Measuring Transducers

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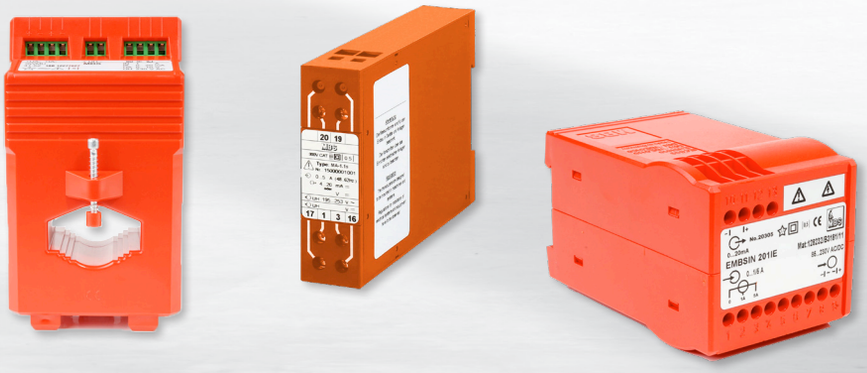

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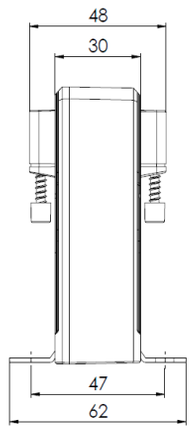
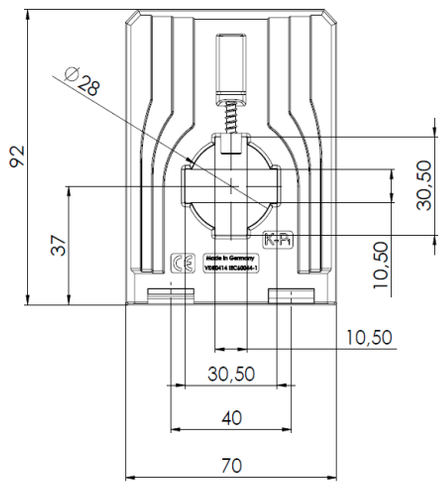
Contents

CCT 31.3 RMS (Compensation current transformer, MBS All current sensors)

Current transformers for the measurement of direct and alternating currents

- For measuring of non-sinusoidal and distorted networks
- As a measuring transducer for the direct input wiring of SPS input cards





Additional accessories:
Snap-on mounting to clip onto
35 mm DIN rail (Art.-no. 53011)

Dimensions:	**Applicable technical standards:**	**Electric connections:**
Bus bar: 30x10 mm	DIN EN 50178, 1997	U_H + 0 (Ground) I_A
Round conductor: 28 mm	DIN EN 61010-1, 2002	Spring clamp terminal
Transformer width: 70 mm	VDE 0160	Connection cross sections: 0.08…2.5 mm²
Transformer height: 92 mm		
Transformer depth: 48 mm		

Technical data:

Measuring range:	0…300 A DC / 0…300 A I_{RMS} AC, depends on varieties! (Nominal current ranges adjusted to standard values according to IEC)
Frequency range:	DC, or AC 20 Hz … 6 kHz, Peak value factor ≤ 4
Current output:	4…20 mA DC, RMS measurement
Max. burden resistance at current output:	R_B ≤ 500 Ω (U_H = 24 V DC)
Current limit under overload:	< 25 mA
Accuracy:	± 1,0 %
Max. operating voltage U_m:	0,72 kV, U_{eff}
Isolation test voltage:	6,4 kV, U_{eff}, 50 Hz, 5 sec., primary conductor against measuring output / housing
Auxiliary voltage:	24 V ± 15 % DC, < 70 mA, external protection via microfuse 250 mA / 250 V, fast!
Step response time (90 % I_{PN}, di/dt = 100 A / µs):	≤ 200 ms (typ. 150 ms)
Signal rise speed di/dt:	< 100 A / µs
Isolation class	E
Protection class	IP 20
Operating altitude	≤ 2000 m (DIN EN 61010-1)
Max. temperature of the primary conductor:	100° C
Operating temperature:	-25° C < T_U < +60° C, 0…95% rH, without condensation
Storage temperature:	-40° C < T_L < +90° C

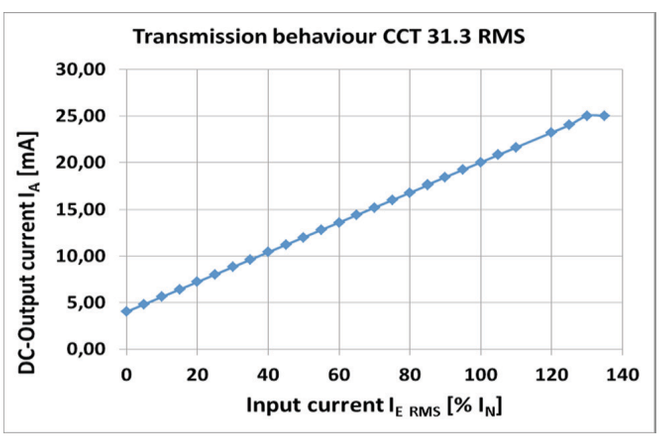
Functions of the CCT 31.3 RMS:

- Electricity is conducted over the magnetic field and is captured by the measuring core. The current induced in the measuring core is proportional to the magnetic flow and is captured by a semi-conductor element. An integrated electronic control unit converts the semi-control signal into a true effective value of the measuring size in proportion to the DC output current signal. The true effective value is calculated by the delta-sigma-method.
- A contactless inductive captured parameter creates a galvanically separated output signal.
- Electrical contact with the secondary circuit of the current transformer is achieved by means of a 4-pole spring-clamp. This clamp is suitable for connection to a flexible conductor up to 2.5 mm².
- A DC auxiliary voltage of 24 V is required to supply the electronic controls. The auxiliary voltage input must be secured by a HRC fuse size of 250 mA / 250 V/F.

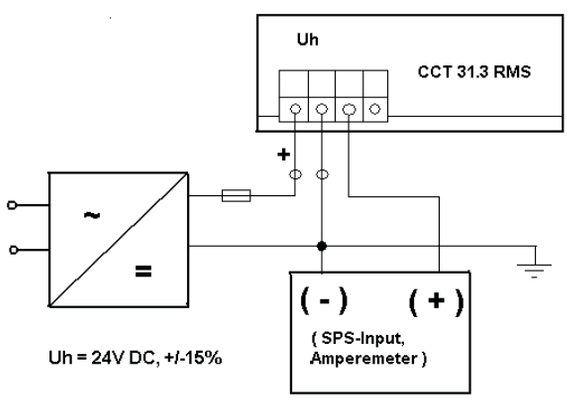
Advantages and benefits of the CCT 31.3 RMS:

- Measuring of direct current as well as alternating current with only one current transformer is possible.
- Exact calculation of the true effective value of any temporal process of the current which is to be measured.
- Large working frequency range from 0 Hz (DC) or 20 Hz…6 kHz (AC).
- High electric protection of the galvanically isolated capture of the measured variable.
- Low power-consumption (≤ 2.5 VA)
- Easy and safety electrical connection by means of spring clamp terminal.
- Direct mounting onto the bus bar by means of integrated fixing screws which are part of the unit.
- Mounting onto 35 mm DIN-rail by means of optional supply of snap-on mounting.
- High climatic and mechanical durability, PU-resin hardened enclosures of all electrical components.

Transfer ratio of the CCT 31.3 RMS:



Wiring Diagram of the CCT 31.3 RMS:



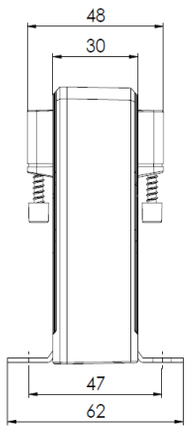
Order list:

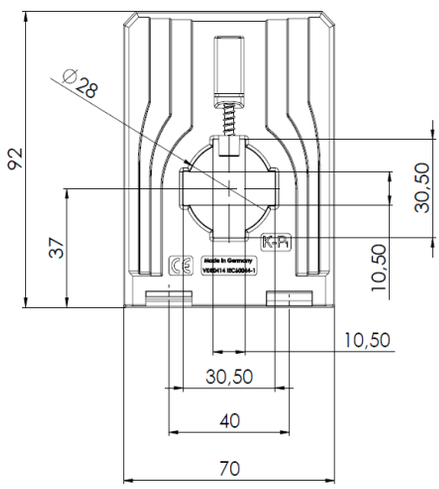
Type	Primary current I_{RMS} [A]	Art.-no.	Current output
CCT 31.3 RMS	50	1103-10001	4…20 mA DC
	100	1103-10003	
	150	1103-10005	
	200	1103-10006	
	250	1103-10007	
	300	1103-10008	

CCT 31.3 I (Compensation current transformer, MBS All current sensors)

Current transformers for the measurement of direct and alternating currents

- For network analysis, monitoring,
- and measuring of non-sinusoidal and distorted networks





Additional accessories:
Snap-on mounting to clip onto
35 mm DIN rail (Art.-no. 53011)

Dimensions:	**Applicable technical standards:**	**Electric connections:**
Bus bar: 30x10 mm	DIN EN 50178, 1997	U_H + 0 (Ground) I_A
Round conductor: 28 mm	DIN EN 61010-1, 2002	Spring clamp terminal
Transformer width: 70 mm	VDE 0160	Connection cross sections: 0.08…2.5 mm²
Transformer height: 92 mm		
Transformer depth: 48 mm		

Technical data:

Measuring range:	0…300 A DC / AC I_{eff}, depends on varieties! (Nominal current ranges adjusted to standard values according to IEC)
Frequency range:	0…100 kHz, any signal curves
Current output at AC-input signal:	AC: 0…20 mA I_{eff}, (± 28.2843 mA I_{Peak})
Current output at DC-input signal:	DC: 0…± 20 mA
Max. burden resistance at current output:	R_B ≤ 200 Ω (U_H = 24 V DC)
Current limit under overload:	< 25 mA
Accuracy:	± 0,5 %
Max. operating voltage U_m:	0,72 kV, U_{eff}
Isolation test voltage:	6,4 kV, U_{eff}, 50 Hz, 5 sec., primary conductor against measuring output / housing
Auxiliary voltage:	± 12 V DC, ± 15% < 70 mA, external protection via microfuse 100 mA / 250 V, fast!
Energia response time (90 % I_{PN}, di/dt = 100 A / µs):	≤ 1 µs (typ. 150 ns)
Signal rise velocity di/dt:	< 100 A / µs
Isolation class	E
Protection class	IP 20
Operating altitude	≤ 2000 m (DIN EN 61010-1)
Max. temperature of the primary conductor:	100° C
Operating temperature:	-25° C < T_U < +60° C, 0…95% rH, without condensation
Storage temperature:	-40° C < T_L < +90° C

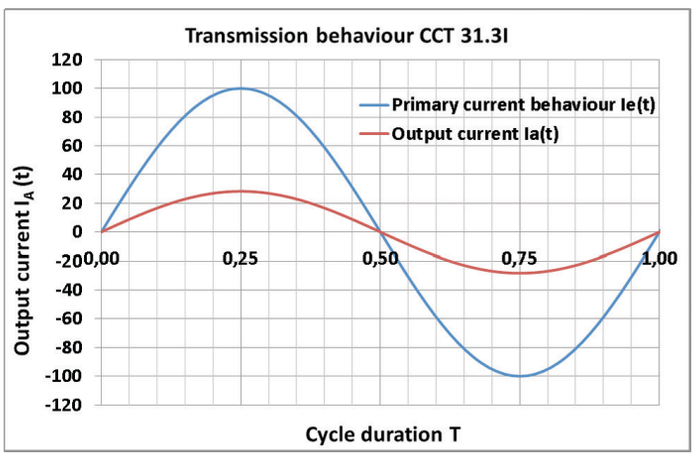
Functions of the CCT 31.3 I:

- Electricity is conducted over the magnetic field and is captured by the measuring core. The current induced in the measuring core is proportional to the primary current and is captured by a semi-conductor element. An integrated electronic control unit converts the semi-control signal into an output current signal, which is directly proportional to the temporal course of the measured primary value.
- A contactless inductive captured parameter creates a galvanically separated output signal.
- Electrical contact with the secondary circuit of the current transformer is achieved by means of a 4-pole-spring-clamp. This clamp is suitable for connection to a flexible conductor up to 2.5 mm².
- A DC auxiliary voltage of ± 12 V is required to supply the electronic controls. The auxiliary voltage input must be secured by a HRC fuse size of 100 mA / 250 V microfuse.

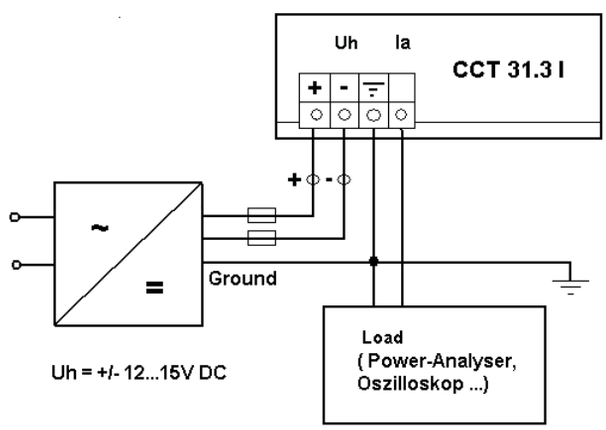
Advantages and benefits of the CCT 31.3 I:

- Measuring of direct current as well as alternating current with only one current transformer is possible.
- Large working frequency range from 0 Hz (DC)…100 kHz (AC).
- High electric protection of the galvanically isolated capture of the measured variable.
- Low power-consumption (≤ 2.5 VA)
- Easy and safety electrical connection by means of spring clamp terminal.
- Direct mounting onto the bus bar by means of integrated fixing screws which are part of the unit.
- Mounting onto 35 mm DIN-rail by means of optional supply of snap-on mounting.
- High climatic and mechanical durability, PU-resin hardened enclosures of all electrical components.

Transfer ratio of the CCT 31.3 I:



Wiring Diagram of the CCT 31.3 I:



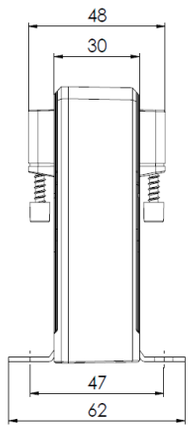
Order list:

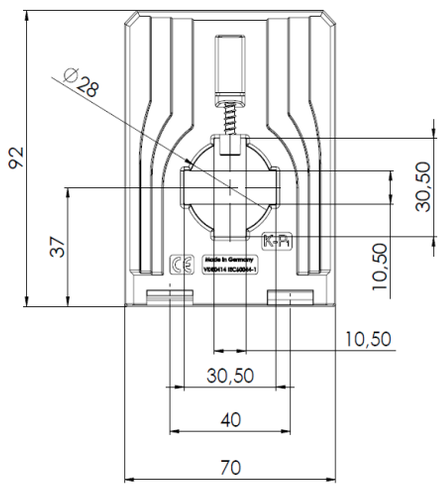
Type	Primary current [A] DC / AC (I_{eff})	Art.-no.	Current output
CCT 31.3 I	50	1101-10001	DC: 0…± 20mA AC: 0…20 mA I_{eff}
	100	1101-10003	
	150	1101-10005	
	200	1101-10006	
	250	1101-10007	
	300	1101-10008	

CCT 31.3 U (Compensation current transformer, MBS All current sensors)

Current transformers for the measurement of direct and alternating currents

- For network analysis, monitoring,
- and measuring of non-sinusoidal and distorted networks





Additional accessories:
Snap-on mounting to clip onto
35 mm DIN rail (Art.-no. 53011)

Dimensions:	**Applicable technical standards:**	**Electric connections:**
Bus bar: 30x10 mm	DIN EN 50178, 1997	U_H + 0 (Ground) I_A
Round conductor: 28 mm	DIN EN 61010-1, 2002	Spring clamp terminal
Transformer width: 70 mm	VDE 0160	Connection cross sections: 0.08…2.5 mm²
Transformer height: 92 mm		
Transformer depth: 48 mm		

Technical data:

Measuring range:	0…300 A DC / AC I_{eff}, depends on varieties! (Nominal current ranges adjusted to standard values according to IEC)
Frequency range:	0…100 kHz, any signal curves
Voltage output, AC Input:	2,5 ± 1 V, U_{eff}, AC; 2,5 ± 1,414 V (Peak-Peak)
Voltage output, DC Input:	2.5 ± 1 V, DC
Min. burden resistance at current output:	R_B ≥ 100 kΩ
Current limit under overload:	< 5 V
Accuracy:	± 0,5 %
Max. operating voltage U_m:	0,72 kV, U_{eff}
Isolation test voltage:	6,4 kV, U_{eff}, 50 Hz, 5 sec., primary conductor against measuring output / housing
Auxiliary voltage:	± 12 V DC, ± 15% < 70 mA, external protection via microfuse 100 mA / 250 V, fast!
Energia response time (90 % I_{PN}, di/dt = 100 A / µs):	≤ 1 µs (typ. 150 ns)
Signal rise velocity di/dt:	< 100 A / µs
Isolation class	E
Protection class	IP 20
Operating altitude	≤ 2000 m (DIN EN 61010-1)
Max. temperature of the primary conductor:	100° C
Operating temperature:	-25° C < T_U < +60° C, 0…95% rH, without condensation
Storage temperature:	-40° C < T_L < +90° C

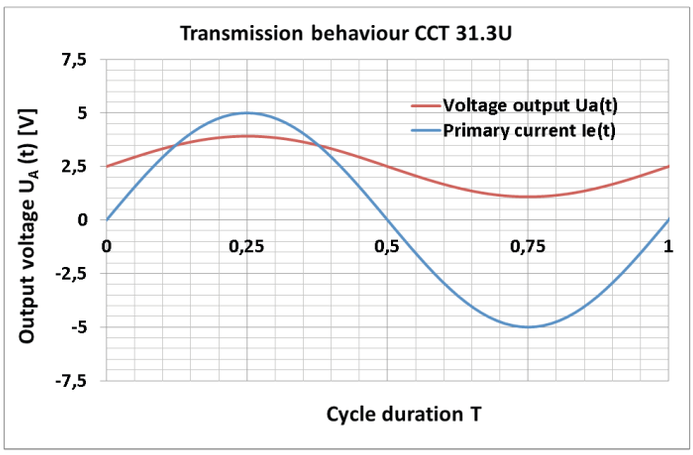
Functions of the CCT 31.3 U:

- Electricity is conducted over the magnetic field and is captured by the measuring core. The current induced in the measuring core is proportional to the primary current and is captured by a semi-conductor element. An integrated electronic control unit converts the semi-control signal into an output voltage signal, which is directly proportional to the temporal course of the measured primary value.
- A contactless inductive captured parameter creates a galvanically separated output signal.
- Electrical contact with the secondary circuit of the current transformer is achieved by means of a 4-pole-spring-clamp. This clamp is suitable for connection to a flexible conductor up to 2.5 mm².
- A DC auxiliary voltage of ± 12 V is required to supply the electronic controls. The auxiliary voltage input must be secured by a HRC fuse size of 100 mA / 250 V microfuse.

