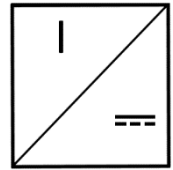
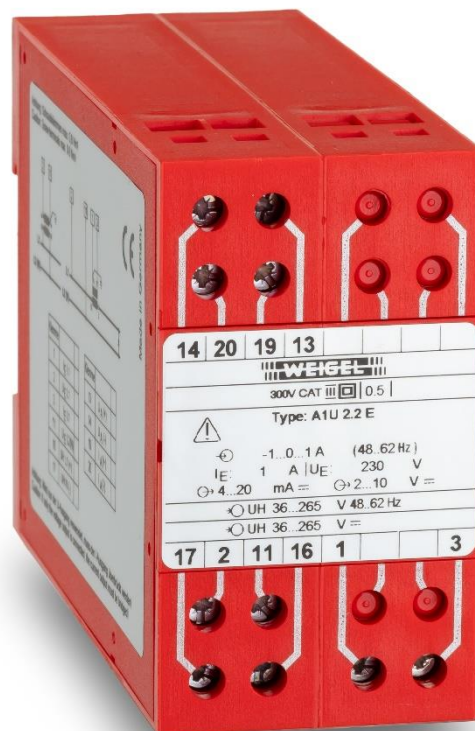


Measuring transducer for alternating current (purchase/supply)

-for sinusoidal signals-



A1U 2.2 E
A1U 2.2 D



Application

The A1U 2.2 E/D transducers convert sinusoidal AC currents into a load independent DC current or an impressed DC voltage. A1U 2.2 E in a single phase AC system A1U 2.2 D in a 3-phase 3- or 4-wire system with balanced loads. In order to recognize purchase or dispose of AC current, a reference voltage of the same system is used. The output signal can be indicated, recorded and/or used for controlling directly at the test point or in measuring facilities located far away. It is possible to connect more than one indicator, recorder, controller, computer etc. to the output circuit provided the total impedance does not exceed the rating.

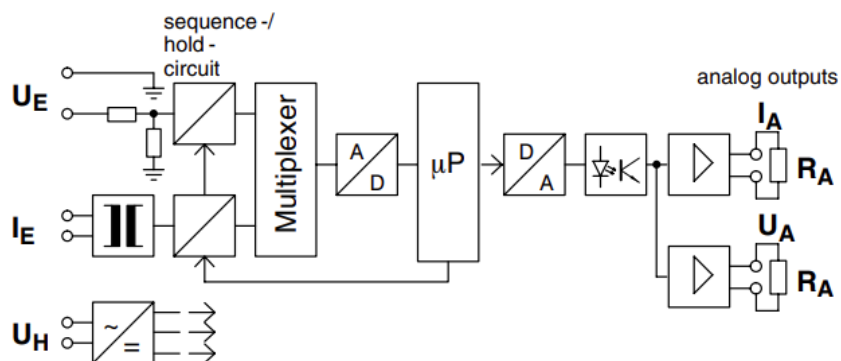
Power supply is effected by a separate auxiliary voltage input. Input, output and auxiliary voltage input are galvanically isolated from each other. The outputs are short-circuit proof and safe against idling.

The transducers are designed to be mounted in machines/systems. Regulations for installation of electrical systems and equipment have to be observed.

Operating principle

A transformer in the current circuit and a divider in the voltage circuit adapt the signals which are transferred to an A/D converter via multiplexer. A microprocessor analyzes and multiplies the digitalized signal in real time. The required output value is computed and transferred to a D/A converter which passes the signal via an optocoupler for galvanic isolation to the output stages. The output amplifier issues the output quantity as a load independent DC current and an impressed DC voltage.

Block circuit diagram

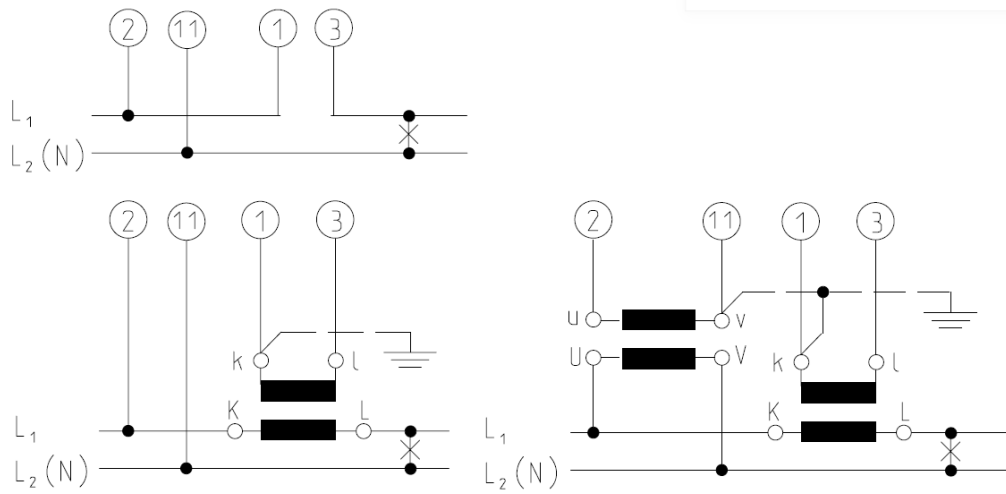


A notice:

