80 GT, 4 or 8 potential-free NO contacts can be controlled from a distance via RS485 bus. The used Modbus-RTU protocol on these devices on the RS485 bus is an open standard and therefore extremely flexible. The up to eight relays can be individually controlled via a separate Modbus register. The devices are equipped with two rotary coding switches, which can be used to set the bus address on the device. If the DIP switch is active (in manual operation) bus commands for the respective relay are ignored because the manual operation has priority. Due to the compact and efficient switching power supply, the devices can be operated in a wide supply voltage range.

Application

Remote control of loads such as valves or motors in building automation as well as in automation technology.
Attention: A mixed wiring of the relays of extra low voltage and grid voltage is only permitted to a limited extent. For example, care must be taken that relays with 24 V and 230 V signals are not adjacent.

Specific characteristics

- RS485-Bus
- Modbus-RTU protocol
- rotary coding switch for setting the bus address
- DIP switch for manual relay operation
- 4 or 8 potential free relays
- wide range power supply

Business data

Article number

AD-KAB 40 GT	RS485 Relaismodul mit 4 Relais
AD-KAB 80 GT	RS485 Relaismodul mit 8 Relais

Accessory

USB/RS485 converter	AD-VarioPass3

Technical specifications

RS485-Bus

Software protocol	Modbus-RTU
Data format (default setting)	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no spur lines)
Cable	twisted and shielded

Relay

Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	closing contact
Switching operations mechanical	10000000
At 230V/2A AC, cos(phi)=1	600000
At 230V/2A AC, cos(phi)=0,4	200000
At 24V/1 A DC	200000

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	22 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	3,5 VA / 2,5 W

Transmission behaviour

Response time	max. 5 ms

Housing

Dimensions (WxHxD)	71x90x58 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 200 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 60 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Power supply / RS485-Bus	3 kV, 50 Hz (1 min.)
Power supply / relay output	3 kV, 50 Hz (1 min.)
Relay output / RS485-Bus	3 kV, 50 Hz (1 min.)

Protection circuits

RS485-Bus	electrical surge protection
Power supply	electrical surge and reverse current protection

[1] During checking, slight signal deviations are possible.

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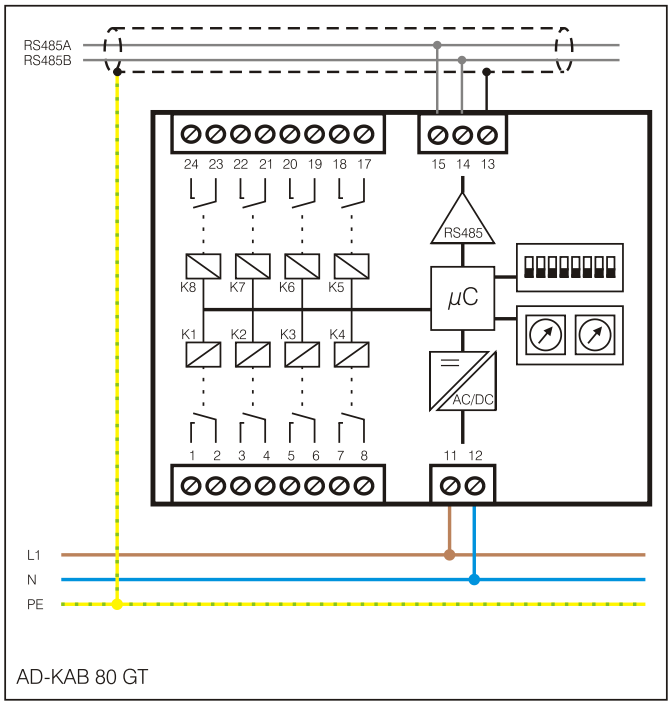
Fieldbus Devices

RS485-Relay Module

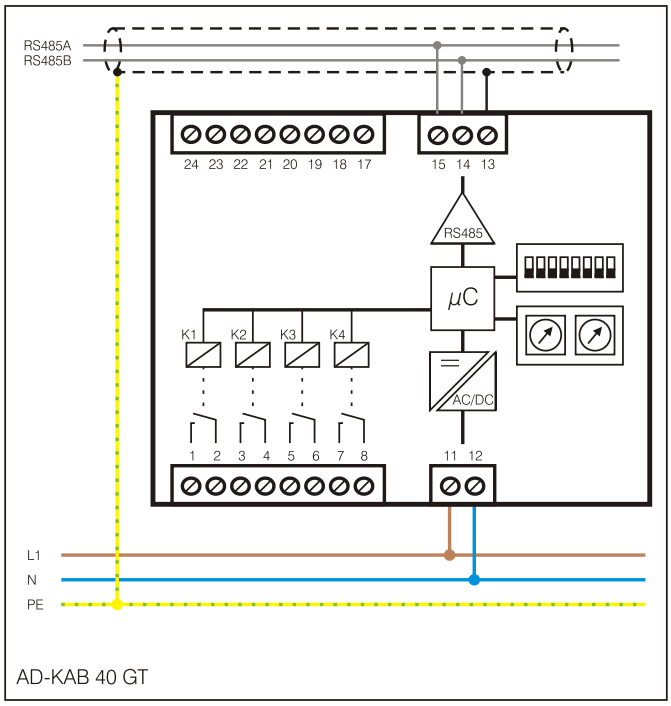
AD-KAB 40 GT

AD-KAB 80 GT

Block and wiring diagram

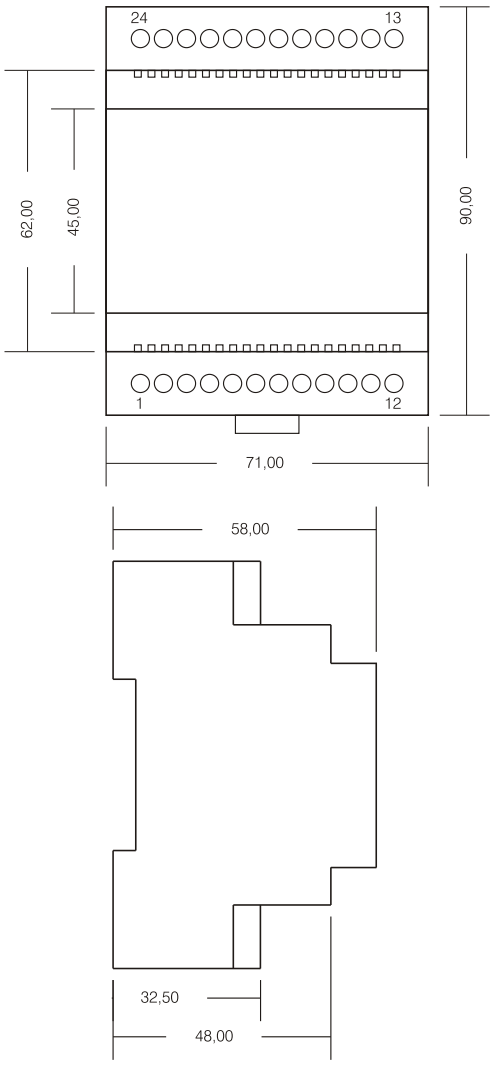


AD-KAB 80 GT



AD-KAB 40 GT

Dimensions



RS485-Relay Module

AD-KAB 40 GT

AD-KAB 80 GT

Modbus communication

data rate: 19200 Baud (Bits/s)	**parity:** even	**data bits:** 8	**stop bits:** 1

The bus address is set at the front-mounted rotary coding switches. Address 0 is not allowed for bus operation. However, at this zero position the device can always be reached via the standard data format (19200, e, 8.1). Position 0 thus represents a service position, which can be used with incorrect parameterization.

The AD-KAB 40/80 GT supports two Modbus functions. These are the functions **"Read Holding Registers" (0x03)** and **"Write Multiple Registers" (0x10)** . The function **"Read Holding Registers"** data can be read from the device and data is written with **"Write Multiple Registers"**. The individual register width is 16 bits.
Please refer to the Modbus specification for a detailed description of the Modbus communication. This is freely available online, but can also be obtained from the Adamczewski homepage.

The following Modbus data are accessible via the RS485 bus:
Each relay can be read or written (0 or 1) via its assigned register (DOUT_RELAIS_x). But it is also possible to manipulate or read out all relays with the register DOUT_RELAIS_COMPLETE. For AD-KAB 80 GT corresponds bit 0 of the word to relay 1 and bit 7 to the relay 8. With the AD-KAB 40 GT corresponding to relay 4.

start address	register number	name	unit	data type	read	write
relay control:						
40501	1	DOUT_RELAY_1		3	1	1
40502	1	DOUT_RELAY_2		3	1	1
40503	1	DOUT_RELAY_3		3	1	1
40504	1	DOUT_RELAY_4		3	1	1
40505	1	DOUT_RELAY_5		3	1	1
40506	1	DOUT_RELAY_6		3	1	1
40507	1	DOUT_RELAY_7		3	1	1
40508	1	DOUT_RELAY_8		3	1	1
40601	1	DOUT_RELAY_COMPLETE		3	1	1
list-parameters:						
41001	1	LIST_RS485_BAUDRATE		3	1	1
41002	1	LIST_RS485_PARITY		3	1	1
41003	1	LIST_RS485_STOPBIT		3	1	1

legend of the data types:

U08: 1	**S08:** 2	**U16:** 3	**S16:** 4	**U32:** 5	**S32:** 6	**float:** 7

coding of the list parameters (list index:value):

baudrate	**0:**2400	**1:**4800	**2:**9600	**3:**14k4	**4:**19k2	**5:**28k8	**6:**38k4	**7:**57k6	**8:**76k8	**9:**115k2
stop bit	**0:**1	**1:**2								
parity	**0:**even	**1:**odd	**2:**none							

Temperature-Input-Bus-Converter

AD-MV 55 GX

Description

The digital temperature measuring converter of series AD-MV55 GX are freely programmable digital measuring transducer with RS485 interface. Device addresses from 1 to 99 can be set via the laterally accessible address switches. The input of all characteristics directly on the device, or use the configuration software "AD-Studio". The device fulfils all tasks of a universal measuring value recording through integral function modules such as selectable relay functions, simulation modus, free linearizing curves and a wide range of supply voltage. The operating voltage is indicated by a green LED. The data communication is signaled by a yellow LED. Invalid measurement signals outside the defined measuring range are detected. In this case, the green LED flashes. The power supply as well as the RS485 bus interface is possible via the rear DIN rail connector.

Specific characteristics

- Resistance thermometer inputs, types Pt/Ni 100, Pt/Ni 500, Pt/Ni 1000
- Thermocouples inputs, types J, T, K, E, N, S, R, B, C or inputs a mV/T-characteristic curve. Selectable internal or external reference junction
- A bipolar mV-Voltage input. Free linearizing curves possible.
- Freely definable scaling of the quantity to be measured through stating range, decimal point position and unit from the list or defined unit.
- Zoom function, expanded scale, linearizing, inverse modus.
- Non-volatile saving of all set parameters.

Business data

Order number	AD-MV 55 GX

Technical specifications

Resistance thermometer inputs Pt100, Pt500, Pt1000 to DIN EN 60751

Measuring range	-200 ... +850 °C
Connection method	2-, 3- oder 4-wire system
Resolution	16 Bit
Accuracy	0,5 K
Smallest measuring spans	30 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	
Pt100	1 mA
Pt500, Pt1000	210 µA

[1] With 2-conductor the line resistance comes as an offset into the measurement.

Resistance thermometer inputs Ni100, Ni500, Ni1000 to DIN EN 43760

Measuring range	-60 ... +230 °C
Connection method	2-, 3- oder 4-wire system
Resolution	16 Bit
Accuracy	0,5 K
Smallest measuring spans	30 K
Max line resistance [1)]	10 Ohm/cable
Sensor supply	
Ni100	1 mA
Ni500, Ni1000	210 µA

[1] With 2-conductor the line resistance comes as an offset into the measurement.

Thermocouples

Comparative place:	
Internal	measurement with LM35 in the device connecting terminals
External	Cold junction temperature selectable by parameters
Resolution	16 Bit
Accuracy	0,2 % of measuring range
Measuring range type J	-200 ... +1200 °C
To DIN EN 60584:	
Measuring range type T	-200 ... +400 °C
Measuring range type K	-200 ... +1360 °C
Measuring range type E	-200 ... +1000 °C
Measuring range type N	-200 ... +1300 °C
Measuring range type S	-40 ... +1760 °C
Measuring range type R	-40 ... +1760 °C
Measuring range type B	+400 ... +1800 °C
After standard ASTM E988:	
Measuring range type C	0 ... +2320 °C
Smallest measuring spans	100 K

Voltage inputs

Measuring range	-18 ... +18 mV
	-36 ... +36 mV
	-72 ... +72 mV
	-144 ... +144 mV
Resolution	16 Bit
Accuracy	0,2 % of measuring range

Printed 23.08.2022 We reserve the right for technical changes.

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Temperature-Input-Bus-Converter AD-MV 55 GX

Technical specifications

Transmission behaviour

Sampling rate	1 measure/s
Temperature influence	+/-100 ppm/K of full scale

RS485-Bus

Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no spur lines)
Cable	twisted and shielded

LEDs

Green [On]	Supply (blinking on error)
Yellow [D]	RS485 Communication

Controls

Address switch	10 + 1

Supply

Supply voltage	18 ... 30 V DC
Max power consumption at 24V DC	300 mW

Housing

Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Manner of fastening	DIN rail mounting 35mm, EN 50022
Type of protection	IP 20
Connection method	screw clamp
Bolting torque terminals	0,5 Nm
Wire cross section	max. 2,5 mm²
Weight	~ 70 g

Environmental conditions

Permissible ambient temperature	-10 ... +50 °C
Storage and transport	-10 ... +70 °C (no condensation)

EMC

Product family standard [2]	EN 61326-1
Emission [3]	EN 55011, CISPR11 Cl. A, Gr. 1

[2] During electromagnetic disturbance minor changes in output signal are possible.

[3] Warning:
This device is not intended to be used in residential areas and can not ensure adequate protection of radio reception in such environments.

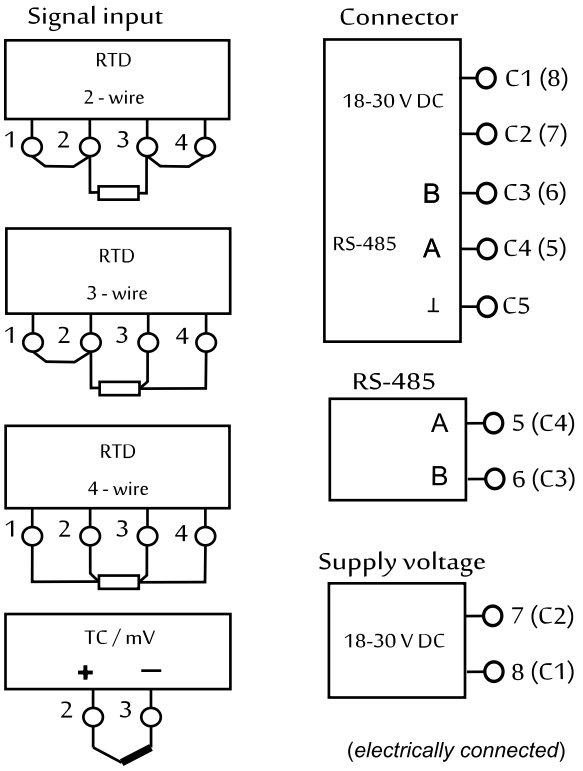
Electrical safety requirements

Product family standard	EN 61010-1

Galvanic isolation, test voltages

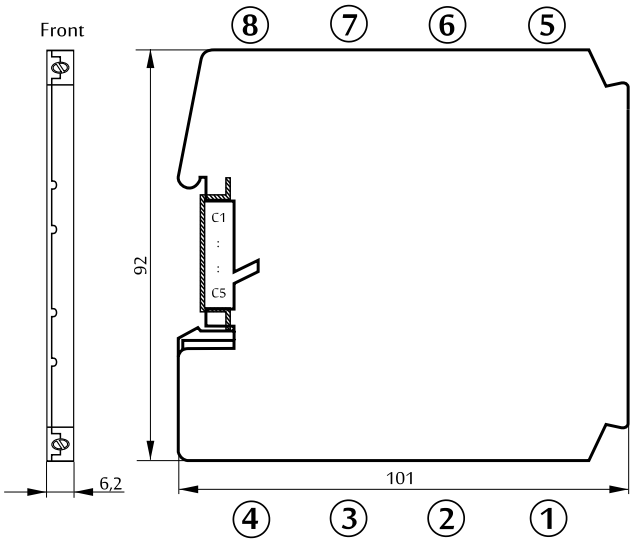
Signal / supply unit	1,5 kV, 50 Hz (1 min.)
Signal / RS485 bus	no galvanic isolation

Block and wiring diagram



(*electrically connected*)

Dimensions



Temperature-Input-Bus-Converter AD-MV 55 GX

Modbus Communikation

The AD-MV 55 GX has an RS485 bus interface on which the Modbus RTU protocol is used. About this bus interface all measured data of the device can be read. The preset standard data format is 19200,e,8,1. Adaptation to a different data format is possible at any time. The bus address (1...99) is set to the side-mounted rotary switches. The address 0 is not permitted for the bus operation. However, on this zero position the device only via the standard data format (19200, e, 8.1) accessible. The position 0 thus represents a service position, the example can be used during parameterization error.

The AD-MV 55 GX supports two Modbus functions. These are the functions **"Read Holding Registers" (0x03)** and **"Write Holding Registers" (0x10)**. With the **"Read Holding Registers"** function data can be read from the device and written with **"Write Holding Registers"** data. The individual register width is 16 bits. Please see the Modbus specification for detailed explanations of the Modbus communication. This is online available for free, but can also be purchased from the Adamczewski homepage.

The following Modbus data are accessible via the RS485 bus:

Start address	Reg. number	Name	Unit	Datatype	[Code] = Value	read	write
Observations:							
40113	1	signal status	keine	U16	0 / 1 / 2 / 4	yes	no
40851	2	signal value	°C / mV	float	####,#	yes	no
40852	6	scale unit	°C / mV	string	unit	yes	no
40811	2	terminal temperature	°C	float	##,####	yes	no
Parameters:							
43101	2	filter value	numeric	float	seconds	yes	yes
43001	1	signal type	list	U16	[0]=RTD; [1]= TC; [2]=mV	yes	yes
43002	1	RTD type	list	U16	RTD-Liste	yes	yes
43003	1	RTD connectivity	list	U16	2-3-4-Leiter	yes	yes
43201	2	range begin Pt100	°C	float	-200...+850	yes	yes
43301	2	range end Pt100	°C	float	-200...+850	yes	yes
43202	2	range begin Pt500	°C	float	-200...+850	yes	yes
43302	2	range end Pt500	°C	float	-200...+850	yes	yes
43203	2	range begin Pt1000	°C	float	-200...+850	yes	yes
43303	2	range end Pt1000	°C	float	-200...+850	yes	yes
43204	2	range begin Ni100	°C	float	-60...+230	yes	yes
43304	2	range end Ni100	°C	float	-60...+230	yes	yes
43205	2	range begin Ni500	°C	float	-60...+230	yes	yes
43305	2	range end Ni500	°C	float	-60...+230	yes	yes
43206	2	range begin Ni1000	°C	float	-60...+230	yes	yes
43306	2	range end Ni1000	°C	float	-60...+230	yes	yes
43207	2	range begin R/T	°C	float	-200...1500	yes	yes
43307	2	range end R/T	°C	float	-200...1500	yes	yes
43401	2	R/T characteristic X1	Ohm	float	0...4000	yes	yes
43425	2	R/T characteristic Y1	°C	float	-200...1500	yes	yes
43400 + n	2	R/T characteristic Xn	Ohm	float	0...4000	yes	yes
43424 + n	2	R/T characteristic Yn	°C	float	-200...1500	yes	yes
43424	2	R/T characteristic X24	Ohm	float	0...4000	yes	yes
43448	2	R/T characteristic Y24	°C	float	-200...1500	yes	yes
43004	1	TC type	list	U16	TC-Liste	yes	yes
43005	1	junction	list	U16	[0]=int.; [1]=ext.	yes	yes
43102	2	junction temperature	°C	float	0...100	yes	yes
43208	2	range begin Typ J	°C	float	-200...+1200	yes	yes
43308	2	range end Typ J	°C	float	-200...+1200	yes	yes
43209	2	range begin Typ T	°C	float	-200...+400	yes	yes
43309	2	range end Typ T	°C	float	-200...+400	yes	yes
43210	2	range begin Typ K	°C	float	-200...+1360	yes	yes
43310	2	range end Typ K	°C	float	-200...+1360	yes	yes
43211	2	range begin Typ E	°C	float	-200...+1000	yes	yes
43311	2	range end Typ E	°C	float	-200...+1000	yes	yes
43212	2	range begin Typ N	°C	float	-200...+1300	yes	yes
43312	2	range end Typ N	°C	float	-200...+1300	yes	yes
43213	2	range begin Typ S	°C	float	-40...+1760	yes	yes
43313	2	range end Typ S	°C	float	-40...+1760	yes	yes
43214	2	range begin Typ R	°C	float	-40...+1760	yes	yes
43314	2	range end Typ R	°C	float	-40...+1760	yes	yes
43215	2	range begin Typ B	°C	float	+400...+1800	yes	yes
43315	2	range end Typ B	°C	float	+400...+1800	yes	yes
43216	2	range begin Typ C	°C	float	0...+2320	yes	yes
43316	2	range end Typ C	°C	float	0...+2320	yes	yes

43217	2	range begin U/T	°C	float	-200...+2500	yes	yes
43317	2	range end U/T	°C	float	-200...+2500	yes	yes
43449	2	U/T characteristic X1	mV	float	-144...144	yes	yes
43473	2	U/T characteristic Y1	°C	float	-200...1500	yes	yes
43448 + n	2	U/T characteristic Xn	mV	float	-144...144	yes	yes
43472 + n	2	U/T characteristic Yn	°C	float	-200...1500	yes	yes
43472	2	U/T characteristic X24	mV	float	-144...144	yes	yes
43496	2	U/T characteristic Y24	°C	float	-200...1500	yes	yes
42997	1	baud rate	index	U16	see list below	yes	yes
42998	1	parity		U16	[0]=even; [1]=odd; [2]=no	yes	yes

Coding baudrate list

index	0	1	2	3	4	5	6	7	8	9
baud	2400	4800	9600	14400	19200	28800	38400	57600	76800	115200

Indicator

AD-MM 400 FE

Description

The Monitor module AD-MM 400 FE is a display and control unit for front panel mounting. The device can be used as master or slave. As a master, the device reads the displayed values of devices that are connected via the RS485 interface with the AD-MM 400 FE. The display values are polled at a certain time frame. The display values can be any data such as measured values, output values, digital inputs or outputs or various counters for energy or amounts. In addition to the display function, the AD-MM 400 FE can configure the connected devices via the menu. As a slave, the device can also be used as pure display device, where the display values are then sent from a master to the AD-MM 400.

Application

Display measurements in a graphic display. Scroll through multiple views. Configuration of connected devices via their menu.

Specific characteristics

- Connection in the master operation of up to 32 slaves.
- Scroll up to 10 different user-configurable displays.
- Display of up to 4 values per display.
- Freely configurable labeling of the displays and values.
- Convenient configuration of the displays via PC software AD-Studio.
- Connection of several AD-MM 400 FE on a bus in slave mode.

Business data

Order number	AD-MM 400 FE

Technical specifications

Supply

Supply voltage	20 ... 253 V AC/DC
Max. power consumption	1,0W / 2,0VA

Housing

Dimensions (WxHxD)	96x96x63 mm
Front panel cut out	92x92 mm
Protection class panel	IP 54
Protection class connection	IP 20
Connection method	detachable terminal clamp
Manner of fastening	Panel-mount-case
Weight	205 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1

Interface 1

Standard	RS-485
Protocol	Modbus-RTU
Max. attendance	32
Max. length of bus	100 m
Bus termination	120 Ohm (both sites of the bus)
Wiring	bus topology

Interface 2

Standard	UART, proprietary
Function	configuration

Display

Type	3,5" TFT
Resolution	320x240 Pixel

Operation

Type	3 short-stroke keys

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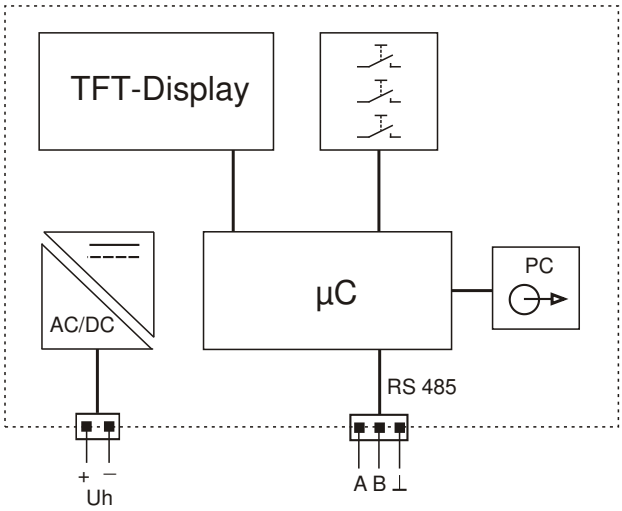
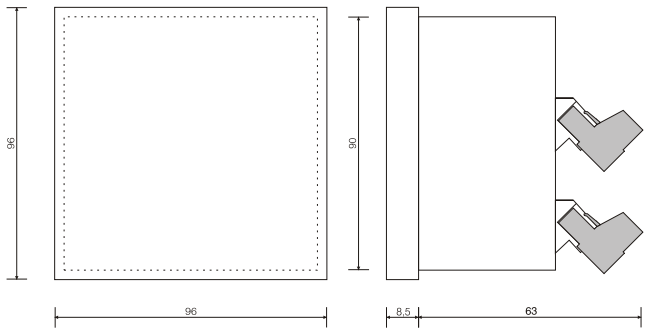
Indicator

AD-MM 400 FE

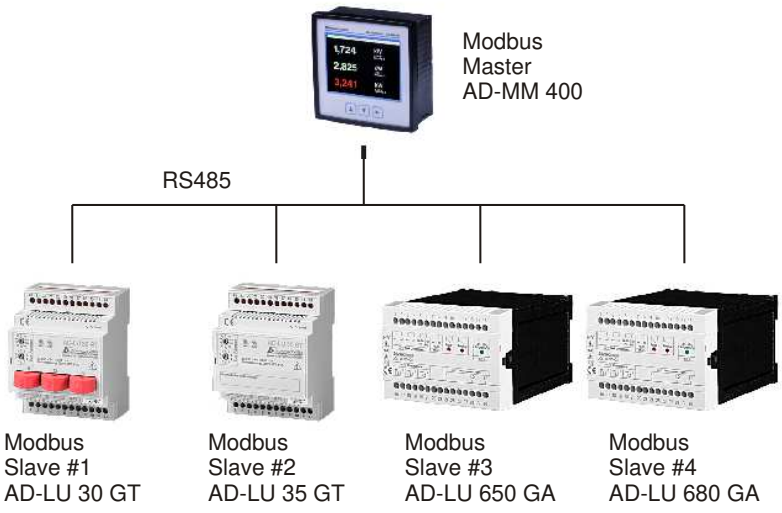
Block and wiring diagram

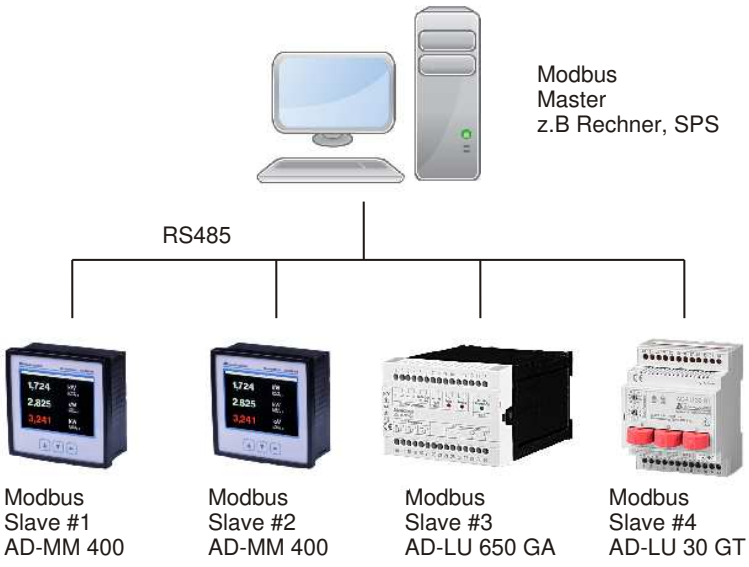


Dimensions



Circuit examples





Indicator

Data Logger

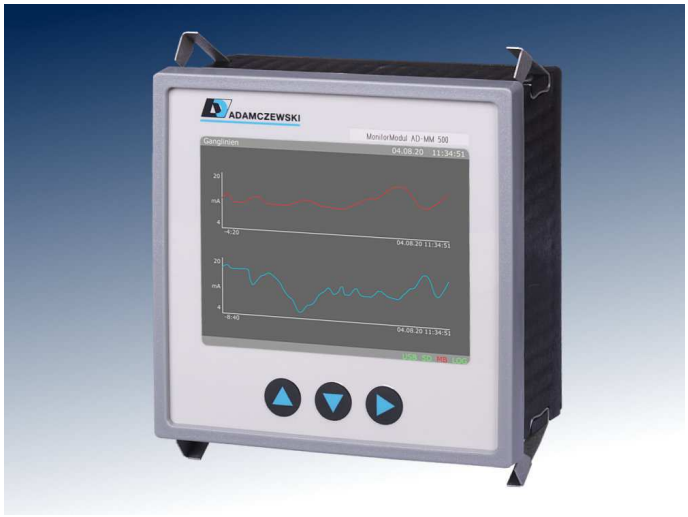
AD-MM 500 FE

Description

The AD-MM 500 FE monitor module is a display device, control unit and data logger for front panel installation. The AD-MM 500 FE always works as a Modbus master. It collects the values that are to be displayed or logged cyclically from one or more Modbus slaves. The values can be any data such as measured values, output values, digital inputs or outputs or various counters for energy or quantities. The display is done by freely configurable display elements such as numeric display, bar graphs, time diagrams, drag pointers, LEDs, etc. In addition to the display function, the AD-MM 500 FE can also configure connected devices from ADAMCZEWSKI. To do this, you can navigate in the menu of the connected device and configure the desired parameter. The logged data is saved on an internal micro SD card. They can be picked up at any time with a USB stick.

Application

Display measurements in a graphic display. Scroll through multiple views. Configuration of connected devices via their menu. Log the data for later evaluation.



Specific characteristics

- Connection in the master operation of up to 32 slaves.
- Scroll up to 10 different user-configurable displays.
- Display of up to 4 values per display.
- Freely configurable labeling of the displays and values.
- Convenient configuration of the displays via PC software AD-Studio.
- Connection of several AD-MM 400 on a bus in slave mode.

Business data

Order number	AD-MM 500 FE

Technical specifications

Supply

Supply voltage	20 ... 253 V DC
Supply voltage	50 ... 253 V AC
Max. power consumption	2,0W / 4,0VA

Housing

Dimensions (WxHxD)	96x96x63 mm
Front panel cut out	92x92 mm
Protection class panel	IP 54
Protection class connection	IP 20
Connection method	detachable terminal clamp
Manner of fastening	Panel-mount-case
Weight	350 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
Pollution degree	2

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1

RS485-interface

Connection	3-pin socket 3.81mm grid
Standard	RS-485
Function	Modbus-Master
Protocol	Modbus-RTU
Max. attendance	32
Max. length of bus	100m - twisted, shielded cable
Bus termination	120 Ohm (both sites of the bus)

Configuration interface

Connection	3.5mm jack socket
Standard	UART, proprietary
Function	configuration

Network interface

Connection	RJ45 socket
Standard	Ethernet
Function	Reserve for future expansions

USB interface

Connection	Type A socket for USB stick
Standard	USB 1.0, 2.0
Function	Data transfer

Display

Type	3,5" TFT
Resolution	320x240 Pixel

Operation

Type	3 short-stroke keys

Data logger

Internal memory size	2 GB (andere auf Anfrage)
Internal storage medium	µSD, single level cell
Sampling interval	1s ... ~18h
Max. channels	32
Data format	*.csv

Printed 23.08.2022 We reserve the right for technical changes.

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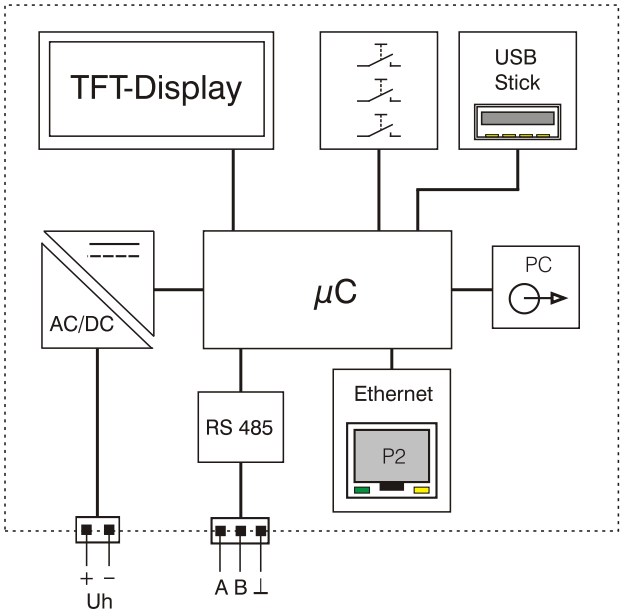
Indicator

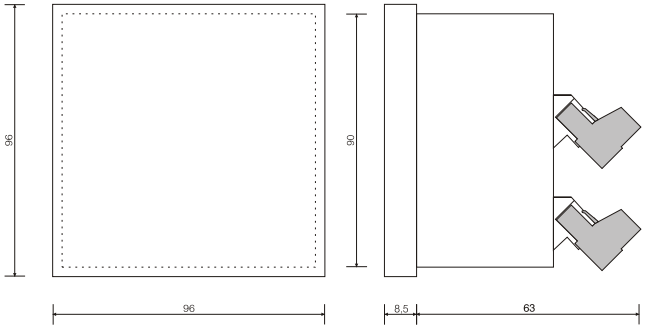
Data Logger

AD-MM 500 FE

Block and wiring diagram



Dimensions



Indicating / Operating Module

AD-VarioControl

AD-VarioConnect

Description

The removable control modules AD-VarioControl are used to display measured values of a base device (transmitter, isolation amplifiers ...) with a relevant interface. After plugging in, which is also possible during operation of the base device without restrictions, the basic device is automatically read out and the corresponding measured value is displayed. In addition to the display function, access to the parameters and controller functions of the basic device is also possible. The parameter settings can be loaded into the control panel using the backup function and can be restored on a different base device of the same type.
Establishment of a transmitter is usually necessary only once in the operating period of a device, therefore a display and operating elements are not permanently necessary for each device. By using the AD-VarioControl in connection with compatible basic equipment, operating elements and displays on each individual device can be dispensed with. This way, the installed devices are tamper-proof and more cost-effective.
The **AD-VarioConnect** has a fieldbus interface with the protocol Modbus-RTU via RS485. All measured values of the basic units are available above this.

Application

Control device to display and configuration of DIN rail devices with optional fieldbus.

Specific characteristics

- Removeable (hot-plugged)
- Store and restore of parameters
- LCD for display of different operating modes, lit in several colours (R/Y/B)
- Menu languages switchable to: German, English
- Simulation modus
- Fieldbus interface with Modbus RTU (AD-VarioConnect)

Business data

Order number	
Control panel	AD-VarioControl
Control panel with RS485	AD-VarioConnect
Basic devices	
Frequency measuring converter	AD-FM 255 GVD
Limit-Switch	AD-MK 350 GVD
Temperature Measuring Converter	AD-MV 550 GVD
Power measurement transducer	AD-LU 320 GVD / AD-LU 325 GVD
Power measurement transducer	AD-LU 620 GVF / AD-LU 625 GVF
Isolation amplifier	AD-TV 400 GVD
Isolation amplifier	AD-TV 420 GVD
AC Isolation Amplifier	AD-TV 588 GVD
Multifunction transducer	AD-VC 1 GVD

Technical specifications

Display	
Type	LCD graphic
Dimensions (WxH)	18x13 mm
Resolution	42X56 Pixel
Lighting	RGB
Operation	
Type	3 short-stroke keys
RS485 Bus (Varioconnect)	
Protocol	Modbus-RTU
Data format (default)	19200, e, 8, 1
Max. bus users	32
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no stubs)
Cable	twisted and shielded
Supply	
Supply voltage	5 DC
Max. power consumption	0,2 W
Housing	
Dimensions (WxHxD)	20x86x14 mm
Dimensions with clamp	20x95x14 mm
Type of protection	IP 20
Weight	20 g
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Galvanic isolation, test voltages (VarioConnect)	
RS485-bus to basic device	1,5 kV

Printed 23.08.2022 We reserve the right for technical changes.