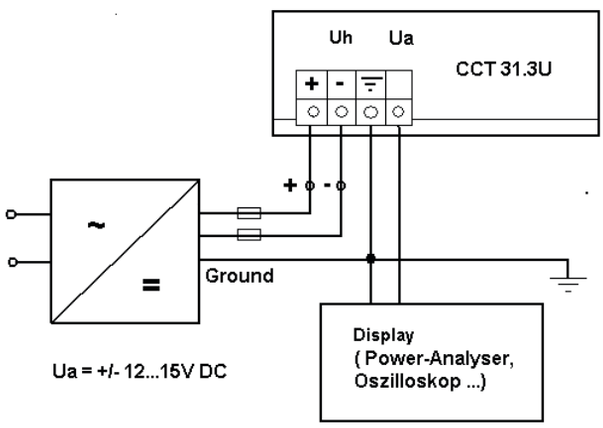
Advantages and benefits of the CCT 31.3 U:

- Measuring of direct current as well as alternating current with only one current transformer is possible.
- Large working frequency range from 0 Hz (DC)…100 kHz (AC).
- High electric protection of the galvanically isolated capture of the measured variable.
- Low power-consumption (≤ 2.5 VA)
- Easy and safety electrical connection by means of spring clamp terminal.
- Direct mounting onto the bus bar by means of integrated fixing screws which are part of the unit.
- Mounting onto 35 mm DIN-rail by means of optional supply of snap-on mounting.
- High climatic and mechanical durability, PU-resin hardened enclosures of all electrical components.

Transfer ratio of the CCT 31.3 U:



Wiring Diagram of the CCT 31.3 U:



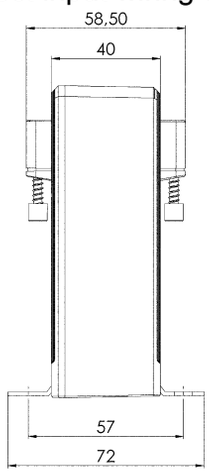
Order list:

Type	Primary current I_{eff} [A] DC / AC (I_{eff})	Art.-no.	Voltage output
CCT 31.3 U	50	1102-10001	DC: 2.5 ± 1V AC: 2,5 ± 1,414 V (Peak-Peak)
	100	1102-10003	
	150	1102-10005	
	200	1102-10006	
	250	1102-10007	
	300	1102-10008	

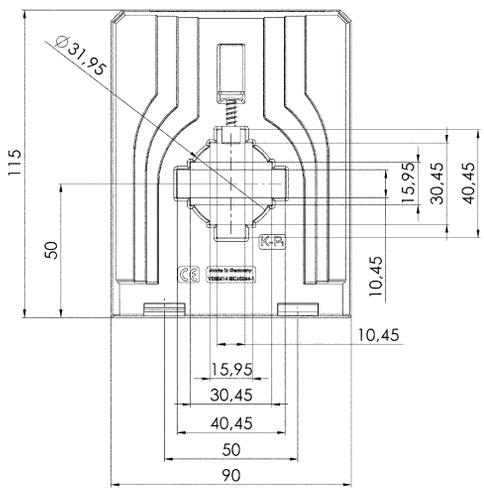
CCT 41.4 RMS (Compensation current transformer, MBS All current sensors)

Current transformers for the measurement of direct and alternating currents

- For measuring of non-sinusoidal and distorted networks
- As a measuring transducer for the direct input wiring of SPS input cards



Additional accessories:
Snap-on mounting to clip onto
35 mm DIN rail (Art.-no. 55012)



Dimensions:
Bus bar 1: 40x10 mm
Bus bar 2: 30x15 mm
Round conductor: 31,5 mm
Transformer width: 90 mm
Transformer height: 115 mm
Transformer depth: 58,5 mm

Applicable technical standards:
DIN EN 50178, 1997
DIN EN 61010-1, 2002
VDE 0160

Electric connections:
U_H + 0 (Ground) I_A
Spring clamp terminal
Connection cross sections: 0.08…2.5 mm²

Technical data:

Measuring range:	0…500 A DC / 0…500 A I_{RMS} AC, depends on varieties! (Nominal current ranges adjusted to standard values according to IEC)
Frequency range:	DC, or AC 20 Hz … 6 kHz, Peak value factor ≤ 4
Current output:	4…20 mA DC, RMS measurement
Max. burden resistance at current output:	R_B ≤ 500 Ω (U_H = 24 V DC)
Current limit under overload:	< 25 mA
Accuracy:	± 1,0 %
Max. operating voltage U_m:	0,72 kV, U_{eff}
Isolation test voltage:	6,4 kV, U_{eff}, 50 Hz, 5 sec., primary conductor against measuring output / housing
Auxiliary voltage:	24 V ± 15 % DC, < 70 mA, external protection via microfuse 250 mA / 250 V, fast!
Step response time (90 % I_{PN}, di/dt = 100 A / µs):	≤ 200 ms (typ. 150 ms)
Signal rise speed di/dt:	< 100 A / µs
Isolation class	E
Protection class	IP 20
Operating altitude	≤ 2000 m (DIN EN 61010-1)
Max. temperature of the primary conductor:	100° C
Operating temperature:	-25° C < T_U < +60° C, 0…95% rH, without condensation
Storage temperature:	-40° C < T_L < +90° C

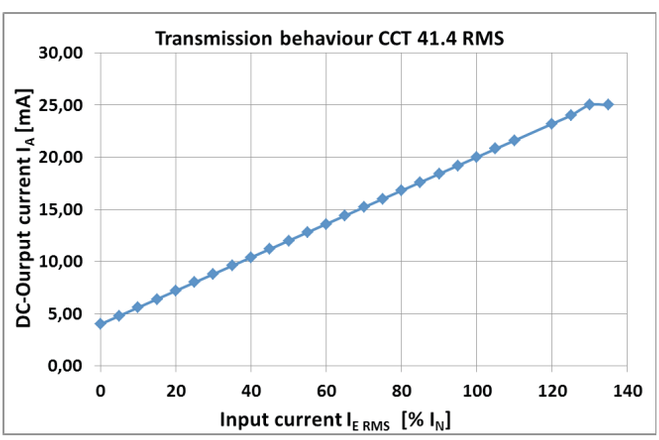
Functions of the CCT 41.4 RMS:

- Electricity is conducted over the magnetic field and is captured by the measuring core. The current induced in the measuring core is proportional to the magnetic flow and is captured by a semi-conductor element. An integrated electronic control unit converts the semi-control signal into a true effective value of the measuring size in proportion to the DC output current signal. The true effective value is calculated by the delta-sigma-method.
- A contactless inductive captured parameter creates a galvanically separated output signal.
- Electrical contact with the secondary circuit of the current transformer is achieved by means of a 4-pole spring-clamp. This clamp is suitable for connection to a flexible conductor up to 2.5 mm².
- A DC auxiliary voltage of 24 V is required to supply the electronic controls. The auxiliary voltage input must be secured by a HRC fuse size of 250 mA / 250 V/F.

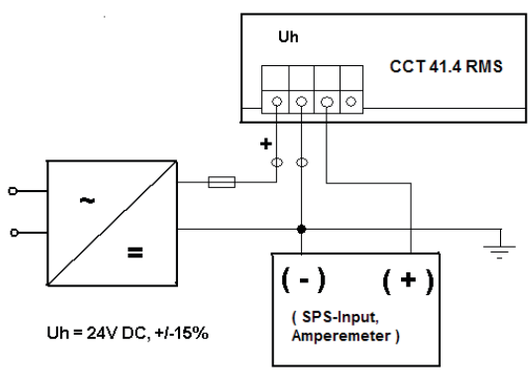
Advantages and benefits of the CCT 41.4 RMS:

- Measuring of direct current as well as alternating current with only one current transformer is possible.
- Exact calculation of the true effective value of any temporal process of the current which is to be measured.
- Large working frequency range from 0 Hz (DC) or 20 Hz…6 kHz (AC).
- High electric protection of the galvanically isolated capture of the measured variable.
- Low power-consumption (≤ 2.5 VA)
- Easy and safety electrical connection by means of spring clamp terminal.
- Direct mounting onto the bus bar by means of integrated fixing screws which are part of the unit.
- Mounting onto 35 mm DIN-rail by means of optional supply of snap-on mounting.
- High climatic and mechanical durability, PU-resin hardened enclosures of all electrical components.

Transfer ratio of the CCT 41.4 RMS:



Wiring Diagram of the CCT 41.4 RMS:



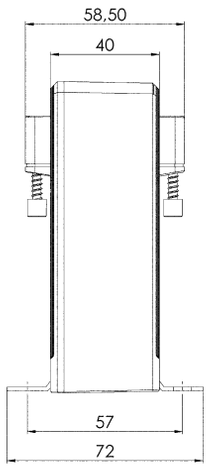
Order list:

Type	Primary current I_{RMS} [A]	Art.-no.	Current output
CCT 41.4 RMS	150	1203-10005	4…20 mA DC
	200	1203-10006	
	250	1203-10007	
	300	1203-10008	
	400	1203-10009	
	500	1203-10010	

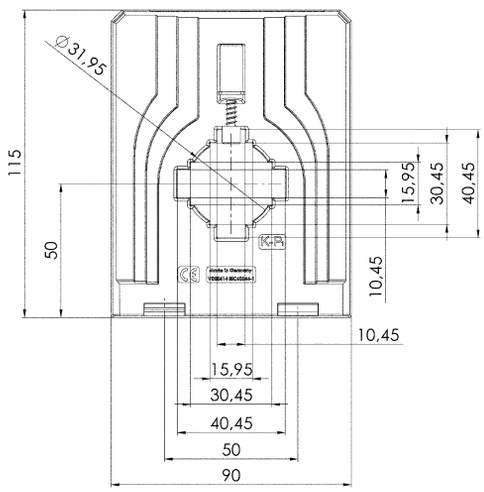
CCT 41.4 I (Compensation current transformer, MBS All current sensors)

Current transformers for the measurement of direct and alternating currents

- For network analysis, monitoring,
- and measuring of non-sinusoidal and distorted networks



Additional accessories:
Snap-on mounting to clip onto
35 mm DIN rail (Art.-no. 55012)



Dimensions:	**Applicable technical standards:**	**Electric connections:**
Bus bar 1: 40x10 mm	DIN EN 50178, 1997	U_H + 0 (Ground) I_A
Bus bar 2: 30x15 mm	DIN EN 61010-1, 2002	Spring clamp terminal
Round conductor: 31,5 mm	VDE 0160	Connection cross sections: 0.08…2.5 mm²
Transformer width: 90 mm		
Transformer height: 115 mm		
Transformer depth: 58,5 mm		

Technical data:

Measuring range:	0…500 A DC / AC I_{eff}, depends on varieties! (Nominal current ranges adjusted to standard values according to IEC)
Frequency range:	0…100 kHz, any signal curves
Current output at AC-input signal:	AC: 0…20 mA I_{eff}, (± 28.2843 mA I_{Peak})
Current output at DC-input signal:	DC: 0…± 20 mA
Max. burden resistance at current output:	R_B ≤ 200 Ω (U_H = 24 V DC)
Current limit under overload:	< 25 mA
Accuracy:	± 0,5 %
Max. operating voltage U_m:	0,72 kV, U_{eff}
Isolation test voltage:	6,4 kV, U_{eff}, 50 Hz, 5 sec., primary conductor against measuring output / housing
Auxiliary voltage:	± 12 V DC, ± 15% < 70 mA, external protection via microfuse 100 mA / 250 V, fast!
Energia response time (90 % I_{PN}, di/dt = 100 A / µs):	≤ 1 µs (typ. 150 ns)
Signal rise velocity di/dt:	< 100 A / µs
Isolation class	E
Protection class	IP 20
Operating altitude	≤ 2000 m (DIN EN 61010-1)
Max. temperature of the primary conductor:	100° C
Operating temperature:	-25° C < T_U < +60° C, 0…95% rH, without condensation
Storage temperature:	-40° C < T_L < +90° C

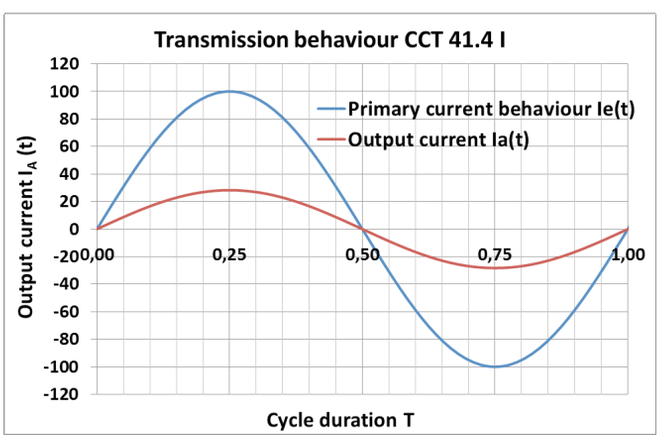
Functions of the CCT 41.4 I:

- Electricity is conducted over the magnetic field and is captured by the measuring core. The current induced in the measuring core is proportional to the primary current and is captured by a semi-conductor element. An integrated electronic control unit converts the semi-control signal into an output current signal, which is directly proportional to the temporal course of the measured primary value.
- A contactless inductive captured parameter creates a galvanically separated output signal.
- Electrical contact with the secondary circuit of the current transformer is achieved by means of a 4-pole-spring-clamp. This clamp is suitable for connection to a flexible conductor up to 2.5 mm².
- A DC auxiliary voltage of ± 12 V is required to supply the electronic controls. The auxiliary voltage input must be secured by a HRC fuse size of 100 mA / 250 V microfuse.

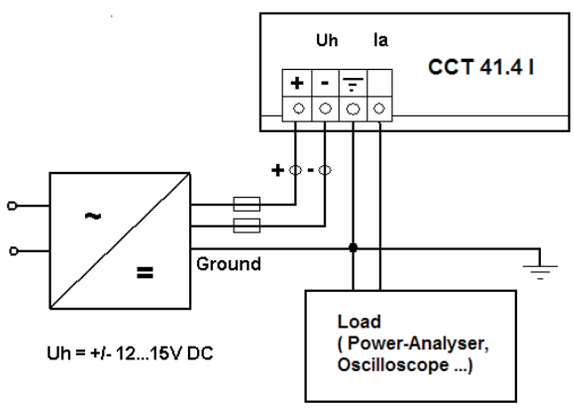
Advantages and benefits of the CCT 41.4 I:

- Measuring of direct current as well as alternating current with only one current transformer is possible.
- Large working frequency range from 0 Hz (DC)…100 kHz (AC).
- High electric protection of the galvanically isolated capture of the measured variable.
- Low power-consumption (≤ 2.5 VA)
- Easy and safety electrical connection by means of spring clamp terminal.
- Direct mounting onto the bus bar by means of integrated fixing screws which are part of the unit.
- Mounting onto 35 mm DIN-rail by means of optional supply of snap-on mounting.
- High climatic and mechanical durability, PU-resin hardened enclosures of all electrical components.