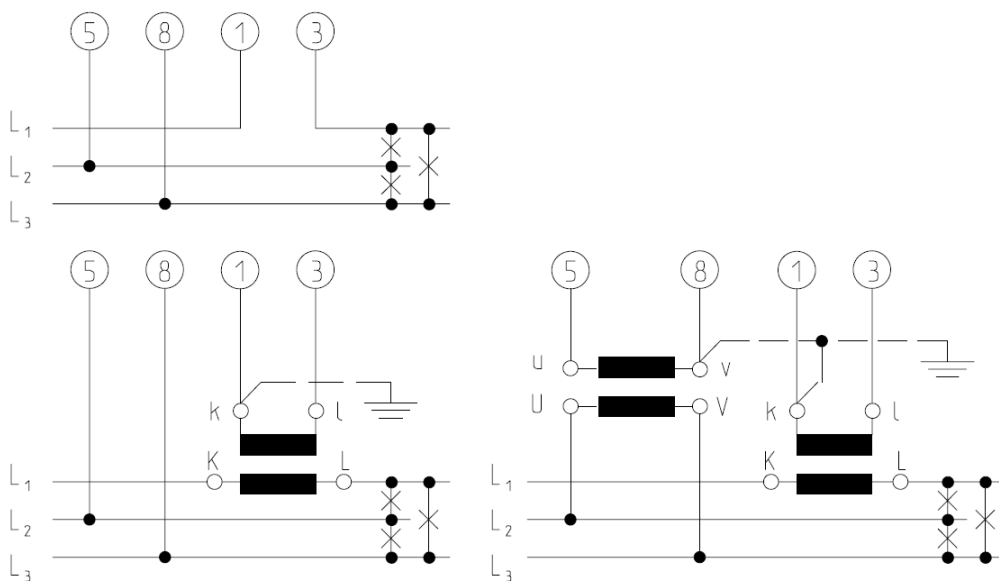
Input, outputs and auxiliary voltage are galvanically isolated from each other.

Connections

Inputs A1U 2.2 E Single-phase AC network



Inputs A1U 2.2 D Three or four-wire-system balanced load



Input

Rated input current	Measuring ranges
IEN	-IEN...0...+IEN
1A	-1 A (supply) ... 0 ... +1 A (supply)
5A	-5 A (supply) ... 0 ... +5 A (supply) (also for current transformer connection)
Input size	sinusoidal alternating current
Frequency range	48...62 Hz
Power consumption	approx. 0.25 mA per voltage path $I^2 \times 0.01 \Omega$ per current path
Nominal input voltages UEN	57.7 V, 63.5 V, 100 V, 110 V, 230 V, 240 V, 380 V, 400 V, 415 V, 440 V, 500 V
Operating voltage	max. 519 V (300V CAT III)
Overload limit	1.2x IEN continuous, 10x IEN max. 1s

Outputs

Current output

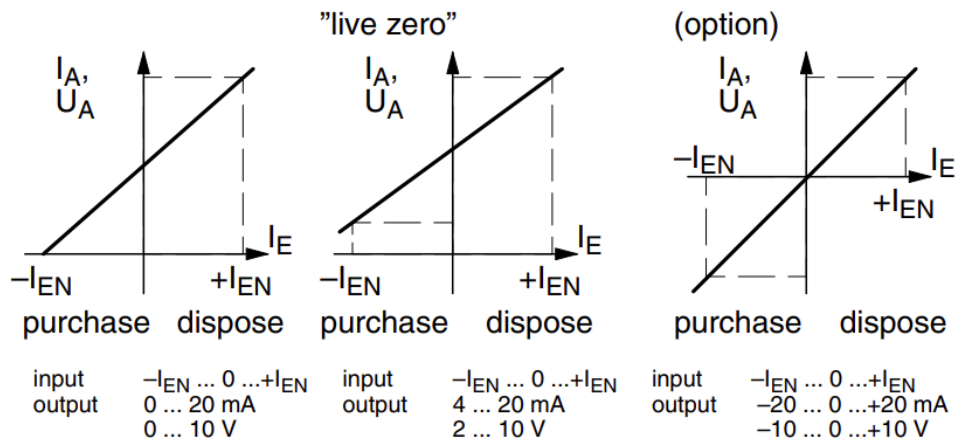
Output current IA	impressed direct current
Rated current IAN	0 ... 20 mA or 4 ... 20 mA
Burden area RA	0...10V / IAN
Current limitation	approx. 120 % of end value