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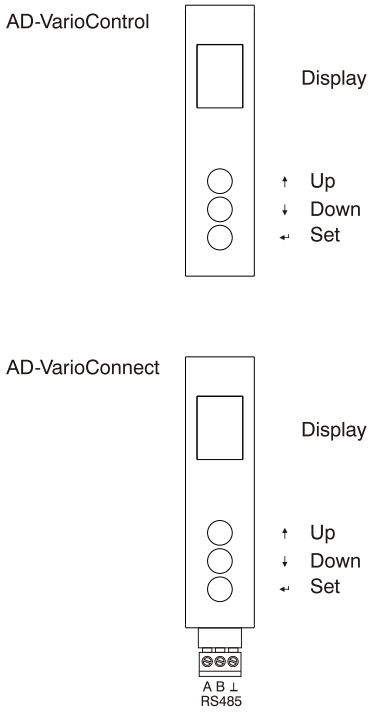
Indicating / Operating Module

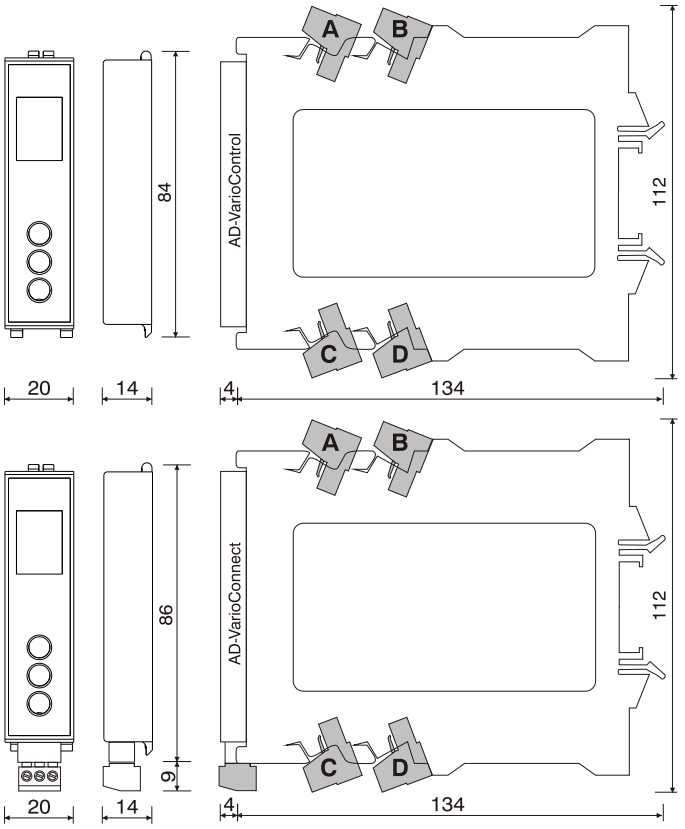
AD-VarioControl

AD-VarioConnect

Block and wiring diagram



Dimensions



Special Functions

USB Programming Adapter

AD-VarioPass 3

Description

The programming adapter AD-VarioPass 3 is a galvanic separated programming adapter, which is operated with the PC via an USB interface. With this USB programming adapter, the digital devices of the company Adamczewski can be parameterized. The AD-VarioPass 3 is simply connected to a free USB interface of the PC via the enclosed USB cable. The AD-VarioPass 3 has, on the secondary side, three device interfaces, which create the connection to the device with diverse cable connector, which are supplied. It has a jack plug (UART interface), via a double terminal (RS485 bus) and a pin connector (UART+interface). Dependent on the device, the correct interface is selected. Two or three interfaces must never be used simultaneously. For the correct function of the programming adapter, the suitable hardware driver must be installed. As soon as the driver is installed correctly, a virtual COM interface is established, via which the communication to the device is realised. To obtain access to the parameter of the connected device, it is recommended to install the free-of-charge configuration software AD-Studio. The current versions of the software and of the hardware driver can be downloaded from the download area of the homepage of the company Adamczewski. When installing the software AD-Studio, the hardware driver for the programming adapter AD-VarioPass 3 can also be installed. With the AD-VarioPass 3 and the configuration software AD-Studio, all digital Adamczewski devices can be parameterized.

Application

Access to all digital devices of the company Adamczewski from the PC.

Specific characteristics

- USB-port enables connection to a PC - galvanically isolated from:
- UART-port enables connection to relevant Adamczewski device
- RS485-port enables connection to relevant Adamczewski device
- UART+-port enables connection to relevant Adamczewski device

Business data

Order number	AD-VarioPass 3

Technical specifications

PC connection / supply	
Voltage range USB	4,8 ... 5,2 V DC
Nominal voltage USB	5 V DC
Power consumption	< 1 W (depending on the output load)
Device interface 1	
UART	Standard UART device interface for the connection of most Adamczewski devices
Device interface 2	
RS485 BUS	RS485 bus-interface for connecting BUS-enabled devices
Device interface 3	
UART+	UART interface with integrated 5V supply
Housing	
Dimensions (WxHxD)	42x22x63 mm
Type of protection	IP 20
Connection method PC	USB interface
Connection method interface 1	stereo jack (UART)
Connection method interface 2	2-wire plug-in terminal (RS485)
Connection method interface 3	6-pin connector (UART+)
Weight	~ 50 g
Manner of fastening	hand-held case
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
USB to outputs	1 kV, 50 Hz (1 min.)
Protection circuits	
USB	electrical surge protection
RS485 bus interface	electrical surge protection

[1] During checking, slight signal deviations are possible.

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Interface Converter

AD-NETGW 100 GT

Description

The network interface converter (AD-NETGW 100 GT) enables a connection to devices with serial interface vie IP-based networks (LAN). For this, the device contains a LAN connection, a RS485 interface and an AD-UART interface. An integral wide range power pack enables operation in almost all supply situations.

Application

The AD-NETGW 100 GT makes access to measuring values and unit conditions from distant sites possible at all times. Devices can be parameterized or measuring values can be read out. For instance, this way conditions in pumping stations can be interrogated and monitored at any time. The remote maintenance of ADAMCZEWSKI devices in local networks or via the internet can be realised.

Specific characteristics

- Ethernet 10/100 Mbit
- Protocols: modbus/TCP, modbus-RTU, data transparency
- RS-485 interface for field devices
- Integrated web server for configuration
- Password protected configuration

Business data

Order number

AD-NetGw 100 GT

Technical specifications

Ethernet-interface	
LAN	10/100 Mbit
Protocol	TCP/IP
Addressing	IP4
DHCP	can be deactivated
IP standard address	192.168.178.99
Access port	80
Password protection	configuration / webserver
RS485-interface	
Baud rate	2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 76800
Data format	8N1, 8E1, 8O1
Max. bus users	32
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no stubs)
Cable	twisted and shielded
AD-UART-interface	
Baud rate	2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 76800
Data format	8N1, 8E1, 8O1
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Input power AC/DC	1,8 VA / 1 W
Housing	
Dimensions (WxHxD)	35,5 x 90 x 58 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 90 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Supply line to all interfaces	3 kV, 50 Hz (1 min.)
Ethernet to AD-UART/RS-485	1,5 kV, 50 Hz (1 min.)
Protection circuits	
Interfaces	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current

[1)] During checking, communication errors are possible.

Printed 25.01.2023 We reserve the right for technical changes.

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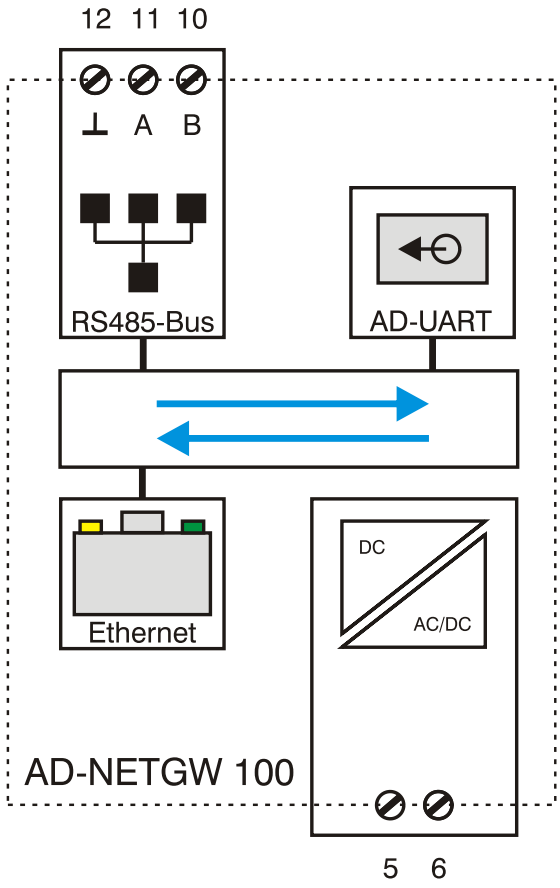
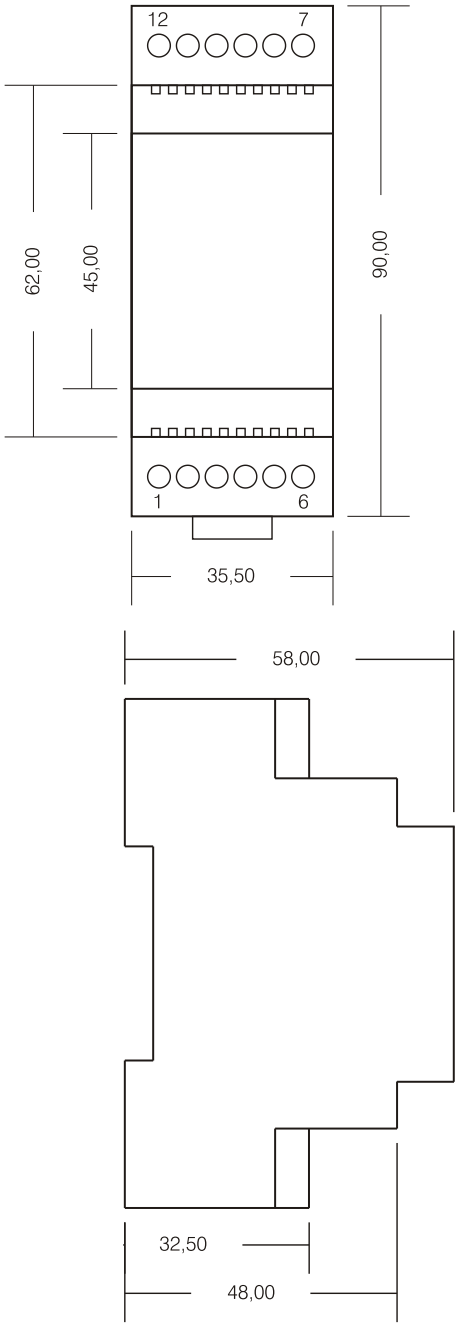
Interface Converter

AD-NETGW 100 GT

Block and wiring diagram



Dimensions



Interface Converter

AD-NETGW 100 GT

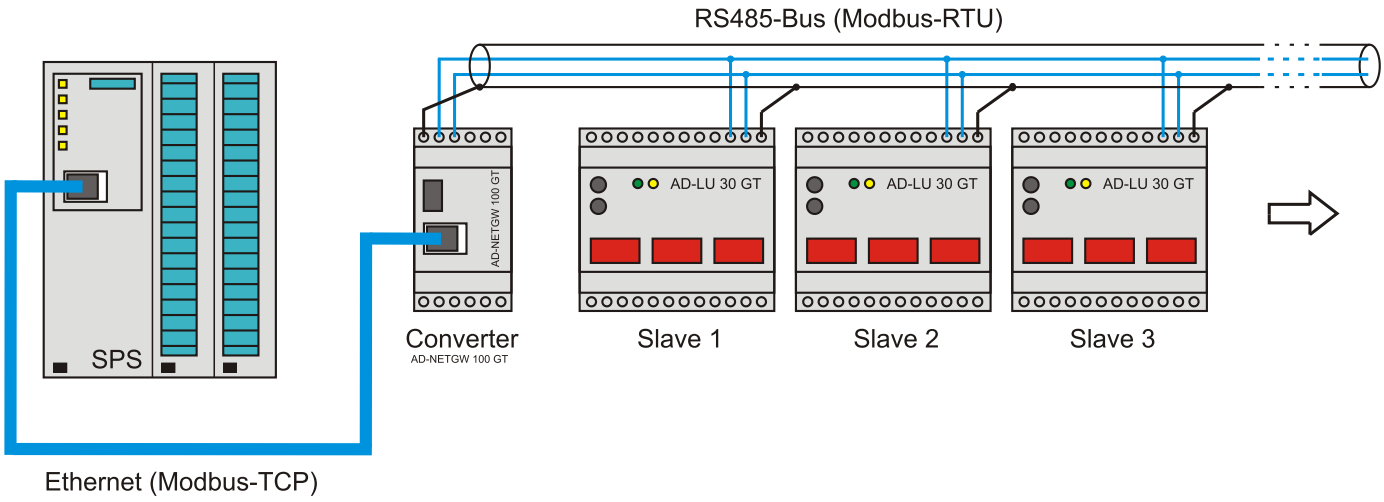
Function

On the network side, the device has 6 freely usable TCP channels, so-called sockets. Each of these channels can be configured freely. Also, this way up to 6 simultaneous network enquiries can be processed (i.e. of Modbus-TCP masters). For each channel, port number, bridge functions and timeout can be set. The data transport path such as Modbus-TCP can be determined on RS485 modbus RTU via the bridge functions. The date interfaces work simultaneous and independent of each other. The setting up of the serial interfaces is possible in different tapes of protocol. The connection of any device with serial interface is, of course, also possible due to the transparent router function. Ready for operation is indicated by the green illuminated diode at the LAN socket when the network cable is plugged in. The device configuration is carried out via the web server integral in the device. Here, all settings can be carried out manually via one surface. Alternatively, the device can be set up with the PC software "AD-Studio" via the AD-UART interface. Apart from the protocol conversion Modbus-TCP to Modbus-RTU, a data transparent connection can also be selected. With this, any devices with the most diverse protocols can be tied to IP networks. Already at the initial commissioning via the web interface, a password for the web surface is essential. This password is activated during the initial use of the set-up surface and will be asked for again with each new session.

Accessories (not included)

The voltage multiplier AD-SV 1224 GL is suitable for operation with 12V supply voltages. For connection to ADAMCZEWSKI devices with AD-UART interface, an adapter cable, 6 polar on a jack, is available.

Circuit examples



Frequency Converter

AD-FM 300 GT

AD-FM 600 GT

Description

The AD-FM 300 GT (1-channel) and AD-FM 600 GT (2-channel) are freely programmable frequency/analog measuring transducers with integrated display unit. Due to its multifunctional processing of the input frequency and the up to 2 analog outputs (current/voltage) per channel or the evaluable digital outputs, the device is optimally suited for the display of instantaneous flow rates with simultaneous evaluable counting pulse output for water meters with main and sub meters. Especially for large water meters with bypass, a scaled summation is integrated in the AD-FM 600 GT. Both the instantaneous flows and the counted quantities are output. A low level suppression is shiftable.

Application

The main area of application is the through-flow measuring at water meters. Further applications are the measuring of rotation speed or energy consumption.

Specific characteristics

- 1 (AD-FM 300 GT) or 2 (AD-FM 600 GT) channels in just one housing
- Inputs: NAMUR, contact, open collector, 3-conductor Opto, 24V activ
- Analog outputs: each channel 1 current and 1 voltage (synchronous)
- Digital outputs: relay respectively optocouple (puls function or limit contact)
- Scaled summation and shiftable low level suppression
- Programming directly on the device or free programming software
- DIN rail mounting

Business data

Order number

AD-FM 300 GT	1 relay output
AD-FM 300 GTO	1 semiconductor output
AD-FM 600 GT	2 relay outputs
AD-FM 600 GTO	2 semiconductor outputs

Accessory (optional)

USB programming adapter	AD-VarioPass / AD-Studio

Technical specifications

Digital inputs

Input	NAMUR (EN 60947-5-6), reed contact, open-collector, 3-lead opto-transmitter or 24V active
Input frequency	min. 0 ... 10 mHz; max. 0 ... 10 kHz
Frequency generator supply	active: max. 10V/10mA; NAMUR:8V/8mA
Contact debouncing	activatable, pulse duration > 40 ms

Current outputs

Output range	0 ... 20 mA; 4 ... 20 mA
Max. burden	400 Ohm
Residual ripple	< 50 µAss

Voltage outputs

Output range	0 ... 10 V, 2 ... 10 V
Min. burden	10 kOhm
Residual ripple	< 20 µVss

Relay outputs

Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	changeover contact
Switching operations mechanical	10000000
At 230V/2A AC, cos(phi)=1	600000
At 230V/2A AC, cos(phi)=0,4	200000
At 24V/1 A DC	200000

Display

Graphic-LCD	122x32 Pixel, background lit
Digital display	5-digit, can be configured
Display functions each channel	input frequency, scaled instantaneous measuring value, quantity impulse, scaled dimension as quasi analogue bar

Accuracy

Unit	0,3%
Temperature influence	<100 ppm / K
Update rate	1 s

Supply

Supply voltage	20 ... 253 V DC / 50 ... 253 V AC
Max. power consumption	4,5 W / 7,5 VA

RS485-Bus

Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	247
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no stubs)
Cable	twisted and shielded

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Frequency Converter

AD-FM 300 GT

AD-FM 600 GT

Technical specifications

Housing

Dimensions (WxHxD)	105x90x58 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 300 g
Manner of fastening	35 mm DIN rail

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1 In a critical EMC environment, shielded encoder cables are recommended.

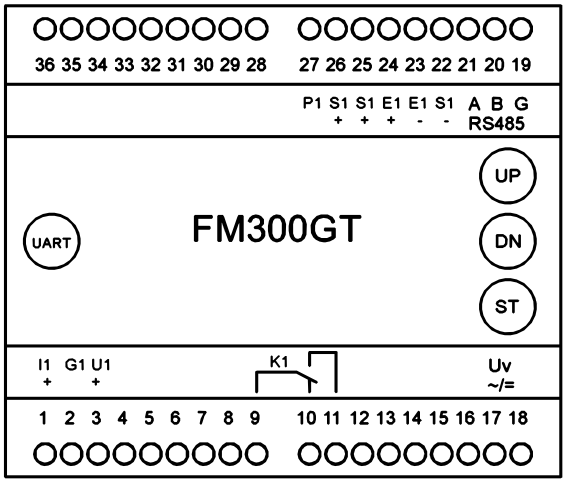
Electrical safety requirements

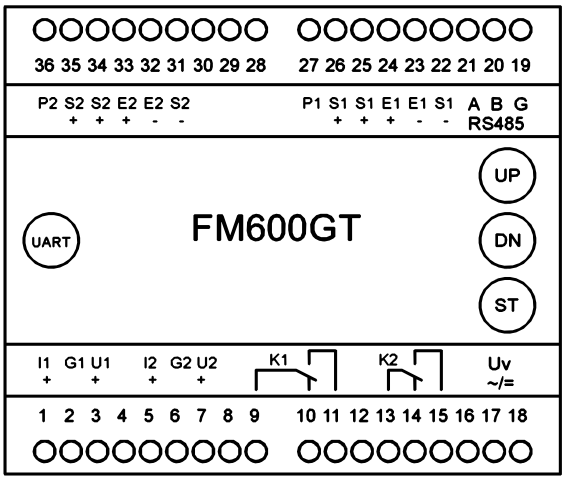
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	1 kV RMS (1 min.)
Signal/auxiliary voltage	3 kV RMS (1 min.)

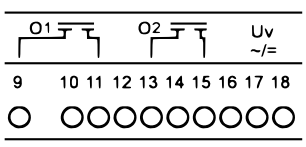
Block and wiring diagram



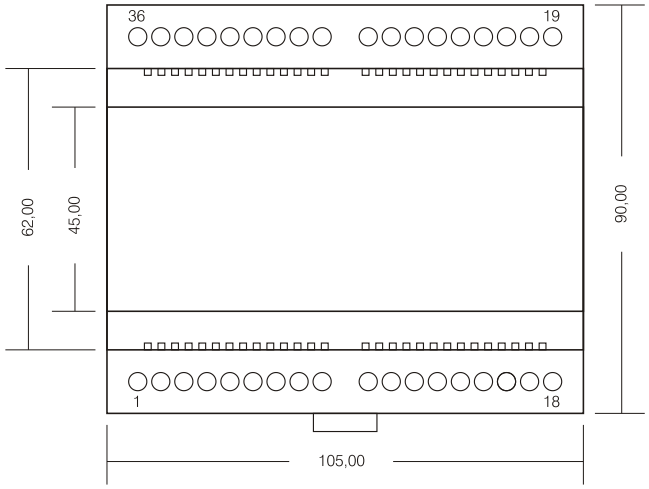


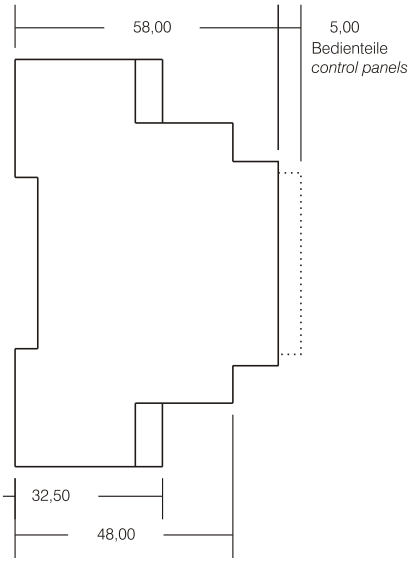
Halbleiterausgang (Option)

Semiconductor output (option)



Dimensions





Modbus Communication

The AD-FM 300 GT / AD-FM 600 GT has an RS485 bus interface on which the Modbus-RTU protocol is used. All measured values ??of the device can be read out via this bus interface. The preset standard data format is 19200, e, 8,1. The bus address can be set (1...247). Adaptation to a different data format is possible at any time. The device configuration can be carried out manually using the menu navigation or using AD Studio software on one of the interfaces itself.
With the **Read Holding Registers (0x03)** function, data can be read individually from the device.
The device does not support **multiple register read**. The individual register width is 16 bits. Please see the Modbus specification for detailed explanations of the Modbus communication.

The following Modbus data are accessible via the RS485 bus:

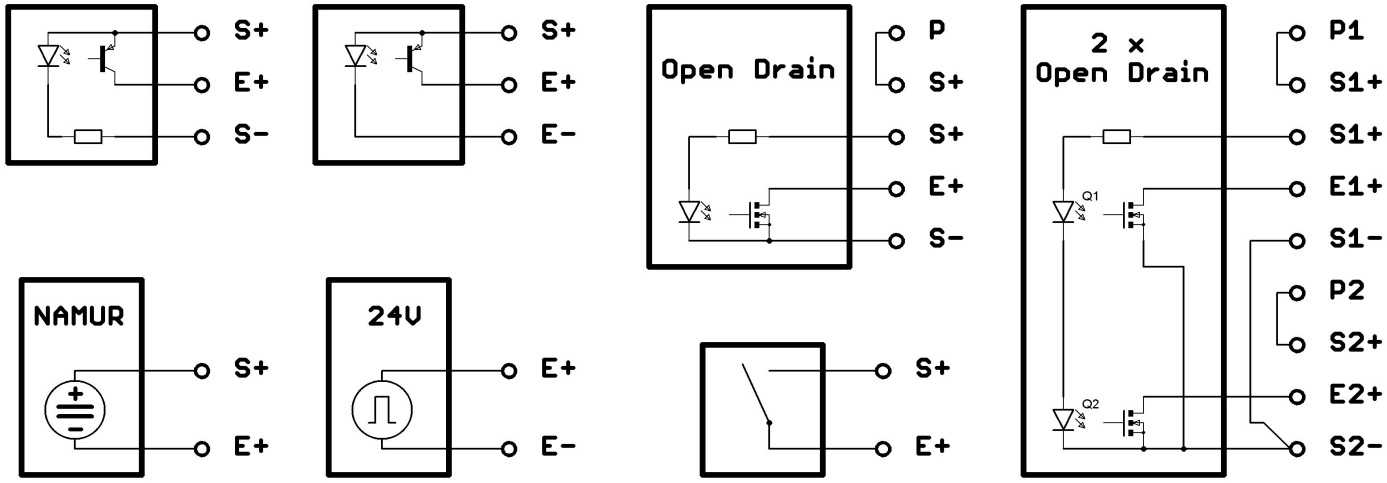
Start address	Reg. number	Name	Datatype	[Code] = Value
40102	2	Counter Z1	U32	
40103	2	Input frequency F1	float	Hz
40104	2	Scale value E1	float	Unit / [s, min, h]
40105	2	Analog output value A1	float	V / mA
40601	2	Digital output value D1	U16	0 / 1
40112	2	Counter Z2	U32	
40113	2	Input frequency F2	float	Hz
40114	2	Scale value E2	float	Unit / [s, min, h]
40115	2	Analog output value A2	float	V / mA
40611	2	Digital output value D2	U16	0 / 1

Frequency Converter

AD-FM 300 GT

AD-FM 600 GT

Circuit examples



Frequency Converter

AD-FM 300/600 GA

AD-FM 300/600 FE

Description

The AD-FM 300 FE/GA (1-channel) and AD-FM 600 FE/GA (2-channel) are freely programmable frequency/analog measuring transducers with display units for panel mounting (FE) and DIN-rail mounting (GA). Through its multi-function input frequency processing and the up to 2 analog outputs (current/voltage) of each channel and the assessable digital outputs, the device is ideally suited for the display of instantaneous flow with simultaneous assessable for counting pulse water meter with main and secondary points. Especially for water meters with bypass a scaled summation is integrated (only AD-FM 600 FE/GA). A low level suppression is shiftable. Both the instantaneous flow rates and the meter quantites are outputted added.

Application

The main area of application is the through-flow measuring at water meters. Further applications are the measuring of rotation speed or energy consumption.

Specific characteristics

- 1 (FM300) or 2 (FM600) channels in just one housing
- Inputs: NAMUR, contact, open collector, 3-conductor Opto, 24V activ
- Analog outputs: each channel 1 current and 1 voltage (synchronous)
- Digital outputs: relay respectively optocouple (puls function or limit contact)
- Scaled summation
- Shiftable low level suppression
- Programming directly on the device or via a free programming software
- DIN rail or panel mounting

Business data

Order number

AD-FM 300 FE	1-channel; front mounting
AD-FM 300 GA	1-channel; DIN rail mounting
AD-FM 600 FE	2-channel; front mounting
AD-FM 600 GA	2-channel; DIN rail mounting

Technical specifications

Digital inputs

Input	NAMUR (EN 60947-5-6), reed contact, open-collector, 3-lead opto-transmitter or 24V active
Input frequency	min. 0 ... 10 mHz; max. 0 ... 10 kHz
Frequency generator supply	active: max. 13,5V (max. 20mA); NAMUR:8V/8mA
Contact debouncing	activatable, pulse duration > 40 ms

Current outputs

Output range	0 ... 20 mA; 4 ... 20 mA
Max. burden	400 Ohm
Residual ripple	<50 µAss

Voltage outputs

Output range	0 ... 10 V, 2 ... 10 V
Min. burden	10 kOhm
Residual ripple	<20 µVss

Relay outputs

Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	changeover contact
Switching operations mechanical	10000000
at 230V/2A AC, cos(phi)=1	600000
at 230V/2A AC, cos(phi)=0,4	200000
at 24V/1 A DC	200000

Display

Graphic-LCD	122x32 Pixel, background lit
Digital display	5-digit, can be configured
Display functions each channel	input frequency, scaled instantaneous measuring value, quantity impulse, scaled dimension as quasi analogue bar, channel description and scaling unit in plain language

Accuracy

Unit	0,3%
Temperature influence	<100 ppm / K
Response time	~70 ms

Supply

Supply voltage	20 ... 253 V DC / 50 ... 253 V AC
Max. power consumption	4 W / 5 VA

Housing front mounting

Manner of fastening	Panel-mount-case (DIN 43 700)
Type of protection	IP 65
Connection method	screw clamp
Dimensions (WxHxD)	96x48x131 mm
Front panel cut out	92x44 mm
Switchboard thickness	1,5-10 mm
Weight	~230 g

DIN rail housing

Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connection method	screw clamp
Dimensions (WxHxD)	100x74x119 mm
Weight	~230 g

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Frequency Converter

AD-FM 300/600 GA

AD-FM 300/600 FE

Technical specifications

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1 In a critical EMC environment, shielded encoder cables are recommended.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

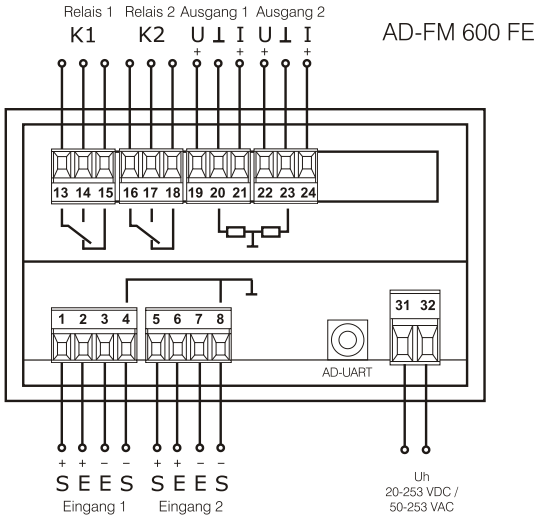
Galvanic isolation, test voltages

Input/output	2 kV RMS (1 min.)
Signal/auxiliary voltage	4 kV RMS (1 min.)

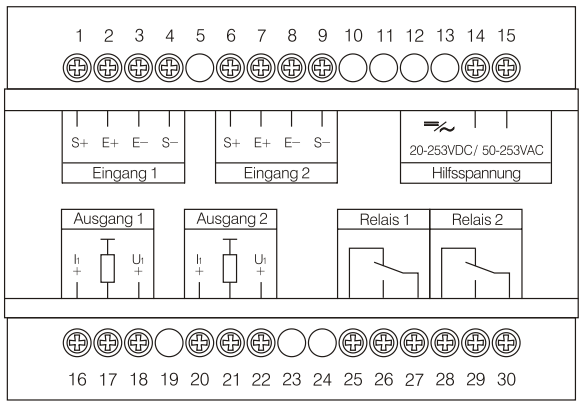
More technical documentation

instruction manual

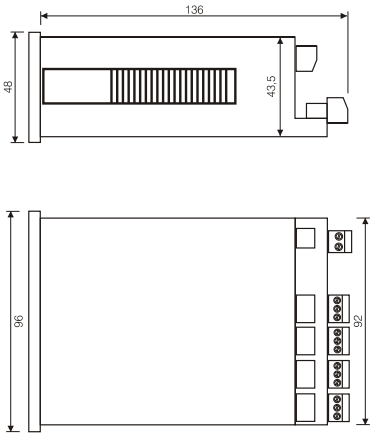
Block and wiring diagram

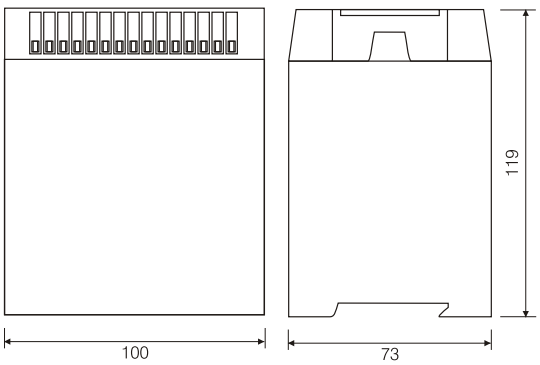


AD-FM 600 GA



Dimensions



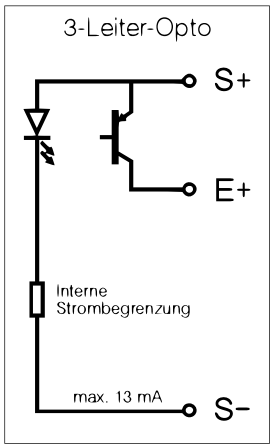


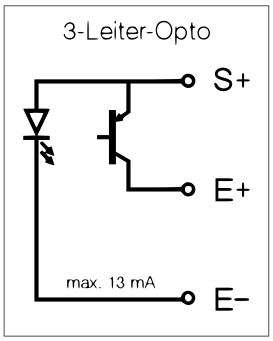
Frequency Converter

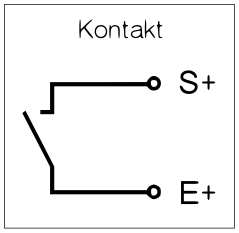
AD-FM 300/600 GA

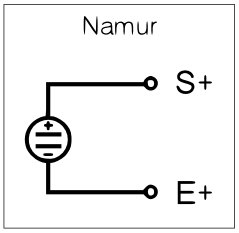
AD-FM 300/600 FE

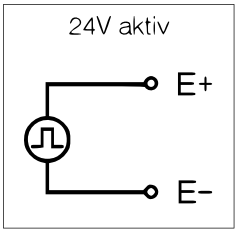
Circuit examples











Frequency Converter

AD-FM 255 GVD

AD-FM 255 GVD-O

Description

The frequency measuring converter AD-FM 255 GVD supplies an initiator or a contact and transforms its impulse sequence to a proportional impressed analogue signal. The output signal is independent from the connected load up to a maximum value. All measuring ranges and outputs can be freely parameterized. This can be carried out via the optional operating panel AD-VarioControl or via the programming software AD-Studio. Input, output and the supply voltage are separated from each other galvanically with high isolation.

Application

The main area of application is the through-flow measuring at water meters, further applications are energy consumption measuring etc.

Specific characteristics

- Inputs: NAMUR, contact, open collector, 3-conductor Opto, 24V activ
- Outputs: current and voltage
- Digital output: Relay or semiconductor (pulse or limit value function)
- Operating module VarioControl as an accessory
- Programming via configuration software

Business data

Order number

AD-FM 255 GVD	relay output
AD-FM 255 GVD-O	semiconductor output

Accessory (optional)

Operating module	AD-VarioControl
USB programming adapter	AD-VarioPass /AD-Studio

Technical specifications

Digital input	
Input	NAMUR (EN 60947-5-6), reed contact, open-collector, 3-lead opto-transmitter or 24V active
Input frequency	min. 0 ... 10 mHz; max. 0 ... 10 kHz
Frequency generator supply	active: 8V / 8mA
Kontaktentprellung (activatable)	40 ms
Output current	
Output range	0 ... 20 mA
Max. burden	400 Ohm
Residual ripple	< 50 µAss
Output voltage	
Output range	0 ... 10 V
Min. burden	10 kOhm
Residual ripple	<20 µVss
Accuracy	
Unit	<0,3%
Temperature influence	<100 ppm / K
Response time	approx. 70 ms
Relay output	
Contact type	potential-free changeover
Max. AC-breaking capacity	250 V AC, 2 A AC, 50Hz
Max. DC-breaking capacity	50 V DC, 2 A DC
Switching operations	
Mechanical	10^7
AC: 230V / 2A, cos(phi)=1	$6 * 10^5$
AC: 230V / 2A, cos(phi)=0,4	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$
Semiconductor output (optional)	
Max switching voltage	30 V DC
Max. switching current	50 mA DC
Voltage drop	< 1 V
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	3,7 VA / 2,1 W
Housing	
Dimensions (WxHxD)	23x110x134 mm
With operating module (bxhxt)	23x110x138 mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 140 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Frequency Converter

AD-FM 255 GVD

AD-FM 255 GVD-O

Technical specifications

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
	In a critical EMC environment, shielded encoder cables are recommended.

[1)]During electromagnetic disturbance minor changes in output signal are possible.

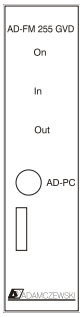
Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

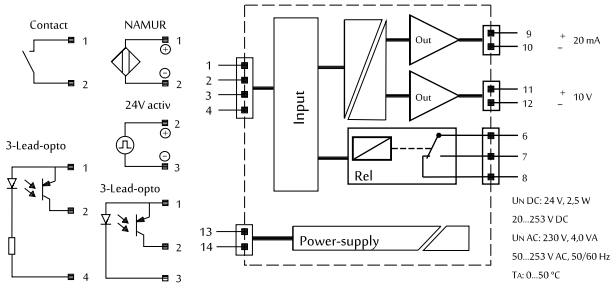
Input/output	2 kV RMS (1 min.)
Signal/auxiliary voltage	3 kV RMS (1 min.)