Transfer ratio of the CCT 41.4 I:



Wiring Diagram of the CCT 41.4 I:



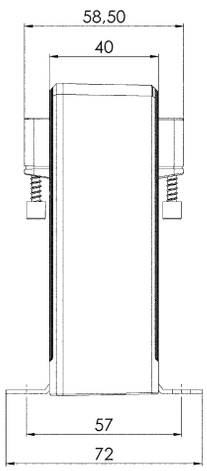
Order list:

Type	Primary current [A] DC / AC (I_{eff})	Art.-no.	Current output
CCT 41.4 I	150	1201-10005	DC: 0…± 20mA AC: 0…20 mA I_{eff}
	200	1201-10006	
	250	1201-10007	
	300	1201-10008	
	400	1201-10009	
	500	1201-10010	

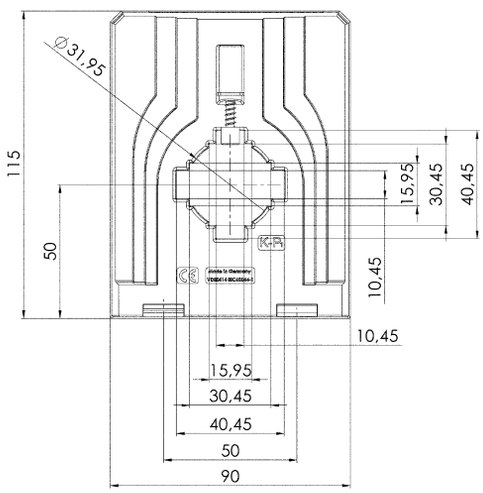
CCT 41.4 U (Compensation current transformer, MBS All current sensors)

Current transformers for the measurement of direct and alternating currents

- For network analysis, monitoring,
- and measuring of non-sinusoidal and distorted networks



Additional accessories:
Snap-on mounting to clip onto
35 mm DIN rail (Art.-no. 55012)



Dimensions:
Bus bar 1: 40x10 mm
Bus bar 2: 30x15 mm
Round conductor: 31,5 mm
Transformer width: 90 mm
Transformer height: 115 mm
Transformer depth: 58,5 mm

Applicable technical standards:
DIN EN 50178, 1997
DIN EN 61010-1, 2002
VDE 0160

Electric connections:
U_H + 0 (Ground) I_A
Spring clamp terminal
Connection cross sections: 0.08…2.5 mm²

Technical data:

Measuring range:	0…500 A DC / AC I_{eff}, depends on varieties! (Nominal current ranges adjusted to standard values according to IEC)
Frequency range:	0…100 kHz, any signal curves
Voltage output, AC Input:	2,5 ± 1 V, U_{eff}, AC; 2,5 ± 1,414 V (Peak-Peak)
Voltage output, DC Input:	2.5 ± 1 V, DC
Min. burden resistance at current output:	R_B ≥ 100 kΩ
Current limit under overload:	< 5 V
Accuracy:	± 0,5 %
Max. operating voltage U_m:	0,72 kV, U_{eff}
Isolation test voltage:	6,4 kV, U_{eff}, 50 Hz, 5 sec., primary conductor against measuring output / housing
Auxiliary voltage:	± 12 V DC, ± 15% < 70 mA, external protection via microfuse 100 mA / 250 V, fast!
Energia response time (90 % I_{PN}, di/dt = 100 A / µs):	≤ 1 µs (typ. 150 ns)
Signal rise velocity di/dt:	< 100 A / µs
Isolation class	E
Protection class	IP 20
Operating altitude	≤ 2000 m (DIN EN 61010-1)
Max. temperature of the primary conductor:	100° C
Operating temperature:	-25° C < T_U < +60° C, 0…95% rH, without condensation
Storage temperature:	-40° C < T_L < +90° C

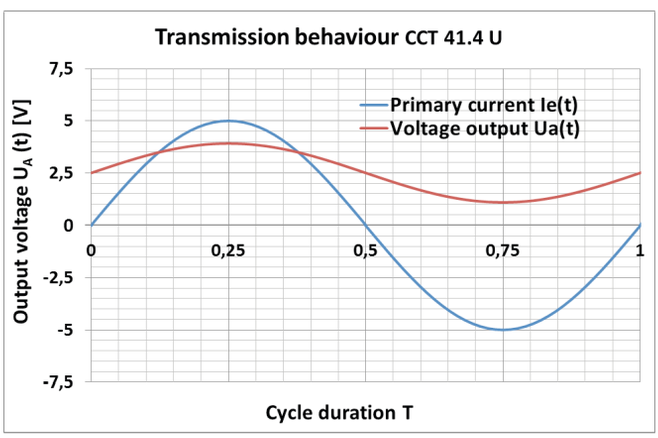
Functions of the CCT 41.4 U:

- Electricity is conducted over the magnetic field and is captured by the measuring core. The current induced in the measuring core is proportional to the primary current and is captured by a semi-conductor element. An integrated electronic control unit converts the semi-control signal into an output voltage signal, which is directly proportional to the temporal course of the measured primary value.
- A contactless inductive captured parameter creates a galvanically separated output signal.
- Electrical contact with the secondary circuit of the current transformer is achieved by means of a 4-pole-spring-clamp. This clamp is suitable for connection to a flexible conductor up to 2.5 mm².
- A DC auxiliary voltage of ± 12 V is required to supply the electronic controls. The auxiliary voltage input must be secured by a HRC fuse size of 100 mA / 250 V microfuse.

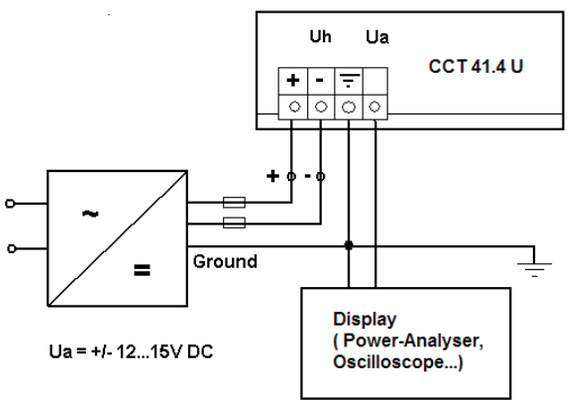
Advantages and benefits of the CCT 41.4 U:

- Measuring of direct current as well as alternating current with only one current transformer is possible.
- Large working frequency range from 0 Hz (DC)…100 kHz (AC).
- High electric protection of the galvanically isolated capture of the measured variable.
- Low power-consumption (≤ 2.5 VA)
- Easy and safety electrical connection by means of spring clamp terminal.
- Direct mounting onto the bus bar by means of integrated fixing screws which are part of the unit.
- Mounting onto 35 mm DIN-rail by means of optional supply of snap-on mounting.
- High climatic and mechanical durability, PU-resin hardened enclosures of all electrical components.

Transfer ratio of the CCT 41.4 U:



Wiring Diagram of the CCT 41.4 U:



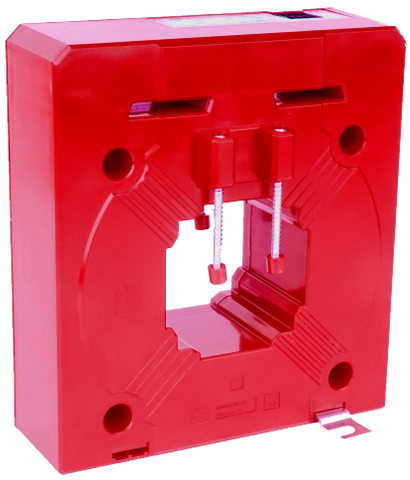
Order list:

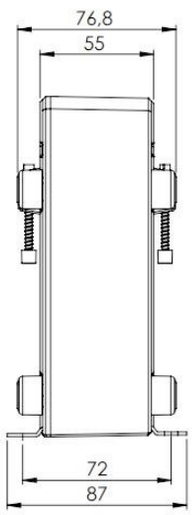
Type	Primary current I_{eff} [A] DC / AC (I_{eff})	Art.-no.	Voltage output
CCT 41.4 U	150	1202-10005	DC: 2.5 ± 1V AC: 2,5 ± 1,414 V (Peak-Peak)
	200	1202-10006	
	250	1202-10007	
	300	1202-10008	
	400	1202-10009	
	500	1202-10010	

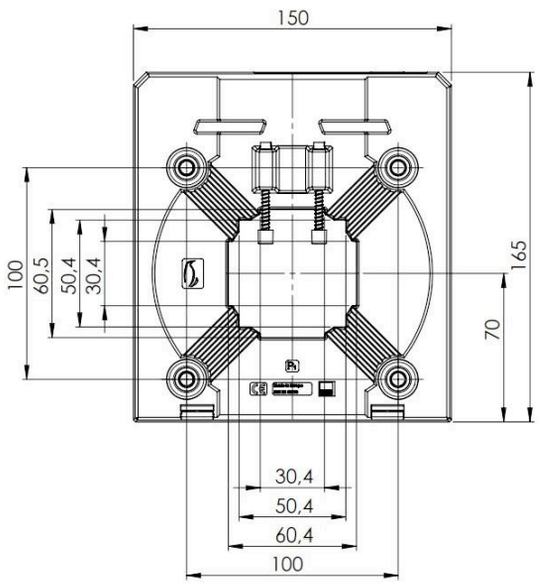
CCT 63.6 I (Compensation current transformer, MBS universal current sensor)

Current transformer for measuring both direct and alternating currents

- For use in network analysis, monitoring
- and for current measurement of non-sinusoidal and distorted networks







Dimensions:

Rail 1: 60x30 mm
Rail 2: 50x50 mm
Round conductors: 50 mm
Width: 165 mm
Height: 150 mm
Total depth: 77 mm

Applied technical standards:

DIN EN 50178, 1998-04
DIN EN 61326-1, 2013-07
IEC 61000-3/4
DIN EN 61010-1

Electrical connections:

U_H + U_H - 0 (Ground) I_A
Plug-in terminal
Connection cross-sections: 0.2 … 1.5 mm²
Stripping length: 10mm

Technical data:	
Measuring range:	0…1,500 A DC / AC I_{eff} (rated current ranges adjusted to standard values according to IEC)
Frequency range:	DC or 16.7 Hz ... 100 kHz, greater than 400 Hz only small signal
Current output with AC input signal:	AC: 0 … 300 mA I_{eff}
Current output with DC input signal Max. load resistance at current output:	DC: 0 … ± 300mA $R_B \leq 3\ \Omega$* (U_H = 24 V DC)
Accuracy:	± 0.5%
Max. operating voltage U_m:	0.72 kV, U_{eff}
Insulation test voltage:	. 6.4 kV, U_{eff}, 50 Hz, 12 sec., primary conductor against measuring output / housing
Auxiliary voltage:	± 24 V DC, ± 10%, external fuse protection via one 300 mA fine-wire fuse each
Step response time (90 % I_{PN}, di/dt = 100 A / µs):	≤ 1 µs
Signal slew rate di/dt:	> 100 A / µs
Insulation material class:	E
Protection class:	IP 20
Permitted altitude for operation:	≤ 2000 m (DIN EN 61010-1)
Max. temperature of the primary conductor:	100 °C
Working temperature range:	-25 °C < T_U < +60 °C, 0 ... 95% rel. humidity, no condensation!
Storage temperature range:	-50 °C < T_L < +90 °C

* The measurement output must not be operated open!

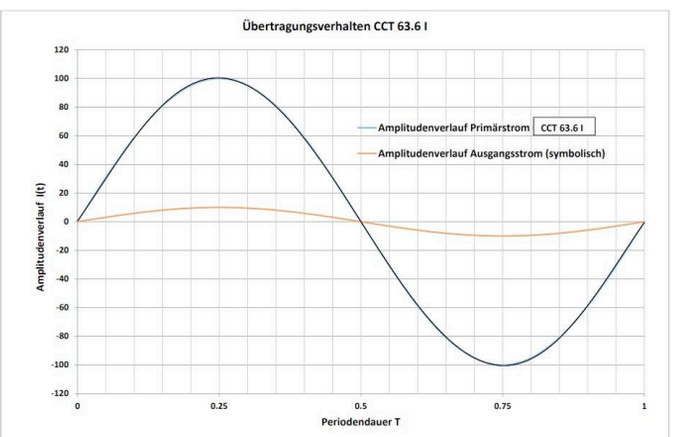
Functions of the CCT 63.6 I:

- The magnetic field surrounding a current-carrying conductor is detected by a measuring core surrounding the conductor. The magnetic flux induced in the measuring core, which is directly proportional to the current strength in the primary conductor, is detected by means of a semiconductor component. An electronic control unit integrated in the unit converts the signal supplied by the semiconductor into an output current signal directly proportional to the time curve of the measured variable.
- The inductive, contactless acquisition of the measured variable provides an electrically isolated output signal.
- The electrical contact of the secondary circuit of the current transformer is made via an 8-pole plug-in terminal. This terminal is suitable for connecting flexible stranded wires up to 1.5 mm².
- A bipolar DC auxiliary power supply of ± 24 V DC is required to supply the control electronics. The auxiliary voltage inputs must be protected by a 300 mA / 250 V / F fine-wire fuse.

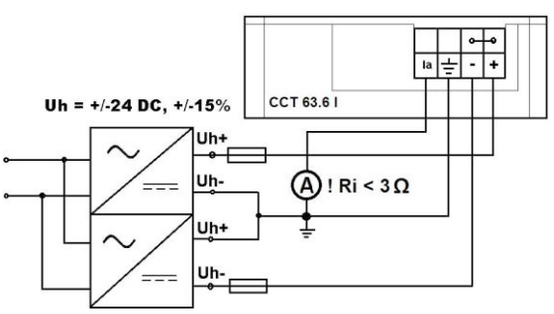
Advantages and benefits of the CCT 63.6 I:

- Measurement of both direct and alternating currents is possible with only one transformer.
- Wide working frequency range from 0 Hz (DC) to 100 kHz (AC).
- High electrical safety due to galvanically isolated acquisition of the measured variable.
- Low power consumption (≤ 2.5 VA)
- Simple and safe electrical wiring using proven plug-in terminal technology.
- Direct mounting on busbars by means of fixing screws integrated in the unit.
- High climatic and mechanical resistance due to PU encapsulation of all electrical components.