Voltage output

Output voltage UA	impressed direct voltage
Rated voltage UAN	0...10 V or 2...10 V
Load RA	$\geq 4 \text{ k}\Omega$
Load error	$\leq 0.1\%$ based on 50 % load change

residual ripple	$\leq 1\%$ eff
response time	approx. 500 ms
idling voltage	$\leq 15 \text{ V}$

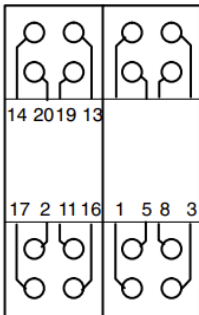
Conversion Characteristics



Auxiliary supply

Power supply	auxiliary voltage	power consumption
	20 ... 100 V= or 20 ... 70 V~	< 3 VA
	36 ... 265 V= or 36 ... 265 V~	< 7 VA

Terminal assignment



No.	Function	Transducer	A1U 2.2 E	A1U 2.2 D
1	I_E L1	input current IN	X	X
3	I_E L1	input current OUT	X	X
2	U_E L1	input voltage	X	–
5	U_E L2	input voltage	–	X
8	U_E L3	input voltage	–	X
11	U_E N	input voltage	X	–
13	U_A (+)	positive output	X	X
14	U_A (-)	negative output	X	X
19	I_A (+)	positive output	X	X
20	I_A (-)	negative output	X	X
16	U_H L1(+)	auxiliary voltage	X	X
17	U_H N (-)	auxiliary voltage	X	X

I_E current input

U_E Voltage input

The numbers on the terminals correspond to the information in the connection diagrams (according to DIN 43 807).

I_A current output

U_A voltage output

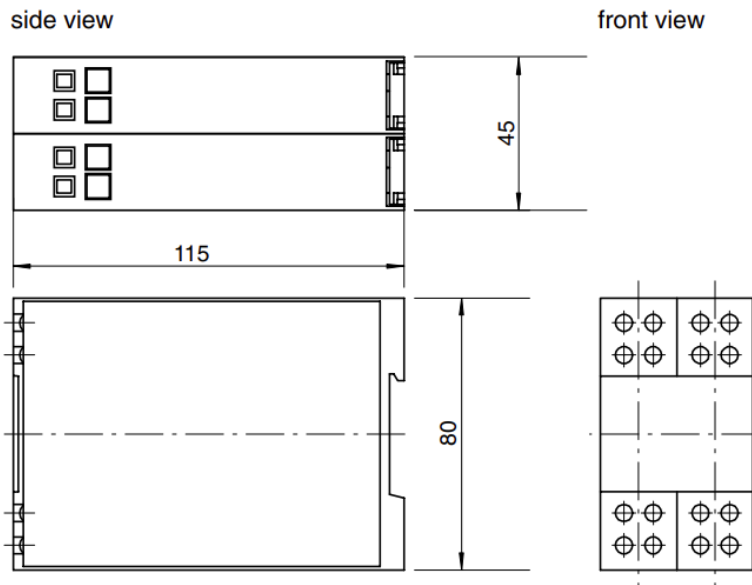
U_H auxiliary voltage input

Danger:

The two outputs must not be connected to each other!

If only the voltage output is connected, terminals 19 and 20 (current output) must be bridged!

Dimensions



(dimensions in mm)

(symbolic illustration)

General technical data

Design	Surface-mounted housing for snap mounting on DIN rail TH 35 according to DIN EN 60 715
Case material	ABS/PC red self-extinguishing according to UL 94 V-0
Connections	Screw terminals, max. torque 0.8 Nm
Wire cross section	max. 4 mm ²
Protection class	IP 30 housing IP 20 terminals
Test voltages	Measuring circuit and auxiliary voltage against output: 3510 Vrms 5 sec Measuring circuit and auxiliary voltage against housing: 3510 Vrms 5 sec Output against housing: 2210 Vrms 5 sec
Working voltage	300 V (nominal line voltage phase-zero)
Protection class	II
Measurement category	CAT III
Pollution level	2
Sealevel of the place of use	max. 2000 m above sea level

Special versions (on request)