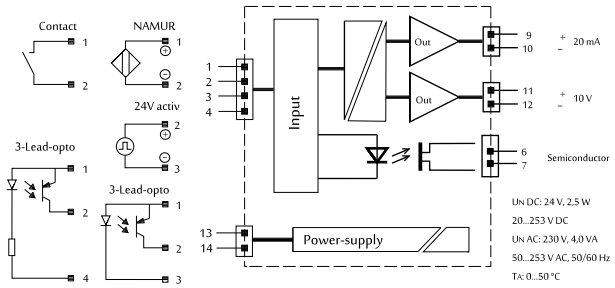
Display and operating elements



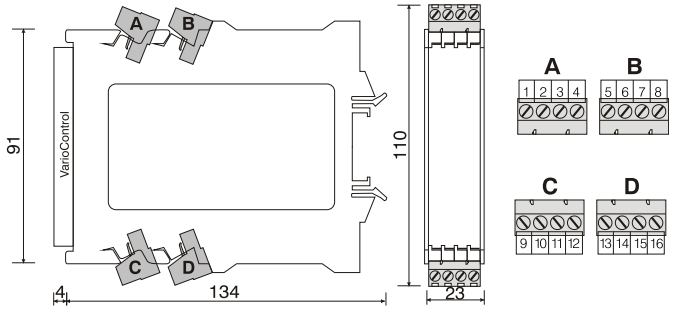
On: LED for the power indicator in green
lights up - normal operation
flashing - signal failure, signal outside range limits
In: LED for input pulse signal
0 ... 7 Hz - according to signal
>7 Hz - 7 Hz flashing **Out**: LED for the relays / semiconductor
lights up - relay energized
AD-PC: Communication interface for configuration by a PC
Communication interface VarioControl

Block and wiring diagram





Dimensions



Modbus Communication

The optional AD-VarioConnect operating module has an RS-485 interface. The data is transferred via the Modbus RTU protocol, the AD-VarioConnect operating module represents a Modbus slave. Communication takes place according to the master-slave procedure and starts with a request from the master, e.g. from a PLC or a PC. Each bus participant must have a unique address. If a slave detects that its address has been addressed by the master, the slave always sends an answer. The slaves never communicate with each other. They are also not able to start a communication with the master.
The Modbus master can read out the individual registers of the AD-FM 255 GVD via the addresses.
The default standard data format is 19200,e,8,1 with slave address 1. These settings can be changed via the AD-VarioConnect operating module.

Start address	Number of registers	Name	Unit	Data type	read	write
Measured values:						
40801	2	Input frequency	Hz	float	1	0
40803	2	Scaled input		float	1	0
40805	2	Input percentage	%	float	1	0
40901	2	Output signal voltage	V	float	1	1
40903	2	Output signal current	mA	float	1	1

Frequency Converter

AD-FM 250 GVC

Description

The frequency measuring converter AD-FM 250 GVC supplies an initiator or a contact and transforms its impulse sequence to a proportional impressed analogue signal. The output signal is independent from the connected load up to a maximum value. Furthermore, this series of devices is equipped with a configuration interface AD-PC as standard, with which the input and output measuring signal can be freely programmed with the programming software AD-Studio. Input, output and the supply voltage are separated from each other galvanically with high isolation.

Application

The main area of application is the through-flow measuring at water meters, further applications are energy consumption measuring etc.

Specific characteristics

- Inputs: arbitrary
- Outputs: current and voltage
- Programming via configuration software

Business data

Order number	AD-FM 250 GVC

Technical specifications

Digital input

Input	NAMUR (EN 60947-5-6), reed contact, open-collector, 3-lead opto-transmitter or 24V active
Input frequency	min. 0 ... 1 mHz; max. 0 ... 10 kHz
Frequency generator supply	active: ca. 13,5V (max. 13mA); NAMUR:8V/8mA
Contact debouncing	activatable, pulse duration > 40 ms

Output current

Output range	0 ... 20 mA; 4 ... 20 mA
Max. burden	500 Ohm
Residual ripple	<50 µAss

Output voltage

Output range	0 ... 10 V, 2 ... 10 V
Min. burden	10 kOhm
Residual ripple	<20 µVss

Accuracy

Unit	0,3%
Temperature influence	<100 ppm / K
Response time	approx. 70 ms

Supply

Supply voltage	20 ... 253 V DC / 50 ... 253 V AC
Max. power consumption	2 W / 3,6 VA

Housing

Dimensions (WxHxD)	18x110x134mm
Type of protection	IP 20
Connection method	detachable terminal clamp
Manner of fastening	DIN rail 35mm (EN 50022)
Weight	ca. 130 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

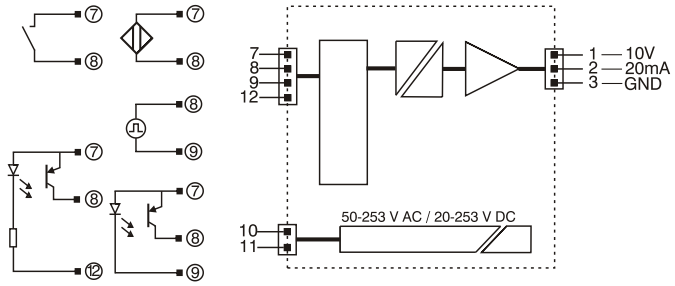
EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
	In a critical EMC environment, shielded encoder cables are recommended.

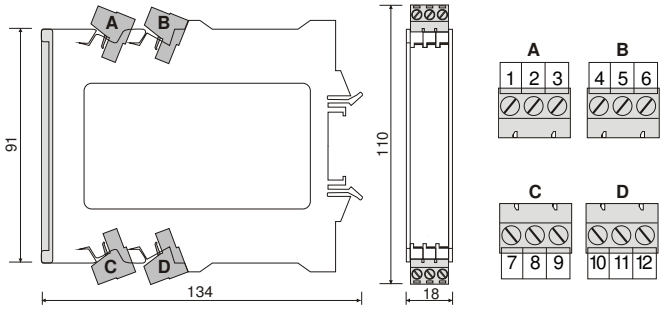
Galvanic isolation, test voltages

Input/output	2 kV RMS (1 min.)
Signal/auxiliary voltage	3 kV RMS (1 min.)

Block and wiring diagram



Dimensions



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Frequency Converter

AD-FM 210 GS

Description

The frequency converter AD-FM 210 GS is adapted ex works for user-side sensors and delivered exactly calibrated for the application. He can supply an initiator or a contact. Default switching thresholds are set for active signals. The required data must be given when ordering the device. The input pulse train is converted into a proportional impressed analog signal. The output signal is independent of the connected load up to a maximum value.

Application

The main area of application is flow measurement in water meters, other applications are energy consumption measurements, wind and speed measurements, etc. All common encoder types can be used: initiator according to NAMUR (DIN-EN 60947-5-6), 3-wire optical encoder, reed contacts, transistor outputs and other initiators .

Specific characteristics

- Wide range power supply
- Factory signal adjustment
- Adjustment trimmer optional
- analog signal processing
- no software
- Status LEDs

Business data

Catalog number	AD-FM 210 GS
Order details:	
Signaling device	Type & Connection technology
Frequency	Range
Analog output signal	mA / V
Output signal	Range
Response time	Seconds

Technical specifications

Digital input

Input	NAMUR (EN 60947-5-6), reed contact, open-collector, 3-lead opto-transmitter or 24V active[1)]
Input frequency	min. 0 ... 500 Hz; max. 0 ... 20 kHz[1)]
Frequency generator supply	active: 8V / 8mA[1)]

Output current

Output range	0 ... 20 mA[1)]
Max. burden	500 Ohm
Residual ripple	< 50 µAss

Output voltage

Output range	0 ... 10 V[1)]
Min. burden	500 Ohm
Residual ripple	< 20 µVss

[1)]Specify in plain text when ordering.

Accuracy

Unit	< 0,3%
Temperature influence	< 100 ppm / K
Response time	~ 200 ms

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	2,5 VA / 1,2 W

Housing

Dimensions (WxHxD)	23 x 78 x 103 mm³
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 200 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [2)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
	In a critical EMC environment, shielded encoder cables are recommended.

[2)] During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input/output	2 kV RMS (1 min.)
Signal/auxiliary voltage	3 kV RMS (1 min.)

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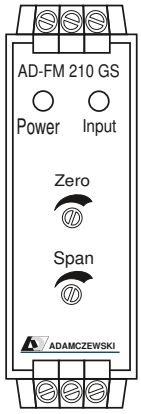
Frequency Converter

AD-FM 210 GS

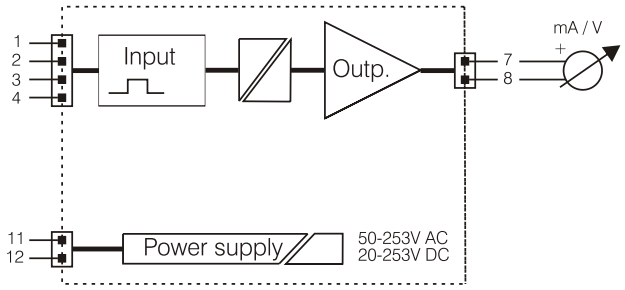
Display and operating elements

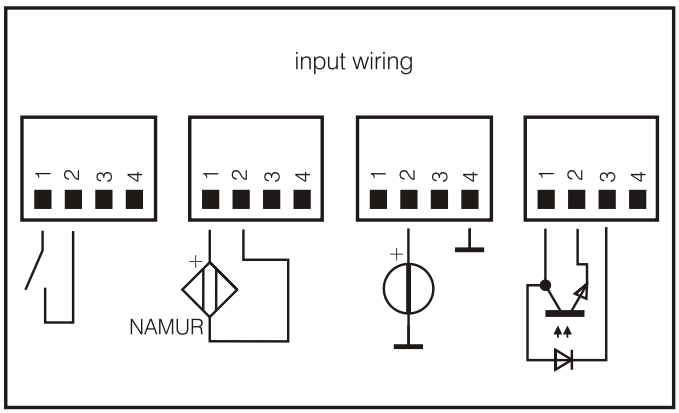


Front

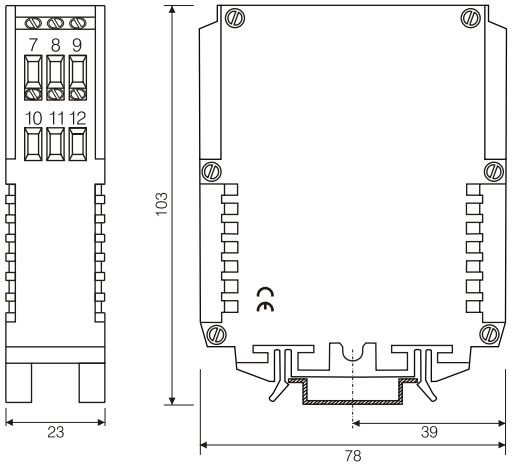
Designation	Meaning
Power	LED green, Power supply
Input	LED red, Input signal
Zero	Trimmer 0 %-Value
Span	Trimmer 100 %-Value

Block and wiring diagram





Dimensions



Impulse Converter

Analogue-Pulse-Converter

AD-AI 200 GVC

Description

The analogue pulse converter AD-AI 200 GVC converts analogue signals to quantity signals, which, for instance, correspond to a flow or throughput. These pulses are outputted via the internal relay or, optionally, via a faster transistor. The AD-AI 200 GVC is equipped with a compact switching power supply, which works with high efficiency in a wide supply voltage range. The converter can be configured via the PC with an available parametric software AD-Studio. However, it can also be delivered preset.

Application

Producing quantity signals from a current or voltage signal. The exact description of the function can be found in the document "Functionality AI200GVC.pdf". Practical example 1: Input: 0...20 mA corresponds to a flow of 1000 l/h Output: 1 pulse/l Practical example 2: Input: 0...10 V corresponds to a throughput of 10 kg/min Output: 10 pulses/kg

Business data

Order number

AD-AI 200 GVC	relay output
AD-AI 200 GVCO	transistor output

Technical specifications

Input

Input current	0/4 ... 20 mA (Rin: 50 Ohm) resolution 10 Bit
Input voltage	0/2 ... 10 V (Rin: 100 kOhm) resolution 10 Bit

Relay output

Max. load AC	250 V / 2 A (cos phi = 1)
Max. load DC	50 V / 1 A (resistive load)
Cycles AC- load	2 A (cos phi = 1): ca. 110000
Cycles DC- load	1 A (resistive load): ca. 100000
Pulse duration	0,5 ... 5 s

Transistor output (optional)

Max. load DC	30V / 50mA
Pulse duration	0,05 ... 5 s (50% duty cycle at high frequency)

Supply

Voltage range	20 ... 253 V DC / 50 ... 253 V AC
Power consumption	max. 1,5 W / 2,6 VA (50 Hz)

Accuracy

Accuracy	< 0,2 %
Input (AD-Converter)	ca. 0,1 % of full scale

Housing

Dimensions (WxHxD)	18x110x134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp (2,5 mm² flex wire / 4 mm² one wire)
Bolting torque screw terminals	0,5 Nm
Weight	135 g
Manner of fastening	DIN rail 35mm (EN 50022)

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1

Galvanic isolation, test voltages

Input / output	4 kV (1 min.)
Signal / supply unit	4 kV (1 min.)

Protection circuits

Input	electrical surge protection
Power supply	electrical surge and reverse current protection
Relay output	no protection
Transistor output	electrical surge protection

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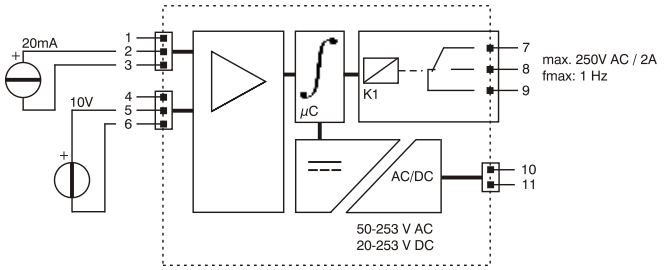
Impulse Converter

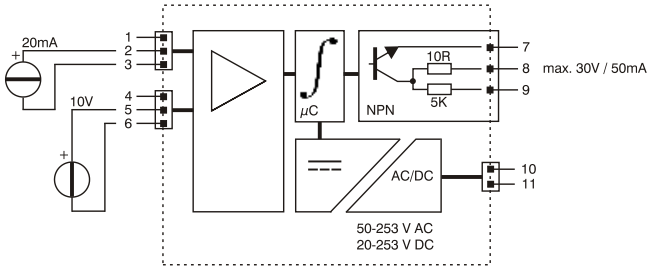
Analogue-Pulse-Converter

AD-AI 200 GVC

Block and wiring diagram

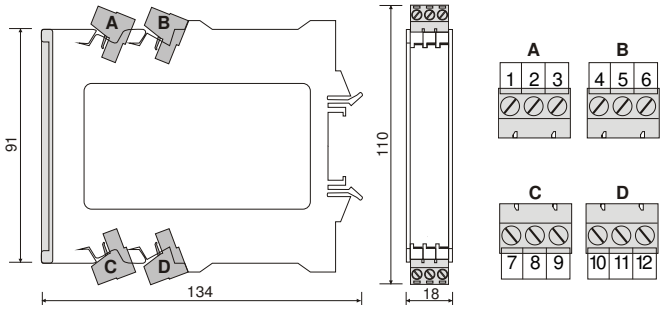


AD-AI 200 GVC



AD-AI 200 GVCO

Dimensions



Impulse Converter

Pulse Summator

AD-IS 102 GVC

Description

The pulse summator AD-IS 102 GVC adds pulses arriving at two inputs and gives out sum-proportional pulses via its relay or transistor outputs. During this, the input pulses can be ready in any sequence and also at the same time. Each input can be assessed freely, this way differently assessed pulses can also be added. For evaluation of the inputs only whole number factors or divisors are possible. Mechanical contacts, NAMUR transmitter, active signals and semi-conductor switches can be connected and evaluated. The device can be parameterized by the customer via the optional PC configuration software AD-Studio, however, it can also be delivered preset. The inputs and outputs as well as the power pack are galvanic separated with high insulation. The transfer function of the device is: O = (I1*(F1/D1)) + (I2*(F2/D2)) O = output, I = input, F = factor, D = divisor

Application

Adding of any quantity signals, such as through-flows or energy. Application example of energy balance: Input 1: 1000 Imp/kWh, Input 2: 10 Imp/kWh, Output: 100 Imp/kWh

Specific characteristics

- 2 freely assessable impulse inputs
- relay output or transistor output
- integral wide-range power pack
- compatible with many types of transmitters
- max. input frequency 1 kHz
- only 18 mm construction width
- screw terminals can be pulled off
- can be parameterized via PC (AD-Studio)

Business data

Order number

AD-IS 102 GVC	relay output
AD-IS 102 GVCO	transistor output

Technical specifications

Input

NAMUR- transmitter	0 ... 1 kHz (analysis of the NAMUR values)
Mechanical contact	0 ... 10 Hz (debounced input - Please note: low input bandwidth)
Active voltage	0 ... 1 kHz (12 V or 24 V)
Semiconductor switch	0 ... 1 kHz (such as transistor / optocoupler)

Relay output

Max. load AC	250 V / 2 A (cos phi = 1)
Max. load DC	50 V / 1 A (resistive load)
Cycles AC- load	2 A (cos phi = 1): ca. 110000
Cycles DC- load	1 A (resistive load): ca. 100000
Pulse duration	0,5 ... 5 s

Transistor output (optional)

Max. load DC	30V / 50mA
Pulse duration	0,05 ... 5 s (50% duty cycle at high frequency)

Supply

Voltage range	20 ... 253 V DC / 50 ... 253 V AC
Power consumption	max. 1,5 W / 2,6 VA

Housing

Dimensions (WxHxD)	18x110x134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp (2,5 mm² flex wire / 4 mm² one wire)
Bolting torque screw terminals	0,5 Nm
Weight	135 g
Manner of fastening	DIN rail 35mm (EN 50022)

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1

Galvanic isolation, test voltages

Input / output	3,75 kV (1 min.)
Signal / supply unit	3,75 kV (1 min.)

Protection circuits

Input	electrical surge protection
Power supply	electrical surge and reverse current protection
Relay output	no protection
Transistor output	electrical surge protection

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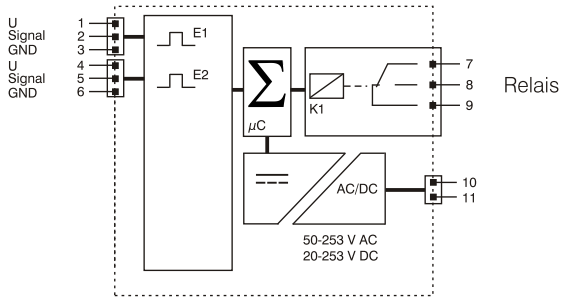
Impulse Converter

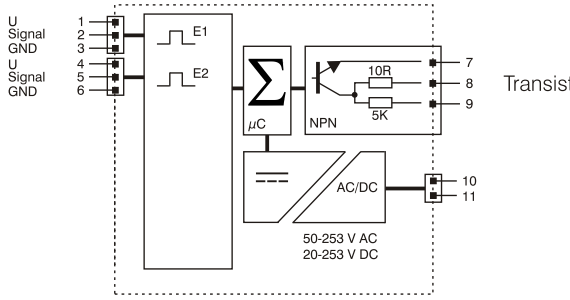
Pulse Summator

AD-IS 102 GVC

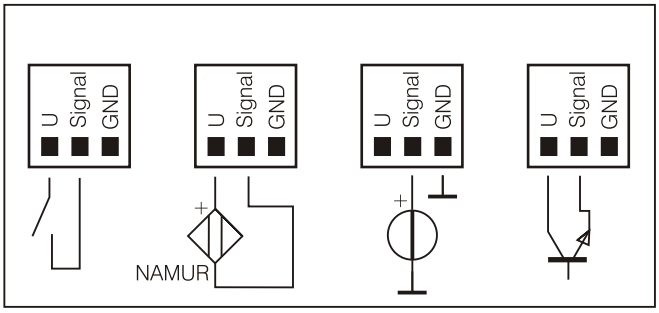
Block and wiring diagram



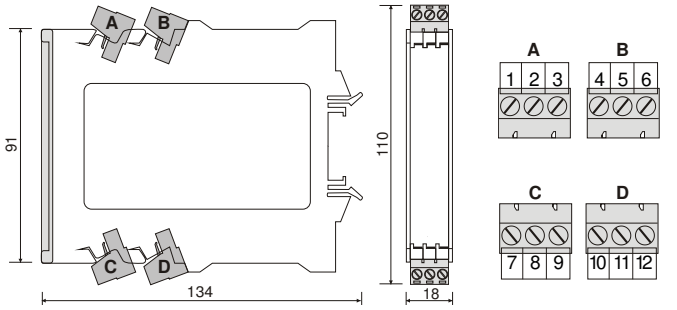
Relais



Transistor



Dimensions



Impulse Converter

Pulse Summator

AD-IS 106 GVF

Description

The pulse summator AD-IS 106 GVF adds pulses arriving at six inputs and gives out sum-proportional pulses via its relay or transistor outputs. During this, the input pulses can be ready in any sequence and also at the same time. Each input can be assessed freely, this way differently assessed pulses can also be added. For evaluation of the inputs only whole number factors or divisors are possible. Mechanical contacts, NAMUR transmitter, active signals and semi-conductor switches can be connected and evaluated. The device can be parameterized by the customer via the optional PC configuration software AD-Studio, however, it can also be delivered preset. The inputs and outputs as well as the power pack are galvanic separated with high insulation. The transfer function of the device is: O = output, I = input, F = factor, D = divisor O = (I1*(F1/D1)) + (I2*(F2/D2)) + (I3*(F3/D3)) + (I4*(F4/D4)) + (I5*(F5/D5)) + (I6*(F6/D6))

Application

Adding of any quantity signals, such as through-flows or energy. Application example of energy balance: I1: 1000 Imp/kWh, I2: 10 Imp/kWh, I3: 1 Imp/kWh, I4: 300 Imp/kWh, I5: 10 Imp/kWh, I6: 5000 Imp/kWh, O: 100 Imp/kW

Specific characteristics

- 6 freely assessable impulse inputs
- relay output or transistor output
- integral wide-range power pack
- compatible with many types of transmitters
- max. input frequency 1 kHz
- only 33 mm construction width
- screw terminals can be pulled off
- can be parameterized via PC (AD-Studio)

Business data

Order number

AD-IS 106 GVF	relay output
AD-IS 106 GVFO	transistor output

Technical specifications

Input

NAMUR- transmitter	0 ... 1 kHz (analysis of the NAMUR values)
Mechanical contact	0 ... 10 Hz (debounced input - Please note: low input bandwidth)
Active voltage	0 ... 1 kHz (12 V or 24 V)
Semiconductor switch	0 ... 1 kHz (such as transistor / optocoupler)

Relay output

Max. load AC	250 V / 2 A (cos phi = 1)
Max. load DC	50 V / 1A (resistive load)
Cycles AC- load	2 A (cos phi = 1): ca. 110000
Cycles DC- load	1A (resistive load): ca. 100000
Pulse duration	0,5 ... 5 s

Transistor output (optional)

Max. load DC:	30V / 50mA
Pulse duration	0,05 ... 5 s (50% duty cycle at high frequency)

Supply

Voltage range	20 ... 253 V DC / 50 ... 253 V AC
Power consumption	max. 2,2 W / 3,3 VA

Housing

Dimensions (WxHxD)	33x110x134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp (2,5 mm² flex wire / 4 mm² one wire)
Bolting torque screw terminals	0,5 Nm
Weight	205 g
Manner of fastening	DIN rail 35mm (EN 50022)

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1

Galvanic isolation, test voltages

Input / output	3,75 kV (1 min.)
Signal / supply unit	3,75 kV (1 min.)

Protection circuits

Input	electrical surge protection
Power supply	electrical surge and reverse current protection
Relay output	no protection
Transistor output	electrical surge protection

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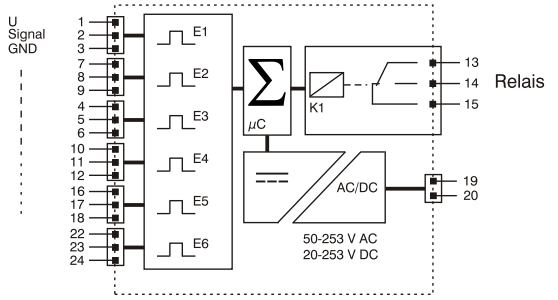
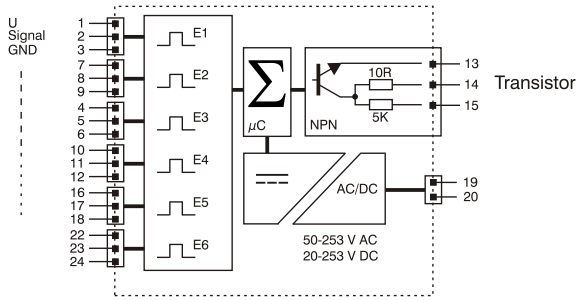
Impulse Converter

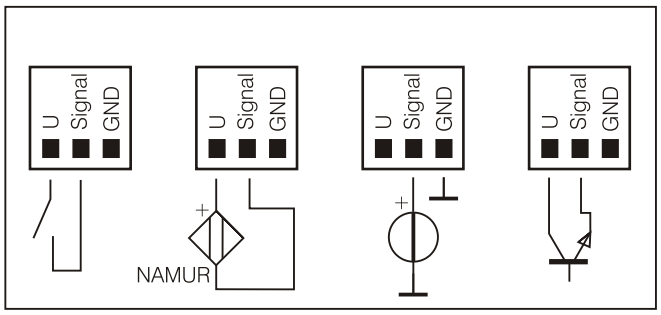
Pulse Summator

AD-IS 106 GVF

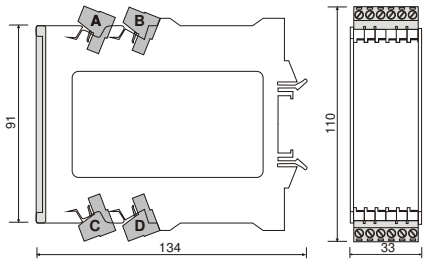
Block and wiring diagram

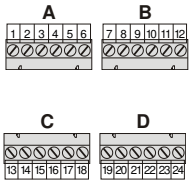






Dimensions





Impulse Converter

Pulse Divider

AD-IU 214 GVC

Description

The pulse divider AD-IU 214 GVC detects pulses arriving the input and gives out divided or multiplied pulses via its relay or transistor outputs. The input can be assessed freely. For evaluation of the input only whole number factors or divisors are possible. Mechanical contacts, NAMUR transmitter, active signals and semi-conductor switches can be connected and evaluated. The device can be parameterized by the customer via the optional PC configuration software AD-Studio, however, it can also be delivered preset. The inputs and outputs as well as the power pack are galvanic separated with high insulation. The transfer function of the device is: O = (I*(F1/D1)) O = output, I = input, F = factor, D = divisor

Application

Dividing of any quantity signals, such as through-flows or energy. Application example of energy balance: Input: 1000 Imp/kWh Output: 10 Imp/kWh

Specific characteristics

- freely assessable impulse input
- relay output or transistor output
- integral wide-range power pack
- compatible with many types of transmitters
- max. input frequency 1 kHz
- only 18 mm construction width
- screw terminals can be pulled off
- can be parameterized via PC (AD-Studio)

Business data

Order number	
AD-IU 214 GVC	relay output
AD-IU 214 GVCO	transistor output

Technical specifications

Input	
NAMUR- transmitter	0 ... 1 kHz (analysis of the NAMUR values)
Mechanical contact	0 ... 10 Hz (debounced input - Please note: low input bandwidth)
Active voltage	0 ... 1 kHz (12 V or 24 V)
Semiconductor switch	0 ... 1 kHz (such as transistor / optocoupler)
Relay output	
Max. load AC	250 V / 2 A (cos phi = 1)
Max. load DC	50 V / 1 A (resistive load)
Cycles AC- load	2 A (cos phi = 1): ca. 110000
Cycles DC- load	1 A (resistive load): ca. 100000
Pulse duration	0,5 ... 5 s
Transistor output (optional)	
Max. load DC	30V / 50mA
Pulse duration	0,05 ... 5 s (50% duty cycle at high frequency)
Supply	
Voltage range	20 ... 253 V DC / 50 ... 253 V AC
Power consumption	max. 1,5 W / 2,6 VA
Housing	
Dimensions (WxHxD)	18x110x134 mm
Type of protection	IP 20
Connection method	detachable terminal clamp (2,5 mm² flex wire / 4 mm² one wire)
Bolting torque screw terminals	0,5 Nm
Weight	135 g
Manner of fastening	DIN rail 35mm (EN 50022)
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Galvanic isolation, test voltages	
Input / output	4 kV (1 min.)
Signal / supply unit	4 kV (1 min.)
Protection circuits	
Input	electrical surge protection
Power supply	electrical surge and reverse current protection
Relay output	no protection
Transistor output	electrical surge protection

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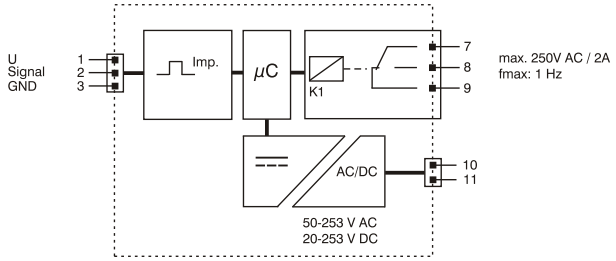
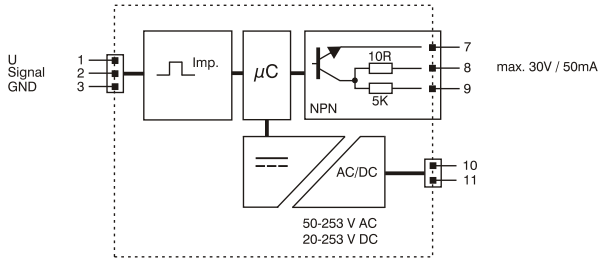
Impulse Converter

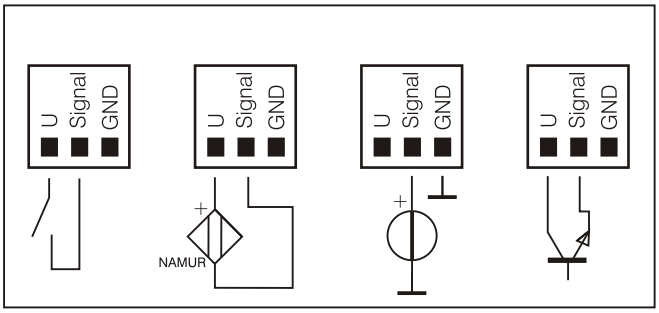
Pulse Divider

AD-IU 214 GVC

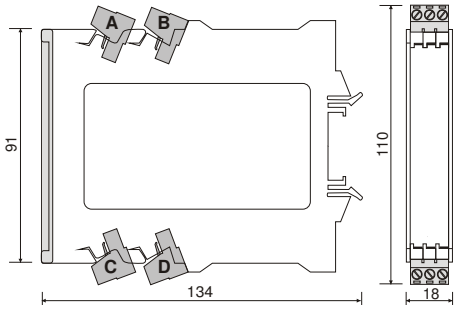
Block and wiring diagram

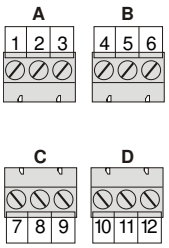






Dimensions





Impulse Converter

Contact-Protection-Relay

AD-KI 10 GX

Description

The contact protection pulse relay (switching amplifier, pulse shaper) serves preferably the protection of weak transducer contacts or the amplification of binary transducer signals. At the same time it transforms the prepared input signals into output pulses with constant, adjustable length. Typical input signals are reed contact signal transducers according to DIN-EN 60947-5-6 (NAMUR), voltage signals or resistance change. A heavy-duty and potential free contact is available at the output. In combination with a narrow 6.2 overall width, a high packing density is achieved.

Application

Pulse reception from water meters or flow monitors for measuring the flow rate. Amplification and contact protection of weak transducer signals (reed contacts, limit switches etc.), switching signal transfers in control circuits. Switching amplifiers for inductive and capacitive proximity switches according to Namur (DIN-EN 60947-5-6).

Business data

Order number

	AD-KI 10 GX

Accessory

DIN-rail connector	AD-GX Connector

Technical specifications

Impulse input

Namur supply voltage	~ 8,2 V DC
Logic level for Namur signals	Low / High: 2,1 mA / 1,2 mA
Logic level for active signals	Low / High: 9,5 V / 11,5 V
Max. input voltage	30 V DC
Reed contact	8 mA
Pulse width	1 ms ... infinite

Pulse processing

Output pulse length	0,2 ... 10 s

Relay output

Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	potential-free closer
Switching operations mechanical	10000000
At 230V/2A AC, cos(phi)=1	600000
At 230V/2A AC, cos(phi)=0,4	200000
At 24V/1 A DC	200000

Supply

Voltage range DC	18 ... 30 V DC
Nominal voltage DC	24 V DC
Power consumption DC	700 mW

Housing

Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 70 g
Manner of fastening	DIN rail mounting 35mm, EN 50022

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... +70 °C (no condensation)

EMC

Product family standard [1]	EN 61326-1
Emission [2]	EN 55011, CISPR11 Cl. A, Gr. 1

[1] During checking, slight signal deviations are possible.

[2] Warning:
This device is not intended to be used in residential areas and can not ensure adequate protection of radio reception in such environments.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Signal / supply unit	1,5 kV, 50 Hz (1 min)
Reed contact	3 kV, 50 Hz (1 min)

Protection circuits

Input	electrical surge protection
Power supply	protection against over voltage, over temperature and reverse polarity

[1] During checking, slight signal deviations are possible.

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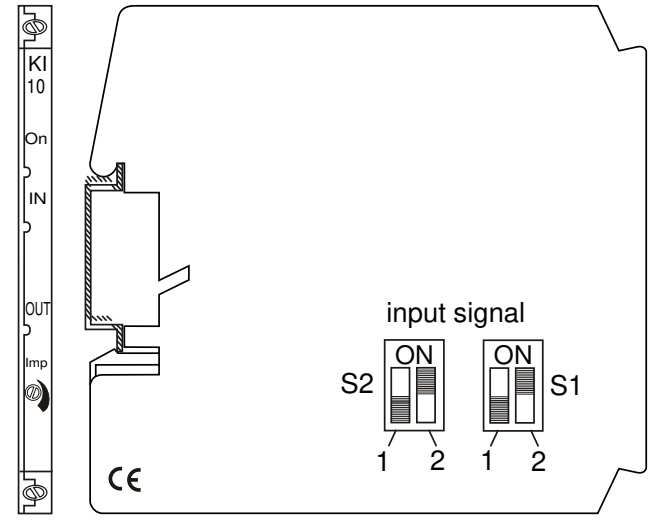
Impulse Converter

Contact-Protection-Relay

AD-KI 10 GX

Display and operating elements

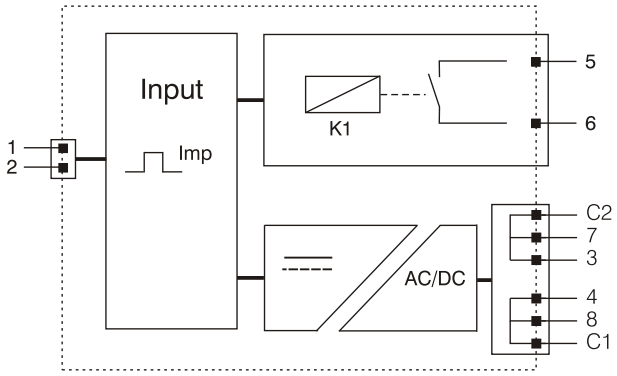


Front

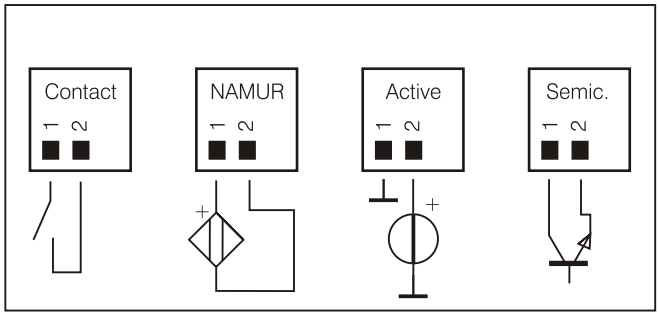
Front	Meaning
On	LED green, Power supply
IN	LED yellow, Input signal
OUT	LED red, Output state
Imp	Pulse time: 0,2 ... 10 s

Input signal	S2		S1	
	1	2	1	2
Contact	OFF	ON	OFF	ON
Namur	ON	OFF	OFF	ON
24 V	OFF	ON	ON	OFF

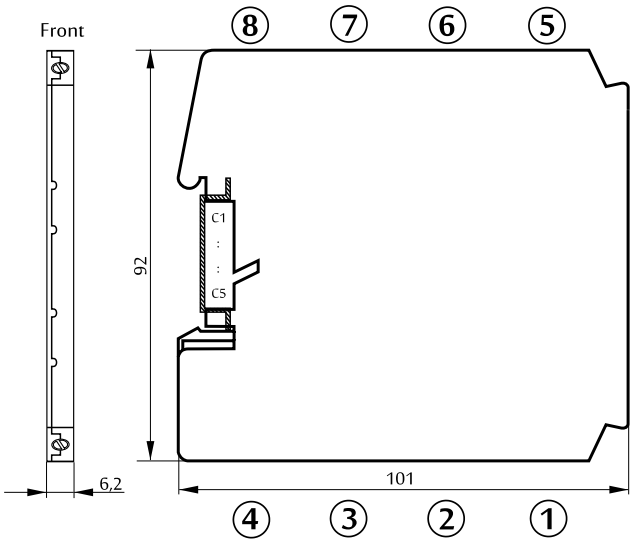
Block and wiring diagram



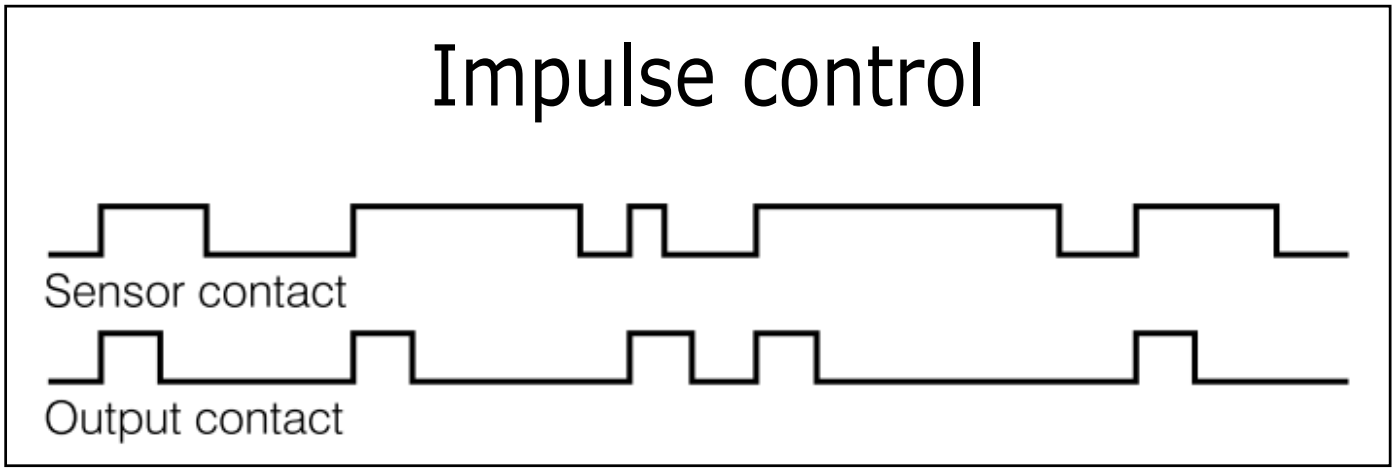
Encoder wiring at the input



Dimensions



Circuit examples



Impulse Converter

Contact-Protection-Relay

AD-KI 100 GS

AD-KI 100 GS-O

Description

The contact protection pulse relay (switching amplifier, pulse shaper) serves preferably the protection of weak transducer contacts or the amplification of binary transducer signals. At the same time it converts the prepared input signals to output pulses with constant, adjustable lengths (via trimmer at the front). Typical input signals are reed contacts, signal generator according to Namur (DIN EN 60947-5-6), TTL level, voltage signals or resistance changes. Heavy-duty and potential-free contacts are available at the output. The version AD-KI 100 GSO has wear-free transistor outputs, which are also galvanic separated via opto-coupler. Further, the device has an electronic wide-range power pack, which supplies the AD-KI 100 GS(O) energy-efficient from a wide supply voltage range.