Transmission behaviour of the CCT 63.6 I:



Wiring diagram of the CCT 63.6 I:

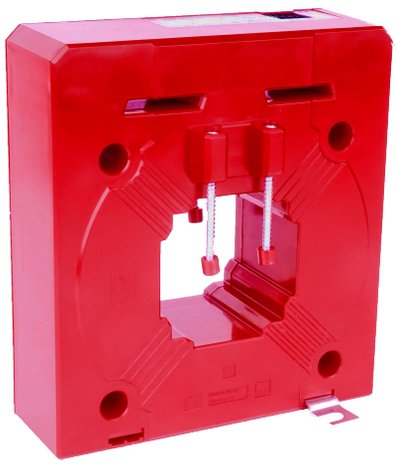


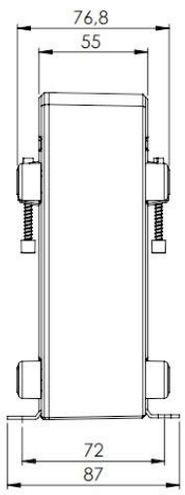
Ordering table

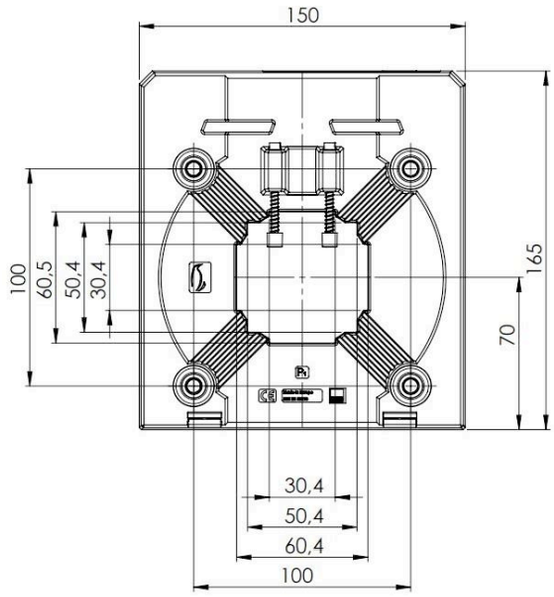
Type	Primary current [A] DC / AC (I_{eff})	Article number	Output signal
CCT 63.6 I	1500	1301-10006	DC: 0 … ± 300mA AC: 0 … 300 mA I_{eff}

CCT 63.6 RMS (**C**ompensation **c**urrent **t**ransformer, MBS universal current sensor)
Current transformer for measuring both direct and alternating currents

- For current measurement of non-sinusoidal and distorted (constant)networks
- As current transducer for direct input wiring of PLC input cards







Dimensions:	**Applied technical standards:**	**Electrical connections:**
Rail 1: 60x30 mm Rail 2: 50x50 mm Round conductors: 50 mm Width: 165 mm Height: 150 mm Total depth: 77 mm	DIN EN 50178, 1998-04 IEC 61000-3/4 DIN EN 61010-1, 2002 DIN EN 61326-1, 2013-07	U_H + U_H - 0 (Ground) I_A Plug-in terminal Connection cross-sections: 0.2 … 1.5 mm² Stripping length: 10mm

Technical data:	
Measuring range:	0 ... 1,500 A DC / 0 ... 1,500 A I_{RMS} AC, depending on variant! (rated current ranges adjusted to standard values according to IEC)
Frequency range:	DC or 16.7 Hz ... 6 kHz, crest factor ≤ 4
Power output:	4 … 20 mA DC, true effective value measurement
Max. load resistance at current output:	R_B ≤ 500 Ω (U_H = ± 24 V DC)
Output signal limitation in case of overload:	< 30 mA
Accuracy:	± 1.0%
Max. operating voltage U_m:	0.72 kV, U_{eff}
Insulation test voltage:	6.4 kV, U_{eff}, 50 Hz, 12 sec., primary conductor against measuring output / housing
Auxiliary voltage:	± 24 V DC, ± 10%, external fuse protection via one 300 mA fine-wire fuse each
Step response time (90 % I_{PN}, di/dt = 100 A / µs):	≤ 200 ms
Signal slew rate di/dt:	> 100 A / µs
Insulation material class:	E
Protection class:	IP 20
Permitted altitude for operation:	≤ 2000 m (DIN EN 61010-1)
Max. temperature of the primary conductor:	100 °C
Working temperature range:	-25 °C < T_U < +60 °C, 0 ... 95% rel. humidity, no condensation!
Storage temperature range:	-50 °C < T_L < +90 °C

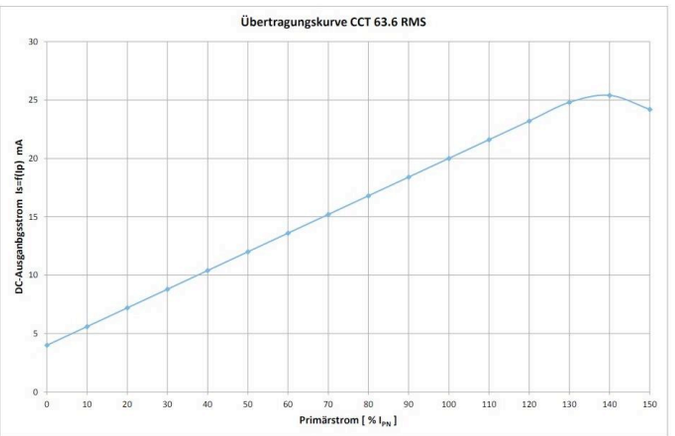
Functions of the CCT 63.6 RMS:

- The magnetic field surrounding a current-carrying conductor is detected by a measuring core surrounding the conductor. The magnetic flux induced in the measuring core, which is directly proportional to the current strength in the primary conductor, is detected by means of a semiconductor component. An electronic control unit integrated in the unit converts the signal supplied by the semiconductor into a DC output current signal proportional to the true effective value of the measured variable. The true effective values are calculating using the delta-sigma method.
- The inductive, contactless acquisition of the measured variable provides an electrically isolated output signal.
- The electrical contact of the secondary circuit of the current transformer is made via an 8-pole plug-in terminal. This terminal is suitable for connecting flexible stranded wires up to 1.5 mm².
- A bipolar DC auxiliary power supply of ± 24 V DC is required to supply the control electronics. The auxiliary voltage inputs must be protected by a 300 mA / 250 V / F fine-wire fuse.

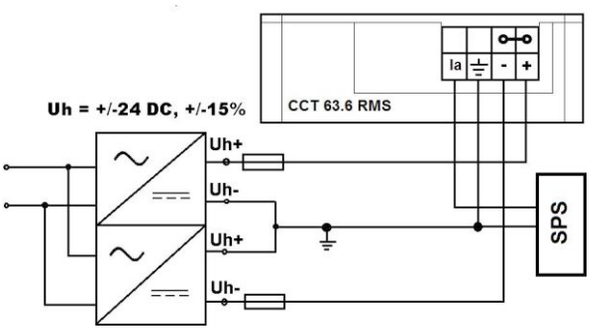
Advantages and benefits of the CCT 63.6 RMS:

- Measurement of both direct and alternating currents is possible with only one transformer.
- Accurate calculation of the true effective values of almost any time curve of the current to be measured.
- Wide working frequency range from 0 Hz (DC) to 20 Hz ... 6 kHz (AC).
- High electrical safety due to galvanically isolated acquisition of the measured variable.
- Low power consumption (≤ 2.5 VA)
- Simple and safe electrical wiring using proven plug-in terminal technology.
- Direct mounting on busbars by means of fixing screws integrated in the unit.
- High climatic and mechanical resistance due to PU encapsulation of all electrical components.

Transmission behaviour of the CCT 63.6 RMS:



Wiring diagram of the CCT 63.6 RMS:



Ordering table

Type	Primary current I_{RMS} [A]	Article number	Output signal
CCT 63.6 RMS	2000	1303-10006	4 … 20 mA DC

SWMU 31.5

Measuring transducer for alternating current

with or without auxiliary power supply
with integrated current transformer
housing unit for 35 mm DIN rail

Features/benefits
- measuring input: Sinus-shaped AC current (1 A … 750 A),
- arithmetical mean value measurement, effective value calibrated
- measuring output: Unipolar output signal
- measuring principle: Rectifier process
- with integrated current transformer
- minimal wiring

Application
Measuring transducers for the transformation of sinus-shaped AC current. For an output signal a load-independent DC current / and an imprinted DC voltage signal is available, which stands proportionally to the measurement value of the input volume.
These signals can be used for display, recording, monitoring and/or control function.
The measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMV) and security (IEC 1010 and EN 61010).

Technical data SWMU 31.51/52 SWMU 32.51/52

measuring input	
nominal frequency	f_N 50/60 Hz
rated input current I_N	
SWMU 31.52	1…10 A
SWMU 31.51	15…750 A
consumption	≤ 1 VA (2.5 VA without auxiliary voltage)
overload capacity	1.5 · I_N, constant 8 · I_N, 40 sec.
measuring output	
load-independent DC current	0…20 mA or 4…20 mA*
max. burden resistance	≤ 500 Ω
max. burden voltage	≤ 15V
current limit under overload	≤ 34 mA
imprinted DC voltage	0…10 V or 2…10 V*
burden resistance	≥ 10 kΩ
max. burden voltage under overload	≤ 18 V
voltage limit	≤ 18 V
residual ripple of the output current	≤ 1% p.p.
response time	≤ 500 ms
operating temperature range	-5° C ≤ ϑ ≤ +40° C

auxiliary power	
AC power supply	230 V ± 10% (50…60 Hz)
DC	24 V ± 15%
power input	≤ 1.5 W (2.5 VA)
accuracy	
reference value	output end value
accuracy class	class 0.5
warming-up time	≤ 5 min.
protection	
electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
contamination class	2
test voltages (DIN 57411)	4 kV, active circuits against housing 4 kV, auxiliary voltage against measuring output (230 V AC-version) 500 V, auxiliary voltage against measuring output (24 V DC-version)

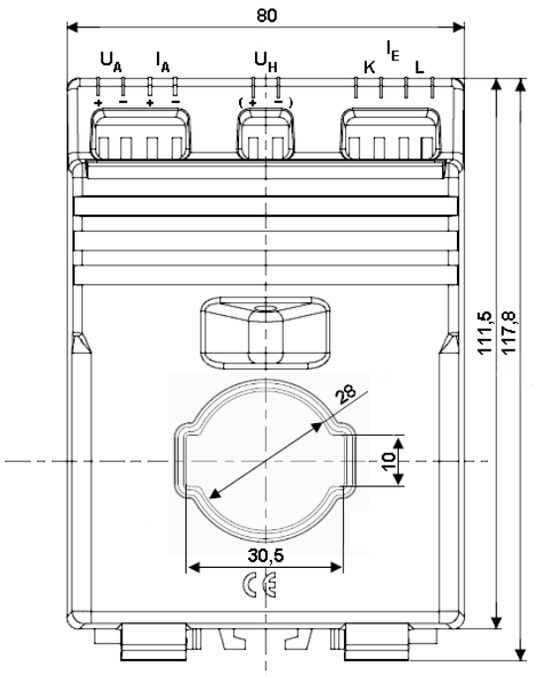
*Live-Zero only with auxiliary power

Please note: Mounting base for direct fitting without use of 35mm DIN rail included in the deliveries

1. Auxiliary power supply 230 V AC

Type SWMU	Primary current [A]	Measuring output			
		0…20mA and 0…10V	4…20mA and 0…10V	0…20mA and 2…10V	4…20mA and 2…10V
31.52	1	31-1006	31-2006	31-3006	31-4006
	5	31-1007	31-2007	31-3007	31-4007
	10	31-1008	31-2008	31-3008	31-4008
31.51	15	31-1009	31-2009	31-3009	31-4009
	20	31-1010	31-2010	31-3010	31-4010
	25	31-1011	31-2011	31-3011	31-4011
	30	31-1012	31-2012	31-3012	31-4012
	40	31-1013	31-2013	31-3013	31-4013
	50	31-1014	31-2014	31-3014	31-4014
	60	31-1015	31-2015	31-3015	31-4015
	75	31-1016	31-2016	31-3016	31-4016
	100	31-1017	31-2017	31-3017	31-4017
	150	31-1018	31-2018	31-3018	31-4018
	200	31-1019	31-2019	31-3019	31-4019
	250	31-1020	31-2020	31-3020	31-4020
	300	31-1021	31-2021	31-3021	31-4021
	400	31-1022	31-2022	31-3022	31-4022
	500	31-1023	31-2023	31-3023	31-4023
	600	31-1024	31-2024	31-3024	31-4024
	750	31-1025	31-2025	31-3025	31-4025

measuring frequency 50/60 Hz
weight: 350 g



Depth: 50 (72) mm

2. Auxiliary power supply 24 V DC

Type SWMU	Primary current [A]	Measuring output			
		0…20mA and 0…10V	4…20mA and 0…10V	0…20mA and 2…10V	4…20mA and 2…10V
31.52	1	31-5006	31-6006	31-7006	31-8006
	5	31-5007	31-6007	31-7007	31-8007
	10	31-5008	31-6008	31-7008	31-8008
31.51	15	31-5009	31-6009	31-7009	31-8009
	20	31-5010	31-6010	31-7010	31-8010
	25	31-5011	31-6011	31-7011	31-8011
	30	31-5012	31-6012	31-7012	31-8012
	40	31-5013	31-6013	31-7013	31-8013
	50	31-5014	31-6014	31-7014	31-8014
	60	31-5015	31-6015	31-7015	31-8015
	75	31-5016	31-6016	31-7016	31-8016
	100	31-5017	31-6017	31-7017	31-8017
	150	31-5018	31-6018	31-7018	31-8018
	200	31-5019	31-6019	31-7019	31-8019
	250	31-5020	31-6020	31-7020	31-8020
	300	31-5021	31-6021	31-7021	31-8021
	400	31-5022	31-6022	31-7022	31-8022
	500	31-5023	31-6023	31-7023	31-8023
	600	31-5024	31-6024	31-7024	31-8024
	750	31-5025	31-6025	31-7025	31-8025

measuring frequency 50/60 Hz
weight: 250 g

3. Without power supply

Type SWMU	Primary current [A]	Measuring output
		0…20mA and 0…10V
32.52	1	31-9006
	5	31-9007
	10	31-9008
32.51	40	31-9013
	50	31-9014
	60	31-9015
	75	31-9016
	100	31-9017
	150	31-9018
	200	31-9019
	250	31-9020
	300	31-9021
	400	31-9022
	500	31-9023
	600	31-9024
	750	31-9025

power requirements $P_E \geq 2,5$ VA !
measuring frequency 50/60 Hz
weight 600g
operating range 15 … 120 % I_N

SWMU 41.5

Measuring transducer for alternating current

with or without auxiliary power supply
with integrated current transformer
housing unit for 35 mm DIN rail

Features/benefits

- measuring input: Sinus-shaped AC current (1 A … 800 A),
- arithmetical mean value measurement, effective value calibrated
- measuring output: Unipolar output signal
- measuring principle: Rectifier process
- with integrated current transformer
- minimal wiring

Application

Measuring transducers for the transformation of sinus-shaped AC current. For an output signal a load-independent DC current / and an imprinted DC voltage signal is available, which stands proportionally to the measurement value of the input volume.
These signals can be used for display, recording, monitoring and/or control function.
The measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMV) and security (IEC 1010 and EN 61010).

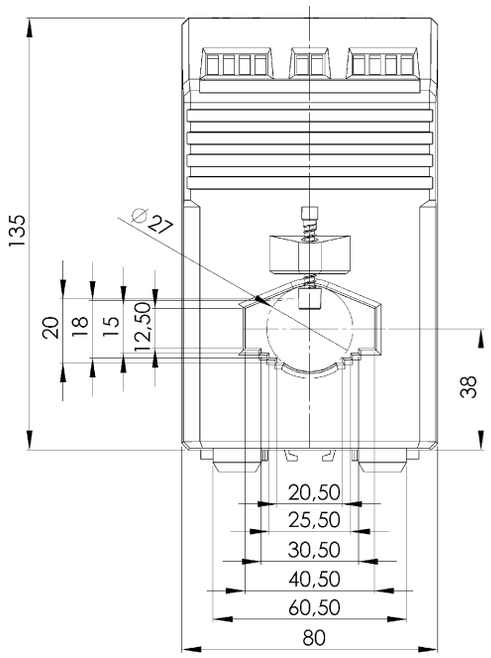
Technical data SWMU 41.51/52 SWMU 42.51/52

measuring input		**auxiliary power**	
nominal frequency	f_N 50/60 Hz	AC power supply	230 V ± 10% (50…60 Hz)
rated input current I_N		DC	24 V ± 15%
SWMU 41.52	1…10 A	power input	≤ 1.5 W (2.5 VA)
SWMU 41.51	15…800 A	**accuracy**	
consumption	≤ 1 VA (2.5 VA without auxiliary voltage)	reference value	output end value
		accuracy class	class 0.5
overload capacity	1.5 · I_N, constant 8 · I_N, 40 sec.	warming-up time	≤ 5 min.
		protection	
measuring output		electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
load-independent DC current	0…20 mA or 4…20 mA*		
max. burden resistance	≤ 500 Ω		
max. burden voltage	≤ 15V	contamination class	2
current limit under overload	≤ 34 mA	test voltages (DIN 57411)	4 kV, active circuits against housing 4 kV, auxiliary voltage against measuring output (230 V AC-version) 500 V, auxiliary voltage against measuring output (24 V DC-version)
imprinted DC voltage	0…10 V or 2…10 V*		
burden resistance	≥ 10 kΩ		
max. burden voltage under overload	≤ 18 V	*Live-Zero only with auxiliary power	
voltage limit	≤ 18 V		
residual ripple of the output current	≤ 1% p.p.		
response time	≤ 500 ms	Please note: Mounting base for direct fitting without use of 35mm DIN rail included in the deliveries	
operating temperature range	-5° C ≤ ϑ ≤ +40° C		

1. Auxiliary power supply 230 V AC

Type SWMU	Primary current [A]	Measuring output			
		0…20mA and 0…10V	4…20mA and 0…10V	0…20mA and 2…10V	4…20mA and 2…10V
41.52	1	61006	62006	63006	64006
	5	61007	62007	63007	64007
	10	61008	62008	63008	64008
41.51	15	61009	62009	63009	64009
	20	61010	62010	63010	64010
	25	61011	62011	63011	64011
	30	61012	62012	63012	64012
	40	61013	62013	63013	64013
	50	61014	62014	63014	64014
	60	61015	62015	63015	64015
	75	61016	62016	63016	64016
	100	61017	62017	63017	64017
	150	61018	62018	63018	64018
	200	61019	62019	63019	64019
	250	61020	62020	63020	64020
	300	61021	62021	63021	64021
	400	61022	62022	63022	64022
	500	61023	62023	63023	64023
	600	61024	62024	63024	64024
	750	61025	62025	63025	64025
	800	61026	62026	63026	64026

measuring frequency 50/60 Hz
weight: 350 g



Depth: 50 (72) mm

2. Auxiliary power supply 24 V DC

Type SWMU	Primary current [A]	Measuring output			
		0…20mA and 0…10V	4…20mA and 0…10V	0…20mA and 2…10V	4…20mA and 2…10V
41.52	1	65006	66006	67006	68006
	5	65007	66007	67007	68007
	10	65008	66008	67008	68008
41.51	15	65009	66009	67009	68009
	20	65010	66010	67010	68010
	25	65011	66011	67011	68011
	30	65012	66012	67012	68012
	40	65013	66013	67013	68013
	50	65014	66014	67014	68014
	60	65015	66015	67015	68015
	75	65016	66016	67016	68016
	100	65017	66017	67017	68017
	150	65018	66018	67018	68018
	200	65019	66019	67019	68019
	250	65020	66020	67020	68020
	300	65021	66021	67021	68021
	400	65022	66022	67022	68022
	500	65023	66023	67023	68023
	600	65024	66024	67024	68024
	750	65025	66025	67025	68025
	800	65026	66026	67026	68026

measuring frequency 50/60 Hz
weight: 250 g

3. Without auxiliary power supply

Type SWMU	Primary current [A]	Measuring output
		0…20mA and 0…10V
42.52	1	69006
	5	69007
	10	69008
42.51	40	69013
	50	69014
	60	69015
	75	69016
	100	69017
	150	69018
	200	69019
	250	69020
	300	69021
	400	69022
	500	69023
	600	69024
	750	69025
	800	69026

power requirements $P_E \geq 2,5$ VA!
measuring frequency 50/60 Hz
weight: 600g
operating range 15 … 120 % I_N

NMC

Measuring transducer for AC currents

Clip-on measuring transducer for MBS current transformers in modular construction. Versions with (NMC 2/3/4) or without auxiliary voltage supply (NMC 0).