Output	Special output e.g.: -5...0...5 mA
Nominal voltage	as specified

Accuracy at reference conditions

Accuracy class	0.5 (± 0.5 % of end value)
Temperature drift	≤ 0.02 % / K, valid for standard version and max. 1 year

Reference conditions

Input voltage	$U_{EN} \pm 0.5$ %
Frequency	50...60 Hz, sine wave, total harmonic distortion ≤ 0.1 %
Auxiliary voltage	$U_{HN} \pm 2$ %, 48...62 Hz
Ambient temperature	23 °C ± 1 K
Warm-up time	≤ 5 min

Environmental

Climate suitability	Climate class 3 according to VDE/VDI 3540 sheet 2
Working temperature range	-10...+55 °C
Storage temperature range	-25...+65 °C
Relative humidity	≤ 75 % annual average, no condensation only use the device indoors

Ordering Guide

Order number	Measuring transducer for alternating current (purchase/supply)
IMU10-1	A1U 2.2 E single-phase AC network
IMU10-2	A1U 2.2 D three or four-wire-system with balanced load
	Measuring ranges
1	-1 A (purchase)...0...+1 A (supply)
5	-5 A (purchase)...0...+5 A (supply)
9	special measuring range
	Rated input voltage
1	57,5 V
2	63,5 V
3	100 V
4	110 V
5	115 V
6	120 V
7	230 V
8	240 V
9	special voltage input
A	380 V (max. 300 V nominal mains voltage phase-zero)
B	400 V (max. 300 V nominal mains voltage phase-zero)
C	415 V (max. 300 V nominal mains voltage phase-zero)
D	440 V (max. 300 V nominal mains voltage phase-zero)
E	500 V (max. 300 V nominal mains voltage phase-zero)
	Frequency range input
2	48...62 Hz
	Output
1	0...20 mA and 0...10 V
2	0...10 mA and 0...10 V
3	0...5 mA and 0...10 V
4	4...20 mA and 2...10 V
5	-20...0...20 mA and -10...0...10 V
9	special output
	Auxiliary supply
4	DC 20...100 V / AC 20...70 V
5	DC 36...265 V / AC 36...265 V
	Manufacturing certificate
0	without
1	with

*) standard

Order example:

Transmitter for Alternating Current (Supply/Output) A1U 2.2 E, Measuring Range: -5 A (Reference)... 0...+5 A (output), voltage input: 100 V, frequency 50Hz. output: 4-20 mA, auxiliary power: 230 V, without test protocol.

Item number according to number code: IMU10-1532450

Guidelines and standards

Directive 2014/30/EU	EMC Directive
Directive 2014/35/EU	Low Voltage Directive
Directive 2011/65/EU	RoHS Directive
DIN EN 60529	Protection types through housing
DIN EN 60688	measuring transducer for converting alternating current variables into analog or digital signals
DIN EN 60715	Dimensions of low-voltage switching devices
	Standardized mounting rails for the mechanical fastening of electrical devices in switchgear
DIN EN 61010-1	Safety regulations for electrical measuring, control, regulation and laboratory devices Part 1: General requirements
DIN EN 61326-1	Electrical measuring, control, regulating and laboratory devices - EMC requirements - Part 1: General requirements 61000-4-3 Evaluation criterion B

Safety regulations and general information



- Check the relevant details for installation of the Measuring transducer against the nameplate and the terminal connections to ensure that they are suitable for your area of application.
- The Measuring transducer may only be installed by qualified electricians.
- The Measuring transducer must be checked for transport damage before commissioning and may only be put into operation if it is in perfect condition. In case of safety-relevant damages the device may not be put into operation.



- Ensure that the connections match the terminal connections.
- Circuits must be fused for the maximum permissible currents.
- When commissioning and using the Measuring transducer, the applicable laws, regulations and provisions for the respective area of use and application must be observed.
- The Measuring transducer is not suitable for use in environments with explosive gases or explosive substances.
- The Measuring transducer may only be operated in the environmental and ambient conditions specified in the data sheet. Direct sunlight must be avoided.



- The Measuring transducer may only be installed on non-flammable materials. The applicable fire protection regulations in the area of use and application must be observed.
- Due to the operating voltage, the distance or insulation from other devices must be observed in accordance with the applicable regulations.



- Stranded cables are only permitted if they are fitted with wire end sleeves.
- Connecting cables must be laid away from electromagnetic interference fields.
- Dangerous electrical voltage (more than 75 V DC or more than 50 V AC) can lead to electric shock and burns.
- The Measuring transducer must always be disconnected when fitting, removing, installing, uninstalling or troubleshooting.
- The Measuring transducer is maintenance-free when used as intended.
- Improper use and non-compliance with these safety instructions can lead to serious injury or even death.

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Technical changes reserved
12/2024