Application

Pulse reception of water meter or flow monitors for metering the through-flow quantity. Amplification and contact protection of weak transducer signals (reed contacts, limit switches, etc.), sound signal transmission in control circuits. Sound amplifier for inductive and capacitive proximity switches according to Namur (DIN 19234).

Specific characteristics

- support for all standard encoder types
- via front-trimmer adjustable output pulse length
- LEDs for signal display
- two independent potential-free relay output (AD-AI 100 GS)
- two independent semiconductor switches (AD-AI 100 GSO)
- wide range power supply
- narrow Design

Business data

Order number

AD-KI 100 GS	with 2 independent relay outputs
AD-KI 100 GSO	with 2 independent semiconductor outputs

Technical specifications

Impulse input

Min. pulse width	2 ms
Namur supply voltage	ca. 8,2 V DC
Logic level for Namur signals	Low < 1,2 mA ... High > 2,1 mA
Max. input voltage (active)	30 V DC
Logic level for active signals	Low < 5 V ... High > 20 V
Type of contact	potential-free

Pulse processing

Adjustable output pulse length	0,2 ... 10 s (0,5 s factory default)

Relay outputs

Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	potential-free changeover
Switching operations mechanical	10000000
At 230V/2A AC, cos(phi)=1	600000
At 230V/2A AC, cos(phi)=0,4	200000
At 24V/1 A DC	200000

Semiconductor outputs

Max switching voltage	30 V DC
Max. switching current	50 mA DC
Working voltage at pullup	10 ... 30 V DC
Internal pullup	5 kOhm

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	3 VA / 2W

Transmission behaviour

Temperature influence	100 ppm/K
Response time	~ 5 ms

Housing

Dimensions (WxHxD)	23x81x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 115 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Impulse Converter

Contact-Protection-Relay

AD-KI 100 GS

AD-KI 100 GS-O

Technical specifications

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

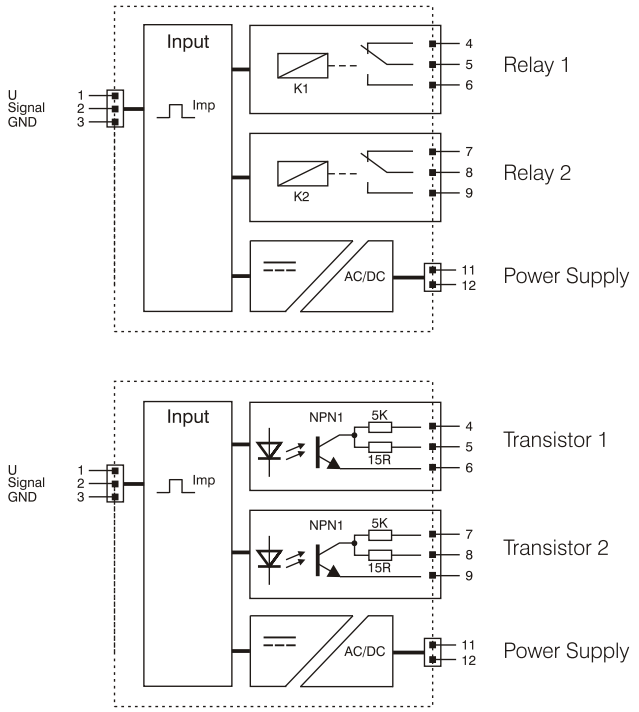
Input / output	3,75 kV, 50 Hz (1 min.)
Signal / supply unit	4 kV, 50 Hz (1 min.)

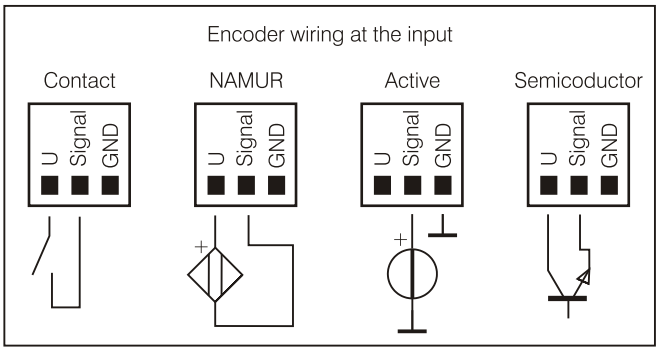
Protection circuits

Input	electrical surge protection
Power supply	protection against over voltage, over temperature and reverse polarity

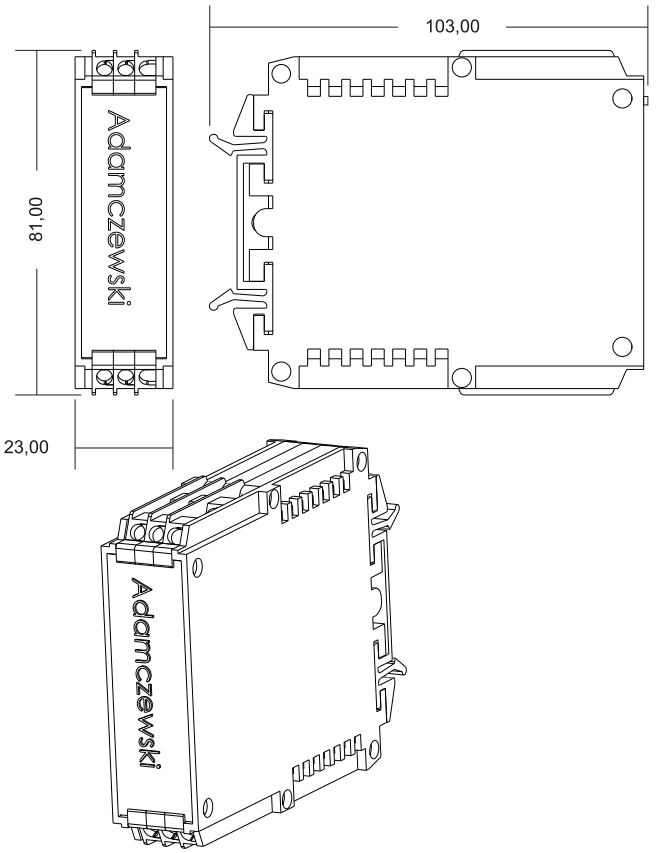
[1] During checking, slight signal deviations are possible.

Block and wiring diagram





Dimensions



Impulse Converter

Contact Amplifier

AD-KV 100 GS

AD-KV 100 GS-O

Description

The contact protection pulse relay (switching amplifier) serves preferably the protection of weak transducer contacts or the amplification of binary transducer signals. The AD-KV 100 GS(o) provides the input pulse, temporarily amplified 1:1, at the output. At the same time it converts the prepared input signals to output pulses with constant, adjustable lengths (via trimmer at the front). Typical input signals are reed contacts, signal generator according to Namur (DIN EN 60947-5-6), TTL level, voltage signals or resistance changes. Heavy-duty and potential-free contacts are available at the output. The version AD-KI 100 GSO has wear-free transistor outputs, which are also galvanic separated via opto-coupler. Further, the device has an electronic wide-range power pack, which supplies the AD-KV 100 GS(o) energy-efficient from a wide supply voltage range.

Application

Pulse reception of water meter or flow monitors for metering the through-flow quantity. Amplification and contact protection of weak transducer signals (reed contacts, limit switches, etc.), sound signal transmission in control circuits. Sound amplifier for inductive and capacitive proximity switches according to Namur (DIN 19234).

Specific characteristics

- support for all standard encoder types
- via front-trimmer adjustable output pulse length
- LEDs for signal display
- two independent potential-free relay output (AD-AI 100 GS)
- two independent semiconductor switches (AD-AI 100 GSO)
- wide range power supply
- narrow Design

Business data

Order number

AD-KV 100 GS	mit zwei unabhängen Relaisausgängen
AD-KV 100 GS-O	mit zwei unabhängigen Halbleiterausgängen

Technical specifications

Impulse input

Min. pulse width	2 ms
Namur supply voltage	ca. 8,2 V DC
Logic level for Namur signals	Low 2,1 mA
Max. input voltage (active)	30 V DC
Logic level for active signals	Low 20 V
Type of contact	potential-free

Pulse processing

Output pulse length	output follows input 1:1

Relay outputs

Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	potential-free changeover
Switching operations mechanical	10000000
At 230V/2A AC, cos(phi)=1	600000
At 230V/2A AC, cos(phi)=0,4	200000
At 24V/1 A DC	200000

Semiconductor outputs

Max switching voltage	30 V DC
Max. switching current	50 mA DC
Working voltage at pullup	10 ... 30 V DC
Internal pullup	5 kOhm

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	3 VA / 2W

Transmission behaviour

Temperature influence	100 ppm/K
Response time	~ 5 ms

Housing

Dimensions (WxHxD)	23x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 115 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Impulse Converter

Contact Amplifier

AD-KV 100 GS

AD-KV 100 GS-O

Technical specifications

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

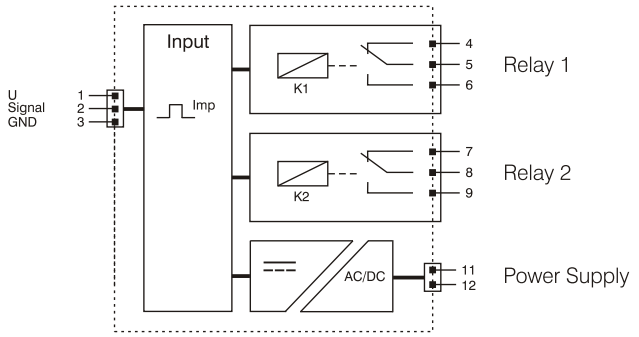
Input / output	3,75 kV, 50 Hz (1 min.)
Signal / supply unit	4 kV, 50 Hz (1 min.)

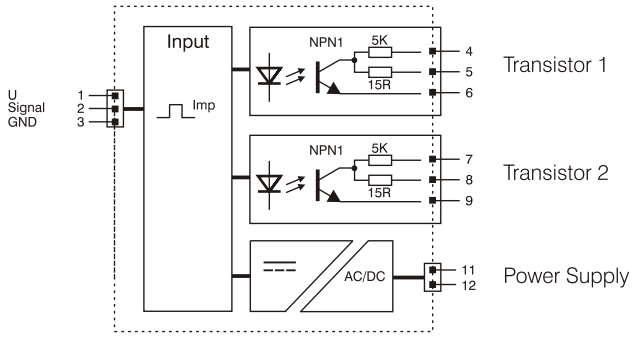
Protection circuits

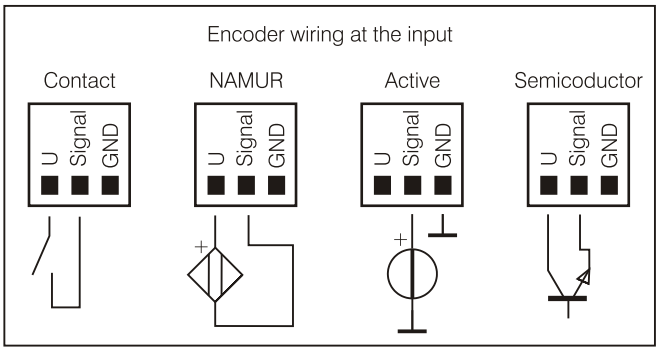
Input	electrical surge protection
Power supply	protection against over voltage, over temperature and reverse polarity

[1] During checking, slight signal deviations are possible.

Block and wiring diagram







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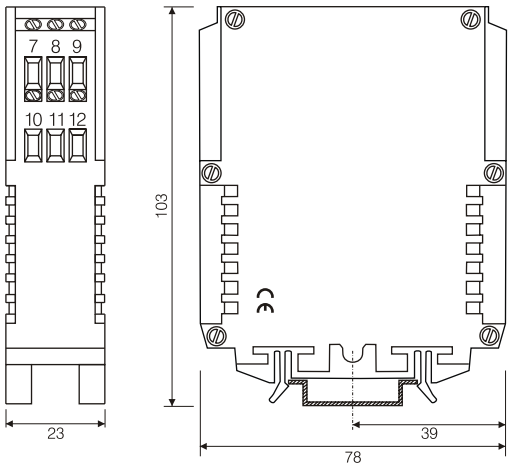

Coupling Relays

AD-KR 11 GX
AD-KR 12 GX
AD-KR 22 GX

Description

The coupling relays of series AD-KR 11 GX, AD-KR 12 GX (1-channel) and AD-KR 22 GX (2-channel) serve the galvanic separation and amplification of contact messages by means of a 24V auxiliary voltage. At the front, the operating condition of the relay is indicated via a red illuminated diode. A free-wheeling diode and a reverse polarity protection are integral. Due to the narrow type of construction, with an overall housing width of only 6.2 mm, a high packing density is achieved.

Application

Galvanic separation and amplification of contact messages.

Business data

Order number	AD-KR 11 GX AD-KR 12 GX AD-KR 22 GX

Technical specifications

Input

Nominal voltage	24 V DC
Voltage range	20 ... 30 V DC
Response time	6 ms
Fallback time	6 ms

Relay output

Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Switching capacity AC	< 100 VA
Switching capacity DC	< 100 W
Switching frequency	< 1 Hz
Switching operations mechanical	10000000
At 230V/2A AC, cos(phi)=1	600000
At 230V/2A AC, cos(phi)=0,4	200000
At 24V/1 A DC	200000

Contact construction

AD-KR 11 GX	1 potential-free changeover
AD-KR 12 GX	2 potential free contacts
AD-KR 22 GX	2 potential free contacts

Housing

Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	DIN rail mounting 35mm, EN 50022

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... +70 °C (no condensation)

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Input to relay	1,5 kV, 50 Hz (1 min)
Relay to relay	1,5 kV, 50 Hz (1 min)

Protection circuits

Input	electrical surge protection

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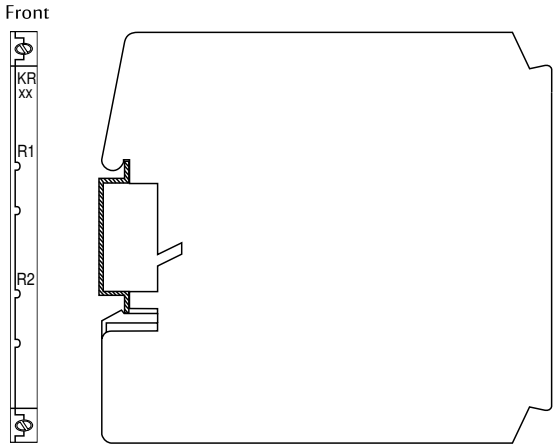
Coupling Relays

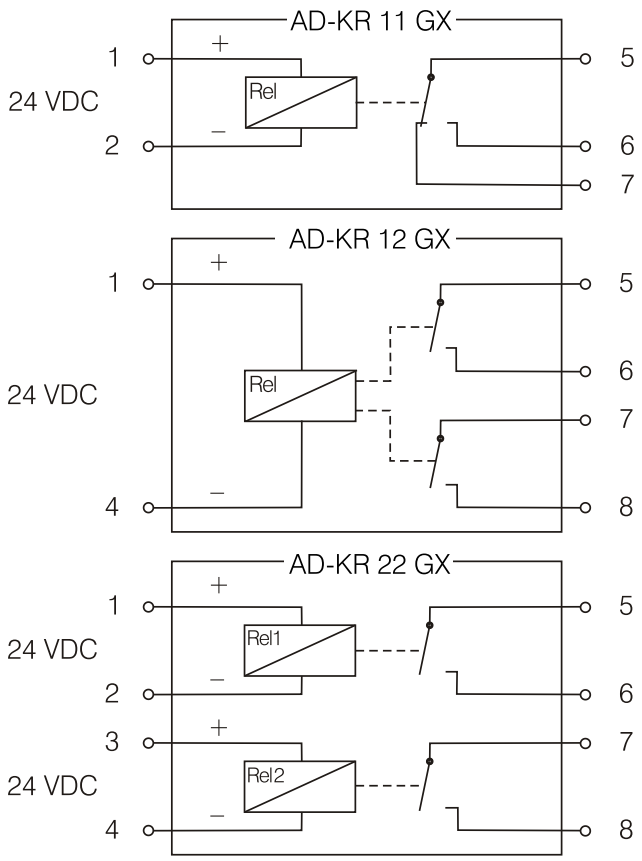
AD-KR 11 GX
AD-KR 12 GX
AD-KR 22 GX

Display and operating elements



Designation	LED	Meaning
R1	red	Contact 1 state
R2	red	Contact 2 state

Block and wiring diagram



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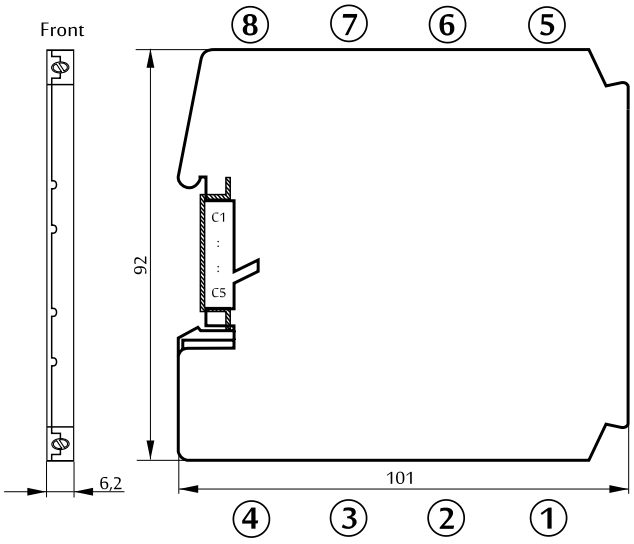


Indicator Light

AD-LM 6 FE

Description

The signal lamp/fault indicator AD-LM 6 FE, for mounting at the front of the control panel, informs about errors or operating conditions via max. 6 LED signal transmitter. The lamps are equipped with red, green or yellow LEDs, mounted on plug bases. These can be exchanged after removing the front plate (other colours on request). To test their readiness for operation, a lamp test can be carried out at any time through pressing on the front panel, whereby all LEDs light up simultaneously. All messages can be labelled with the aid of inserted strips (i.e. paper, foil etc.).

Specific characteristics

- LED colours: green, yellow, orange, white, blue, red

Business data

Order number	AD-LM 6 FE

Technical specifications

Input

Input	10 ... 30 V DC
Input power at 10V	< 80mW
Input power at 30V	< 350mW

Housing

Dimensions (WxHxD)	72x72x71mm
Front panel cut out	68x68mm
Protection class front plate	IP 40
Protection class connection	IP 20
Connection method	Abziehbare Klemmen
Manner of fastening	Panel-mount-case
Weight	130 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

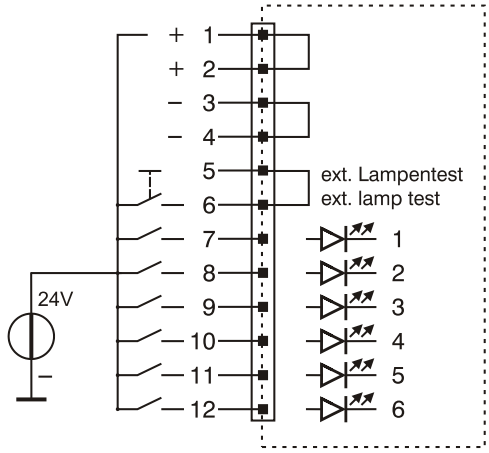
EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1

Block and wiring diagram



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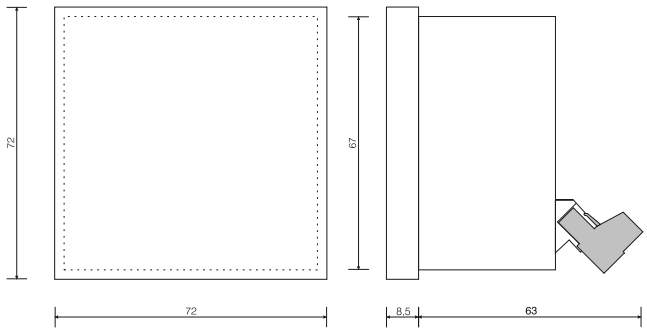

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Indicator Light

AD-LM 6 FE-Vario

AD-LMB 6 FE-Vario

Description

The signal/fault indicator AD-LM 6 FE-Vario, for mounting at the front of the control panel, informs with 6 multicolour leds about errors or operating conditions with glowing or blinking. Because of the multicolour leds, it`s not necessary to change the leds for changing the colour. So it`s very easy to change the technical appliance. The AD-LM 6 Vario can catch and save short pulses at the inputs, and for resetting its possible to connect external buttons. The device comes with 12 independet inputs which are easy to allot to one or more leds. Its possible to generate a colour- change by changing the input. A keypress on the touch key at the front of the device, generates a light test for all leds (all leds white). The AD-LM 6 Vario has a RS485 bus interface, which can used for the configuration over the AD- Studio (PC). All messages can be labelled with the aid of inserted strips (i.e. paper, foil etc.). This signal/fault indicator is also available with no physical inputs as a bus version (AD-6 Vario LMB). This can be controlled by the remote terminal block AD-AB 32 or by an external master.

Application

Indicate signal/fault status of machines or plants.

Specific characteristics

- detachable terminal clamps
- multicolour leds
- configuration by PC
- 12 independent inputs
- short-circuit proof feeding voltage
- external terminal- block for hat rail available

Business data

Order number

AD-LM 6 FE-Vario	standard version with physical inputs
AD-LMB 6 FE-Vario	bus- version without physical inputs

Accessory

AD-AB 12/24/32 WG	terminal block for hat rail available with up to 32 inputs (only adaptable with the bus version) see: Datasheet AD-AB 12/24/32

Technical specifications

Active inputs	
Voltage range	5 ... 30 V DC
Input resistance	> 45 kOhm
Supply	
Voltage range AC	50 ... 253 V AC, 50/60Hz
Voltage range DC	22 ... 253 V DC
Nominal voltage AC / DC	230 V AC / 24 V
Power consumption AC / DC	3,2VA / 1,7W
Feeding voltage for contacts	
Voltage	4,8 ... 5,2 V DC
Strength	max. 1 mA
Housing	
Dimensions (WxHxD)	72x72x71 mm
Front panel cut out	68x68 mm
Protection class panel	IP 54
Protection class connection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	1,0 mm² Strand with wire end ferrule / 1,5 mm² one wire
Manner of fastening	Panel-mount-case
Weight	145 g
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
RS485- Bus	
Max. attendance	32
Max. length of bus	100 m
Bus termination	120 Ohm (both sites of the bus)
Wiring	bus topology

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Indicator Light

AD-LM 6 FE-Vario

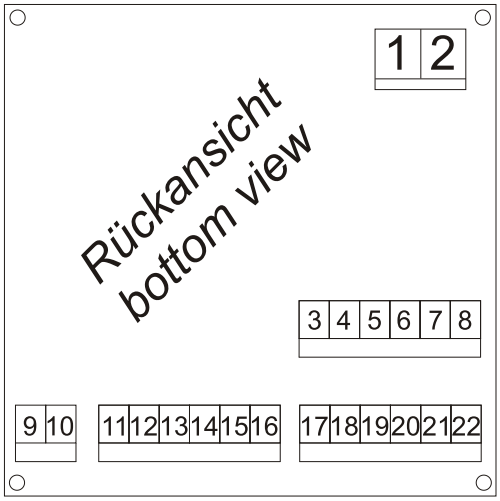
AD-LMB 6 FE-Vario

Technical specifications

Terminal assignment

Clamp	connection name
1	supply voltage
2	supply voltage
3	contact supply
4	contact supply
5	input for light test
6	ground
7	ground
8	ground
9	RS485 A
10	RS485 B
11	input 1
12	input 2
13	input 3
14	input 4
15	input 5
16	input 6
17	input 7
18	input 8
19	input 9
20	input 10
21	input 11
22	input 12

Block and wiring diagram



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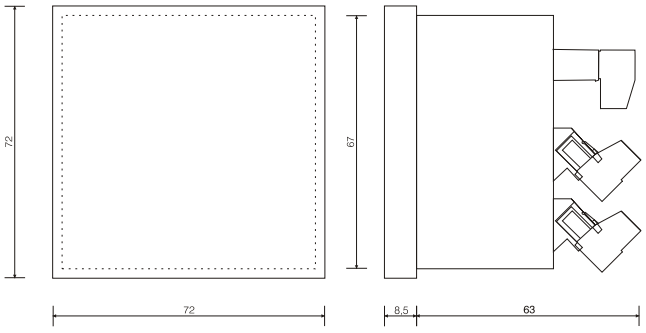


Indicator Light

AD-LM 8 FE

Description

The signal lamp/fault indicator AD-LM 8 FE, for mounting at the front of the control panel, informs about errors or operating conditions via max. 8 LED signal transmitter. The lamps are equipped with red, green or yellow LEDs, mounted on plug bases. These can be exchanged after removing the front plate (other colours on request). To test their readiness for operation, a lamp test can be carried out at any time through pressing on the front panel, whereby all LEDs light up simultaneously. All messages can be labelled with the aid of inserted strips (i.e. paper, foil etc.).

Specific characteristics

- LED colours: green, yellow, orange, white, blue, red

Business data

Order number	AD-LM 8 FE

Technical specifications

Input

Input	10 ... 30 V DC
Input power at 10V	< 80 mW per input
Input power at 30V	< 350 mW per input

Housing

Dimensions (WxHxD)	96x96x71mm
Manner of fastening	Panel-mount-case
Front panel cut out	92x92mm
Connection method	Abziehbare Klemmen
Protection class front plate	IP 40
Protection class connection	IP 20
Weight	260 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

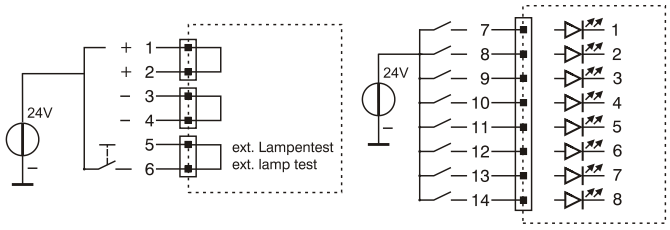
EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1

Block and wiring diagram



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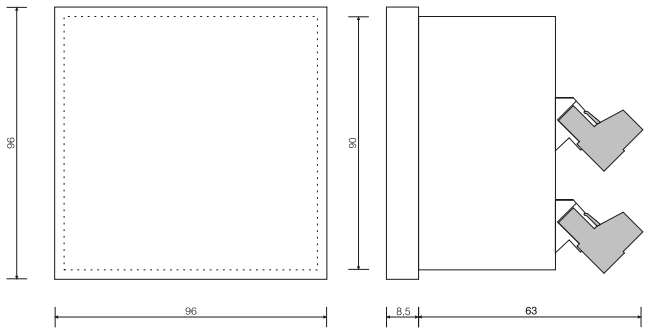

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Indicator Light

AD-LM 8 FE-Vario

AD-LMB 8 FE-Vario

Description

The signal/fault indicator AD-LM 8 FE-Vario, for mounting at the front of the control panel, informs with 8 multicolour leds about errors or operating conditions with glowing or blinking. Because of the multicolour leds, it`s not necessary to change the leds for changing the colour. So it`s very easy to change the technical appliance. The AD-LM 8 Vario can catch and save short pulses at the inputs, and for resetting its possible to connect external buttons. The device comes with 16 independet inputs which are easy to allot to one or more leds. Its possible to generate a colour- change by changing the input. A keypress on the touch key at the front of the device, generates a light test for all leds (all leds white). The AD-LM 8 Vario has a RS485 bus interface, which can used for the configuration over the AD- Studio (PC). All messages can be labelled with the aid of inserted strips (i.e. paper, foil etc.). This signal/fault indicator is also available with no physical inputs as a bus version (AD-LMB 8 Vario). This can be controlled by the remote terminal block AD-AB 32 or by an external master.

Application

Indicate signal/fault status of machines or plants.

Specific characteristics

- detachable terminal clamps
- multicolour leds
- configuration by PC
- 16 independent inputs
- short-circuit proof feeding voltage
- external terminal-block for hat rail available

Business data

Order number	AD-LM 8 FE-Vario;AD-LMB 8 FE-Vario

Technical specifications

Active inputs	
Voltage range	5 ... 30 V DC
Input resistance	> 45 kOhm
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Voltage range DC	22 ... 253 V DC
Nominal voltage AC / DC	230 V AC / 24 V
Power consumption AC / DC	3,0 VA / 1,3 W
Feeding voltage for contacts	
Voltage	4,8 ... 5,2 V DC
Strength	max. 1 mA
Relay	
Max. load AC	250 V / 2 A (cos phi = 1)
Max. load DC	50 V / 0,5 A (resistive load)
Cycles AC- load	ca. 100000 (cos phi = 1)
Cycles DC- load	ca. 100000 (resistive load)
Housing	
Dimensions (WxHxD)	96x96x71 mm
Front panel cut out	92x92 mm
Protection class panel	IP 54
Protection class connection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	1,0 mm² Strand with wire end ferrule / 1,5 mm² one wire
Manner of fastening	Panel-mount-case
Weight	305 g
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
RS485- Bus	
Max. attendance	32
Max. length of bus	100 m
Bus termination	120 Ohm (both sites of the bus)
Wiring	bus topology

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Indicator Light

AD-LM 8 FE-Vario

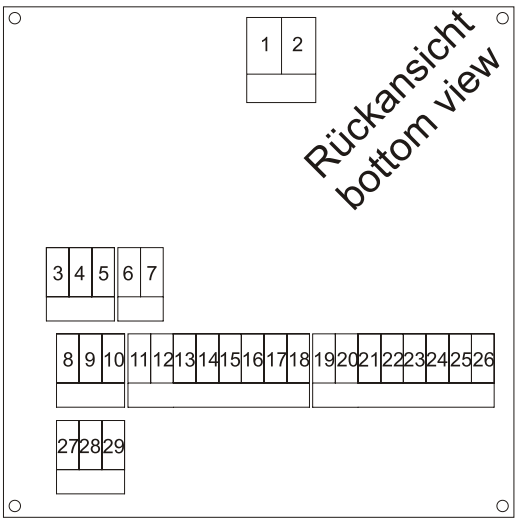
AD-LMB 8 FE-Vario

Technical specifications

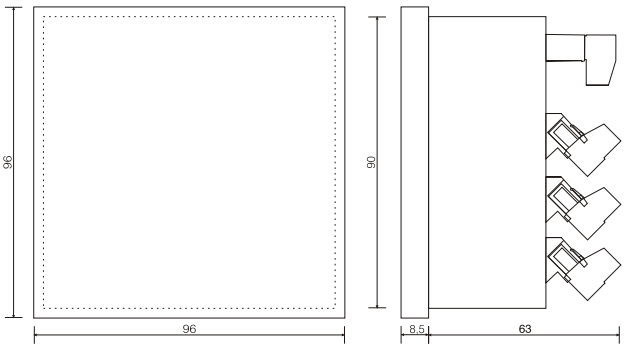
Terminal assignment

Clamp	connection name
1	supply voltage
2	supply voltage
3	ground
4	ground
5	ground
6	RS485 A
7	RS485 B
8	contact supply
9	contact supply
10	input for light test
11	input 1
12	input 2
13	input 3
14	input 4
15	input 5
16	input 6
17	input 7
18	input 8
19	input 9
20	input 10
21	input 11
22	input 12
23	input 13
24	input 14
25	input 15
26	input 16
27	relay NO
28	relay COM
29	relay NC

Block and wiring diagram



Dimensions



Indicator Light

AD-LM 12 FE

Description

The signal lamp/fault indicator AD-LM 12 FE, for mounting at the front of the control panel, informs about errors or operating conditions via max. 12 LED signal transmitter. The lamps are equipped with red, green or yellow LEDs, mounted on plug bases. These can be exchanged after removing the front plate (other colours on request). To test their readiness for operation, a lamp test can be carried out at any time through pressing on the front panel, whereby all LEDs light up simultaneously. All messages can be labelled with the aid of inserted strips (i.e. paper, foil etc.).

Specific characteristics

- LED colours: green, yellow, orange, white, blue, red

Business data

Order number	AD-LM 12 FE

Technical specifications

Input

Input	10 ... 30 V DC
Input power at 10V	< 80 mW per input
Input power at 30V	< 350 mW per input

Housing

Dimensions (WxHxD)	144x72x71mm
Manner of fastening	Panel-mount-case
Front panel cut out	140x68mm
Connection method	Abziehbare Klemmen
Protection class front plate	IP 40
Protection class connection	IP 20
Weight	220g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

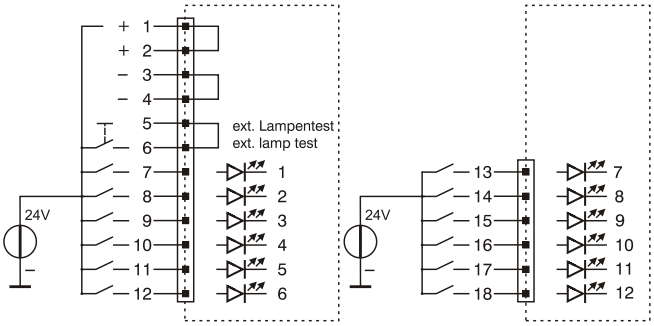
EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1

Block and wiring diagram



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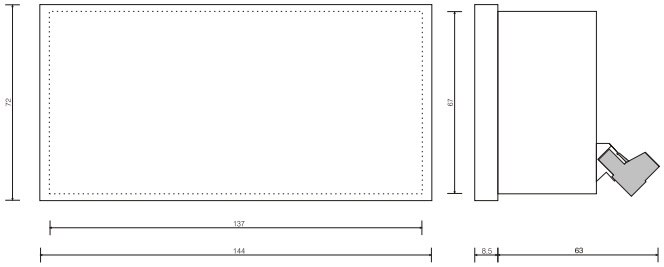

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Indicator Light

AD-LM 12 FE-Vario

AD-LMB 12 FE-Vario

Description

The signal/fault indicator AD-LM 12 FE-Vario, for mounting at the front of the control panel, informs with 12 multicolour leds about errors or operating conditions with glowing or blinking. Because of the multicolour leds, it`s not necessary to change the leds for changing the colour. So it`s very easy to change the technical appliance. The AD-LM 12 Vario can catch and save short pulses at the inputs, and for resetting its possible to connect external buttons. The device comes with 24 independet inputs which are easy to allot to one or more leds. Its possible to generate a colour- change by changing the input. A keypress on the touch key at the front of the device, generates a light test for all leds (all leds white). The AD-LM 12 Vario has a RS485 bus interface, which can used for the configuration over the AD- Studio (PC). All messages can be labelled with the aid of inserted strips (i.e. paper, foil etc.). This signal/fault indicator is also available with no physical inputs as a bus version (AD-12 Vario LMB). This can be controlled by the remote terminal block AD-AB 32 or by an external master.