Features/benefits

- Measuring input: Sinus-shaped AC current (1 A or 5 A), arithmetical mean value measurement, effective value calibrated
- Measuring output: Unipolar output signal
- Measuring principle: Rectifier process
- Direct notching with MBS current transformers through contact studs
- Economic wiring

Application

Measuring transducers for the transformation of sinus-shaped AC current. For an output signal a load-independent DC current and in imprinted DC voltage signal is available, which stands proportionally to the measurement value of the input volume.
These signals can be used for display, recording, monitoring and or control function. Simultaneously, the secondary current of the current transformer can be utilized to operate conventional needle instruments.
The measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMC) and security (IEC 1010 and EN 61010).
This measuring transducer has been designed, produced and tested in accordance with ISO 9001.

Technical data

Measuring input	
Nominal frequency f_N	50/60 Hz
Rated input current I_N	1 A or 5 A
Power input from measuring circuit	≤ 1 VA (2.5 VA w/o auxiliary voltage
Overload capacity	1.2 · I_N, constant 8 · I_N, 40 sec.
Measuring output	
Load-independent DC current	0 (4) … 20 mA
max. burden resistance	≤ 500 Ω
max. burden voltage	≤ 15V
Current limit under overload	≤ 34 mA
Residual ripple of the output current	≤ 1 % p.p.
Imprinted C voltage	0 (2) … 10 V
min. burden resistance	≥ 10 kΩ
max. burden voltage under overload	≤ 18 V
Response time	< 500 ms

Accuracy	
Reference value	Output end value
Accuracy class	0.5 %
Accuracy range	1 … 120 % I_N (NMC 2/3/4) 15 … 120 % I_N (NMC 0)
Warming-up time	≤ 5 min.
Auxiliary power	
AC power supply	230 V ± 10% (50…60 Hz) or 110 V ± 10% (50…60 Hz)
DC	24 V ± 15%
Power input	≤ 1.5 W (2.5 VA)
Protection	
Electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, Connection terminals (Test digit, EN 60529)
Contamination class	2
Test voltages (DIN 57411)	4 kV, active circuits against housing 4 kV, auxiliary voltage against measuring output (230 V AC-version) 500 V, auxiliary voltage against measuring output (24 V DC-version)

NMC measuring transducer for sinus-shaped alternating currents, for clip-on onto MBS current transformer (rectifier-mean value measurement)

Auxiliary power supply 24 V DC, galvanically separated

Type NMC (2)	Measuring outputs			Primary current [A]	Suitable for CTs in the product range
	0…20 mA and 0…10 V	4…20 mA and 0…10 V	4…20 mA and 2…10 V		
211	39212	39232	39252	1	A
212	39213	39233	39253	1	B
213	39214	39234	39254	1	C
214	39215	39235	39255	1	D
221	39012	39032	39052	5	A
222	39013	39033	39053	5	B
223	39014	39034	39054	5	C
224	39015	39035	39055	5	D

Nominal frequency 50/60 Hz; Weight: 80 g; Operating range 0 … 120 % I_N

Auxiliary power supply 230 V AC, galvanically separated

Type NMC (3)	Measuring outputs			Primary current [A]	Suitable for CTs in the product range
	0…20 mA and 0…10 V	4…20 mA and 0…10 V	4…20 mA and 2…10 V		
311	36212	36232	36252	1	A
312	36213	36233	36253	1	B
313	36214	36234	36254	1	C
314	36215	36235	36255	1	D
321	36041	36032	36052	5	A
322	36042	36033	36053	5	B
323	36043	36034	36054	5	C
324	36044	36035	36055	5	D

Nominal frequency 50/60 Hz; Weight: 80 g; Operating range 0 … 120 % I_N

Auxiliary power supply 110 V AC, galvanically separated

Type NMC (4)	Measuring outputs			Primary current [A]	Suitable for CTs in the product range
	0…20 mA and 0…10 V	4…20 mA and 0…10 V	4…20 mA and 2…10 V		
411	76212	76232	76252	1	A
412	76213	76233	76253	1	B
413	76214	76234	76254	1	C
414	76215	76235	76255	1	D
421	76012	76032	76052	5	A
422	76013	76033	76053	5	B
423	76014	76034	76054	5	C
424	76015	76035	76055	5	D

Nominal frequency 50/60 Hz; Weight: 80 g; Operating range 0 … 120 % I_N

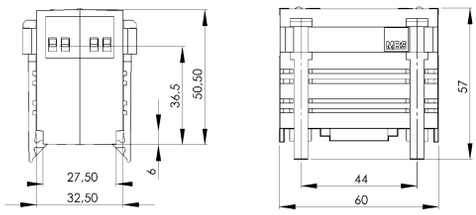
Without auxiliary power supply, power requirement ≥ 2.5 VA

Type NMC (0)	Measuring outputs	Primary current [A]	Suitable for CTs in the product range
	0…20 mA and 0…10 V		
011	37212	1	A
012	37213	1	B
013	37214	1	C
014	37215	1	D
021	37012	5	A
022	37013	5	B
023	37014	5	C
024	37015	5	D

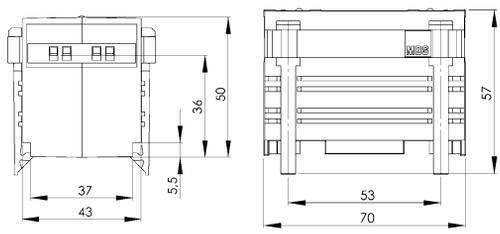
Nominal frequency 50/60 Hz; Weight: 80 g; Operating range 15…120 % I_N

Drawings

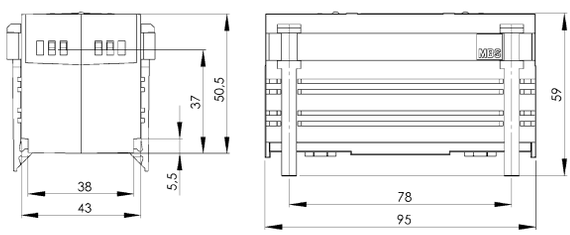
Construction type „A“

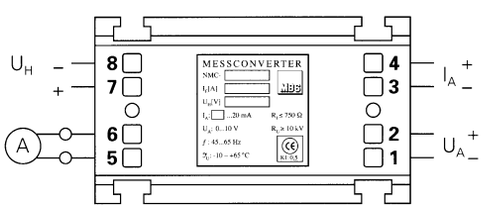


Construction type „B“ / „C“



Construction type „D“





Comment: The dimensions of the measuring transducer are relevant only for the adaption to the existing current transformer construction types. All units consist of the same electronic modules.

NMC selection chart

Primary current [A]	Construction type														
	A						B	C			D				
1						WSK 30	WSK 40								
5															
10															
15															
20															
25															
30										ASK 421.4					
40				ASR 22.3	ASK 21.3										
50			ASK 31.3					ASK 41.4	ASK 412.4						
60		ASK 318.3													
75															
80															
100	ASK 41.3 (sec. 1 A up to 300 A)														
125															
150											ASK 61.4				
200															
250												ASK 63.4			
300															
400													ASK 81.4		
500															
600														ASK 101.4	
750															ASK 105.6
800															
1000															
1200															
1250															
1500															
1600															
2000															
2500															
3000															

NMC-AD

Adaptor for current transformers of any make to clip onto 35 mm DIN rail

Features/benefits

- Accomodation of any make of current transformers in connection with transducers of type NMC
- Direct mounting of measuring transducer, in visual devision to the measuring point, onto a standard 35 mm DIN rail

Art.-no.	Application with NMC art.-no.
36011	39xx2; 36xx1/2; 37xx2; 76xx2

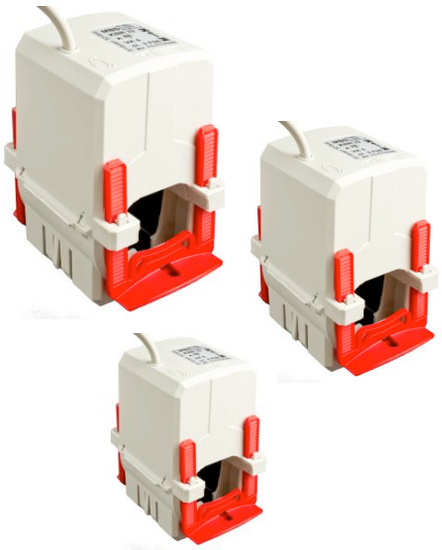
Connection	Description
6, 7	Incoming terminals 5 A or 1 A (sourced from current transformer)

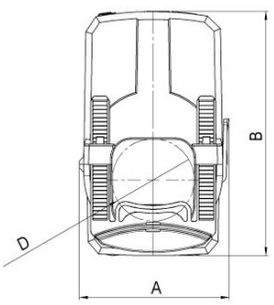
Short circuit adaptor NMC-KSx

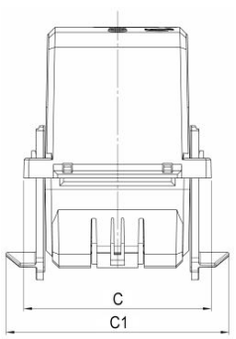
Application

Adaptors of type NMC-KSx are clipped onto current transformers. When the secondary circuit of a current transformer is not being energized the adaptors prevent idling of the transformer, and thus the occurrence of high neutral voltages in the nominal current of the current transformer.

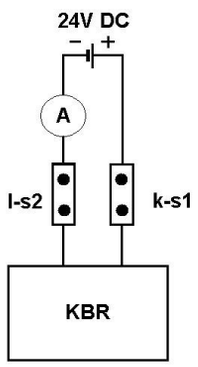
Type NMC-KSx	Art.-no.	Applicable with MBS current transformer types													Drawing
		WSK 30	WSK 40	ASR 22.3	ASK 21.3	ASK 31.3	ASK 41.3	ASK 41.4	ASK 421.4	ASK 61.4	ASK 63.4	ASK 81.4	ASK 101.4	ASK 105.6	
0	39090	•		•	•	•	•								A
1	39091		•												B / C
2	39092							•	•						B / C
3	39093									•	•	•	•	•	D







Wiring diagram of the KBR 32 + 44
With DC output current 4…20 mA



Split-core current transformer, type KBR

With voltage output 0…333 mV or
with DC current output 4…20 mA DC

Features / benefits
- Perfect for subsequent assembly into already existing installations
- Due to the „click"-system even a one-hand mounting is possible
- Deliverable as a current sensor (0…333 mV) or measuring transducer (4…20 mA DC) or with AC secondary current 5 A / 1 A.
- Auxiliary power supply via output circuit (2-wire connection)
- Three different construction types

Available measuring ranges

KBR 18 (Inner diameter: 18.5 mm):
- Primary current: 50 – 250 A
- Voltage output: 0…333 mV
- Accuracy class 1

KBR 32 (Inner diameter: 32.5 mm):
- Primary current: 100 – 600 A
- Current or voltage output: 4…20 mA DC or 0…333 mV
- Accuracy class 1

KBR 44 (Inner diameter: 44 mm):
- Primary current: 250 – 1000 A
- Current or voltage output: 4…20 mA DC or 0…333 mV
- Accuracy class 1

General technical specifications
- Length of connection cable: 0…333 mV: 2.5 m, cross section 2x0.75 mm²
  4…20 mA: 2.5 m, cross section 2x0.75 mm²
  (Other lengths are possible on request)
- Operating temperature: -5°C < T < +50°C
- Storage temperature: -25°C < T < +70°C
- Therm. nominal continuous rated current I_{cth}: 1.2 x I_N
- Therm. nominal short-time current I_{th}: 60 x I_N, 1 sec.
- Max. operating voltage U_m: 0.72 kV
- Isolation test voltage: 3 kV, U_{eff}, 50 Hz, 1 min.
- Rated frequency: 50 Hz
- Isolation class: E
- Applicable technical standard: DIN EN 61869, part 1 + 2

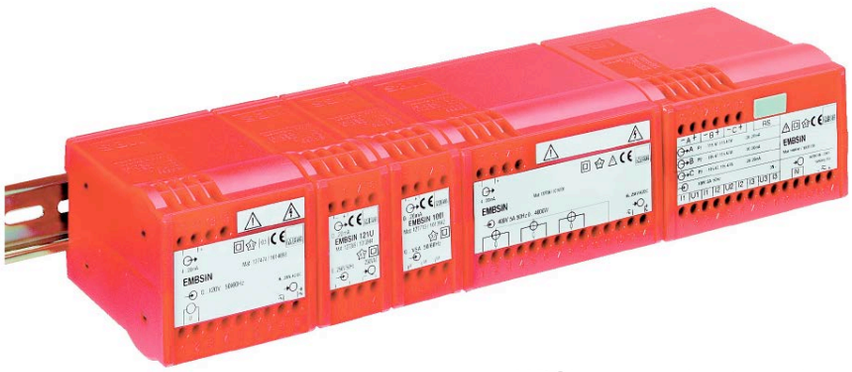
Dimensions

Type	A (width) [mm]	B (height) [mm]	C / C1 (depth) [mm]	D (diameter) [mm]
KBR 18	41.6	64.5	55 / 67.3	18.5
KBR 32	59.2	96.4	75 / 89.2	32.5
KBR 44	72.2	120.6	85 / 98.1	44

Technical characteristics for the KBR with output signal 4…20 mA:
- 2-wire connection, auxiliary power via output circuit
- Auxiliary power: 24 V DC ± 15 %, P_V = max. 1 VA
- Load-independent DC current: Live-zero, 4…20 mA
- External resistance: max. 300 Ω
- Current limit under overload: < 30 mA
- Residual ripple of the output current: ≤ 1 % p.p.
- Response time: < 300 ms

EMBSIN

Measuring transducers for electrical variables



MBS's measuring transducers of the type EMBSIN transforms an input alternating voltage and/or an input alternating current, received as a standard signal from a current transformer, – or voltage transformer, or from the power system, into a load imprinted output voltage.

The various EMBSIN units are arranged to collate all measuring variables, which are necessary to monitor and to control, the power supply and consumption, to display the output signals, or to accept these into other units of the measuring- and control technic.

Several units such as indicators, recorders or signal processing systems can be connected to the output. The transducer's configuration assures a safe division for all functions for a galvanic separation between inputs and outputs. The most important applications for the transducers are in the generation and distribution of energy, in the manufacturing industry, and panel building enterprises.

The transducers have been developed upon an intirely new housing technology concept and are available in 5 different sizes.

The housing material made of high quality polycarbonate are **free of silicon as well as halogen** and, are flame resistant. High quality screw terminals are provided for the safe connections of inputs and outputs. Fitment onto the base wall is made with a 35 mm DIN rail. All electrical connections are made at the top of the units for safe and easy access.

The transducers bear the CE symbol. This symbol provides the highest level of protection for humans, the machine, as well as the environment, and of course, comply with all applicable safety regulations.

MBS's production of high current measuring transducers, made of the finest quality enjoy a long tradition and a distinguished worldwide reputation.