Application

Indicate signal/fault status of machines or plants.

Specific characteristics

- detachable terminal clamps
- multicolour leds
- configuration by PC
- 24 independent inputs
- short-circuit proof feeding voltage
- external terminal- block for hat rail available

Business data

Order number

AD-LM 12 FE-Vario	standard version with physical inputs
AD-LMB 12 FE-Vario	bus- version without physical inputs

Accessory

AD-AB 12/24/32 WG	terminal block for hat rail available with up to 32 inputs (only adaptable with the bus version) see: Datasheet AD-AB 12/24/32

Technical specifications

Active inputs	
Voltage range	5 ... 30 VDC
Input resistance	> 45 kOhm
Supply	
Voltage range AC	50 ... 253 V AC, 50 / 60 Hz
Voltage range DC	22 ... 253 V DC
Nominal voltage AC / DC	230 V AC / 24 V
Power consumption AC / DC	7,0VA / 3,8W
Feeding voltage for contacts	
Voltage	4,8 ... 5,2 V DC
Strength	max. 1 mA
Relay	
Max. load AC	250 V / 2 A (cos phi = 1)
Max. load DC	50 V / 0,5 A (resistive load)
Cycles AC- load	ca. 100000 (cos phi = 1)
Cycles DC- load	ca. 100000 (resistive load)
Housing	
Dimensions (WxHxD)	144x72x71 mm
Front panel cut out	140x68 mm
Protection class panel	IP 54
Protection class connection	IP 20
Connection method	detachable terminal clamp
Manner of fastening	Panel-mount-case
Terminals, wire cross section	1,0 mm² Strand with wire end ferrule / 1,5 mm² one wire
Weight	260 g
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
RS485- Bus	
Max. attendance	32
Max. length of bus	100 m
Bus termination	120 Ohm (both sites of the bus)
Wiring	bus topology

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Indicator Light

AD-LM 12 FE-Vario

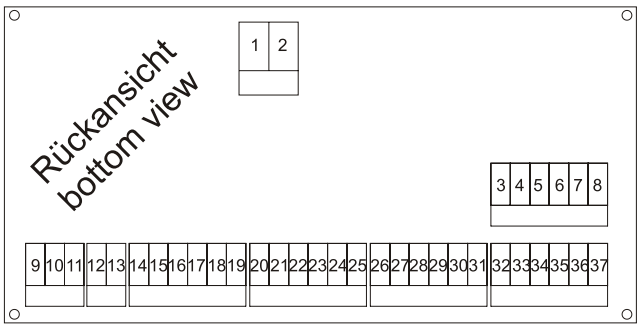
AD-LMB 12 FE-Vario

Technical specifications

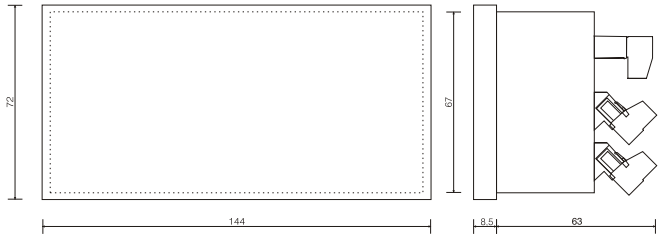
Terminal assignment

Clamp	connection name
1	supply voltage
2	supply voltage
3	contact supply
4	contact supply
5	input for light test
6	ground
7	ground
8	ground
9	relay NO
10	relay COM
11	relay NC
12	RS485 A
13	RS485 B
14	input 1
15	input 2
16	input 3
17	input 4
18	input 5
19	input 6
20	input 7
21	input 8
22	input 9
23	input 10
24	input 11
25	input 12
26	input 13
27	input 14
28	input 15
29	input 16
30	input 17
31	input 18
32	input 19
33	input 20
34	input 21
35	input 22
36	input 23
37	input 24

Block and wiring diagram



Dimensions



Indicator Light

AD-LM 16 FE

Description

The signal lamp/fault indicator AD-LM 16 FE, for mounting at the front of the control panel, informs about errors or operating conditions via max. 16 LED signal transmitter. The lamps are equipped with red, green or yellow LEDs, mounted on plug bases. These can be exchanged after removing the front plate (other colours on request). To test their readiness for operation, a lamp test can be carried out at any time through pressing on the front panel, whereby all LEDs light up simultaneously. All messages can be labelled with the aid of inserted strips (i.e. paper, foil etc.).

Specific characteristics

- LED colours: green, yellow, orange, white, blue, red

Business data

Order number	AD-LM 16 FE

Technical specifications

Input

Input	10 ... 30 V DC
Input power at 10V	< 80 mW per input
Input power at 30V	< 350 mW per input

Housing

Dimensions (WxHxD)	96x96x71mm
Manner of fastening	Panel-mount-case
Front panel cut out	92x92mm
Connection method	Abziehbare Klemmen
Protection class front plate	IP 40
Protection class connection	IP 20
Weight	260 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

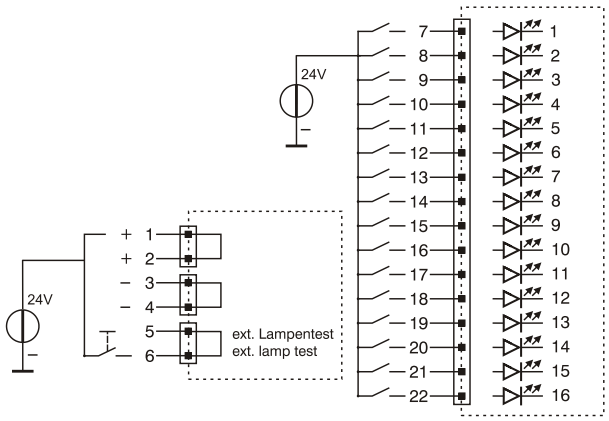
EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

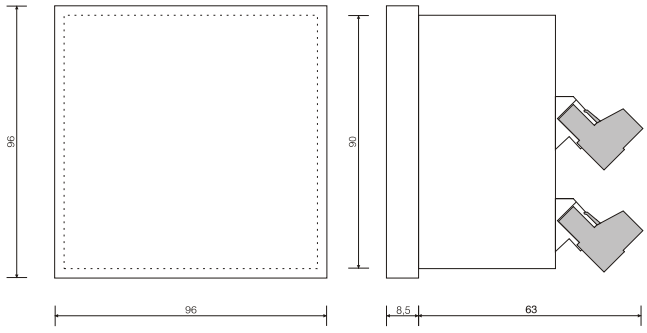
Electrical safety requirements

Product family standard	EN 61010-1

Block and wiring diagram



Dimensions



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Indicator Light

AD-LM 16 FE-Vario

AD-LMB 16 FE-Vario

Description

The signal/fault indicator AD-LM 16 FE-Vario, for mounting at the front of the control panel, informs with 16 multicolour leds about errors or operating conditions with glowing or blinking. Because of the multicolour leds, it`s not necessary to change the leds for changing the colour. So it`s very easy to change the technical appliance. The AD-LM 16 Vario can catch and save short pulses at the inputs, and for resetting its possible to connect external buttons. The device comes with 32 independet inputs which are easy to allot to one or more leds. Its possible to generate a colour- change by changing the input. A keypress on the touch key at the front of the device, generates a light test for all leds (all leds white). The AD-LM 16 Vario has a RS485 bus interface, which can used for the configuration over the AD- Studio (PC). All messages can be labelled with the aid of inserted strips (i.e. paper, foil etc.). This signal/fault indicator is also available with no physical inputs as a bus version (AD-16 Vario LMB). This can be controlled by the remote terminal block AD-AB 32 or by an external master.

Application

Indicate signal/fault status of machines or plants.

Specific characteristics

- detachable terminal clamps
- multicolour leds
- configuration by PC
- 32 independent inputs
- short-circuit proof feeding voltage
- external terminal-block for hat rail available

Business data

Order number

AD-LM 16 FE-Vario	standard version with physical inputs
AD-LMB 16 FE-Vario	bus- version without physical inputs

Accessory

AD-AB 12/24/32 WG	terminal block for hat rail available with up to 32 inputs (only adaptable with the bus version) see: Datasheet AD-AB 12/24/32

Technical specifications

Active inputs

Voltage range	5 ... 30 V DC
Input resistance	> 45 kOhm

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Voltage range DC	22 ... 253 V DC
Nominal voltage AC / DC	230 V AC / 24 V
Power consumption AC / DC	4,0 VA / 1,9 W

Feeding voltage for contacts

Voltage	4,8 ... 5,2 V DC
Strength	max. 1 mA

Relay

Max. load AC	250 V / 2 A (cos phi = 1)
Max. load DC	50 V / 0,5 A (resistive load)
Cycles AC- load	ca. 100000 (cos phi = 1)
Cycles DC- load	ca. 100000 (resistive load)

Housing

Dimensions (WxHxD)	96x96x71 mm
Front panel cut out	92x92 mm
Protection class panel	IP 54
Protection class connection	IP 20
Connection method	detachable terminal clamp
Terminals, wire cross section	1,0 mm² Strand with wire end ferrule / 1,5 mm² one wire
Manner of fastening	Panel-mount-case
Weight	305 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1

RS485- Bus

Max. attendance	32
Max. length of bus	100 m
Bus termination	120 Ohm (both sites of the bus)
Wiring	bus topology

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Indicator Light

AD-LM 16 FE-Vario

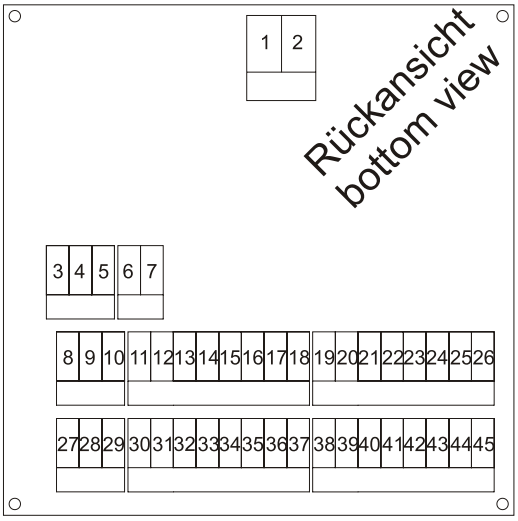
AD-LMB 16 FE-Vario

Technical specifications

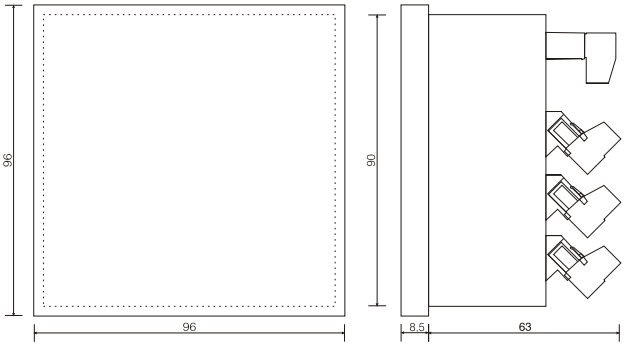
Terminal assignment

Clamp	connection name
1	supply voltage
2	supply voltage
3	ground
4	ground
5	ground
6	RS485 A
7	RS485 B
8	contact supply
9	contact supply
10	input for light test
11	input 1
12	input 2
13	input 3
14	input 4
15	input 5
16	input 6
17	input 7
18	input 8
19	input 9
20	input 10
21	input 11
22	input 12
23	input 13
24	input 14
25	input 15
26	input 16
27	relay NO
28	relay COM
29	relay NC
30	input 17
31	input 18
32	input 19
33	input 20
34	input 21
35	input 22
36	input 23
37	input 24
38	input 25
39	input 26
40	input 27
41	input 28
42	input 29
43	input 30
44	input 31
45	input 32

Block and wiring diagram



Dimensions



Indicator Light

External Terminal Block

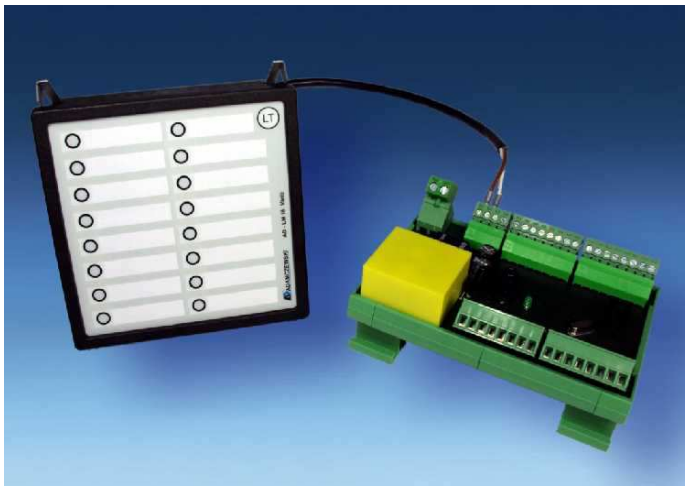
AD-AB 12 WG
AD-AB 24 WG
AD-AB 32 WG

Description

The detached connection block AD-AB 12/24/32 has been specially developed for the LMB Vario series of devices. The bus version of the Vario illuminated indicator has no input terminals and is therefore controllable exclusively via the RS485 bus. The detached connection block AD-AB 12/24/32 can be connected at this bus connection. This bus connection has active inputs, which are transmitted to the indicator light via its RS485 bus. With this, the Vario illuminated indicator can be configured via the configuring software ADStudio and behaves as if it had physical inputs. If the illuminated indicator is located in the control cabinet door or in the control centre, then the connection block can be easily mount on the hat rail in the control cabinet on site. The external connection block is available in three different variants. With 12, 24 and 32 inputs. The connection block has a short-circuit-proof supply voltage, with which contacts can also be supplied and therefore queried. Furthermore, an efficient switching power supply has been fitted, which works in a wide supply voltage range.

Application

Application in connection with the Vario bus illuminated indicators (AD-LMB 6, AD-LMB 12, AD-LMB 16). When messages are to be indicated spatially separated from the control cabinet, a substantial amount of wiring can be saved here.



Specific characteristics

- available with 12, 24 or 32 inputs
- RS485 Bus connection to the indicator lights
- Allpower supply
- short-circuit proof feeding voltage
- mouting on DIN rail

Business data

Order number

AD-AB 12	(12 Inputs)
AD-AB 24	(24 Inputs)
AD-AB 32	(32 Inputs)

Technical specifications

Active inputs	
Voltage range	5 ... 30 V DC
Input resistance	> 45 kOhm
Supply	
Supply voltage	20 ... 253 V AC/DC
Max. power consumption	0,3W / 0,6VA
Feeding voltage for contacts	
Voltage	4,8 ... 5,2 V DC
Strength	max. 1 mA
RS485 Bus	
Cable length (screened)	max. 100 m (terminator is integrated)
Send interval input data	ca. 100 ms
Housing	
Dimensions (WxHxD)	113x82x54 mm
Type of protection	IP 10
Connection method	terminal clamp / optionally detachable terminal clamp
Manner of fastening	DIN rail housing
Calmping torque- RM 5	0,5 Nm
Clamping torque- RM 3,81	0,25 Nm
Weight	150 g
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
LEDs	
Power- LED (green)	On: power supply OK Off: power supply error
Data- LED (yellow)	blinking: data connection OK On/Off: data connection error

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Indicator Light

External Terminal Block

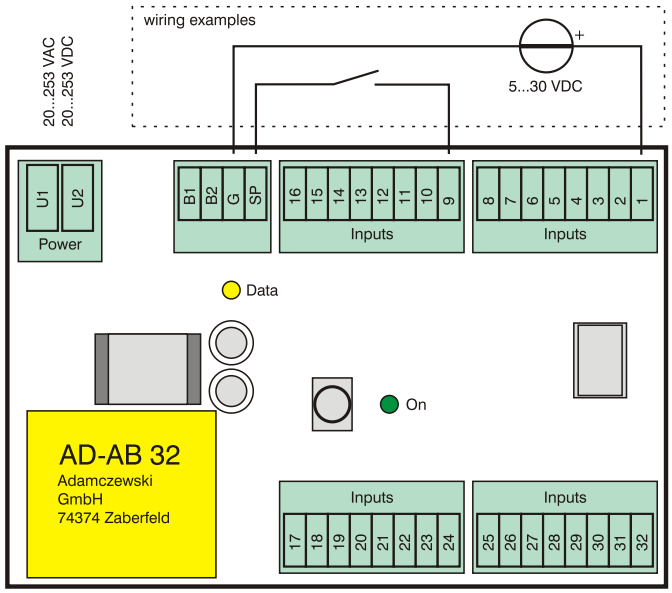
AD-AB 12 WG
AD-AB 24 WG
AD-AB 32 WG

Technical specifications

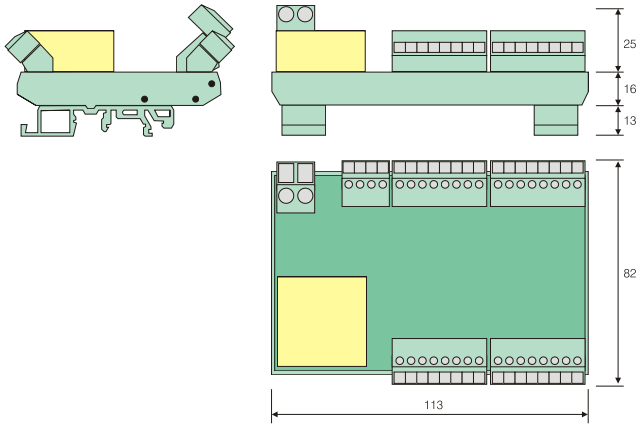
Terminal assignment

Clamp	connection name
U1	supply voltage
U2	supply voltage
B1	RS485 Bus clamp B
B2	RS485 Bus clamp A
G	GND of the device
SP	Supply Voltage for contacts
1	input 1
2	input 2
3	input 3
4	input 4
5	input 5
6	input 6
7	input 7
8	input 8
9	input 9
10	input 10
11	input 11
12	input 12
13	input 13
14	input 14
15	input 15
16	input 16
17	input 17
18	input 18
19	input 19
20	input 20
21	input 21
22	input 22
23	input 23
24	input 24
25	input 25
26	input 26
27	input 27
28	input 28
29	input 29
30	input 30
31	input 31
32	input 32

Block and wiring diagram



Dimensions



Overvoltage Protection

Signal Line Protection

AD-BS 1 ST
AD-BS 2 ST
AD-BS 3 ST

Description

The overvoltage protection elements AD-BS1 ST, AD-BS2 ST and AD-BS3 ST have been designed for the protection of low voltage signal lines (e.g. 0/4...20 mA, 0/2...10V etc.). The overvoltage pulses can be caused e.g. by lightning strikes, switching operations in the power grid, inductive interference or static discharges. A special L-type is also available, which has inductors instead of resistors as longitudinal current limitation. This allows the voltage drop at the longitudinal protection to be significantly reduced and the signal to be protected to be less loaded. Due to the plug-in module design, the overvoltage protection elements can be easily replaced after response or during revision. After the protective element has been removed, the signal path is interrupted. Thus, operation without a protective element is not possible.

Application

Protection of technology connected to low voltage signal lines against overvoltage surges.

Specific characteristics

- Plug-in module technology
- Standard Phoenix plug-in socket

Business data

Order number

AD-BS 1 ST	Grobschutz ohne Längsstrombegrenzung
AD-BS 2 ST	Grob- und Feinschutz mit Längsstrombegrenzung durch Widerstände
AD-BS 2 ST-L	Grob- und Feinschutz mit Längsstrombegrenzung durch Induktivitäten
AD-BS 3 ST	Grob- und Feinschutz mit Querspannungsbegrenzung und Längsstrombegrenzung durch Widerstände
AD-BS 3 ST-L	Grob- und Feinschutz mit Querspannungsbegrenzung und Längsstrombegrenzung durch Induktivitäten

Technical specifications

General

Weight	~ 120 g
Mounting type	DIN rail 35mm 35 mm
Ambient temperature	-20 ... 60 °C
Type of protection	IP20
Connection method	screw clamp
Conductor cross section	2,5 mm² Strand with wire end ferrule / 4 mm² one wire

AD-BS 1 ST

Rated voltage wire to earth	90 V
Output voltage limitation	at 1 kV/ms: < 450 V
Series resistance per wire	0 Ohm
Max rated current per wire	2 A
Rated leakage current per wire	10 kA (8/20 pulse)
Response time	< 100 ns

AD-BS 2 ST

Rated voltage wire to earth	22 V
Protective voltage wire to earth	25 V
Series resistance per wire	22,1 Ohm
Max rated current per wire	100 mA
Rated leakage current per wire	10 kA (8/20 pulse)
Response time	< 0,10 ns
Other protection voltages	33 V, 50 V
Line inductance for L-type	40 uH

AD-BS 3 ST

Rated voltage wire to earth	22 V
Cross-voltage limitation (nominal) Wire against wire	22 V
Protective voltage wire to earth	25 V
Cross-voltage limitation (protection) wire against wire	25 V
Series resistance per wire	22,1 Ohm
Max rated current per wire	100 mA
Rated leakage current per wire	10 kA (8/20 Impuls)
Response time	< 0,1 ns
Other protection voltages	33 V, 50 V
Line inductance for L-type	40 uH

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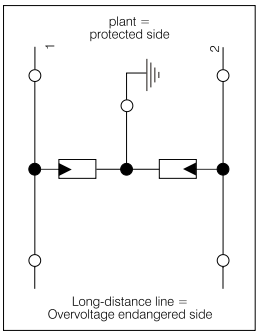
Overvoltage Protection

Signal Line Protection

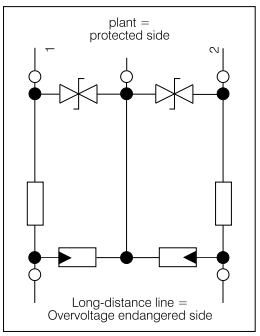
AD-BS 1 ST
AD-BS 2 ST
AD-BS 3 ST

Block and wiring diagram

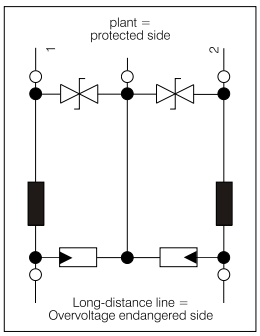
AD-BS 1 ST



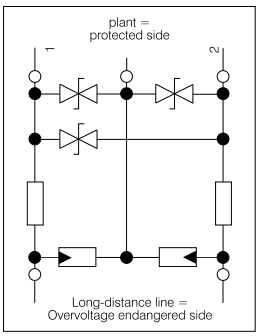
AD-BS 2 ST



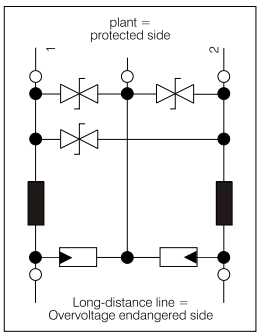
AD-BS 2 ST-L



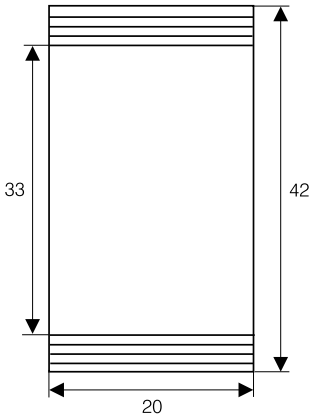
AD-BS 3 ST

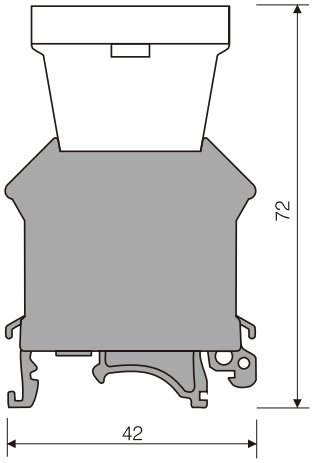


AD-BS 3 ST-L



Dimensions





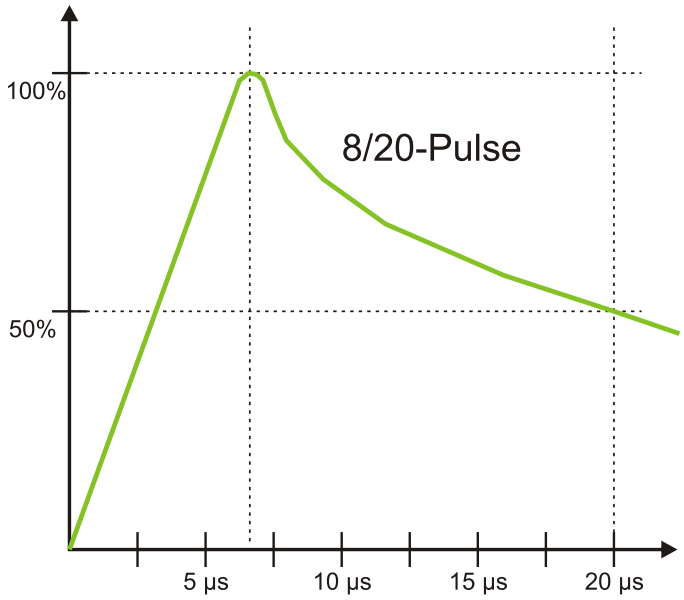
Signal Line Protection

AD-BS 1 ST
AD-BS 2 ST
AD-BS 3 ST

Attention

Input side is where overvoltage is expected (remote line). Output side points to the protecting installation. Earth connection is to be connected directly to the designating terminal. Avoid capacitive and inductive couplings, i.e. do not lay unprotected lines near the protected lines.

Circuit examples



Special Functions

Power Supply

AD-SV 20 GS

AD-SV 40 GS

Description

With the power supplies AD-SV 20 GS (1-channel) and AD-SV 40 GS (2-channel), external sensors and devices with a filtered DC voltage of about 24 V DC with max. 50 mA can be supplied.The output voltage is electrically isolated from the supply voltage and the second channel. For each channel, two different electronic current limiters are available, which can be alternatively selected via terminals. Due to the highly efficient integrated electronic wide range power supply high output loads are achieved with low power consumption and heating.

Application

For an isolated power supply of external sensors etc. Devices with a DC separation, eg. 2 - or 3-wire transmitter

Specific characteristics

- Wide range power supply: 90 ... 253 V AC or DC
- galvanically isolated output voltages
- Two different current limits per channel
- Current limit selectable via terminals
- Single-channel (AD-SV 20 GS) and two channels (AD-SV 40 GS) available

Business data

Order number

AD-SV 20 GS	1-channel
AD-SV 40 GS	2-channel

Technical specifications

Output 1

Nominal voltage	24 V DC
Open-circuit voltage	ca. 27 V DC
Full load voltage	ca. 21 V DC
Current limit	25 mA / 50 mA (can be alternatively selected via terminals)
Residual ripple	max. 50 mVss

Output 2

Nominal voltage	24 V DC
Open-circuit voltage	ca. 27 V DC
Full load voltage	ca. 21 V DC
Current limit	25 mA / 50 mA (can be alternatively selected via terminals)
Residual ripple	max. 50 mVss

Supply

Voltage range AC	90 ... 253 V AC, 50/60 Hz
Nominal voltage AC	110 V AC / 230 V AC
Voltage range DC	90 ... 253 V DC
Nominal voltage DC	110 V DC / 230 V DC
Power consumption AC / DC	6 VA / 4 W (two channels, full load)

Transmission behaviour

Temperature influence	100 ppm/K

Housing

Dimensions (WxHxD)	23x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 120 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1)]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Output 1 / output 2	2 kV (1 min.)
Outputs / power supply	4 kV (1 min.)

Protection circuits

Output	protection against overvoltage and short circuit
Power supply	protection against over voltage, over temperature and reverse polarity

[1)] During electromagnetic disturbance minor changes in output signal are possible.

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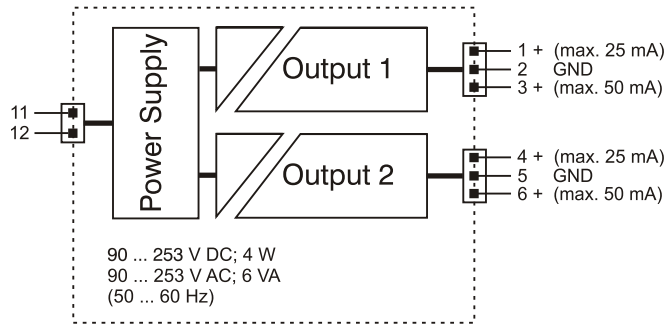
Special Functions

Power Supply

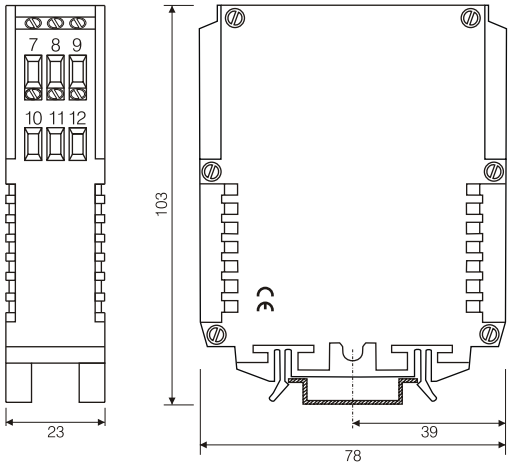
AD-SV 20 GS

AD-SV 40 GS

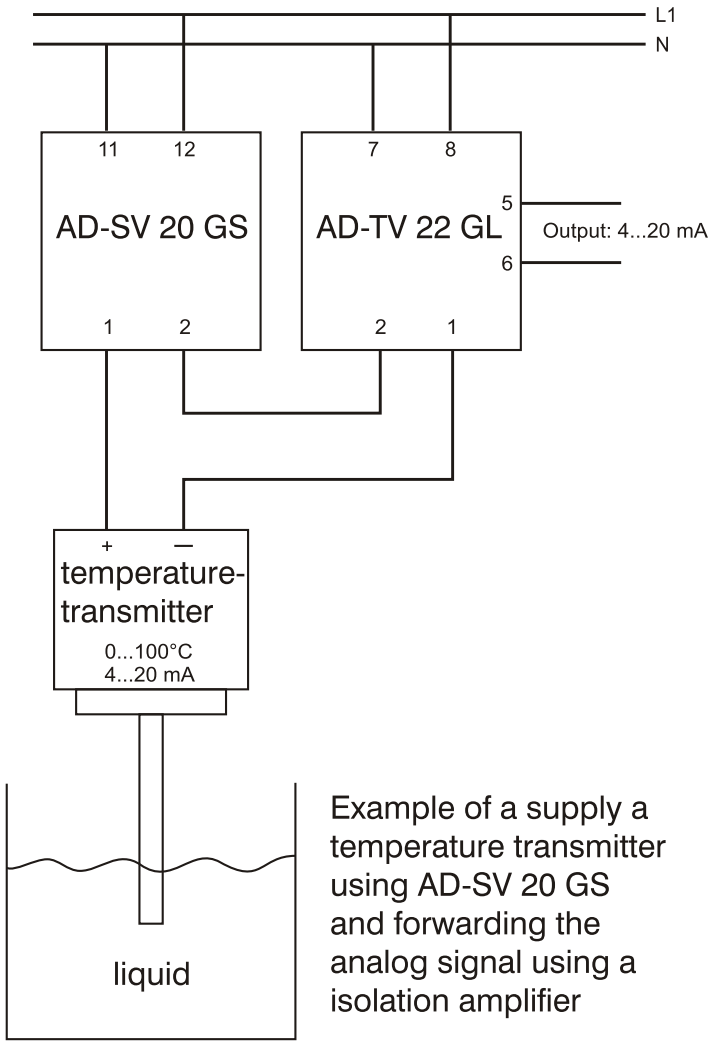
Block and wiring diagram



Dimensions



Circuit examples



Example of a supply a temperature transmitter using AD-SV 20 GS and forwarding the analog signal using a isolation amplifier

Special Functions

Power Supply

AD-SV 1224 GL

Description

The power converter AD-SV 1224 GL is for increasing an available low supply voltage to a substantially higher value. An upward regulation switching with a high degree of sufficiency enables the operation of electric measuring converters, which demand a supply voltage of at least 20 V DC. An electric over current protection switches the device securely off during a short circuit at the output. To reset this fuse, a brief voltage separation at the input is necessary.

Application

A mains supply is not always available at all installation sites. In such cases, one resorts to battery voltages with 12V DC, which are also possibly charged by solar energy. Almost all devices of the AD-device family work from a supply voltage of 20 V DC upwards and therefore can also be operated in remote areas. This also enables operation in vehicles with 12V board voltage.

Specific characteristics

- Increasing a voltage supply to a level required for operating a device.
- It is not essential that the earth lead for the load is acquired from the AD-SV 1224 GL. The earth connection can also be carried out directly at the feeding voltage source.
- Electronic overload protection with reverting characteristic and manual hold.

Business data

Order number	AD-SV 1224 GL

Technical specifications

Input

Input voltage range	11 ... 15 V DC

Output

Output voltage range	20 ... 30 V DC
Max. load	5 W

Housing

Dimensions (WxHxD)	18 x 78 x 103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² Litze / 4 mm² Draht
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm Normschiene

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (Betauung vermeiden)

EMC

Product family standard	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation

Input/output	KEINE Trennung! Durchgehende Masseleitung.

Protection circuits

Input	Schutz gegen Überspannung, Überstrom
Output	Schutz gegen Überspannung, Überstrom

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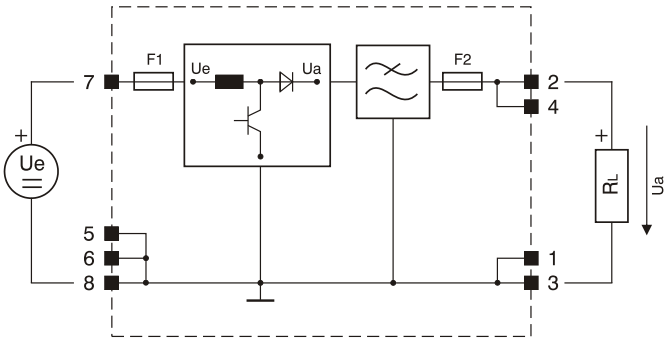
Power Supply

AD-SV 1224 GL

Block and wiring diagram



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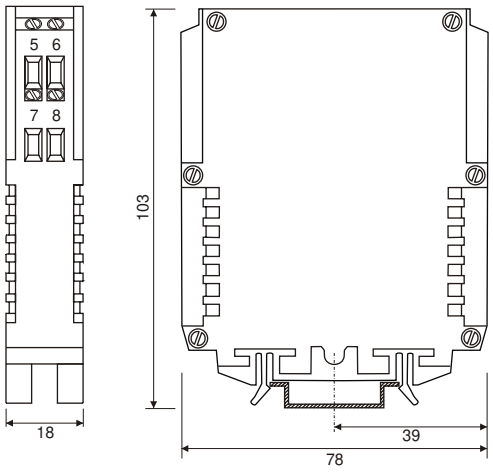

Special Functions

Setpoint Encoder

AD-SWG 211 GS

Description

With the setpoint encoder AD-SWG 211 GS setpoints in the form of analog signals can be set by adjustable Coding switch. The range is 0 ... 99 % of the final value and is set on the front in steps of 1%. The output is galvanically isolated from the supply voltage and up to the maximum resistance independent of the connected load. It can be selected between current or voltage output. Due to the highly efficient integrated wide range power supply high output loads are achieved with low power consumption.

Application

For presetting analog set values in measurement and control systems, for simulating analog measurement signals, etc.

Specific characteristics

- frontal coding switch for setpoint
- Current or voltage output
- Wide range power supply

Business data

Order number

ADSWG211GS23	setpoint range 0 ... 20 mA
ADSWG211GS43	setpoint range 4 ... 20 mA
ADSWG211GS13	setpoint range 0 ... 10 V
AD-SWG 211 GS	

Technical specifications

Coding switch	
Setting range	0 ... 99 % (1%- steps)
Output current	
Output range	0 ... 20 mA, 4 ... 20 mA[1]
Max. burden	500 Ohm
Residual ripple	20 µAss
Output voltage	
Output range	0 ... 10 V, 2 ... 10 V [1]
Min. burden	500 Ohm
Residual ripple	50 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	2 VA / 1 W
Transmission behaviour	
Accuracy	< 0,2 %
Temperature influence	50 ppm/K
Response time	~ 200 ms
Housing	
Dimensions (WxHxD)	23x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [2]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Signal / supply unit	4 kV (1 min.)
Protection circuits	
Input	electrical surge protection
Output	electrical surge protection
Power supply	electrical surge and reverse current protection

[1] Specify signal range in plain text when ordering.

[2] During electromagnetic disturbance minor changes in output signal are possible.

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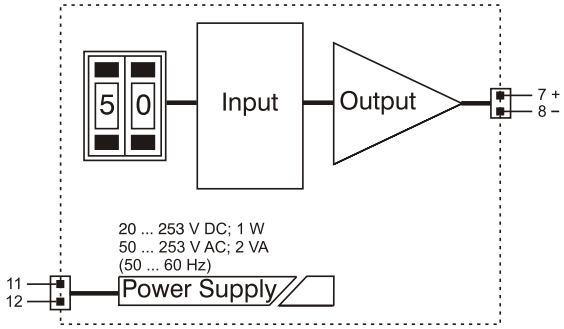
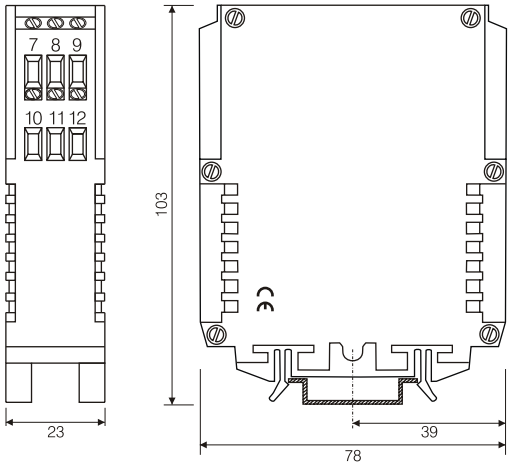
Setpoint Encoder

AD-SWG 211 GS

Block and wiring diagram



Dimensions



Special Functions

Incremental Setpoint Generator

AD-ISW 100 GS

Description

The incremental setpoint generator is used to preset an analog value (0 / 4–20 mA, 0–10 V) with the aid of external control signals. The output range from 0–100% is divided into 256 steps. The output change by one step is carried out by an input pulse of at least 64 ms in length. With a continuous signal, there is an automatic change approx. every 282 ms by one step (ramp function). An infinite ramp function when the signal direction is reversed at the range limits can be configured. Potential-free contacts as well as active voltages of 5–30 V DC can be used as input pulse sources. The signal setting can also be made with the two device buttons. Pressing both buttons at the same time for approx. 2 seconds saves the instantaneous value as the start value after a supply voltage failure. The storage process is acknowledged by blanking the operating voltage LED. There is a red LED for each signal direction input, which indicates the active input status. During the ramp function, the respective LED flashes according to the direction of change. The output signal is galvanically separated from the active inputs and also from the supply voltage.
The following can be configured using AD Studio software:
- Number of steps (2 ... 1000)
- Time interval per step (10 ... 2000 ms)
- Area limits
- Ramp function
- Signal start values

Application

Presetting of analog values by means of external control signals (contact or DC voltage).

Business data

Order number	AD-ISW 100 GS

Technical specifications

Contact	
Feeding voltage	5 V
Current limit	~ 3 mA
Input voltage	
Input level	0 / 5 ... 30 V
Input resistance	3 kOhm
Input signals	
Minimum pulse width	64 ms
Contact debouncing	50 ms
Ramp start	> 2000 ms
Step time	282 ms [1]
Step size	1 / 256 [1]
Output current	
Output range	0...20 mA; 4...20 mA [1]
Max. burden	500 Ohm
Max. residual ripple	40 µAss
Open-circuit voltage	< 13 V
Output voltage	
Output range	0...10 V; 2...10 V [1]
Min. burden	10 kOhm
Max. residual ripple	20 mVss
Current limit	< 40 mA
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Input power AC/DC	1,7 VA / 0,8 W
Signal behavior	
Resolution	11 Bit
Basic accuracy	< 0,2 %
Temperature influence	100 ppm/K
Housing	
Dimensions (WxHxD)	23x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Special Functions

Incremental Setpoint Generator

AD-ISW 100 GS

Technical specifications

EMC

Product family standard	EN 61326-1 [2]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

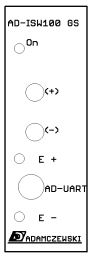
Contact / Output	no
Active input / Output	1,0 kV, 50 Hz (1 min.)
Signal / supply unit	3 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Output	electrical surge protection
Power supply	Protection against overvoltage reverse polarity

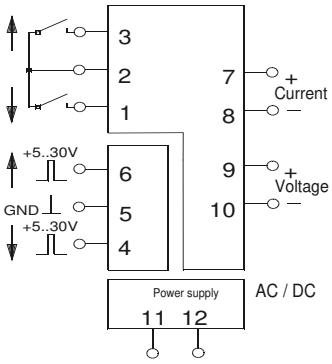
1) In/Out signals can be configured with AD studio software.
2) Slight signal deviations are possible during interference.

Display and operating elements

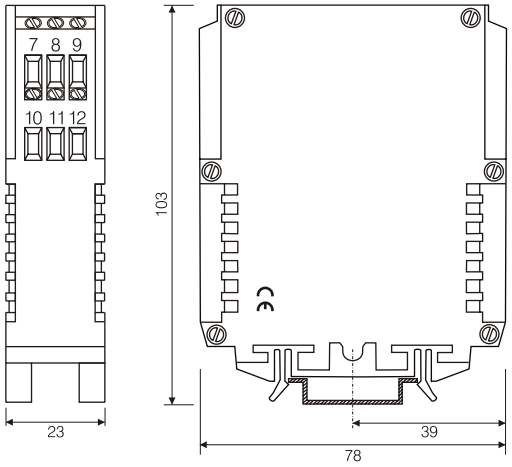


On Power supply LED (green)
lights up in normal operation
Blanking when signal storage
(+) Direction key for signal change
(-) Direction key for signal change
E(+) red LED for signal direction pulse
E(-) red LED for signal direction pulse
AD-UART Communication interface for configuration

Block and wiring diagram



Dimensions



Isolation Amplifier

Isolation Amplifier With Nominal Value Selector

AD-TV 32 GL

Description

The VARIO-isolation amplifier AD-TV 32 GL serves the galvanic separation, conversion and amplification of DC current and voltage signals (0/4-20 mA and 0/2-10 V DC). The signal dimensions are adjustable at the front. The starting and end values can here be adjusted independent of each other. Input, output and the supply voltage are separate from each other with high insulation. An integral electronic wide range power pack with a high degree of effectiveness allows operation in a supply range of 20...253 V DC or 50...253 V AC. Additionally, a nominal value can be specified via switch at the front at the output. The input measuring signal is decoupled and without influence during this. The nominal value at the output, which can be activated and adjusted via a potentiometer at the front.

Application

Conversion, burden amplification and galvanic decoupling of active DC-current and voltage signals with additional manual / automatic operation via a nominal value specification, which can be activated.

Specific characteristics

- Front panel switch for switching between manual and automatic operation
- Value setting for manual operation by front-face potentiometer

Business data

Order number	AD-TV 32 GL

Technical specifications

Input current	
Measuring range	0/4 ... 20 mA
Input resistance	85 Ohm
Input voltage	
Measuring range	0/2 ... 10 V
Input resistance	> 100 kOhm
Output current	
Output range	0/4 ... 20 mA
Max. burden	500 Ohm
Residual ripple	50 µAss
Output voltage	
Output range	0/2 ... 10 V
Min. burden	> 10 kOhm
Residual ripple	50 mVss
Setpoint setting	
Front mounted potentiometer	0 ... 100 %
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Voltage range DC	20 ... 253 V DC
Nominal voltage AC / DC	230 V AC / 24 V DC
Power consumption AC / DC	2,3 VA / 1W
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	100 ppm/K
Response time	~ 20 ms
Housing	
Dimensions (WxHxD)	18x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Input / output	3,75 kV, 50 Hz (1 min.)
Signal / supply unit	4 kV, 50 Hz (1 min.)
Protection circuits	
Input	electrical surge protection
Output	electrical surge protection
Power supply	electrical surge and reverse current protection

[1] During checking, slight signal deviations are possible.

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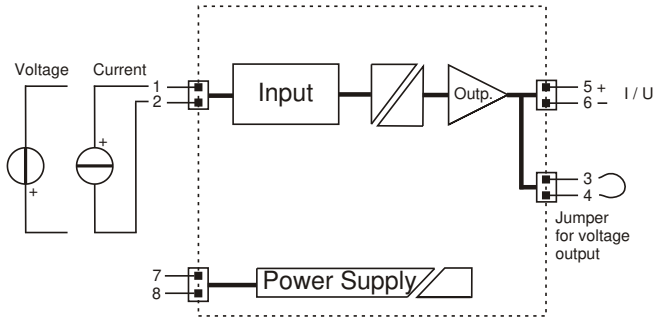
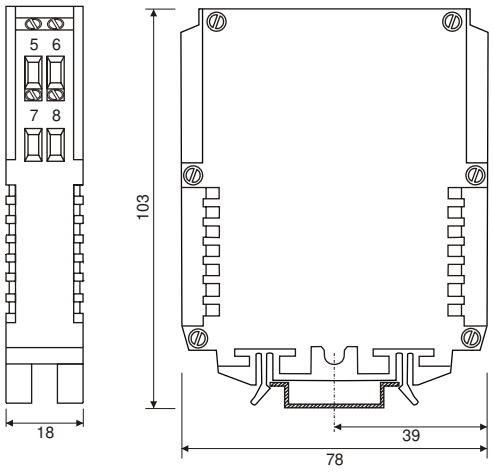
Isolation Amplifier With Nominal Value Selector

AD-TV 32 GL

Block and wiring diagram



Dimensions



Supply Isolation Amplifier

Isolation Amplifier With Reference Function

AD-TV 320 GS

Description

The set value buffer amplifier AD-TV 320 GS serves the galvanic separation, transformation and amplification of DC current and voltage signals (0/4-20mA or 0/2-10V).The device has additionally a transmitter supply and a set value function, which can be switched on. The activation of the set value function is carried out selectable with a brief depression of the key at the front or with a control signal (24V active or contact) at the remote control input. Any output set value is set with the potentiometer at the front. Activation of zero trimmers and full trimmers is possible with longer depression of the set value key. With this, the signal magnitudes are adjustable in the range of ±25%. An integral electronic wide range power pack allows operation in a wide supply area.

Application

Transformation, burden amplification and galvanic disconnection of impressed transmitter signals, current signals and voltage signals with additional simulation function via set value specification, which can be activated.

Specific characteristics

- Restoration of the last device condition on supply connection (i.e. after power cut).
- Setting of a set value is carried out undamped and independent of the trimmer positions between 0...100% of the specified output range.
- Check back contact in set value condition (closer).
- The output signal remains even with missing input signal at the output start (i.e. 4 mA).
- Configurable via AD-STUDIO.

Business data

Order number	AD-TV 320 GS

Technical specifications

Transmitter supply	
Feeding voltage	26 ... 19 V (4 ... 20 mA)
Current limit	~ 25 mA
Input current	
Measuring range	0 ... 20 mA [1]
Input resistance	50 Ohm
Input voltage	
Measuring range	0 ... 10 V [1]
Input resistance	100 kOhm (10 kOhm / Volt)
Output current	
Output range	0 ... 20 mA [1]
Max. burden	500 Ohm
Max. residual ripple	40 µAss
Output voltage	
Output range	0 ... 10 V [1]
Min. burden	1 kOhm
Max. residual ripple	20 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Input power AC/DC	3,5 VA / 2,0 W
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	100 ppm/K
Response time	50 ms
Damping (optional)	0,1 %/s (linear max. ~950 s)
Trimmer function	+/- 25%
Linearization (optional)	24 x/y, interpoliert
Setpoint encoder	0 ... 270° = 0 ... 100 %
Remote control	
Input	Optokoppler
Voltage	10 ... 30 V DC
Pulse controlled	200 ... 1000 ms
Static	> 1000 ms
Front button	~ 200 ms
Housing	
Dimensions (WxHxD)	23x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Supply Isolation Amplifier

Isolation Amplifier With Reference Function

AD-TV 320 GS

Technical specifications

EMC

Product family standard	EN 61326-1 [2]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

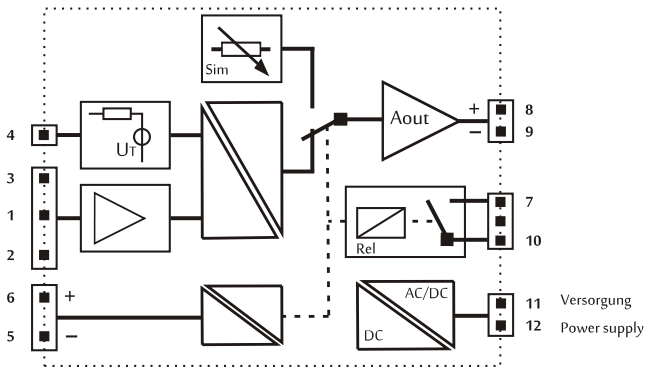
Input / output	1,5 kV, 50 Hz (1 min.)
Signal / supply unit	3 kV, 50 Hz (1 min.)

Protection circuits

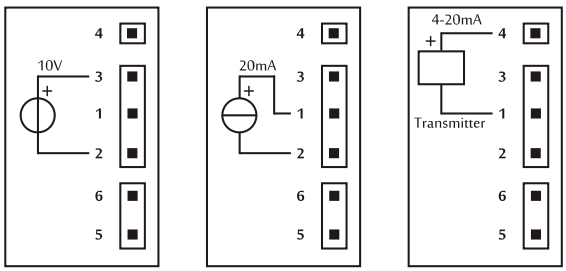
Input	electrical surge protection
Output	electrical surge protection
Power supply	Protection against overvoltage reverse polarity

1) Values must be adviced by order.
2) During checking, slight signal deviations are possible.

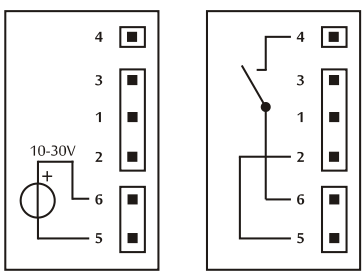
Block and wiring diagram



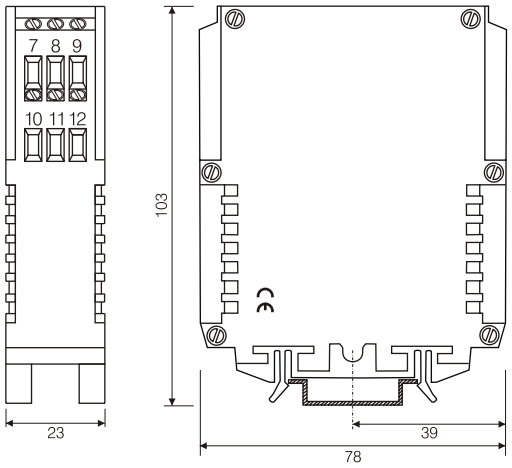
Eingangsbeschaltung / input wiring



Simulationsbeschaltung / simulation wiring



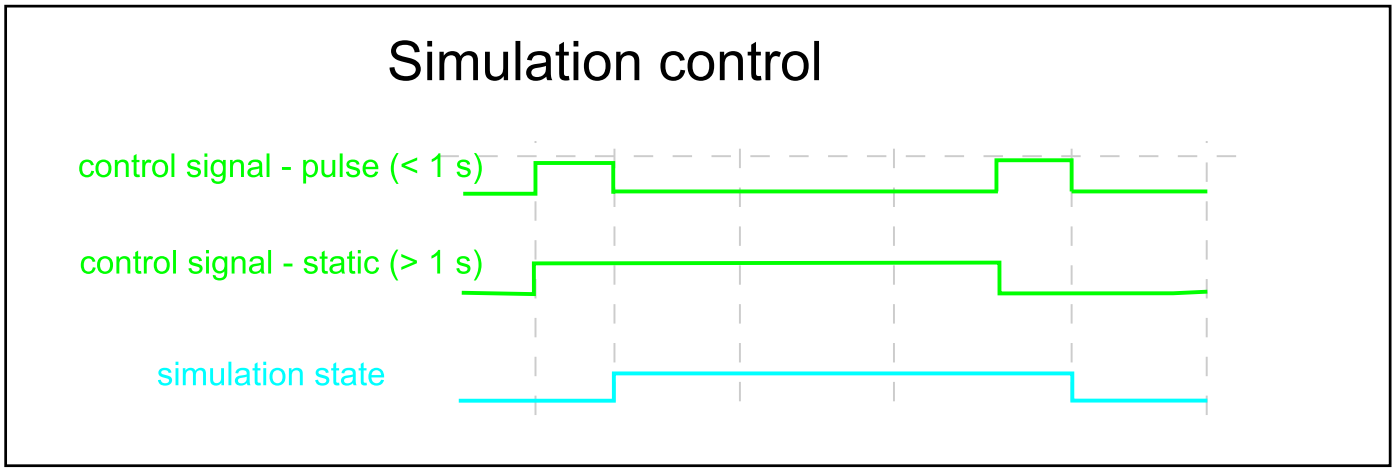
Dimensions



Isolation Amplifier With Reference Function

AD-TV 320 GS

Circuit examples



Special Functions

Burden Amplifier

AD-BV 20 GVC

Description

The burden amplifier AD-BV 20 GVC serves the power amplification (burden increase) in application with high current loop resistance, i.e. line resistance. The burden amplifier is switched directly behind a present current source (i.e. separation amplifier AD-TV 22 GL), whereby the energy of the current source is also used. The device output of the total device chain is optimally utilised. The galvanic signal separation of the series separation amplifier continues to be realised.

Application

In applications where isolation amplifiers with e.g. max. 500 Ohm can no longer provide the required load voltage to bridge high line resistances.

Business data

Order number	AD-BV 20 GVC

Technical specifications

Input current

Input range	0 ... 20 mA
Required input voltage	6 V
Input voltage requirement with bridge cl. 4 and 5	2 V

Output current

Max. output range	0 ... 20 mA; 1:1
Max. burden	1000 Ohm
Maximum load with bridge cl. 4 and 5	1300 Ohm

No galvanic isolation to the input!

Transmission behaviour

Basic accuracy	0,2 % of full scale
Temperature influence	< 10 ppm/K of full scale

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	1,5 VA / 1W

Housing

Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Weight	~ 140 g

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [2)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[2)] During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

Signal/auxiliary voltage	3 kV (1 min)

Protective systems

Input/output	over voltage and over current
Power supply	over voltage, over current and over temperature

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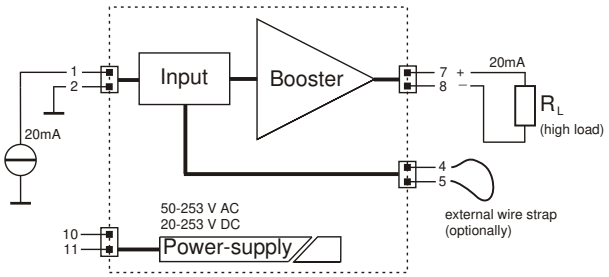
Special Functions

Burden Amplifier

AD-BV 20 GVC

Block and wiring diagram



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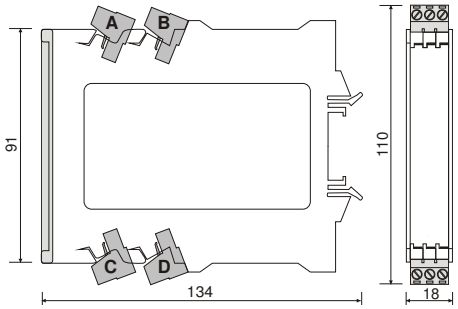

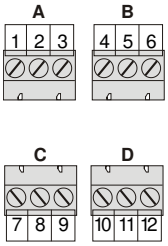

Special Functions

Sum Data Amplifier

AD-SMV 400 GVC

Description

The sum data amplifier adds up or subtracts up to 4 singly rateable input signals and converts these to a sum proportional or difference proportional output signal. As input signals, currents up to 20 mA or voltages up to 10 V (also bipolar) are possible. The inputs are galvanic separated from the auxiliary voltage and the outputs. The two analogue outputs current (max. 20mA) and voltage (max. 10V) can be utilised simultaneously. The device can be configured with the optional configuration software AD-Studio via the interface AD-PC. However, this can also be carried out at the works according to customer data.

Application

Analogue summing/subtraction of single measurable variables such as through flows, outputs or quantities.

Business data

Order number

AD-SMV 400 GVC-I	4 Current inputs
AD-SMV 400 GVC-U	4 voltage inputs

Technical specifications

Current inputs

Measuring range [1]	-20 ... + 20 mA
Number	4
Input resistance	60 Ohm

Voltage inputs

Measuring range [1]	-10 ... + 10 V
Number	4
Input resistance	1 MOhm

[1] Please specify current or voltage inputs when ordering. A galvanic coupling is to be excluded.

Output current

Max. output range	0 ... 20,4 mA
Max. burden	500 Ohm
Residual ripple	20 µAss

Output voltage

Max. output range	0 ... 10,2 V
Min. burden	5 kOhm
Residual ripple	10 mVss

Resolution

Input	13 bit
Output	10 bit

Transmission behaviour

Basic accuracy	0,2 % of full scale
Temperature influence	< 100 ppm/K of full scale
Rise time	100 ms (output auf 90 %)

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	2,2 VA / 1W

Housing

Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Weight	~ 140 g

Environmental conditions

Ambient temperature	-10 ... 60 °C
Storage and transport	-10 ... 70 °C (no condensation)

Printed 23.08.2022 We reserve the right for technical changes.

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Sum Data Amplifier

AD-SMV 400 GVC

Technical specifications

EMC

Product family standard [2)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[2)] During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

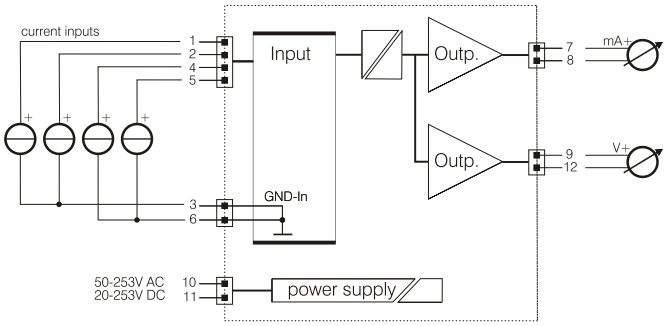
Galvanic isolation, test voltages

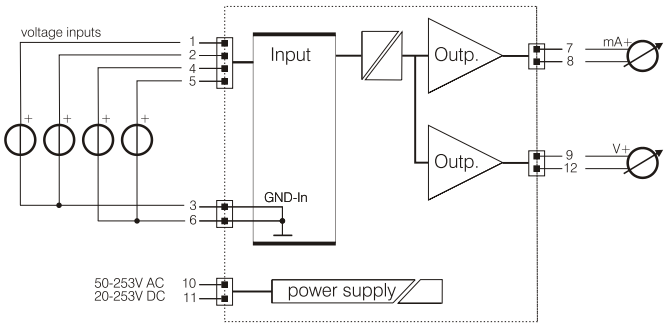
Input/output	2,5 kV (1 min)
Signal/auxiliary voltage	3 kV (1 min)

Protective systems

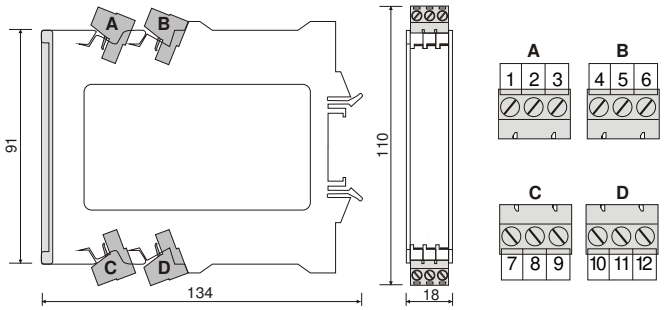
Input/output	over voltage and over current
Power supply	over voltage, over current and over temperature

Block and wiring diagram





Dimensions



Special Functions

Maximum/Minimum Value Evaluator AD-MMA 400 GVC

Description

The evaluator is programmed comfortably via PC or laptop. The relevant parameterization software AD-Studio and the programming interface cable are available as option. The maximum/minimum value evaluator AD-MMA 400 GVC acquires up to four input streams 0/4-20mA, compares them and makes the highest or deepest of these streams available 1:1 at the output. The highly linear and galvanically separated output signal (max. 20mA or 10V) is amplified thereby and can used at the same time. The integrated power supply unit is galvanically separated from the input signal as well as also from the output signal. Customer specific works settings are possible on request.

Application

Acquisition of up to four input signals, comparison and output of the maximum or minimum value.

Business data

Order number

AD-MMA 400 GVC-I	4 Stromeingänge
AD-MMA 400 GVC-U	4 Spannungseingänge

Technical specifications

Current inputs

Measuring range	-20 ... + 20 mA
Number [1)]	4
Input resistance	60 Ohm

Voltage inputs

Measuring range	-10 ... + 10 V
Number [1)]	4
Input resistance	1 MOhm

[1)] Please specify current or voltage inputs when ordering. A galvanic coupling is to be excluded.

Output current

Max. output range	0 ... 20,4 mA
Max. burden	500 Ohm
Residual ripple	20 µAss

Output voltage

Max. output range	0 ... 10,2 V
Min. burden	5 kOhm
Residual ripple	10 mVss

Resolution

Input	13 bit
Output	10 bit

Transmission behaviour

Basic accuracy	0,2 % of full scale
Temperature influence	< 100 ppm/K of full scale
Rise time	100 ms (output auf 90 %)

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	2,2 VA / 1W

Housing

Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Weight	~ 140 g

Environmental conditions

Ambient temperature	-10 ... 60 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Maximum/Minimum Value Evaluator

AD-MMA 400 GVC

Technical specifications

EMC

Product family standard [2)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[2)] During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

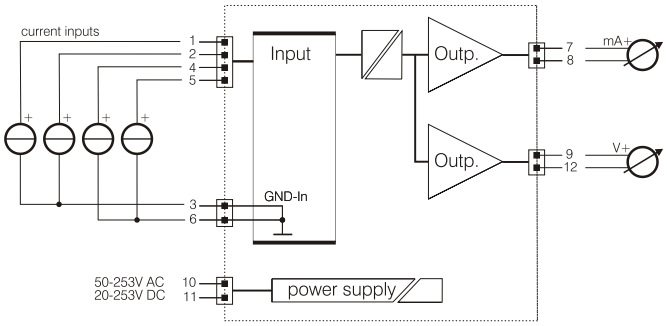
Galvanic isolation, test voltages

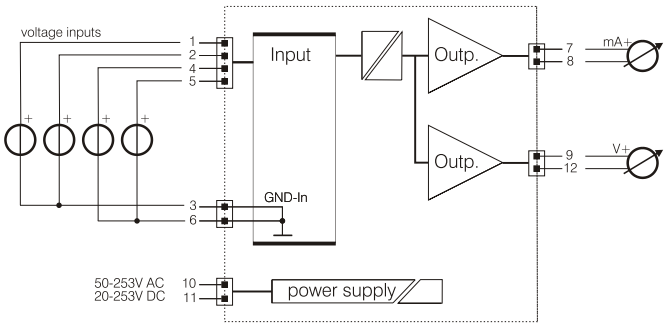
Input/output	2,5 kV (1 min)
Signal/auxiliary voltage	3 kV (1 min)

Protective systems

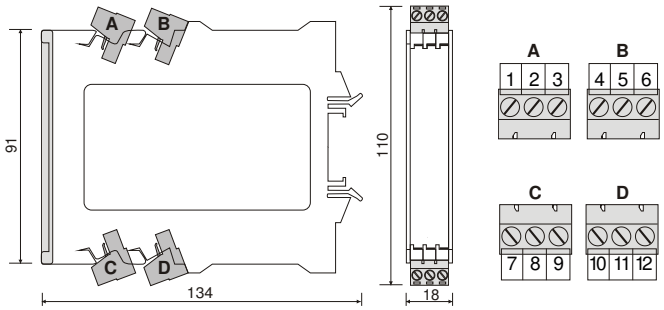
Input/output	over voltage and over current
Power supply	over voltage, over current and over temperature

Block and wiring diagram





Dimensions



Measuring Converter

Redundancy Evaluator

AD-RA 300 GVF

Description

For important analogue values it must be considered that a measuring value can also be incorrect if it is inside the admissible measuring range. Such an error can be determined through redundancy measuring, here three analogue values are measured and a mean value is obtained. If the difference between the channels exceed a user-defined limit, the deviating input is reported via a potential-free relay and is at the same time excluded from the averaging. Consequently a secure analogue signal continues to be present at the output. If more than one channel deviates, the output is set to the measuring range start and all relays report an error. The redundancy evaluator AD-RA 300 can also be operated with only 2 inputs. In this case, the percental difference of the two measuring signals is monitored. If the difference is too great, the two relays would in this case also report an error and the output signal is set to the measuring range start. All necessary parameters can be configured directly at the device or via a PC software.

Specific characteristics

- 3 current inputs (bipolar)
- the deviating input is reported via a respective potential-free relay
- current and voltage input are freely scalable and simultaneously operational
- multicoloured (RGB) illuminated LCD display
- simulation mode (auto/manual)

Business data

Order number	AD-RA 300 GVF

Technical specifications

Current inputs	
Measuring range	-20 ... + 20 mA
Number	3
Input resistance	60 Ohm
Output current	
Max. output range	0 ... 20,4 mA
Max. burden	500 Ohm
Residual ripple	20 µAss
Output voltage	
Max. output range	0 ... 10,2 V
Min. burden	5 kOhm
Residual ripple	10 mVss
Resolution	
Input	13 bit
Output	10 bit
Relay outputs A...C	
Contact type	3 changeover contact
Max. AC-breaking capacity	250 V AC, 2 A AC, 50Hz
Max. DC-breaking capacity	50 V DC, 2 A DC
Switching operations	
Mechanical	10^7
AC: 230V / 2A, cos(phi)=1	$6 * 10^5$
AC: 230V / 2A, cos(phi)=0,4	$2 * 10^5$
DC: 24V / 1A	$2 * 10^5$
Display	
Graphic-LCD	42x64 Pixel, background RGB lights
Digital display	4-digit, can be configured
Display function	scaled input signal, input signal, output, limits, scaling unit
Transmission behaviour	
Basic accuracy	0,2 % of full scale
Temperature influence	+/- 100 ppm/K of full scale
Rise time	100 ms (output auf 90 %)
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	2,2 VA / 1W
Housing	
Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Weight	~ 200 g

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Measuring Converter

Redundancy Evaluator

AD-RA 300 GVF

Technical specifications

Environmental conditions

Ambient temperature	-10 ... 60 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard [1)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[1)]During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

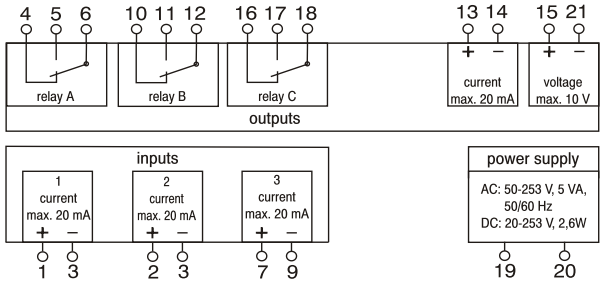
Galvanic isolation, test voltages

Input/output	2,5 kV (1 min)
Signal/auxiliary voltage	3 kV (1 min)

Protective systems

Input/output	over voltage and over current
Power supply	over voltage, over current and over temperature

Block and wiring diagram



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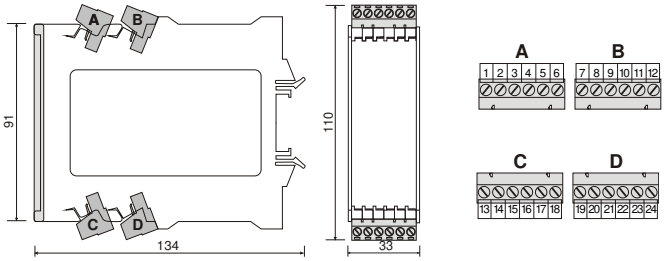

Special Functions

Analogue Calculator

AD-MU 400 GVC

Description

The analogue calculator AD-MU 400 GVC multiplies, divides or extracts square roots up to 4 singly rateable input signals or converts these in a product proportional, quotient proportional or radix proportional output signal. As input signals, currents up to 20 mA or voltages up to 10 V (also bipolar) are possible. The inputs are galvanic separated from the auxiliary voltage and the outputs. The two analogue outputs current (max. 20mA) and voltage (max. 10V) can be utilised simultaneously. The device can be configured with the optional configuration software AD-Studio via the interface AD-PC. However, this can also be carried out at the works according to customer data.

Application

Continuous display of DC output = current x voltage, Amount of heat = temperature difference x through flow etc.

Business data

Order number

AD-MU 400 GVC-I	4 Stromeingänge
AD-MU 400 GVC-U	4 Spannungseingänge

Technical specifications

Current inputs

Measuring range	-20 ... + 20 mA
Number [1)]	4
Input resistance	60 Ohm

Voltage inputs

Measuring range	-10 ... + 10 V
Number [1)]	4
Input resistance	1 MOhm

[1)] Please specify current or voltage inputs when ordering. A galvanic coupling is to be excluded.

Output current

Max. output range	0 ... 20,4 mA
Max. burden	500 Ohm
Residual ripple	20 µAss

Output voltage

Max. output range	0 ... 10,2 V
Min. burden	5 kOhm
Residual ripple	10 mVss

Resolution

Input	13 bit
Output	10 bit

Transmission behaviour

Basic accuracy	0,2 % of full scale
Temperature influence	< 100 ppm/K of full scale
Rise time	100 ms (output auf 90 %)

Supply

Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption AC / DC	2,2 VA / 1W

Housing

Manner of fastening	DIN rail 35mm (EN 50022)
Type of protection	IP 20
Connector cross section	max. 2,5 mm²
Weight	~ 140 g

Environmental conditions

Ambient temperature	-10 ... 60 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Analogue Calculator

AD-MU 400 GVC

Technical specifications

EMC

Product family standard [2)]	EN 61326-1
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

[2)] During electromagnetic disturbance minor changes in output signal are possible.

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

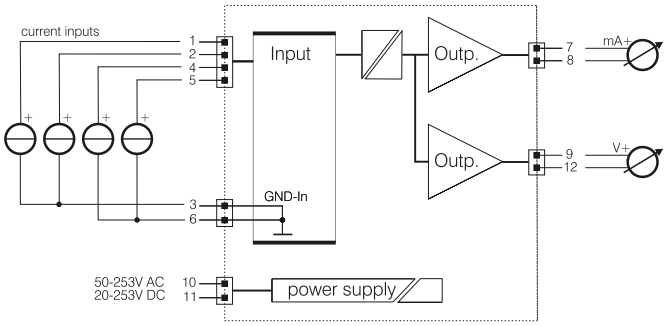
Galvanic isolation, test voltages

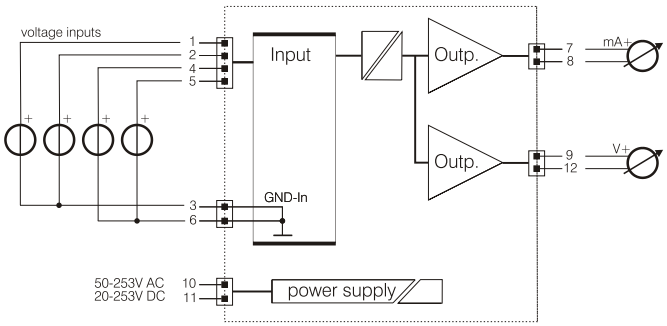
Input/output	2,5 kV (1 min)
Signal/auxiliary voltage	3 kV (1 min)

Protective systems

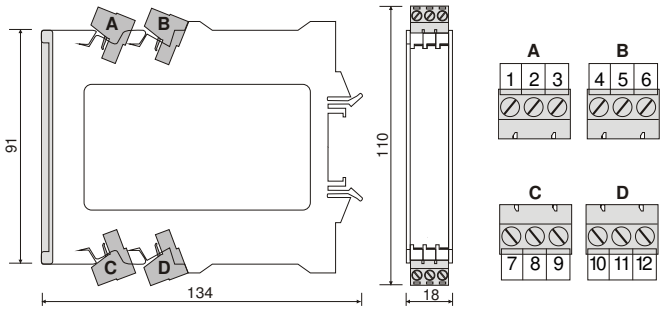
Input/output	over voltage and over current
Power supply	over voltage, over current and over temperature

Block and wiring diagram





Dimensions



Special Functions

Isolation Amplifier With Memory Function

AD-AS 320 GS

Description

The analogue memory AD-AS 320 GS serves the galvanic separation, conversion and amplification of DC current signals and voltage signals (0/4-20mA or 0/2-10V). The device can save an analogue value over an unlimited period. With an active control signal (24V active or contact), the output signal follows the input signal. If the control signal is deactivated, the instantaneous output signal remains saved. The saved value is also restored after a supply voltage failure. Alternatively, the analogue value can also be taken over to the output by pressing the memory key briefly. An activation of zero trimmer and full trimmer is possible by pressing the memory key for longer (only in signal sequence mode). With this, the signal dimensions can be adjusted at the front in the range of ±25%.