The encapsuled housing design, the carefully chosen material and the construction principles, contribute that the measuring transducers are protected against climatic conditions (temperature and humidity), atmospheric conditions (chemical processes, dust and salt), vibration and shocks, interruptions (electrical or mechanical), HF interferences (communications) as well as permanent or transient interference voltages on all electrical connections.

• Compact • Safety • Easy to use • Accurate • Better

Safety
EN 61010 also on the terminals!
690 V max. input voltage
Hosing material: Polycarbonate
Fire resistance class: V-0 acc. to UL94
(self-extinguishing, halogen- free, silicon-free)

Easy to use
Units with two wide-end auxiliary power ranges
24…65 V AC/DC or 85…230 V AC/DC
Auxiliary power, to be connected either on the top or on the bottom
cos φ or linear recalibrating can be synchronized without opening the unit and without AC calibrators!
Mounting onto 35mm DIN rail
Operating instructions are included

Compact

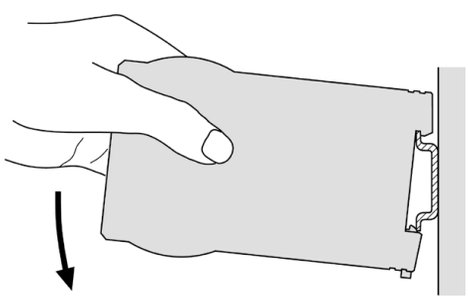
Height	60 mm	
Depth	112 mm	
Width	105 mm for	power,
	70 mm for	frequency and phase as well as *U* and *I* with wide-range auxiliary power,
	35 mm with	two-wire feed 24 V DC or 230 V AC
	35 mm for	current and voltage without auxiliary power supply

Accuracy

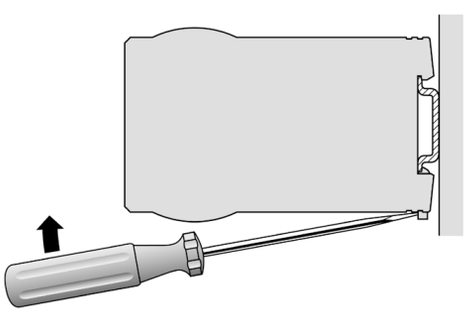
All units	class 0.5
EMBSIN 241 F	class 0.2
EMBSIN 241 FD	class 0.2

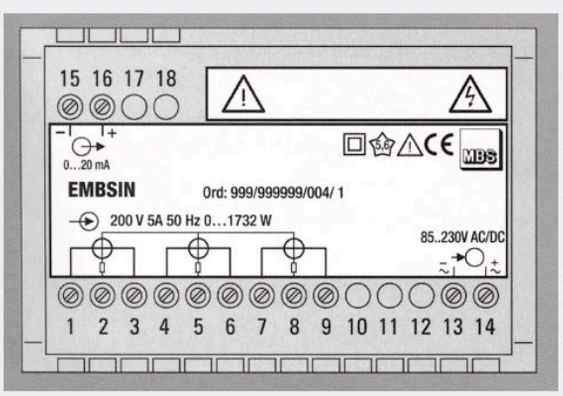
Better
Highest quality and safety at very competitive prices!

Assembly

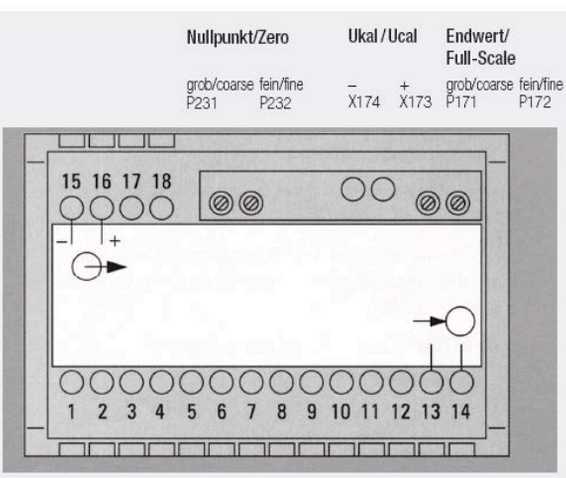


Dismantling





Praxisgerecht



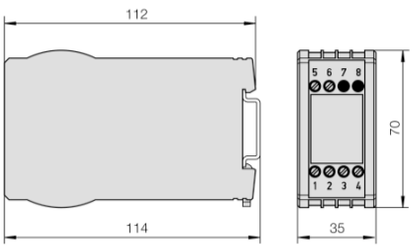
Intermediate circuit calibration

EMBSIN 100 I

Measuring transducer for AC current

Features / benefits

- Without auxiliary voltage supply
- With two measuring ranges (selectable at terminals)
- Housing for 35mm DIN rail mounting
- Measuring input: Sinus-shaped alternating current (0…1/5 A or 0…1.2/6 A, selectable at terminals), arithmetical mean value measurement, effective value calibration
- Measuring output: Unipolar output signal
- Measuring principle: Rectifier mean value measurement process
- Economic wiring



Application

Measuring transducer for the transformation of sinus-shaped alternating current.
A load-independent DC signal which is proportional to the measurement value serves as an output signal, and allows for display, recording, monitoring and/or control functions.
This measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMC) and safety (IEC 1010 and EN 61010).
These measuring transducers are designed for indoor use only.

Technical data

Measuring input	
Rated frequency f_N	50/60 Hz
Rated input current I_N	1 / 5 A or 1.2 / 6 A (selectable at terminal)
Consumption	≤ 2.5 VA
Overload capacity	1.2 · I_N, constant 20 · I_N, 1 sec.
Measuring output	
Load-independent DC current	0…5 mA, 0…10mA or 0…20 mA
Max. burden voltage	≤ 15 V
Voltage limit by R_{EXT} = ∞	≤ 30 V
Current limit under overload	≤ 34 mA
Residual ripple of the output current	≤ 1 % p.p.
Response time	< 500 ms
Accuracy	
Reference value	Output end value
Accuracy class	Class 0.5
Measuring range	0…100 % I_N

Temperature influence (-10 … +55 °C)	0.2 % / 10 K
Operating temperature	-10 °C up to +55 °C
Storage temperature	-40 °C up to +70 °C
Safety	
Protection class	II (protection isolated, DIN EN 61010)
Electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
Contamination class	2
Overvoltage category	III
Nominal isolation voltage (to earth)	250 V, input 40 V, output
Test voltages	50 Hz, 1 min., EN 61010-1 3.7 kV, rms, Measuring input against measuring output and exterior surface 490 V, Measuring output against exterior surface
Weight	270 g

Order lists

EMBSIN 100 I – Measuring transducer for AC current, without auxiliary power supply

Features	Order no.					
EMBSIN 100 I, Measuring transducer for AC current Order no.: 100 I – Mxxxx	100 I –	M	X	X	X	X
1. Construction Housing MBS for 35 mm DIN rail		M				
2. Measuring range 0...1/5 A			1			
0...1.2/6 A			2			
9 Nonstandard (A), 0...0.5 A up to 0...7.5 A (only one measuring range!) _____ A			9			
3. Output signal 0...5 mA, $R_a \leq 3$ kΩ				1		
0...10 mA, $R_a \leq 1{,}5$ kΩ				2		
0...20 mA, $R_a \leq 750$ Ω				3		
4. Measuring range adjustable Measuring range fixed					0	
Measuring end value adjustable approx. ±10 %					1	
5. Test certificates without test certificate						0
with test certificate in German						D
with test certificate in English						E

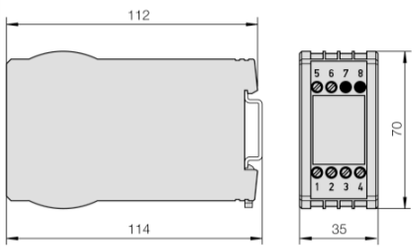
Rated frequency of the measuring signal: 50/60 Hz

EMBSIN 100 I

Measuring transducer for AC current

Features / benefits

- Without auxiliary voltage supply
- With two measuring ranges (selectable at terminals)
- Housing for 35mm DIN rail mounting
- Measuring input: Sinus-shaped alternating current (0…1/5 A or 0…1.2/6 A, selectable at terminals), arithmetical mean value measurement, effective value calibration
- Measuring output: Unipolar output signal
- Measuring principle: Rectifier mean value measurement process
- Economic wiring



Application

Measuring transducer for the transformation of sinus-shaped alternating current.
A load-independent DC signal which is proportional to the measurement value serves as an output signal, and allows for display, recording, monitoring and/or control functions.
This measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMC) and safety (IEC 1010 and EN 61010).
These measuring transducers are designed for indoor use only.

Technical data

Measuring input	
Rated frequency f_N	50/60 Hz
Rated input current I_N	1 / 5 A or 1.2 / 6 A (selectable at terminal)
Consumption	≤ 2.5 VA
Overload capacity	1.2 · I_N, constant 20 · I_N, 1 sec.
Measuring output	
Load-independent DC current	0…5 mA, 0…10mA or 0…20 mA
Max. burden voltage	≤ 15 V
Voltage limit by R_{EXT} = ∞	≤ 30 V
Current limit under overload	≤ 34 mA
Residual ripple of the output current	≤ 1 % p.p.
Response time	< 500 ms
Accuracy	
Reference value	Output end value
Accuracy class	Class 0.5
Measuring range	0…100 % I_N

Temperature influence (-10 … +55 °C)	0.2 % / 10 K
Operating temperature	-10 °C up to +55 °C
Storage temperature	-40 °C up to +70 °C
Safety	
Protection class	II (protection isolated, DIN EN 61010)
Electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
Contamination class	2
Overvoltage category	III
Nominal isolation voltage (to earth)	250 V, input 40 V, output
Test voltages	50 Hz, 1 min., EN 61010-1 3.7 kV, rms, Measuring input against measuring output and exterior surface 490 V, Measuring output against exterior surface
Weight	270 g

EMBSIN 101 I – Measuring transducer for AC current

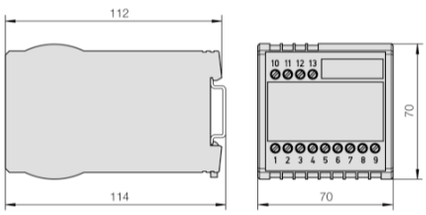
Features	Order no.						
EMBSIN 101 I, Measuring transducer for AC current Order no.: 101 I – Mxx xx	101 I –	M	X	X	X	X	X
1. Construction Housing MBS for 35 mm DIN rail		M					
2. Frequecy of the input voltage / input current							
Rated frequency 50/60 Hz			1				
3. Measuring range							
0...1 A				A			
0...5 A				B			
Z) _____ A ! Z) Nonstandard [A] 0...0.8 up to 0...1.2 or 0...4 up to 0...6				Z			
4. Output signal							
0...20 mA					1		
4...20 mA					2		
4...20 mA, 2-wire-connection / feed					3		
9) _____ mA ! 9) Nonstandard [mA] 0...2.5 up to 0...< 20 1...5 up to < (4... 20)					9		
0...10 V					A		
Z) _____ V ! Z) Nonstandard (V) 0...5.0 up to 0...< 10 1...5 up to 2...10					Z		
5. Auxiliary voltage							
Auxiliary voltage U_h: 24 V AC						1	
Auxiliary voltage U_h: 110 V AC						2	
Auxiliary voltage U_h: 115 V AC						3	
Auxiliary voltage U_h: 120 V AC						4	
Auxiliary voltage U_h: 230 V AC						5	
Auxiliary voltage U_h: 400 V AC, ! max. 300 V to earth!						6	
Auxiliary voltage U_h: 24 V DC						A	
Auxiliary voltage U_h: 24 V DC via output circuit						B	
Auxiliary voltage U_h: 85…230 V AC/DC						C	
Auxiliary voltage U_h: 24…60 V AC/DC						D	
U_h...rated voltage permissible tolerances for AC –15...+33 % permissible tolerances for DC –15...+15 % permissible tolerances for DC via output circuit –50...+33 % ! 1) to A) not to be combined with output signal, order no.: 3) ! B) not to be combined with output signal, order no.: 1), 2), 9), A), Z)							
6. Test certificates							
without test certificate							0
with test certificate in German							D
with test certificate in English							E

EMBSIN 201 IE

Measuring transducer for AC current

Features / benefits

- Auxiliary voltage supply with integrated AC/DC universal power supply
- Effective value measuring, logarithmical measurement process
- With two measuring ranges (selectable at terminals): 0…1/5 A or 0…1.2/6 A
- Measuring input: Sinus-shaped alternating current or distorted alternating currents
- Measuring output: Unipolar and live-zero output signals
- Housing for 35mm DIN rail mounting



Application

Measuring transducer for the transformation of sinus-shaped or distorted alternating currents. A load-independent DC current signal or imprinted DC voltage signal is available, which is proportionally arranged to the rms input volume.
This measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMC) and safety (IEC 1010 and EN 61010).
These measuring transducers are designed for indoor use only.

Technical data

Measuring input	
Rated frequency f_N	50/60 Hz
Rated input current I_N	1 / 5 A or 1.2 / 6 A (selectable at terminal)
Consumption	≤ 1 VA
Overload capacity	1.2 · I_N, constant 20 · I_N, 1 sec.
Measuring output	
Load-independent DC current	0…1 mA to 0…20 mA or live-zero 0.2…1 mA to 4…20 mA
Max. burden voltage	≤ 15 V
External resistance	R_{EXT} [kΩ] ≤ 15 V / I_{AN} [mA]
Current limit under overload	approx. 1.5 x I_{AN}
Imprinted DC voltage	0…1 V to 0…10 V or live-zero 0.2…1 V to 2…10 V
Load capacity	max. 2 mA
External resistance	R_{EXT} [kΩ] ≥ U_{AN} [V] / 2 mA
Voltage limit by R_{EXT} = ∞	≤ 25 V
Current limit under overload	≤ 10 mA
Residual ripple of the output current	≤ 0.5 % p.p. (300 ms) ≤ 2 % p.p. (50 ms)
Response time	50 ms or 300 ms

Accuracy	
Reference value	Output end value
Accuracy class	Class 0.5
Peak value factor	√2
Warming-up time	≤ 5 min
Operating temperature	-10 °C up to +55 °C
Storage temperature	-40 °C up to +70 °C
Auxiliary power	
Universal power supply	DC or AC (40…400 Hz)
AC/DC ranges	24…60 V or 85…230 V
AC power supply	45…65 Hz
Power input	≤ 1.5 W (3 VA)
Safety	
Protection class	II (protection isolated, DIN EN 61010)
Electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
Contamination class	2
Overvoltage category	III
Nominal isolation voltage (to earth)	300 V, input 230 V, auxiliary power 40 V, output
Test voltages	50 Hz, 1 min., EN 61010-1 3.7 kV, Measuring input against all other circuits and exterior surface; 3.7 kV, AC auxiliary power input against output and exterior surface; 490 V, Measuring output against exterior surface
Weight	250 g

EMBSIN 201 IE – Measuring transducer for AC current effective value measuring

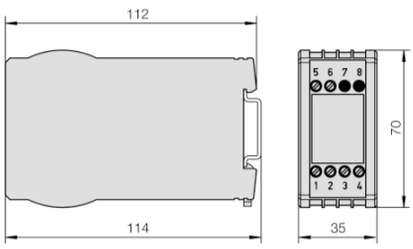
Features	Order no.							
EMBSIN 201 IE, Measuring transducer for AC current effective value, Order no.: 201 IE - Mxx xx x	201 IE –	M	X	X	X	X	X	
1. Construction Housing MBS for 35 mm DIN rail		M						
2. Frequecy of the input voltage / input current								
Rated frequency 50/60 Hz			1					
Rated frequency 400 Hz			2					
3. Measuring range								
0...1.0/5.0 A				1				
0...1.2/6.0 A				2				
9) _____ A Lower / higher measuring range dependent on connection availability ! Z) Nonstandard [A] 0...0.1/0.5 up to 0...< 1.2/6 Measuring range end value ratio 1 : 5				9				
4. Output signal								
0...20 mA					1			
4...20 mA					2			
9) _____ mA ! 9) Nonstandard [mA]: 0...1.00 up to 0...< 20 0.2...1 up to < (4...20)					9			
A) 0...10 V					A			
Z) _____ V ! Z) Nonstandard (V): 0...1.00 up to 0...< 10 0,2...1 up to 2...10					Z			
5. Auxiliary voltage								
Auxiliary voltage U_h: 85...230 V AC/DC 1						1		
Auxiliary voltage U_h: 24...60 V AC/DC 2						2		
Auxiliary voltage from measuring input (≥ 24...60 V AC)						3		
Auxiliary voltage from measuring input (≥ 85...230 V AC)						4		
Auxiliary voltage U_h: 24 V AC/24...60 V DC from low voltage side						5		
U_h...rated voltage Tolerances: DC –15...+33 % AC –15...+15 % ! 3) Not to be combinded with measuring range, order no.: C)...L) ! 4) Not to be combined with measuring range, order no.: A, B, L								
6. Respones time								
300 ms (standard)							1	
50 ms							2	
7. Test certificates								
without test certificate								0
with test certificate in German								D
with test certificate in English								E

EMBSIN 120 U

Measuring transducer for alternating voltage

Features / benefits

- Without auxiliary power supply
- Housing for 35mm DIN rail mounting
- Measuring input: Sinus-shaped alternating voltage (0…20 V to 0…500 V, arithmetical mean value measurement, effective value calibration
- Measuring output: Unipolar output signal
- Measuring principle: Rectifier process
- Economic wiring



Application

Measuring transducer for the transformation of sinus-shaped alternating voltage. A load-independent DC current signal, which is proportional to the measurement value, serves as an output signal, and allows for display, recording, monitoring and/or control functions.
This measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMC) and safety (IEC 1010 and EN 61010). These measuring transducers are designed for indoor use only.