Application

Conversion, burden amplification and galvanic disconnection of impressed transmitter signals, current signals and voltage signals with additional memory function for maintenance work.

Specific characteristics

- The device has additionally a transmitter supply available.
- Restoration of the last device condition (power cut).
- Feedback contact with memory condition (closer).
- Configurable via AD-STUDIO.

Business data

Order number	AD-AS 320 GS

Technical specifications

Transmitter supply	
Feeding voltage	26 ... 19 V (4 ... 20 mA)
Current limit	~ 25 mA
Input current	
Measuring range	0 ... 20 mA [1]
Input resistance	50 Ohm
Input voltage	
Measuring range	0 ... 10 V [1]
Input resistance	100 kOhm (10 kOhm / Volt)
Output current	
Output range	0 ... 20 mA [1]
Max. burden	500 Ohm
Max. residual ripple	40 µAss
Output voltage	
Output range	0 ... 10 V [1]
Min. burden	1 kOhm
Max. residual ripple	20 mVss
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Input power AC/DC	3,5 VA / 2,0 W
Transmission behaviour	
Basic accuracy	< 0,2 %
Temperature influence	100 ppm/K
Response time	50 ms
Damping (optional)	0,3 %/s (linear max. ~300 s)
Trimmer function	+/- 25%
Linearization (optional)	24 Punkte, interpoliert
Remote control	
Input	Optokoppler
Voltage	10 ... 30 V DC
Pulse controlled	200 ... 1000 ms
Static	> 1000 ms
Front button	~ 200 ms
Housing	
Dimensions (WxHxD)	23x78x103 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

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Isolation Amplifier With Memory Function

AD-AS 320 GS

Technical specifications

EMC

Product family standard	EN 61326-1 [2]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2

Galvanic isolation, test voltages

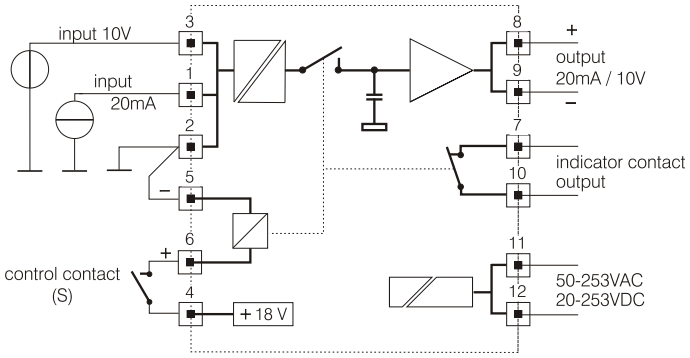
Input / output	1,5 kV, 50 Hz (1 min.)
Signal / supply unit	3 kV, 50 Hz (1 min.)

Protection circuits

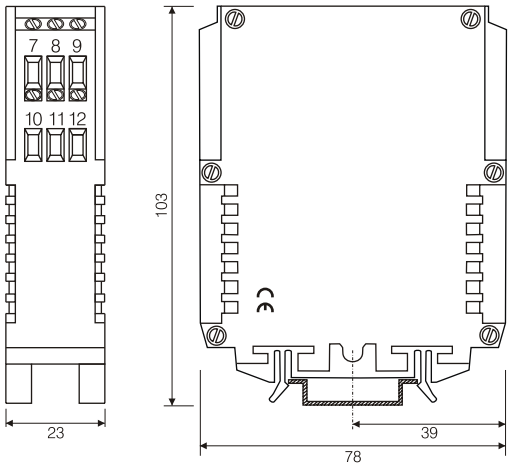
Input	electrical surge protection
Output	electrical surge protection
Power supply	Protection against overvoltage reverse polarity

1) Values must be adviced by order.
2) During checking, slight signal deviations are possible.

Block and wiring diagram



Dimensions



Special Functions

Electrode Relay

AD-ER 01 GS

Description

The electrodes are supplied with alternating voltage. If a conduction liquid i.e. water, bridges the mass and the max-electrode, the output relay responds, the transmitter power monitor lights up. Furthermore an internal, commutator ensures that the min-electrode becomes effective. The relay de-energize, if the mass and the min-electrode are not conductive connected. The sensitivity can be adjusted to the given circumstances via an integral trimmer.

Application

Monitoring and regulating levels of conductive liquids, especially water.

Specific characteristics

- 3 input electrodes
- AC current measurement
- universal wide range power supply

Business data

Order number	AD-ER 01 GS

Technical specifications

Electrodes	
Voltage	< 10 V~
Current	< 1 mA
Frequency	~ 45 Hz
Sensitivity	0 ... 60 kOhm
Response time	~ 10 ms
Relay output	
Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	potential-free changeover
Switching operations mechanical	10000000
At 230V/2A AC, cos(phi)=1	600000
At 230V/2A AC, cos(phi)=0,4	200000
At 24V/1 A DC	200000
Supply	
Voltage range AC	50 ... 253 V AC, 50/60 Hz
Nominal voltage AC	230 V AC
Power consumption AC	3 VA
Voltage range DC	20 ... 253 V DC
Nominal voltage DC	24 V DC
Power consumption DC	1,4 W
Housing	
Dimensions (WxHxD)	23x78x103 mm³
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,5 Nm
Weight	~ 100 g
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)
EMC	
Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1
Electrical safety requirements	
Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Galvanic isolation, test voltages	
Input / output	3 kV, 50 Hz (1 min.)
Signal / supply unit	3 kV, 50 Hz (1 min.)
Protection circuits	
Input	electrical surge protection
Output	electrical surge protection
Power supply	Protection against overvoltage reverse polarity

[1] During electromagnetic disturbance minor changes in output signal are possible.

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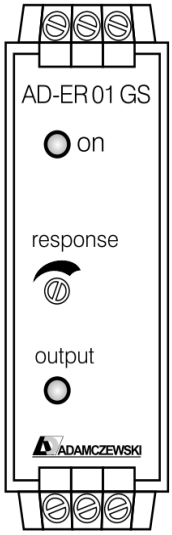
Electrode Relay

AD-ER 01 GS

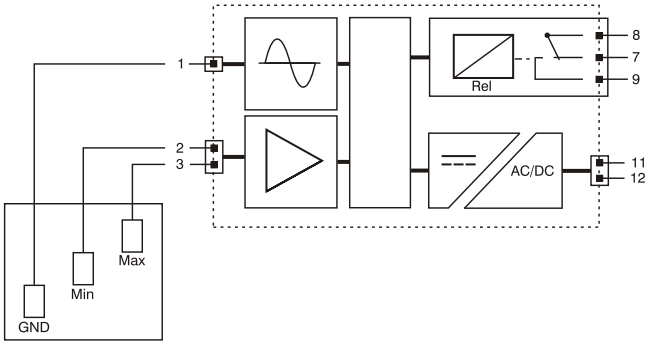
Display and operating elements



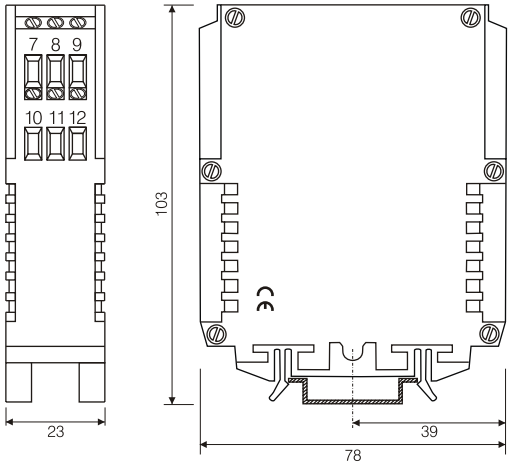
Front view

Front	Meaning
On	LED green, Power supply
response	Sensitivity: 0 ... 60 kOhm
Output	LED red, Output state

Block and wiring diagram



Dimensions



Photovoltaic

Photovoltaic - Optimizer

AD-PVO 2000 GT

Description

The Photovoltaic-Optimizer AD-PVO 2000 monitors the supply of solar energy to the main connection of a building. If the supply output exceeds a limiting value set by the customer via a PC, an internal output relay is triggered. With this switching relay, electric consumers (i.e. electric heating rod in the process water tank of the heating, air-conditioning device or heat pump) can now be triggered. With the AD-PVO 2000, the energy is converted on site and not fed back into the public low-voltage network. Through the use of this device PV systems are optimized for their own consumption and relieves the public low-voltage grid. Additionally, the AD-PVO 2000 has an error message LED and an integral error message relay, via which error messages (i.e. permanent failure of the feeding) can be displayed or acoustically signalled outside the distributor cabinet. It is recommended to mount the AD-PVO 2000 directly after the counter of the energy supply in the distributor cabinet, as measuring should be carried out as close as possible to the feeding point. The device requires all three outer conductor voltages for its measurements and the zero conductor. The AD-PVO 2000 measures the current via three external split current current transformer, which can be mounted directly onto the 3 phases after the counter, therefore saving space (without separation). The Photovoltaic Optimiser acquires the self-generated supply energy from the measurement voltage L1. Due to its efficient switching network and its low power consumption, the AD-PVO 2000 generates only a negligible amount of warming and can therefore be lined up closely.

Application

For optimising the self-generated energy at photovoltaic units

Specific characteristics

- Self-sufficiency through measuring voltages
- Internal overload and fault relay
- Current measurement with clamp on/split core current transformer
- Configuration via PC
- compatible with the most SG-Ready compatible heat pumps

Business data

Order number	AD-PVO 2000 GT

Technical specifications

Current-inputs (I1...I3)	
Measuring range	0 ... 33 mA AC (0 ... 100 A AC via external current transformer)
Input resistance	ca. 10 Ohm
Voltage-inputs (L1...L3)	
Measuring range	230 V AC (+/- 10 %)
Input resistance	ca. 500 kOhm
External current-transformer	
Primary current	0 ... 100 A AC
Secondary current	0 ... 33 mA AC
Transformation ratio	1:3000 (Np : Ns)
Maximum wire diameter	15 mm
Max. secundary wire length	2 m
Isolation-voltage	2,5 kV / 1 min
Dimensions (WxHxD)	32x42x46 mm
Load-relay	
Maximum switching load AC	250 V, 9 A
Maximum switching load DC	50 V, 9 A
Contact construction	closing contact
Switching operations mechanical	6000000
At 230V/9A AC, cos(phi)=1	400000
At 230V/9A AC, cos(phi)=0,4	150000
At 24V/9A DC	200000
Error-relay	
Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	changeover contact
Switching operations mechanical	10000000
At 230V/2A AC, cos(phi)=1	600000
At 230V/2A AC, cos(phi)=0,4	200000
At 24V/2A DC	200000
Supply	
Voltage range AC	230 V AC (+/- 10 %), 50/60 Hz (see voltage-inputs)
Nominal voltage AC	230 V AC
Power consumption	max. 3,8 VA
Transfer behavior - in reference to the current value	
Basic accuracy	< 1 % (class 1)
Temperature influence	80 ppm/K
Response time	< 2 s
Housing	
Dimensions (WxHxD)	71x90x58 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 175 g + 3x 75 g (current-transf.)
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

Printed 23.08.2022 We reserve the right for technical changes.

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Photovoltaic - Optimizer

AD-PVO 2000 GT

Technical specifications

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Grid side to relay outputs	4 kV, 50 Hz (1 min.)
Grid side to the pc-interface	4 kV, 50 Hz (1 min.)
Grid side to control elements	4 kV, 50 Hz (1 min.)
Relay-outputs among each other	4 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Load-relay	spark quenching
Power supply	protection against over-temperature, over-voltage and over-current

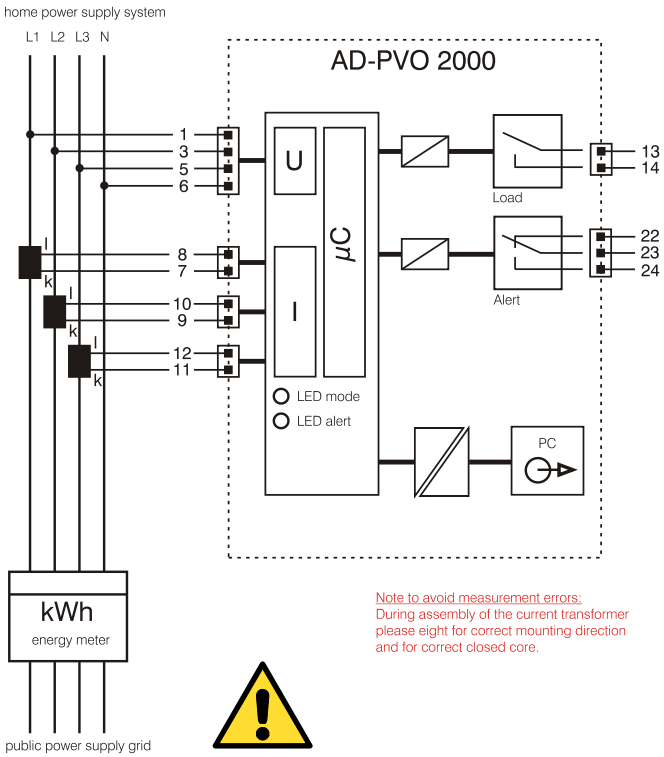
[1] During checking, slight signal deviations are possible.

Heat pump control

SG-Ready

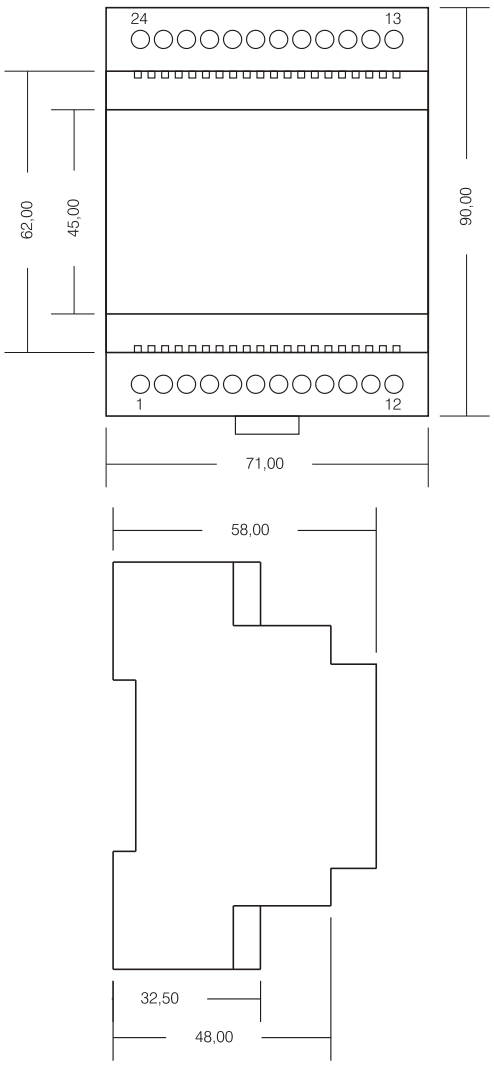
With the PV optimizer AD-PVO 2000 heat pumps can be signaled that enough PV surplus exists.
Thus, the heat pump can raise their storage or flow temperature and increase the personal consumption.
The optimizer is compatible with many SG-Ready (Smart Grid Ready) enabled heat pumps. The SG-Ready logo can be found on your heat pump.
The SG-ready interface is designed in in most cases as a contact input therefore, the overload relay of the PVO can be used easily as a signal for the temperature increase of the heat pump.
What is to be done at a SG-signal, it must be parameterized on the heat pump.

Block and wiring diagram



Note to avoid measurement errors:
During assembly of the current transformer please eight for correct mounting direction and for correct closed core.

Dimensions



Photovoltaic - Optimizer

AD-PVO 2000 GT

Operation

Operating LED
The green operating LED indicates the operating status of the device.
- off: the device has no operating voltage
- permanently on: the device is in normal operation mode
- flashing with 1 Hz: the load is connected to the device
- flashing with 5 Hz: the manual load connection is active

Error LED
The red error LED indicates whether an error is present.
- off: no error
- on: error is present

Key: Manual load
The button "Manual load" serve the manual connection of the load relay. The load is activated with a long depression of the key (2s) and deactivated the same way.

Key: Quit
The key "Quit" is provided for quitting an error message. If an error is present, the red error indicator LED lights up and the error message relay responds. An acoustic indicator can be connected at the error message relay, for instance. Now if the key "Quit" is activated, the relay releases again. The red error LED, however, is lit until the error has been eliminated.

Software and parameterizing
The device can be parameterized and read out with the parameterizing software AD-Studio and the optionally available USB programming adapter AD-VarioPass3. The suitable USB driver for the USB programming adapter AD-VarioPass2 is supplied with the software AD-Studio. With the software, measuring values can also be read out or logged.For connecting to the PC, the blind plug must be removed from the parameterizing interface (AD-PC), i.e. with a small screwdriver. Push the screwdriver into the slot provided and work the blind plug out.
The following parameters can be edited:

- Filter: Analogue value filter for the input measuring dimensions. Serves the suppression of quick measuring value alterations.
- Current transformer type: Specifies the connected current transformers type (distinguishing primary current).
- Power of the load: The power consumption at the load relay required by the connected load must be specified here. This specification is required for internal calculations.
- Switch-on-level: Sets the switch-on threshold of the load relay, in reference to the fed power.
- Switch-off-level: Sets the switch-off threshold of the load relay, in reference to the fed power.
- Fault injection time: Sets the time, after which an alarm is triggered when during this set time no feeding has occurred.
- Plant size: Sets the plant size in kWp. Only used at 70%-message.
- Error relay function: Sets the function of the fault relay. You can choose between two modes: "feed-error" and "70%-message". The standard function "feed error" triggers a fault message after a specified time. This time is set in parameter "Fault injection time". The "70% message" triggers an alarm if all loads of the PVO are switched on and the PV-plant over 70% feeds. It is the "plant size" parameter evaluated.

Automatic load calibration
For commissioning the AD-PVO 2000, the parameters are normally adjusted via the parameterizing software AD-Studio and the available USB programming adapter AD-VarioPass3. However, an "automatic load calibration" can also be started directly at the device. In this operating mode, the output of the consumer connected to the load relay is automatically calibrated and a PC is not necessary. The load calibration is started with a longer depression of the "Quit-key" (3s). As long as the calibration is running, the two LEDs flash alternately. This process can last up to several minutes. If the calibration is cancelled with a brief depression of the "Quit-key", the values in the parameter are reset to the last status. After successful completion of the "automatic load calibration", the device takes over the measuring data and returns to normal operation. If the load calibration is not completed after approx. 15 minutes, there are too strong load fluctuations in the network. With too strong load fluctuations, the device is difficult to calibrate. Here we recommend to separate these loads briefly from the network during the calibration time, or to parameterize the device via the PC.

Safety instructions – it is essential to read these

Explanation of symbols
Two squares, one inside the other, indicate a DOUBLE or REINFORCED insulation of the device against dangerous high voltages (i.e. mains voltage). This is valid for all parts at the housing, which can be touched, for the operating elements and the low voltages generated by and lead from the device.

Explanation of symbols
An exclamation mark inside a triangle indicates important notes in the technical data sheet and in the notes on safety. Read both documents to the end prior to commissioning. They contain important notes for the correct operation and the installation. Non-observation and errors resulting from this can lead to dangers.

Designated usage
The device must only be used for the purpose described in the relevant data sheet.
The device conforms to the valid CE European guidelines and harmonised standards.
Usage in explosion-endangered areas, outdoors or in damp rooms is NOT admissible.
The device must only be operated with the specified nominal voltage. The specified switching capacities must not be exceeded.
Opening or altering the device is not admissible. Do not repair the device yourself, but replace it with an equivalent new device. Repairs must only be carried out by the manufacturer.
The manufacturer accepts no liability due to infringement.
An operation under adverse environmental conditions is not admissible.
Adverse environmental conditions are:
- high sun radiation
- wetness, dewing or too high humidity
- dust and flammable gases, vapours or solvents
- strong vibrations or electro-magnetic fields

Do not expose the device to stresses, which exceed the described limits.
Usage other than the one described in the relevant data sheet is not admissible and leads to damage of the product.
Furthermore, this is connected with dangers, as for instance short circuit, fire, electric shock etc., which can be fatal.

Notes on safety and dangers
Any warranty claim becomes void for damages due to non-observation of these notes on safety and the relevant technical data sheet.
The following points must be noted:
- the valid laws, standards and regulations
- the stand of technology at the time of the installation
- the handbook and/or the technical data sheet
- the recognised rules of technology
- the fact that operating instructions can only state general regulations and that these regulations must be observed
- the device is not a toy and does not belong in the hands of children
- only operate the device with undamaged connection lines.

Notes on connection and installation
WARNING: dangerous electric voltage can lead to electric shock and burns.
- The installation and maintenance must be carried out by qualified electricians.
- Observe the technical data specified in the data sheet.
- Provide a correctly dimensioned overcurrent device in the vicinity of the device.
- Mount the device in an appropriate control box/control cabinet with a suitable type of protection according to IEC
 60529 to protect it from mechanical or electrical damages.
- During maintenance work, cut the device off from all effective sources of energy and secure it against restart.
- If operating elements of protection class 1 are connected to the contact outputs of the device, the protective earthing
 conductor connection must be carried out separately and properly.

ESD
ATTENTION: When handling the device, protective measures against electrostatic discharge must be observed.

Maintenance and cleaning
The device is maintenance-free and does not have to be cleaned.

Disposal
Old electronic devices are valuable substances and do not belong into the household waste. If the device has reached the end of its useful life, dispose of the device according to the valid legal regulations.

Status: 09/2013

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Photovoltaic - Optimizer

AD-PVO 3000 GT

Description

The photovoltaics optimiser AD-PVO 3000 monitors the feed of solar energy at the main connection of a building. The analogue outlput (0...20 mA, 4...20 mA, 0...10 V or 2...10 V) can be parameterized freely, therefore, the electric heating rods can be controlled via a thyristor power controller. The AD-PVO 3000 regulates the heating rod output in such a way, that the feed is kept at zero. This is realised with an integral software PI regulator, which adjusts the power at the heating rod up to its maximum value of the feed-in power. With this device, the energy is optimally implemented on site and is not fed back into the public low-voltage network. This way, the PC units are optimised for personal consumption and the public network is relieved. Additionally, the AD-PVO 3000 has an error message LED and an integral error message relay, via which error messages (i.e. permanent failure of the in-feed) can be indicated or acoustically signalled outside the distribution cabinet. It is recommended to mount the AD-PVO 3000 directly after the energy-counter of the energy supply in the distribution cabinet, as measuring is to be carried as close as possible to the in-feed point. The device requires for its measuring all three external phase voltages and the neutral conductor. The AD-PVO 3000 measures the current via three external split core current transformer, which can be mounted space-saving (without separation) directly on the 3 phases after the counter. The photovoltaic optimizer receives the personal consumption energy from the measuring voltage L1.

Application

Stepless control of heating rods with the aid of a thyristor power controller.

Specific characteristics

- Supply via measuring voltages
- Analogue outlput for thyristor power controller
- Load regulation according to PI behaviour
- Current measuring via split core current transformer
- Parameterizing via PC (AD-Studio)

Business data

Order number	AD-PVO 3000 GT

Technical specifications

Current-inputs (I1...I3)	
Measuring range	0 ... 33 mA AC (0 ... 100 A AC via external current transformer)
Input resistance	ca. 10 Ohm
Voltage-inputs (L1...L3)	
Measuring range	230 V AC (+/- 10 %)
Input resistance	ca. 500 kOhm
External current-transformer	
Primary current	0 ... 100 A AC
Secondary current	0 ... 33 mA AC
Transformation ratio	1:3000 (Np : Ns)
Maximum wire diameter	15 mm
Max. secundary wire length	2 m
Isolation-voltage	2,5 kV / 1 min
Dimensions (WxHxD)	32x42x46 mm
Analogue output - current	
Output range	0 ... 20 mA, 4 ... 20 mA
Max. load	400 Ohm
Resolution	10 Bit
Residual ripple	ca. 30 µAss
Analogue output - voltage	
Output range	0 ... 10 V, 2 ... 10 V
Min. load	1 kOhm
Resolution	10 Bit
Residual ripple	50 mVss
Error-relay	
Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	changeover contact
Switching operations mechanical	10000000
At 230V/2A AC, cos(phi)=1	600000
At 230V/2A AC, cos(phi)=0,4	200000
At 24V/2A DC	200000
Supply	
Voltage range AC	230 V AC (+/- 10 %), 50/60 Hz
Nominal voltage AC	230 V AC
Power consumption	max. 3,8 VA
Transfer behavior - in reference to the current value	
Basic accuracy	< 1 % (class 1)
Temperature influence	80 ppm/K
Response time	< 2 s
Housing	
Dimensions (WxHxD)	71x90x58 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 175 g + 3x 75 g (current-transf.)
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

Printed 23.08.2022 We reserve the right for technical changes.

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Photovoltaic - Optimizer

AD-PVO 3000 GT

Technical specifications

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Grid side to error relay	4 kV, 50 Hz (1 min.)
Grid side to the pc-interface	4 kV, 50 Hz (1 min.)
Grid side to control elements	4 kV, 50 Hz (1 min.)
Grid side to analoge output	3 kV, 50 Hz (1 min.)

Protection circuits

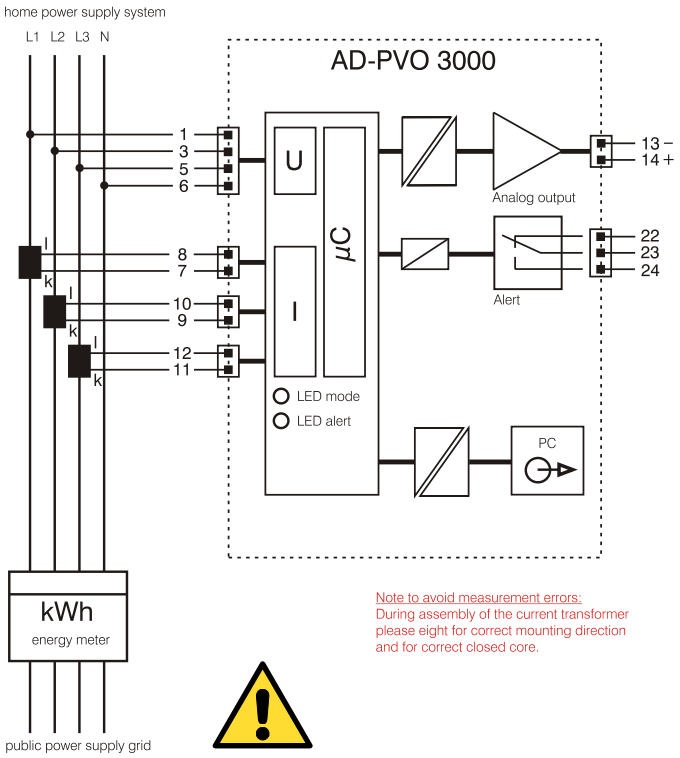
Input	electrical surge protection
Analogue output	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current

[1] During checking, slight signal deviations are possible.

EMC-appropriate assembly

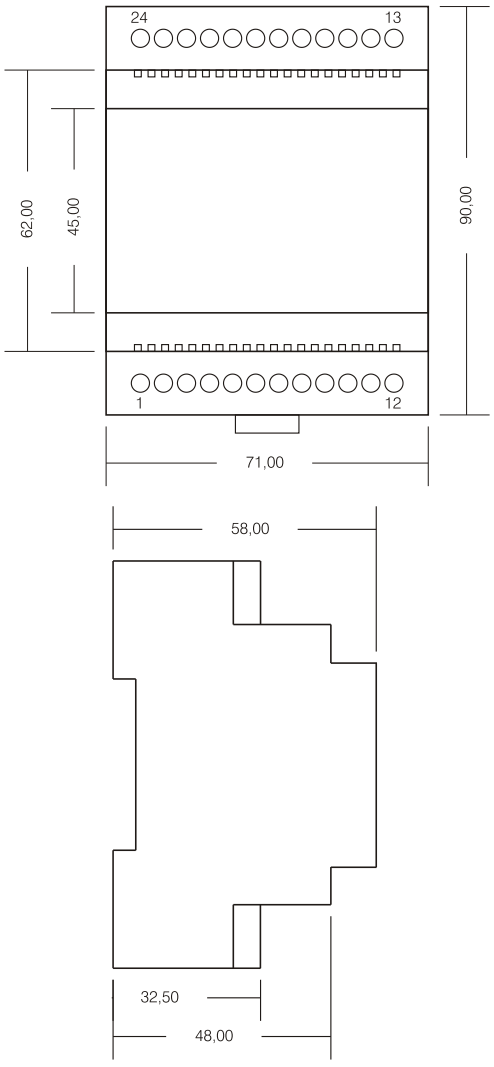
When assembling the AD-PVO 3000, including a thyristor power controller, please observe the regional and/or country specific regulations of the network operator.
When operating great loads with leading phase-angle or trailing phase-angle, considerable network reaction can be expected to the current intake, which is not sinusoidal.
The regulations for operation of heat generators with leading phase-angle or trailing phase-angle depend on the network operator. In case of doubt please contact the network operator.
The erector of the unit must, if necessary, reduce the electromagnetic emission with suitable chokes or suppressor filters.
Chokes reduce the current-dependent network reactions and effect an improvement of the power factor. The current harmonics content is reduced and the network quality is improved.
Network filter serve mainly the protection from high-frequency disturbance variables, which are emitted, conductor bound, via the network cable or through the air.
Shielding measures may be necessary to reduce the emission. The conductor between thyristor and load should be shielded.
The shield must be earthed with low impedance or over a large surface, however, it must not replace the PE conductor!

Block and wiring diagram



Note to avoid measurement errors:
During assembly of the current transformer please eight for correct mounting direction and for correct closed core.

Dimensions



Operation

Operation LED
The green operation LED indicates the operating status of the device. - off: the device has no operating voltage - permanently on: the device is in normal operation - flashes with 5 Hz: the manual load connection is active.
Error LED
The red error LED indicates, whether an error is present. - off: no error - on: error present
Key: manual load
The key "Manual load" serves the manual 100% activation of the load. The load is activated and deactivated through a long pressure on the key (3s).
Key: Quit
The key "Quit" is provided for quitting of an error message. If an error is present, the red error message LED lights up and the error message relay engages. An acoustic indicator can be connected at the error message relay. When the key "Quit" is activated, the relay releases again. The red error LED, however, is lit until the error is eliminated. With long key depression see "Automatic load calibration".

Software and parameterizing
The device can be parameterized and read out via the parameterizing software AD-Studio and at the available USB programming adapter AD-VarioPass3. The appropriate USB driver for the USB programming adapter AD-VarioPass3 is supplied with the software AD-Studio. With this software, measuring values can also be read out or logged. For connection to the PC, the blind plug must be removed from the parameterizing interface (AD-PC) i.e. with a small screwdriver. Please insert the screwdriver into the slot provided for this and lever the blind plug out.

The following parameter can be edited:

- **Filter:** Analogue value filter for the input measured quantity. Serves the suppression of rapid measuring value alterations.
- **Current transformer type:** Specifies the connected current transformers type (distinguishing primary current).
- **Power of the load:** Here must be stated, which power intake the connected load has at the load relay. This specification is required for internal calculations.
- **Type of output signal:** Sets the type of signal at the analogue output (0...20 mA, 4...20 mA, 0...10 V, 2...10 V).
- **Error time in-feed:** Sets the time after which the alarm is released, if no in-feed has occurred during this time.
- **Unit size:** Here the size of the PV unit can be entered in kWp. Is only required with 70% message. - **Function Error message relay:** sets the function of the error message relay. You can choose between two types of functions: "In-feed error" and "70% message". The standard function "In-feed error" activates an error message after the time set in the parameter "error time in-feed". The function "70% message" activates a message, if more than 70% of the installed unit size in KWp is fed in, even though the load is switched on at the PVO. The parameter “unit size" is evaluated.
- **Proportional constant:** Sets the proportional constant of the PI regulators. Attention, influences the regulating behaviour of the device.
- **Integral constant:** Sets the integral constant of the PI regulator. Attention, influences the regulating behaviour of the device.
- **Scanning time:** Sets the scanning time of the PI regulator. Attention, influences the regulating behaviour of the device.

Automatic Load calibration
For the commissioning of the AD-PVO 3000, the parameter are normally set appropriately via the parameterizing software AD-Studio and the available USB programming adapter AD-VarioPass3. However, an "Automatic load calibration" can also be started directly at the device. In this operating mode, the power of the consumer connected to the thyristor power controller is automatically calibrated and a PC is not required. This load calibration is started with a long key depression of the "Quit key" (3s). As long as the calibration is running, both LEDs flash alternately. This process can last for several minutes. If the calibration is cancelled with a short depression of the "Quit key", the values in the parameter are reset to the last status. After successful completion of the "Automatic load calibration", the device takes over the measuring data and returns to normal operation. If the load calibration is not completed after approx. 15 minutes, then there are too strong load deviations in the network. With too strong load deviations, the device has difficulties in calibrating itself. It is recommended to separate these loads briefly from the network during the calibration time, or to parameterize the device with a PC.

Tested thyristor power controller
In principle, any desired thyristor can be connected to the analog output of the AD PVO 3000. However, the thyristor has to correspond to the technical specifications of the analog output. Below are two thyristor listed that have been tested in the house Adamczewski in combination with the AD-3000 PVO.

- **Single phase applications:**
Type: SIL465000
Manufacturer: CELDUC
Power supply: 160 ... 450 VAC
Analog input: 0 ... 10 V
Load: max. 22A (AC-51) - phase angle
Mounting: DIN rail (heat sink integrated)

- **Three-phase applications:**
Typ: RGC3 P 60 I 30 E A P
Manufacturer: CARLO GAVAZZI
Power supply: 90 ... 250 VAC
Analog input: 0/4 ... 20 mA
Load: max. 37A (AC-51) - phase angle
Mounting: DIN rail (heat sink integrated)

Noise free stepless heating element
The heater AC Elwa has a 0 ... 10 V-interface via which it can be controlled. Thus, it is compatible with the AD-PVO 3000. It requires no additional thyristor. The technology for a stepless control is built into the heating element. The heater does not produce disturbances in the power network. It can therefore be used without the consent of the energy supplier with the AD-PVO 3000.
Typ: AC-Elwa
Manufacturer: my-PV GmbH
Power supply: 230 VAC
Analog input: 0 ... 10 V
Heating power: max. 3 kW
Mounting: 1,5"-screwing

Safety instructions – it is essential to read these

Explanation of symbols
Two squares, one inside the other, indicate a DOUBLE or REINFORCED insulation of the device against dangerous high voltages (i.e. mains voltage). This is valid for all parts at the housing, which can be touched, for the operating elements and the low voltages generated by and lead from the device.

Explanation of symbols
An exclamation mark inside a triangle indicates important notes in the technical data sheet and in the notes on safety. Read both documents to the end prior to commissioning. They contain important notes for the correct operation and the installation. Non-observation and errors resulting from this can lead to dangers.

Designated usage
The device must only be used for the purpose described in the relevant data sheet.
The device conforms to the valid CE European guidelines and harmonised standards.
Usage in explosion-endangered areas, outdoors or in damp rooms is NOT admissible.
The device must only be operated with the specified nominal voltage. The specified switching capacities must not be exceeded.
Opening or altering the device is not admissible. Do not repair the device yourself, but replace it with an equivalent new device. Repairs must only be carried out by the manufacturer.
The manufacturer accepts no liability due to infringement.
An operation under adverse environmental conditions is not admissible.
Adverse environmental conditions are:
- high sun radiation
- wetness, dewing or too high humidity
- dust and flammable gases, vapours or solvents
- strong vibrations or electro-magnetic fields

Do not expose the device to stresses, which exceed the described limits.
Usage other than the one described in the relevant data sheet is not admissible and leads to damage of the product.
Furthermore, this is connected with dangers, as for instance short circuit, fire, electric shock etc., which can be fatal.