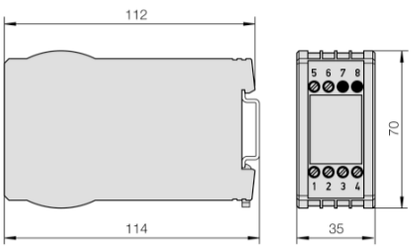
Technical data

Measuring input	
Rated frequency f_N	50/60 Hz
Rated input voltage U_N	0…20 V to 0…500 V (linked voltage!) max. input voltage to earth 300V (operating voltage acc. to EN 61010)
Consumption	≤ 2 VA
Overload capacity	1.2 · U_N, constant 2.0 · U_N, 1 sec.
Measuring output	
Load-independent DC current	0…5 mA, 0…10 mA or 0…20 mA
Max. burden voltage	≤ 15 V
Max. burden resistance	R_{EXT} [kΩ] ≤ 15 V / I_{AN} [mA]
Voltage limit by R_{EXT} = ∞	≤ 54 V
Current limit under overload	≤ 1.7 · I_N
Residual ripple of the output current	≤ 1 % p.p.
Response time	< 300 ms

Accuracy	
Reference value	Output end value
Accuracy class	Class 0.5
Measuring range	20…100 % U_N
Temperature influence (-10 … +55 °C)	0.2 % / 10 K
Operating temperature	-10 °C up to +55 °C
Storage temperature	-40 °C up to +70 °C
Safety	
Protection class	II (protection isolated, DIN EN 61010)
Electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
Contamination class	2
Nominal isolation voltage	300 V, rms, connection category III 500 V, rms, connection category II
Weight	180 g

EMBSIN 120 U – Measuring transducer for alternating voltage, without auxiliary power supply

Features	Order no.					
EMBSIN 120 U, Measuring transducer for alternating voltage Order no.: 120 U – Mxxxx	120 U –	M	X	X	X	X
1. Construction Housing MBS for 35 mm DIN rail		M				
2. Measuring range						
0...100/$\sqrt{3}$ V			A			
0...110/$\sqrt{3}$ V			B			
0...120/$\sqrt{3}$ V			C			
0...100 V			D			
0...110 V			E			
0...116.66 V			F			
0...120 V			G			
0...125 V			H			
0...133.33 V			J			
0...150 V			K			
0...250 V			L			
0...400 V			M			
0...500 V !			N			
Z) _____ V ! Z) Nonstandard (V): 0...20 V up to 0...500 V max. 250 V rated voltage to earth (Rated voltages acc. to EN 61010)			Z			
3. Output signal						
0...5 mA, $R_a \leq 3$ kΩ				1		
0...10 mA, R_a % ≤ 1,5 kΩ				2		
0...20 mA, $R_a \leq 750$ Ω				3		
4. Measuring range adjustable						
Measuring range fixed					0	
Measuring end value adjustable approx. ± 10 %					1	
5. Test certificates						
without test certificate						0
with test certificate in German						D
with test certificate in English						E



EMBSIN 121 U

Measuring transducer for alternating voltage

Features / benefits

- With auxiliary power supply
- Optional with measuring output 4…20 mA and/or 2-wire technic
- Housing for 35mm DIN rail mounting
- Measuring input: Sinus-shaped alternating voltage, arithmetical mean value measurement, effective value calibration
- Measuring output: Unipolar and live-zero output signals
- Measuring principle: Rectifier process
- AC or DC auxiliary power supply

Application

Measuring transducer for the transformation of sinus-shaped alternating voltage. A load-independent DC current signal or imprinted DC voltage signal is available, which stands proportionally to the measurement value of the input volume. This measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMC) and safety (IEC 1010 and EN 61010). These measuring transducers are designed for indoor use only.

Technical data

Measuring input	
Rated frequency f_N	50/60 Hz
Rated input voltage U_N	0…50 V to 0…600 V (linked voltage!) max. input voltage to earth 300V (operating voltage acc. to EN 61010)
Consumption	< U_N · 50µA (U_N ≤ 150 V) < U_N · 20µA (150 < U_N ≤ 400V) < U_N · 5 µA (400 < U_N ≤ 600V)
Overload capacity	1.2 · U_N, constant 2.0 · U_N, 1 sec.
Measuring output	
Load-independent DC current	0…5 mA to 0…20 mA or live-zero 1…5 mA to 4…20 mA
Max. burden voltage	≤ 15 V
Max. burden resistance	R_{EXT} [kΩ] ≤ 15 V / I_{AN} [mA]
By 2-wire connection	standard range 4…20 mA External resistance R_{EXT}, dependent of the auxiliary power H (12…32 V DC) R_{EXT} [kΩ] ≤ (H-12)V / 20mA
Current limit under overload	< 30 mA
Voltage limit by R_{EXT} = ∞	≤ 40 V
Residual ripple of the output current	≤ 1 % p.p.
Imprinted DC voltage	0…5 V to 0…10 V or live-zero 1…5 V to 2…10 V
Min. burden resistance	R_{EXT} [kΩ] ≤ U_{AN} [V] / 10 mA
Voltage limit by R_{EXT} = ∞	≤ 40 V
Current limit under overload	< 30 mA
Residual ripple of the output current	≤ 1 % p.p.
Response time	< 300 ms
Accuracy	
Reference value	Output end value
Accuracy class	Class 0.5 (U_N ≤ 500 V) Class 1 (U_N > 500 V)
Operating temperature	-10 °C up to +55 °C
Auxiliary power	
AC	24…400 V (±15 %, 50/60 Hz) P_V approx. 3 VA
DC	24 V, -15 / +33 % or 24 V, -50 / +33 % by 2-wire feed and output 4…20 mA; P_V approx. 1.5 W
Universal power supply (AC + DC)	24…60 V AC/DC DC -15 / + 33 % Power consumption P_V ≤ 1.5 W AC ±15 % Power consumption P_V ≤ 3 VA
Safety	
Protection class	II (protection isolated, DIN EN 61010)
Electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
Contamination class	2
Overvoltage category	III
Nominal isolation voltage (to earth)	300 V, input 300 V, auxiliary power AC 50 V, auxiliary power 24 V DC 50 V, output
Weight	195 g

EMBSIN 101 I/121 U – Measuring transducer for AC current

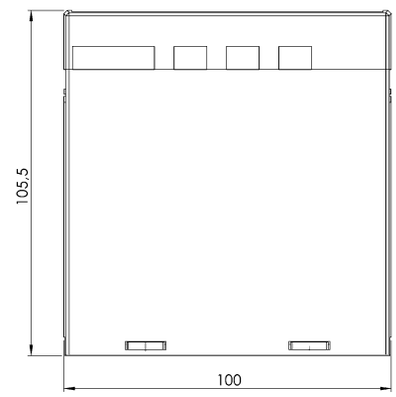
Features	Order no.						
EMBSIN 101 I, Measuring transducer for AC current Order no.: 101 I – Mxx xx	101 I –	M	X	X		X	X
1. Construction Housing MBS for 35 mm DIN rail		M					
2. Frequecy of the input voltage / input current Rated frequency 50/60 Hz			1				
3. Measuring range							
0...100 V				A			
0...250 V				B			
0...500 V				C			
Z) _____ V ! Z) Nonstandard (V) 0...50 bis 0...500 Max. 300 V rated voltage to earth (Rated voltages acc. to EN 61010)				Z			
4. Output signal							
0...20 mA					1		
4...20 mA					2		
4...20 mA, 2-wire-connection / feed					3		
9) _____ mA ! 9) Nonstandard [mA] 0...2.5 up to 0...< 20					9		
1...5 up to < (4... 20)							
0...10 V 1...5 up to 2...10					A		
Z) _____ V ! Z) Nonstandard (V) 0...5.0 up to 0...< 10					Z		
5. Auxiliary voltage							
Auxiliary voltage U_h: 24 V AC						1	
Auxiliary voltage U_h: 110 V AC						2	
Auxiliary voltage U_h: 115 V AC						3	
Auxiliary voltage U_h: 120 V AC						4	
Auxiliary voltage U_h: 230 V AC						5	
Auxiliary voltage U_h: 400 V AC, ! max. 300 V to earth!						6	
Auxiliary voltage U_h: 24 V DC						A	
Auxiliary voltage U_h: 24 V DC via output circuit						B	
Auxiliary voltage U_h: 85…230 V AC/DC						C	
Auxiliary voltage U_h: 24…60 V AC/DC						D	
U_h...rated voltage permissible tolerances for AC –15...+33 % permissible tolerances for DC –15...+15 % permissible tolerances for DC via output circuit –50...+33 % ! 1) to A) not to be combined with output signal, order no.: 3) ! B) not to be combined with output signal, order no.: 1), 2), 9), A), Z)							
6. Test certificates							
without test certificate							0
with test certificate in German							D
with test certificate in English							E

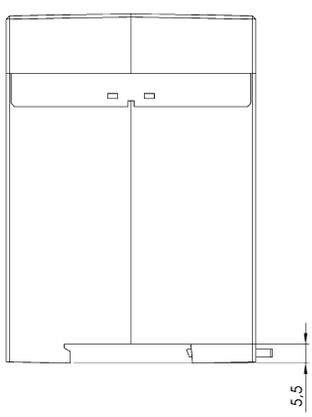
MT 440

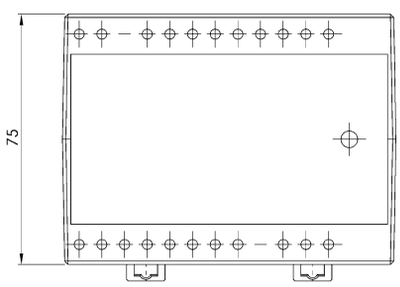
Programmable measuring transducer for all electrical parameters

Features / benefits

- With auxiliary voltage supply by means of an integrated AC/DC universal power supply
- Housing for 35mm DIN rail mounting
- Monitoring of up to 50 different parameters (V, A, kW, kVA, …)
- Multifunctional measuring transducer with 4 freely programmable measuring outputs
- Measuring outputs can be set as analogue output, impulse output, relay output or control output
- By default with USB 2.0 interface (not galvanically isolated!)
- Optionally with additional serial interface RS232 or RS485
- Communication protocol: MODBUS RTU
- Automatic selection of current and voltage inputs
- Easy parameter setting due to user-friendly setting software, which forms the delivery
- Measuring frequency: 50/60 Hz or 400 Hz







Application

The programmable measuring transducer MT 440 enables to capture up to 50 different electrical parameters of the connected network.
Large input ranges of the input volumes allow for the monitoring of almost all standardized electrical parameters.
Four integrated, freely programmable measuring outputs permit the simultaneous use of the assigned measuring value for control and monitoring purposes.

Supported measurements

	Basic measurements
Phase	Voltage U_1, U_2, U_3 and $U^{\sim}$
	Current I_1, I_2, I_3, I_n, I_t and I_a
	Active power P_1, P_2, P_3 and P_t
	Re-active power Q_1, Q_2, Q_3 and Q_t
	Apparent power S_1, S_2, S_3 and S_t
	Power factor PF_1, PF_2, PF_3 and $PF^{\sim}$
	Phase angle φ_1, φ_2, φ_3, and $\varphi^{\sim}$
	THD of phase voltage U_{f1}, U_{f2} and U_{f3}
	THD of phase angle I_1, I_2 and I_3
Phase-to-phase	Phase-to-phase voltage U_{12}, U_{23}, U_{31}
	Average phase-to-phase voltage U_{ff}
	Phase-to-phase angle) φ_{12}, φ_{23}, φ_{31}
	THD of phase-to-phase voltage
Energy	Counter 1
	Counter 2
	Counter 3
	Counter 4
	Active tariff
	Other measurements
MD values	Phase current I_1, I_2, I_3
	Active power P (positive)
	Active power P (negative)
	Re-active power Q – L
	Re-active power Q – C
	Apparent power S
Measurements	Frequency
	Internal temperature

Technical data

Measuring input	
Rated input voltage U_N	500 V (phase against neutral) Automatic selection of the measuring range
Voltage measuring range	62,5 V, 125 V, 250 V, 500 V
Rated input current I_N	5 A
Current measuring range	1 A, 5 A, 10 A
Overload capacity	
Current input (acc. IEC 60688)	15 A constant, 20 x I_N, 5 x 1 sec.
Voltage input (acc. IEC 60688)	600 V constant, 2 x U_N, 10 sec.
Measuring output	
DC current outputs	
4 output ranges, programmable	-100 % … 0 … 100 % -(1…20)mA …0… (1…20)mA
Control range	±120% I_{AN}
Max. burden voltage	≤ 10 V
Max. output current at overload	35 mA
Max. output voltage at open current output	35 V
Max. burden resistance	R_{max} [kΩ] = 10 V / I_{AN} [mA]
Response time	≤ 50 ms (Analog FAST)
Residual ripple of the output current	≤ 1 % p.p.
DC voltage outputs	
2 output ranges, programmable	-100 % … 0 … 100 % -(1…10) V …0… (1…10) V
Control range	±120%
Max. output voltage at overload	120 % nominal
Max. output current	20 mA
Min. burden resistance	R_{BMIN} [kΩ] ≥ U_{AN} / 20 mA
Response time	≤ 50 ms (Analog FAST)
Residual ripple of the output voltage	≤ 1 % p.p.
Accuracy	
IEC 60688	Class 0.5
Auxiliary power	
Universal power supply	AC 40…276 V, (45…65 Hz) DC 24…300 V
Power input	≤ 8 VA

Reference conditions	
Ambient temperature	15…30 °C
Input signal	0…100 % I_N
Frequency	45…65 Hz
Connection terminals	
Screw terminals	2.5 mm², wire with ferrule 4.0 mm², solid conductor
Setting software	MiQen Software for communication and parameterization of transducer
Interfaces (optionally)	RS232 resp. RS485
Operating conditions	
Ambient temperature	-10 … **0 … 45** … 55 °C
Operating temperature	-30 … + 70 °C
Storage temperature	-40 … + 70 °C
Average annual humidity	≤ 93 %
Altitude	≤ 2000 m
Safety	
Electrocution protection	IP 40 (IP 20 for connection terminals)
Contamination class	2
Installation category (EN 61010-1)	CAT III; 600 V, measuring inputs CAT III; 300 V, auxiliary voltage Input
Test voltages (DIN 57411)	3320 V AC_{RMS}, Auxiliary power against input / output / interface 3320 V AC_{RMS}, Auxiliary power against current input / voltage Input 3320 V AC_{RMS} current input against voltage input
Housing material	PC / ABS / UL 94 V-0
Standards	EN 61010-1; 2001 EN 60688; 1995 / A2; 2001 EN 61326-1; 2006 EN 60529; 1997 / A1; 2000 EN 60068-2-1/ -2/ -6/ -27/ -30
Dimensions (B x H x T)	100 x 105 x 75 mm
Weight	370 g

MT 440

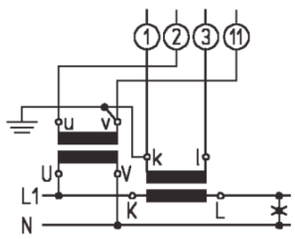
Programmable measuring transducer for all electrical parameters

Connection diagram

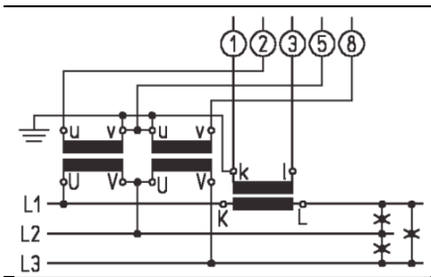
The voltage inputs of the measuring transducer can be connected directly to a low-voltage network or to a high-voltage network via a high-voltage transformer.
The current inputs of the measuring transducer can be directly connected to a low-voltage network via a low-voltage current transformer or to a high-voltage network via a high-voltage current transformer.