Notes on safety and dangers
Any warranty claim becomes void for damages due to non-observation of these notes on safety and the relevant technical data sheet.
The following points must be noted:
- the valid laws, standards and regulations
- the stand of technology at the time of the installation
- the handbook and/or the technical data sheet
- the recognised rules of technology
- the fact that operating instructions can only state general regulations and that these regulations must be observed
- the device is not a toy and does not belong in the hands of children
- only operate the device with undamaged connection lines.

Notes on connection and installation
WARNING: dangerous electric voltage can lead to electric shock and burns.
- The installation and maintenance must be carried out by qualified electricians.
- Observe the technical data specified in the data sheet.
- Provide a correctly dimensioned overcurrent device in the vicinity of the device.
- Mount the device in an appropriate control box/control cabinet with a suitable type of protection according to IEC
 60529 to protect it from mechanical or electrical damages.
- During maintenance work, cut the device off from all effective sources of energy and secure it against restart.
- If operating elements of protection class 1 are connected to the contact outputs of the device, the protective earthing
 conductor connection must be carried out separately and properly.

ESD
ATTENTION: When handling the device, protective measures against electrostatic discharge must be observed.

Maintenance and cleaning
The device is maintenance-free and does not have to be cleaned.

Disposal
Old electronic devices are valuable substances and do not belong into the household waste. If the device has reached the end of its useful life, dispose of the device according to the valid legal regulations.

Status: 09/2013

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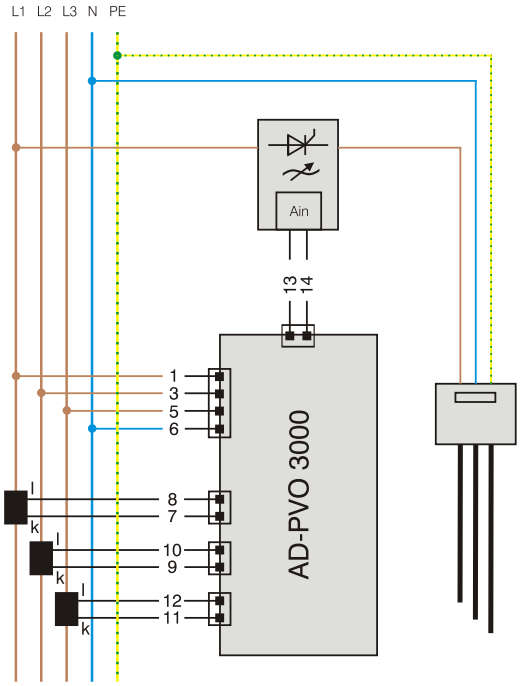
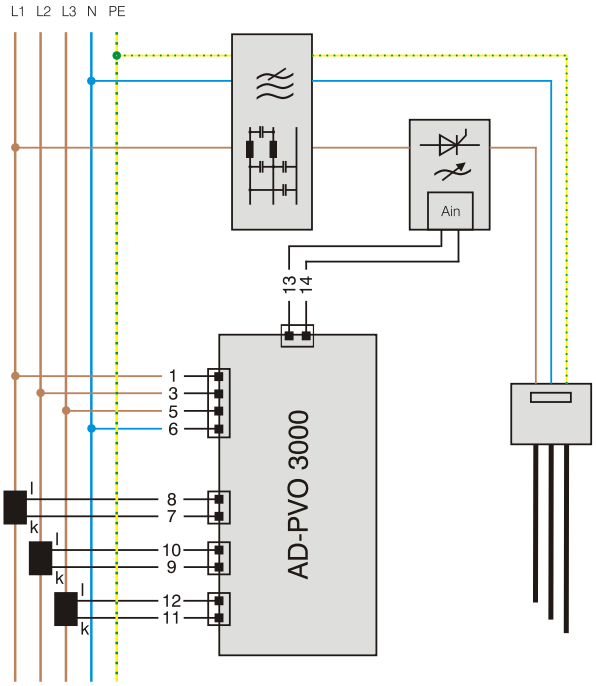
Photovoltaic - Optimizer

AD-PVO 3000 GT

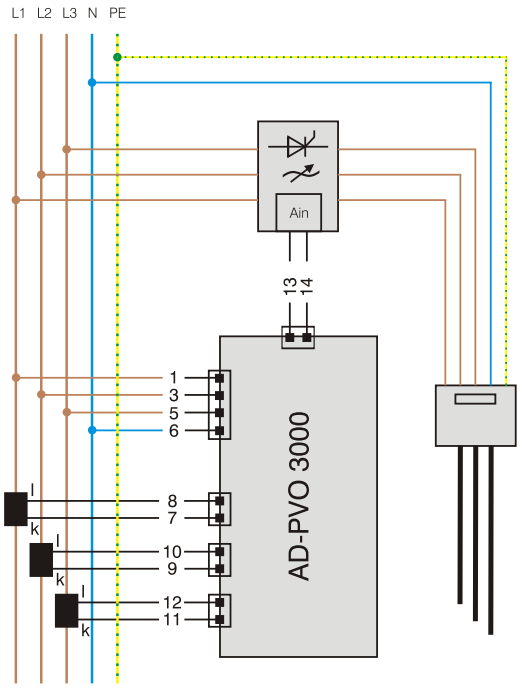
Circuit examples



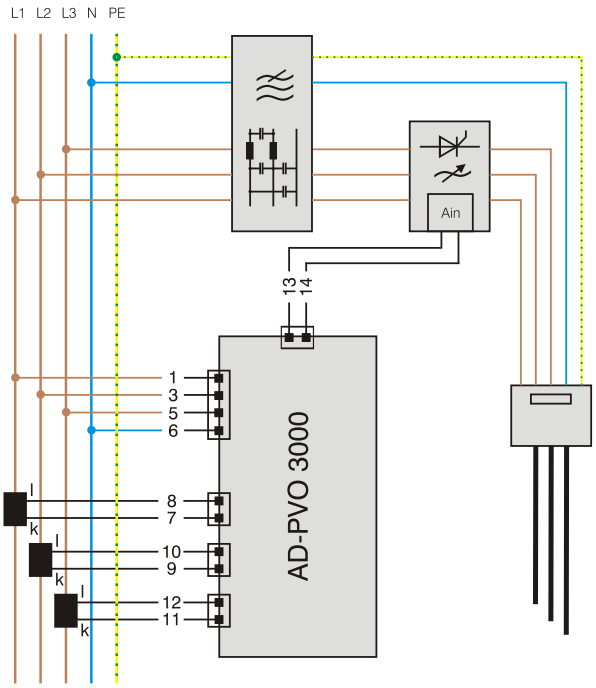
one phase without mains filter



three phases with mains filter



one phase without mains filter



three phases with mains filter

Photovoltaic

Photovoltaic-optimizer

AD-PVO 4000 GT

Description

The Photovoltaic-Optimizer AD-PVO 4000 monitors the supply of solar energy at the main connection of a building. The device has an Ethernet interface, with the aid of which the stepless controllable heater rod of my-PV ”AC ELWA-E” or the PV-Power-Manager "AC THOR"can be started. The device communicates with the devices rod via the Modbus-TCP protocol. There is also a WEB-interface available, with the aid of which the AD-PVO 4000 can be parameterized or measuring values can be read off. The device can also be integrated into the home network with an Ethernet cable, and, depending on surplus power, starts the stepless heater rod or the PV-Power-Manager "AC THOR" with exactly this and regulates the zero feed at the connection to the building. The device also has an RS485 interface, to which the compatible display AD-MM-400 can be connected, or all measuring values are also available with the Modbus-RTU protocol. With this it is possible to display the measuring values directly on site as well as at a greater distance. The device converts the energy on site optimally to immediately available warmth and is not fed back into the public low-voltage network. Through this, the PV units are optimised for own consumption and the public low-voltage network is relieved. It is recommended to mount the AD-PVO 4000 directly after the counter of the energy supply in the distributor cabinet, as measurements should be taken as close as possible to the feed point. The device requires all three outer conductor voltages and the neutral conductor for its measuring. The AD-PVO 4000 measures the current via three external fold-over current transformer, which can be mounted, space saving (without separation), directly onto the 3 phases after the counter. The Photovoltaic-Optimizer obtains the own supply energy from the measuring voltage L1.

Application

Stepless control of the heating element of my-PV "AC ELWA-E" or the PV-Power-Manager "AC THOR" via Ethernet and the Modbus-TCP protocol.

Specific characteristics

- Power supply by measuring voltages
- Ethernet interface for heating rod control
- Load regulation according to PI behavior
- Current measurement through external split current transformer
- Parameterization via WEB interface

Business data

Order number

AD-PVO 4000	Photovoltaik-Optimierer mit Ethernet-Anbindung

Accessory

AD-MM 400	TFT display in 96x96 mm mounting format
AD-VarioPass3	RS485 to USB interface converter
Alternative current transformers	also larger current transformers on request possible

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Photovoltaic-optimizer

AD-PVO 4000 GT

Technical specifications

Current-inputs (I1...I3)

Measuring range	0 ... 33 mA AC (0 ... 100 A AC via external current transformer)
Input resistance	ca. 10 Ohm

Voltage-inputs (L1...L3)

Measuring range	230 V AC (+/- 10 %)
Input resistance	ca. 500 kOhm

External current-transformer

Primary current	0 ... 100 A AC
Secondary current	0 ... 33 mA AC
Transformation ratio	1:3000 (Np : Ns)
Maximum wire diameter	15 mm
Max. secundary wire length	2 m
Isolation-voltage	2,5 kV / 1 min
Dimensions (WxHxD)	32x42x46 mm

Ethernet-interface

Speed	10/100 Mbit
Protocols	Modbus-TCP; HTTP
HTTP-port	80
DHCP	activated
Addressing	IP4
Standard-IP	192.168.178.99
Default subnet mask	255.255.255.0

RS485-interface

Protocol	Modbus-RTU
Baud rate	2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 76800
Data rate	8N1, 8E1, 8O1
Max. bus users	32
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (keine Stichleitungen)
Cable	twisted and shielded
Address	1 ... 255 (adjustable via WEB interface)

Compatible heating element

Type	my-PV "AC ELWA-E"
Protocol	Modbus-TCP
Power	0 ... 3 kW

Supply

Voltage range AC	230 V AC (+/- 10 %), 50/60 Hz
Nominal voltage AC	230 V AC
Power consumption	max. 3,8 VA

Transfer behavior - in reference to the current value

Basic accuracy	< 1 % (class 1)
Temperature influence	80 ppm/K
Response time	ca. 1 s

Housing

Dimensions (WxHxD)	71x90x58 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 175 g + 3x 75 g (current-transf.)
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Grid side to Ethernet interface	4 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current

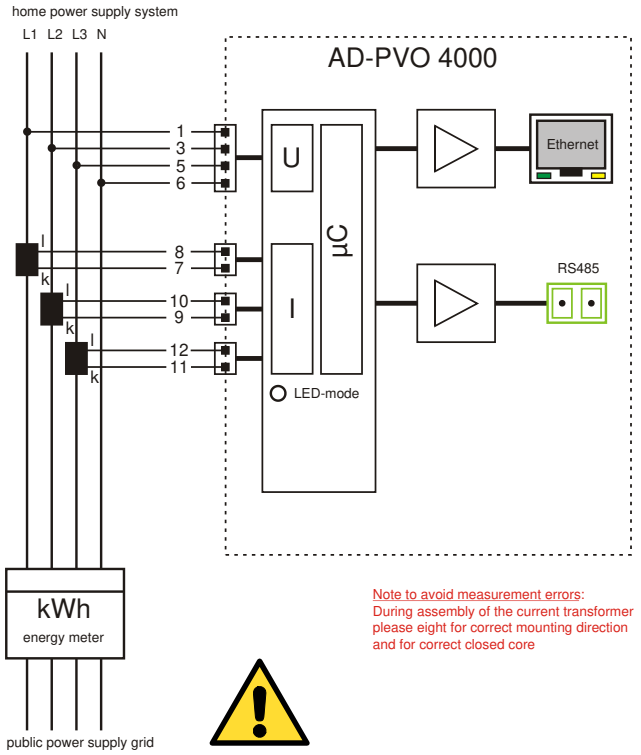
[1] During checking, slight signal deviations are possible.

Photovoltaic

Photovoltaic-optimizer

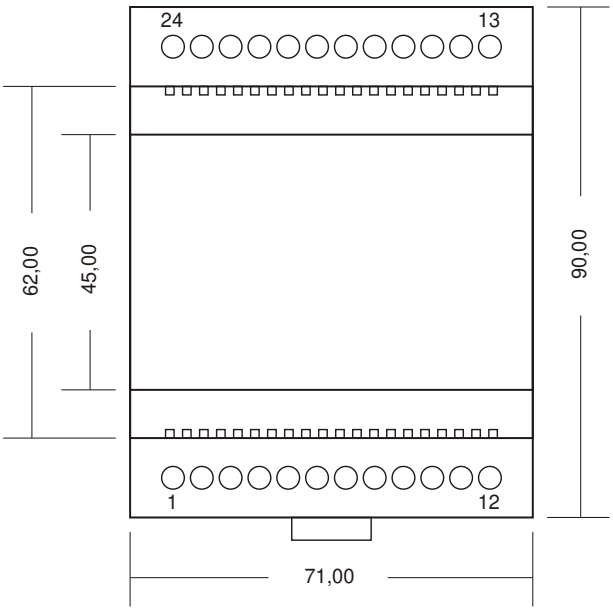
AD-PVO 4000 GT

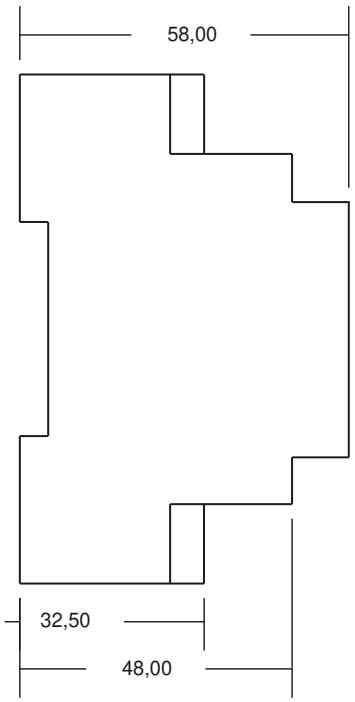
Block and wiring diagram



Note to avoid measurement errors:
During assembly of the current transformer please eight for correct mounting direction and for correct closed core

Dimensions

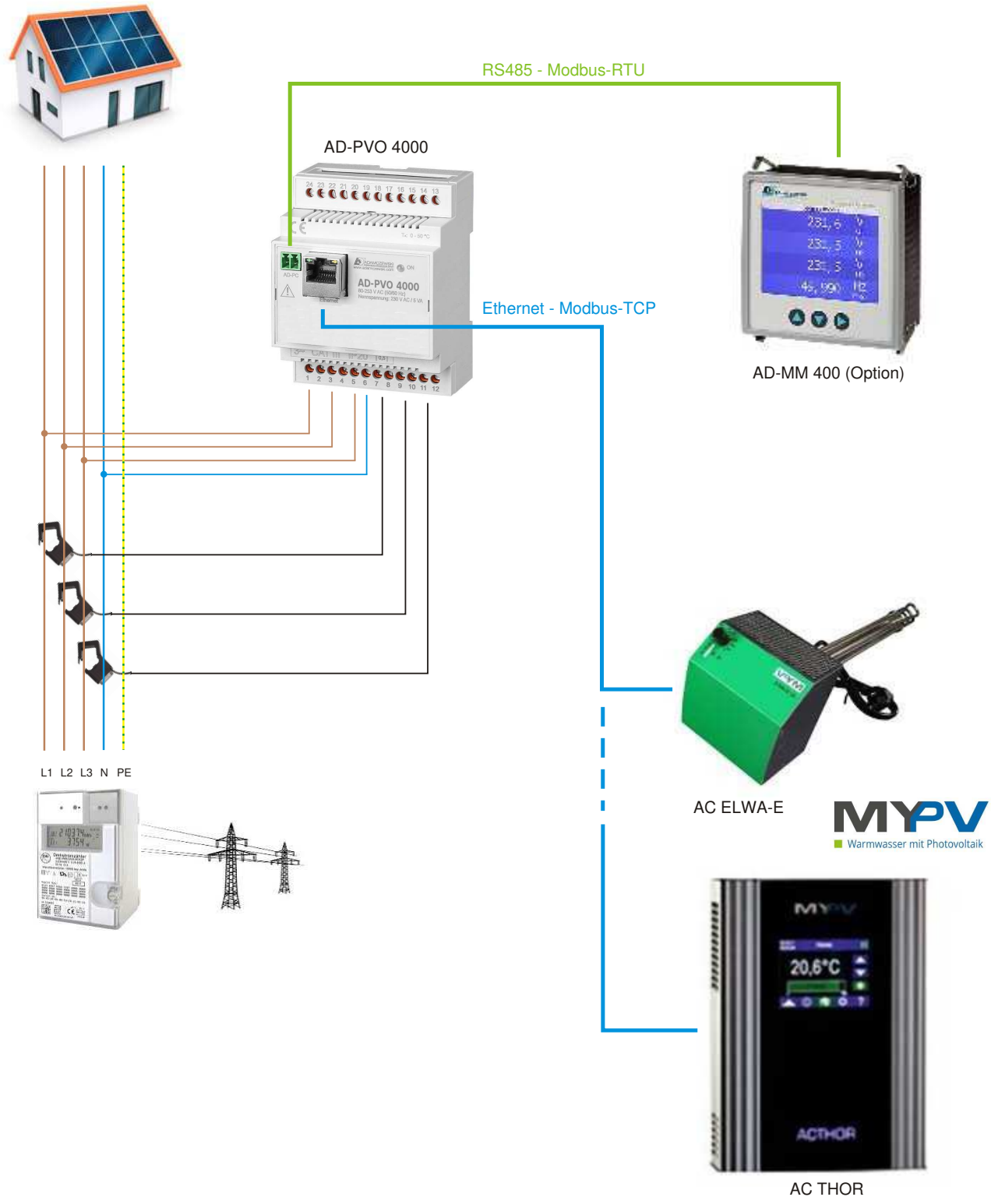




Photovoltaic-optimizer

AD-PVO 4000 GT

Circuit examples



Photovoltaic

Photovoltaic - Optimizer

AD-PVO 6000 GT

Description

The photovoltaic optimizer AD-PVO 6000 monitors the feed of PV energy at the main connection to the building. If the feed conductor exceeds a limiting value, optimized via a PC by the customer, up to three independent load relays can be selected. These three load relays can be parameterized individually and can therefore switch loads either in phases or in steps. With these switching relays, electric consumers (i.e. electric heating rod in the water tank of the heating, air conditioning unit or heat pump), can be selected. With the AD-PVO 6000, the energy is implemented on site, it is not fed back into the public low-voltage network. Through the application of this device, PV units are optimised for personal consumption and the public network is relieved. Additionally, the AD-PCO 6000 has an error-message LED and an integral error message relay, via which error messages (i.e. permanent failure of the feed) can be indicated outside the distributer cabinet or can be signalled acoustically. It is recommended to mount the AD-PVO 6000 directly after the counter of the energy supplier in the distributor cabinet, as measuring should be carried out as close as possible to the feed point. The device requires all three outer conductor voltages and the neutral conductor for its measuring. The AD-PVO 6000 measures the current via three external split core current transformer, which can be mounted space-saving (without separation) directly on the 3 phases after the counter. The photovoltaic optimizer receives the personal consumption energy from the measuring voltage L1. This way, no separate supply voltage must be connected.

Application

Fr optimising the self-generated energy at photovoltaic units

Specific characteristics

- 3 internal overload and 1 fault relay
- Current measurement with clamp on/split core current transformer
- Configuration via PC
- compatible with SG-Ready compatible heat pumps

Business data

Order number	AD-PVO 6000 GT

Technical specifications

Current-inputs (I1...I3)	
Measuring range	0 ... 33 mA AC (0 ... 100 A AC via external current transformer)
Input resistance	ca. 10 Ohm
Voltage-inputs (L1...L3)	
Measuring range	230 V AC (+/- 10 %)
Input resistance	ca. 500 kOhms
External current-transformer	
Primary current	0 ... 100 A AC
Secondary current	0 ... 33 mA AC
Transformation ratio	1:3000 (Np : Ns)
Maximum wire diameter	15 mm
Max. secundary wire length	2 m
Isolation-voltage	2,5 kV / 1 min
Dimensions (WxHxD)	32x42x46 mm
Load relays (K1 to K3)	
Maximum switching load AC	250 V, 9 A
Maximum switching load DC	50 V, 9 A
Contact construction	closing contact
Switching operations mechanical	6 000 000
At 230V/9A AC, cos(phi)=1	400 000
At 230V/9A AC, cos(phi)=0,4	150 000
At 24V/9A DC	200 000
Error-relay	
Maximum switching load AC	250 V, 2 A
Maximum switching load DC	50 V, 2 A
Contact construction	changeover contact
Switching operations mechanical	10 000 000
At 230V/2A AC, cos(phi)=1	600 000
At 230V/2A AC, cos(phi)=0,4	200 000
At 24V/2A DC	200 000
Supply	
Voltage range AC	230 V AC (+/- 10 %), 50/60 Hz (see voltage-inputs)
Nominal voltage AC	230 V AC
Power consumption	max. 5 VA
Transfer behavior - in reference to the current value	
Basic accuracy	< 1 % (class 1)
Temperature influence	80 ppm/K
Response time	< 2 s
Housing	
Dimensions (WxHxD)	105x90x58 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 225 g + 3x 75 g (current-transf.)
Manner of fastening	35 mm DIN rail 35mm
Environmental conditions	
Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

Printed 23.08.2022 We reserve the right for technical changes.

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Photovoltaic - Optimizer

AD-PVO 6000 GT

Technical specifications

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Grid side to relay outputs	4 kV, 50 Hz (1 min.)
Grid side to the pc-interface	4 kV, 50 Hz (1 min.)
Grid side to control elements	4 kV, 50 Hz (1 min.)
Load-relay to error-relay	4 kV, 50 Hz (1 min.)

Protection circuits

Input	electrical surge protection
Load-relay	spark quenching
Power supply	protection against over-temperature, over-voltage and over-current

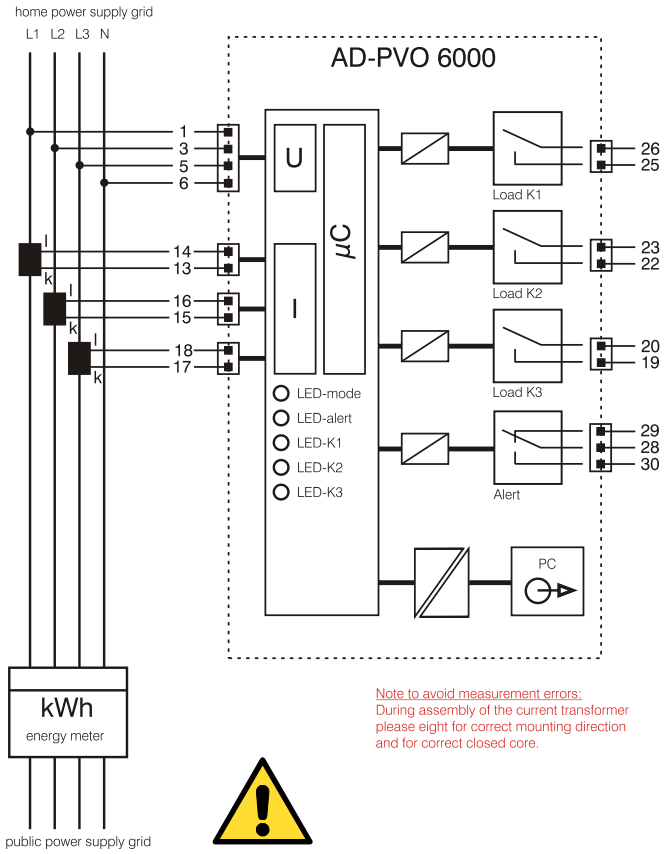
[1] During checking, slight signal deviations are possible.

Heat pump control

SG-Ready

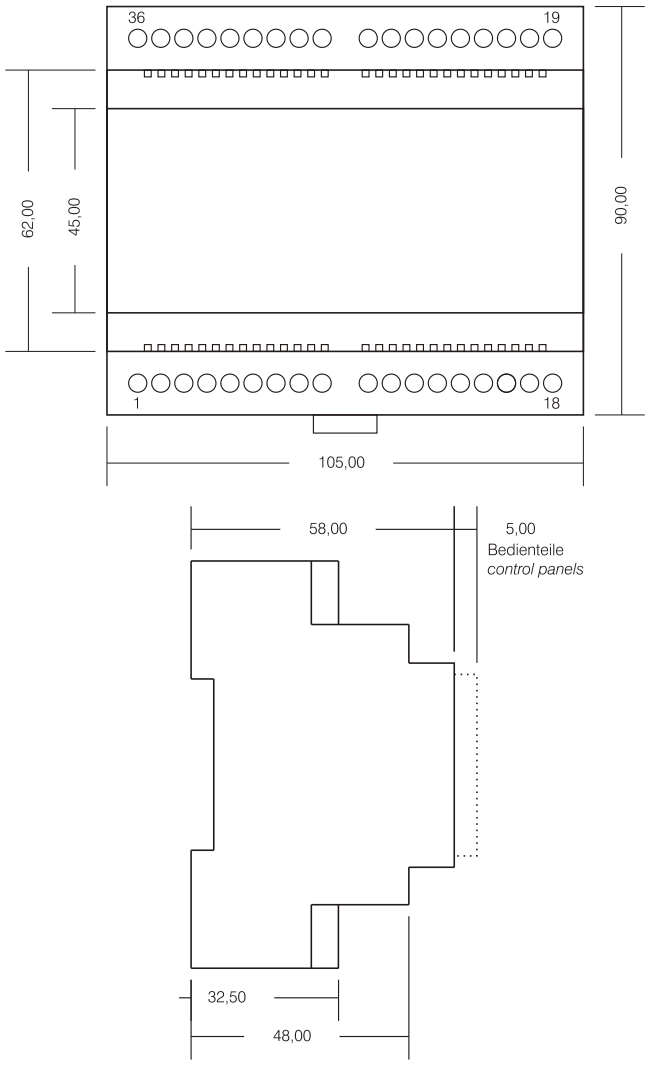
With the PV optimizer AD PVO 6000 heat pumps can be signaled that enough PV surplus exists.
Thus, the heat pump can raise their storage or flow temperature and increase the personal consumption.
The optimizer is compatible with many SG-Ready (Smart Grid Ready) enabled heat pumps. The SG-Ready logo can be found on your heat pump.
The SG-ready interface is designed in in most cases as a contact input therefore, the overload relay of the PVO can be used easily as a signal for the temperature increase of the heat pump.
What is to be done at a SG-signal, it must be parameterized on the heat pump.
Through the three internal load relays, the heat pump can switch multiple states. It can be driven so several power levels.

Block and wiring diagram



Note to avoid measurement errors:
During assembly of the current transformer please eight for correct mounting direction and for correct closed core.

Dimensions



Operation

Operating LED
The green operating LED indicates the operating status of the device.
- off: the device has no operating voltage
- permanently on: the device is in normal operation mode
- flashing with 5 Hz: the manual load connection is active

Relay Status LEDs
- on: the load is connected to the device
- off: no load is connected

Error LED
The red error LED indicates whether an error is present.
- off: no error
- on: error is present

Key: Manual load (K1 ... K3)
The buttons "Manual load" serve the manual connection of the load relays. The load is activated with a long depression of the key (2s) and deactivated again the same way.

Key: Quit
The key "Quit" is provided for quitting an error message. If an error is present, the red error indicator LED lights up and the error message relay responds. An acoustic indicator can be connected at the error message relay, for instance. Now if the key "Quit" is activated, the relay releases again. The red error LED, however, is lit until the error has been eliminated.

Software and parameterizing
The device can be parameterized and read out with the parameterizing software AD-Studio and the optionally available USB programming adapter AD-VarioPass3. The suitable USB driver for the USB programming adapter AD-VarioPass2 is supplied with the software AD-Studio. With the software, measuring values can also be read out or logged.
For connecting to the PC, the blind plug must be removed from the parameterizing interface (AD-PC), i.e. with a small screwdriver. Push the screwdriver into the slot provided and work the blind plug out.
The following parameters can be edited:
- Filter: analogue value filter for the input measuring dimensions. Serves the suppression of quick measuring value alterations.
- Current transformer type: Specifies the connected current transformers type (distinguishing primary current).
- Power of the load (K1 ... K3): the power consumption at the load relays required by the connected load must be specified here. This specification is required for internal calculations.
- Switch-on-level (K1 ... K3): sets the switch-on threshold of the load relay, in reference to the fed power.
- Switch-off-level (K1 ... K3): Sets the switch-off threshold of the load relay, in reference to the fed power.
- Fault injection time: Sets the time, after which an alarm is triggered when during this set time no feeding has occurred.
- Plant size: Sets the plant size in kWp. Only used at 70%-message.
- Error relay function: Sets the function of the fault relay. You can choose between two modes: "feed-error" and "70%-message". The standard function "feed error" triggers a fault message after a specified time. This time is set in parameter "Fault injection time". The "70% message" triggers an alarm if all loads of the PVO are switched on and the PV-plant over 70% feeds. It is the "plant size" parameter evaluated.
- Operation Mode: Sets the operating mode of the device. In operating mode 0, the three load relays (K1, K2 and K3) are assigned with three output stages (example 500W, 1000W and 1500W) and they react in steps to the fed total output in all three phases. For the smallest switching stage, K1 must be selected and for the largest K3 must be selected.
In operating mode 1, each phase output is viewed separately and in each case one relay reacts to the relevant fed phase output (K1 to power in L1, K2 to power in L2 and K3 to power in L3).
With operating mode 2, three different loads are switched intelligently. That is, all possible combinations of the three loads are switched, to optimally implement the surplus energy. If, for instance, a heating rod has three heating coils with 500W, 1000W and 2000W, this results in seven combinations in steps of 500W. Here also the smallest load must be connected to K1 and the largest load must be connected to K3. In this operating mode, only the load capacity can be parameterized, the possible switching combinations and switching thresholds are calculated automatically.

Automatic load calibration
For commissioning the AD-PVO 6000, the parameters are normally adjusted via the parameterizing software AD-Studio and the available USB programming adapter AD-VarioPass3. However, an "automatic load calibration" can also be started directly at the device. In this operating mode, the output of the consumer connected to the load relays is automatically calibrated and a PC is not necessary. The load calibration is started with a longer depression of the "Quit-key" (3s). As long as the calibration is running, the two LEDs flash alternately. This process can last up to several minutes. If the calibration is cancelled with a brief depression of the "Quit-key", the values in the parameter are reset to the last status. After successful completion of the "automatic load calibration", the device takes over the measuring data and returns to normal operation. If the load calibration is not completed after approx. 15 minutes, there are too strong load fluctuations in the network. With too strong load fluctuations, the device is difficult to calibrate. Here we recommend to separate these loads briefly from the network during the calibration time, or to parameterize the device via the PC.

Photovoltaic - Optimizer

AD-PVO 6000 GT

Safety instructions – it is essential to read these

Explanation of symbols
Two squares, one inside the other, indicate a DOUBLE or REINFORCED insulation of the device against dangerous high voltages (i.e. mains voltage). This is valid for all parts at the housing, which can be touched, for the operating elements and the low voltages generated by and lead from the device.

Explanation of symbols
An exclamation mark inside a triangle indicates important notes in the technical data sheet and in the notes on safety. Read both documents to the end prior to commissioning. They contain important notes for the correct operation and the installation. Non-observation and errors resulting from this can lead to dangers.

Designated usage
The device must only be used for the purpose described in the relevant data sheet.
The device conforms to the valid CE European guidelines and harmonised standards.
Usage in explosion-endangered areas, outdoors or in damp rooms is NOT admissible.
The device must only be operated with the specified nominal voltage. The specified switching capacities must not be exceeded.
Opening or altering the device is not admissible. Do not repair the device yourself, but replace it with an equivalent new device. Repairs must only be carried out by the manufacturer.
The manufacturer accepts no liability due to infringement.
An operation under adverse environmental conditions is not admissible.
Adverse environmental conditions are:
- high sun radiation
- wetness, dewing or too high humidity
- dust and flammable gases, vapours or solvents
- strong vibrations or electro-magnetic fields

Do not expose the device to stresses, which exceed the described limits.
Usage other than the one described in the relevant data sheet is not admissible and leads to damage of the product.
Furthermore, this is connected with dangers, as for instance short circuit, fire, electric shock etc., which can be fatal.

Notes on safety and dangers
Any warranty claim becomes void for damages due to non-observation of these notes on safety and the relevant technical data sheet.
The following points must be noted:
- the valid laws, standards and regulations
- the stand of technology at the time of the installation
- the handbook and/or the technical data sheet
- the recognised rules of technology
- the fact that operating instructions can only state general regulations and that these regulations must be observed
- the device is not a toy and does not belong in the hands of children
- only operate the device with undamaged connection lines.

Notes on connection and installation
WARNING: dangerous electric voltage can lead to electric shock and burns.
- The installation and maintenance must be carried out by qualified electricians.
- Observe the technical data specified in the data sheet.
- Provide a correctly dimensioned overcurrent device in the vicinity of the device.
- Mount the device in an appropriate control box/control cabinet with a suitable type of protection according to IEC
 60529 to protect it from mechanical or electrical damages.
- During maintenance work, cut the device off from all effective sources of energy and secure it against restart.
- If operating elements of protection class 1 are connected to the contact outputs of the device, the protective earthing
 conductor connection must be carried out separately and properly.

ESD
ATTENTION: When handling the device, protective measures against electrostatic discharge must be observed.

Maintenance and cleaning
The device is maintenance-free and does not have to be cleaned.

Disposal
Old electronic devices are valuable substances and do not belong into the household waste. If the device has reached the end of its useful life, dispose of the device according to the valid legal regulations.

Status: 09/2013

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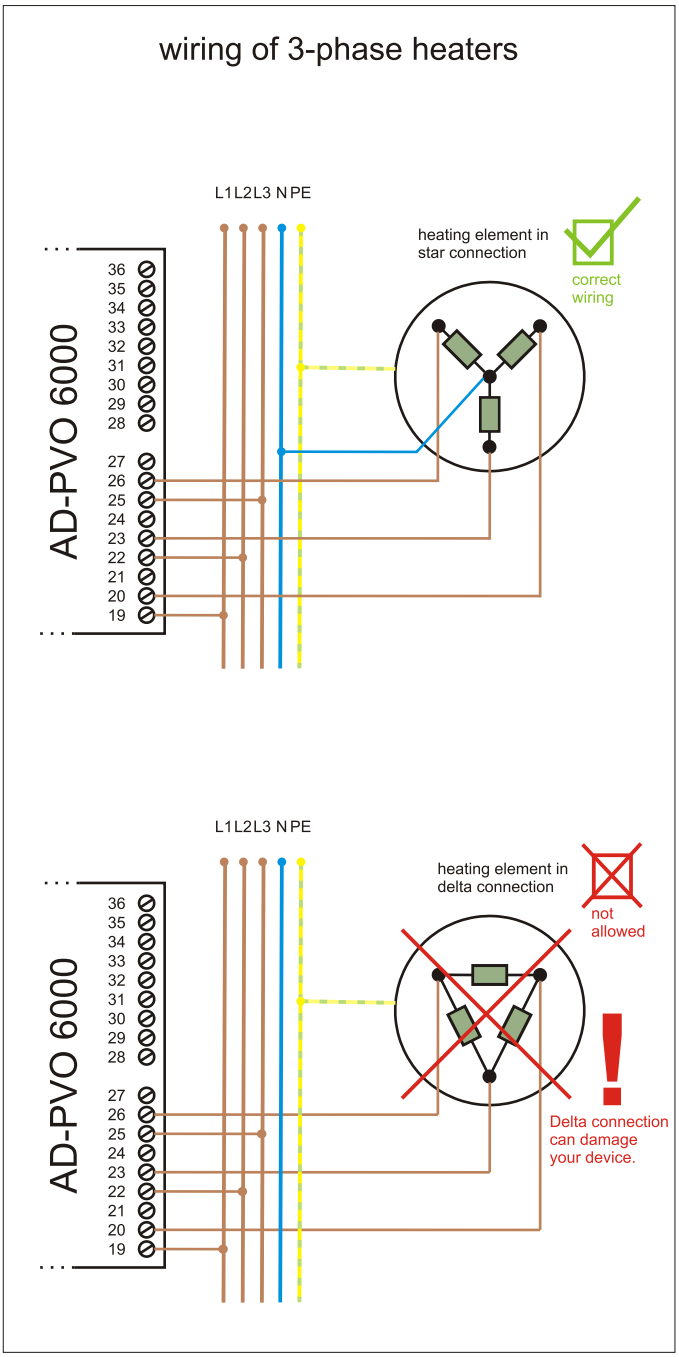
Circuit examples