Function			Connection
Measuring input	AC current	I_{L1}	1/3
		I_{L2}	4/6
		I_{L3}	7/9
	AC voltage	U_{L1}	2
		U_{L2}	5
		U_{L3}	8
		N	11
Measuring outputs	Output 1	ω +	15
		ω ϑ	16
	Output 2	ω +	17
		ω ϑ	18
	Output 3	ω +	19
		ω ϑ	20
	Output 4	ω +	21
		ω ϑ	22
Auxiliary voltage supply		+ / AC (L)	13
		- / AC (N)	14
Interface	RS232 / RS485	R_X A	23
		GND / NC[1)]	24
		T_X / B	25

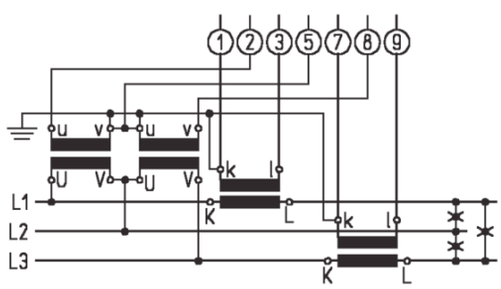
[1)] -NC- do not connect



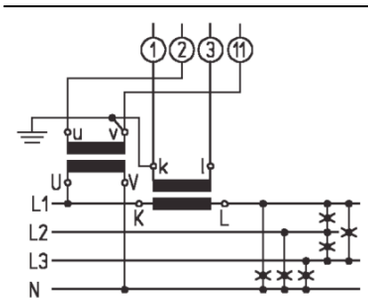
Single-phase current – 1b



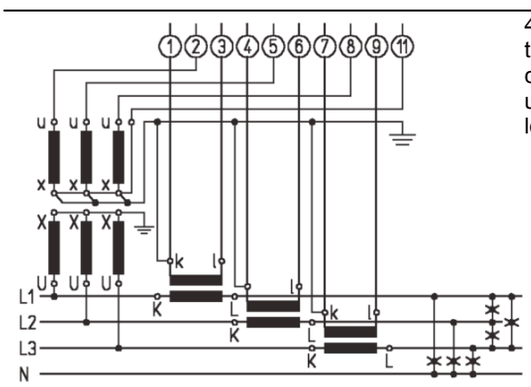
3-wire three-phase current - 3b, balanced load



3-wire three-phase current - 3u, unbalanced load



4-wire three-phase current - 4b, balanced load



4-wire three-phase current - 4u, unbalanced load

MT 440 – Programmable measuring transducer for all electrical values

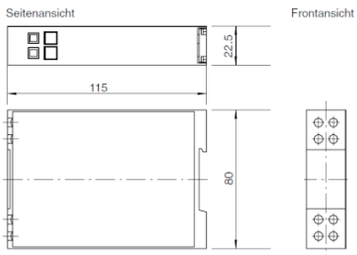
Features	Order no.							
MT 440, programmable measuring transducer all eletrical values Order no.: 440 – xxxxxxx	440 –	X	X	X	X	X	X	X
1. Auxiliary voltage								
Universal (40...276 V AC, 45...65 Hz; 24...300 V DC), 8 VA		1						
2. Rated input frequency								
Rated frequency 50/60 Hz			1					
Rated frequency 400 Hz			2					
3. Communication type								
without				0				
RS232				1				
RS485				2				
4. Output 1								
without					0			
analogue (< 100 ms)					1			
fast analogue (< 50 ms)					2			
solid state relay					3			
electromechanical relay					4			
5. Output 2								
without						0		
analogue (< 100 ms)						1		
fast analogue (< 50 ms)						2		
solid state relay						3		
electromechanical relay						4		
6. Output 3								
without							0	
analogue (< 100 ms)							1	
fast analogue (< 50 ms)							2	
solid state relay							3	
electromechanical relay							4	
7. Output 4								
without								0
analogue (< 100 ms)								1
fast analogue (< 50 ms)								2
solid state relay								3
electromechanical relay								4

MA-1.1s

Measuring transducer for alternating current (sinusoidal)

Characteristics/uses

- Measuring output 0(4) ... 20 mA, 0(2) ... 10 V
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal alternating current
- Measurement output: Unipolar and live-zero output variables
- Standard current inputs 1 A and 5 A with output 0 ... 20 mA without auxiliary voltage



(Maße in mm)

Application

The measuring transducers convert currents into an load-independent DC current or an imprinted DC voltage with the correct sign. These can then be displayed, registered and/or used for control at the measurement location or in more distant control rooms.

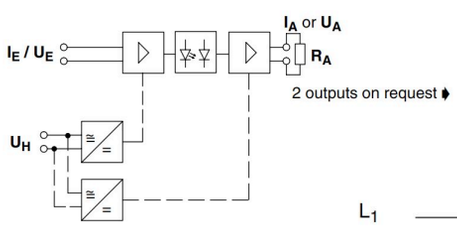
Functional principle

The current is measured internally via a shunt resistor, after which the signal is galvanically isolated from the input via an optical path and converted into a proportional imprinted DC voltage or a proportional load-independent DC current.

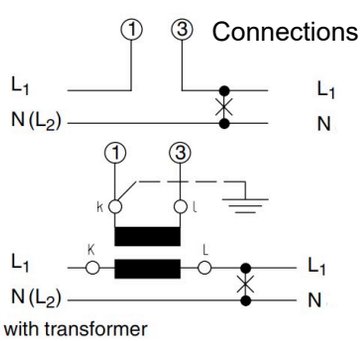
Technical parameters

Measuring input	
Nominal frequency f_N	48…62 Hz
Nominal input current I_N	200 µA – 5 A
Intrinsic consumption	I_E · 0.1 V
Overload capacity	1.2 · I_{EN}, permanent
	10 · I_{EN}, max. 1 sec.
Operating voltage	max. 519 V AC,
	max. 300V phase zero
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 12 V / I_{AN}
Current limitation	to 120 ... 150% of the final value
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms, 250ms, 100ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.01 %/K

Nominal conditions	
Auxiliary voltage	U_{HN} ±5% (50 Hz with AC)
Load	0.5 R_A max. ±1% with current output
	R_A min ±1% with voltage output
Frequency	50…60 Hz
Waveform	Sine, distortion factor ≤ 0.1%
Ambient temperature	23°C ±1K
Warm-up time	≥5 min
Auxiliary energy	
AC voltage	230 V~ (-15% +10%); < 6 VA
	115 V~ (-15% +10%); < 3.5 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 3 … 6 VA
General technical data	
Test voltage	2210 V all circuits against housing
	3536 V all circuits to each other
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 120 g

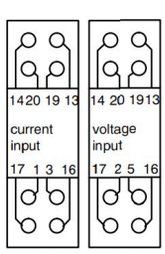


Block circuit diagram



with transformer

Terminal assignment



T.	Function
1	I_E (+)
3	I_E (–)
2	U_E (+)
5	U_E (–)
16	U_H L1(+)
17	U_H N (–)

T.	Function
	single output:
19	U_A, I_A (+)
20	U_A, I_A (–)
	dual output:
13	U_A (+)
14	U_A (–)
19	I_A (+)
20	I_A (–)

I_E current input
U_E voltage input
U_H auxiliary voltage input
I_A current output
U_A voltage output

The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

MA-1.1s – Measuring transducer for alternating current (sinusoidal)

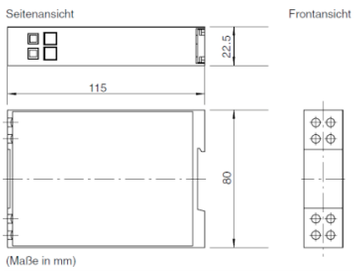
Characteristics	Order number								
MA-1.1s, measuring transducer for sinusoidal alternating current Order No. IMU02 - xxxxxx	IMU	02 –	X	X	X	X	X	X	X
1. Nominal input current									
0 ... 200 µA			1						
0 ... 20 mA			2						
0 ... 0.5 A			3						
0 ... 1 A			4						
0 ... 2 A			5						
0 ... 5 A			6						
Special range up to 5 A			9						
2. Frequency range input									
15 ... 18 Hz (16 2/3 Hz)				1					
48 ... 62 Hz (50/60 Hz)				2					
98 ... 102 Hz (100 Hz)				3					
380 ... 420 Hz (400 Hz)				4					
Special frequency				9					
3. Output									
0 ... 20 mA					1				
4 ... 20 mA					2				
0 ... 10 V					3				
2 ... 10 V					4				
0 ... 20 mA and 0 ... 10 V					5				
4 ... 20 mA and 2 ... 10 V					6				
Special ranges					9				
0 ... 10 mA					A				
0 ... 5 mA					B				
-20 ... 0 ... 20 mA					C				
-10 ... 0 ... 10 V					D				
-20 ... 0 ... 20 mA and -10 ... 0 ... 10 V					E				
according to specification					Z				
4. Accuracy									
± 0.5% of the final value						1			
5. Setting time									
500 ms							1		
250 ms							2		
100 ms							3		
6. **Auxiliary power supply**									
AC 230 V (195 ... 253 V), (48 ... 62 Hz)								1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)								2	
DC 24 V (20 ... 72 V)								3	
DC 20 ... 100 V / AC 15 ... 70 V								4	
DC 90 ... 357 V / AC 65 ... 253 V								5	
without auxiliary energy with input 0 ...1 A / 0 ... 5 A and output 0 ... 20 mA								6	
7. Test reports									
without test report									0
with test report German_English									1

MA-1.1s (eff)

Measuring transducer for non-sinusoidal alternating current (true effective value)

Characteristics/uses

- Measuring output 0(4) ... 20 mA, 0(2) ... 10 V
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: non-sinusoidal alternating current
- Measurement output: Unipolar and live-zero output variables
- True effective value measurement



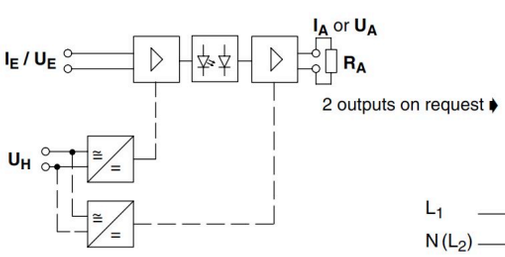
Application:
The measuring transducers convert currents into a load-independent DC current or an imprinted DC voltage with the correct sign. These can then be displayed, registered and/or used for control at the measurement location or in more distant control rooms.

Functional principle
The current is measured internally via a shunt resistor. After this, the signal is galvanically isolated from the input via an optical path and converted into a proportional imprinted DC voltage or a proportional load-independent DC current.

Technical parameters

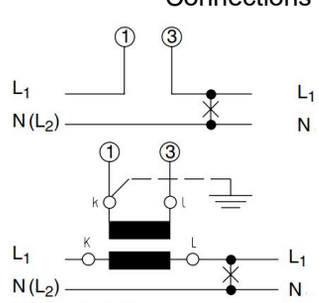
Measuring input	
Nominal frequency f_N	48…62 Hz
Nominal input current I_N	I_{EN} = 200 µA – 5 A
Intrinsic consumption	$I_E \cdot 0.1$ V
Overload capacity	1.2 · I_N, permanent
	10 · I_N, max. 1 sec.
Operating voltage	max. 519 V AC,
	max. 300V phase zero
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 12 V / I_{AN}
Current limitation	to 120 ... 150% of the final value
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.01 %/K

Nominal conditions	
Auxiliary voltage	U_{HN} ±5% (50 Hz with AC)
Load	0.5 R_A max. ±1% with current output
	R_A min ±1% with voltage output
Frequency	50…60 Hz
Waveform	Non-sine, crest factor ≤ 4
Ambient temperature	23°C ±1K
Warm-up time	≥5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 6 VA
	115 V~ (-15% +10%); < 3.5 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 3 … 6 VA
General technical data	
Test voltage	2210 V all circuits against housing
	3536 V all circuits to each other
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 120 g

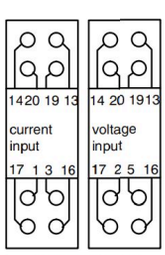


Block circuit diagram

Connections



Terminal assignment



T.	Function
1	I_E (+)
3	I_E (–)
2	U_E (+)
5	U_E (–)
16	U_H L1(+)
17	U_H N (–)

T.	Function
	single output:
19	U_A, I_A (+)
20	U_A, I_A (–)
	dual output:
13	U_A (+)
14	U_A (–)
19	I_A (+)
20	I_A (–)

I_E current input
U_E voltage input
U_H auxiliary voltage input
I_A current output
U_A voltage output

The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

MA-1.1s (eff) - Transducer for non-sinusoidal alternating current (true effective value)

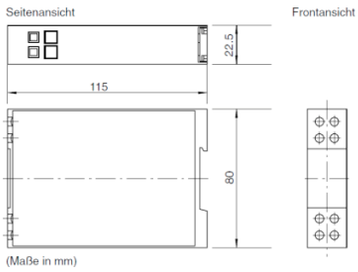
Characteristics	Order number								
MA-1.1s (eff), transducer for non-sinusoidal alternating current Order No. IMU04 - xxxxxx	IMU	04 –	X	X	X	X	X	X	X
1. Nominal input current									
0 ... 200 µA			1						
0 ... 20 mA			2						
0 ... 0.5 A			3						
0 ... 1 A			4						
0 ... 2 A			5						
0 ... 5 A			6						
Special range up to 5 A			9						
2. Frequency range input									
15 ... 18 Hz (16 2/3 Hz)				1					
48 ... 62 Hz (50/60 Hz)				2					
98 ... 102 Hz (100 Hz)				3					
380 ... 420 Hz (400 Hz)				4					
Special frequency				5					
3. Output									
0 ... 20 mA					1				
4 ... 20 mA					2				
0 ... 10 V					3				
2 ... 10 V					4				
0 ... 20 mA and 0 ... 10 V					5				
4 ... 20 mA and 2 ... 10 V					6				
Special ranges					9				
0 ... 10 mA					A				
0 ... 5 mA					B				
-20 ... 0 ... 20 mA					C				
-10 ... 0 ... 10 V					D				
-20 ... 0 ... 20 mA and -10 ... 0 ... 10 V					E				
according to specification					Z				
4. Accuracy									
± 0.5% of the final value						1			
5. Setting time									
500 ms							1		
6. **Auxiliary power supply**									
AC 230 V (195 ... 253 V), (48 ... 62 Hz)								1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)								2	
DC 24 V (20 ... 72 V)								3	
DC 20 ... 100 V / AC 15 ... 70 V								4	
DC 90 ... 357 V / AC 65 ... 253 V								5	
7. Test reports									
without test report									0
with test report German_English									1

MV-1.1s

Measuring transducer for AC voltage (sinusoidal)

Characteristics/uses

- Measuring output 0(4) ... 20 mA, 0(2) ... 10 V
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal alternating voltage
- Measurement output: Unipolar and live-zero output variables
- Standard voltage inputs with output 0 ... 20 mA without auxiliary voltage (according to order list)



Application

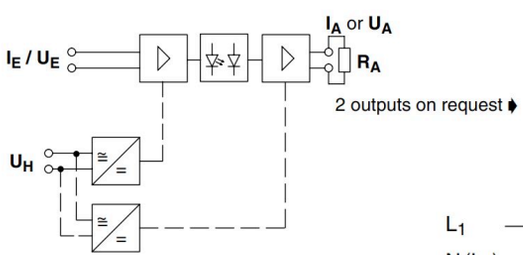
The measuring transducers convert voltages into an load-independent DC current or an imprinted DC voltage with the correct sign. These can then be displayed, registered and/or used for control at the measurement location or in more distant control rooms.

Functional principle

The voltage is measured internally via a voltage divider. After this, the signal is galvanically isolated from the input via an optical path and converted into a proportional imprinted DC voltage or a proportional load-independent DC current.

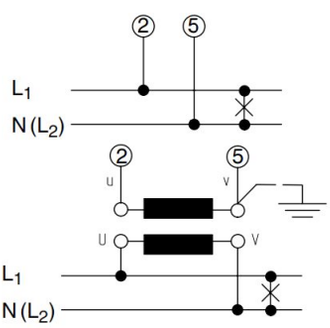
Technical parameters

Measuring input		**Nominal conditions**	
Nominal frequency fN	48...62 Hz	Auxiliary voltage	U_{HN} ±5% (50 Hz for AC)
Nominal input voltage U_{EN}	U_{EN} = 60 mV - 519 V	Load	0.5 R_A max. ±1% for current output
Intrinsic consumption I_E ·	0.1 V	R_A min ±1% for voltage output	
Overload capacity	1.2 · U_{EN}, permanent	Frequency	50 ... 60 Hz
	2 U_{EN}, max. 1 sec.	Waveform	sinus, distortion factor ≤ 0.1%
Operating voltage	max. 519 V AC,	Ambient temperature	23 °C ± 1 K
	max. 300 V phase zero	Warm-up time	≥5 min
Measuring output		**Auxiliary power supply**	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA	AC voltage	230 V~ (-15% +10%); < 6 VA
Load range R_A	0 ... 12 V / IAN		115 V~ (-15% +10%); < 3.5 VA
Current limitation	to 120 ... 150% of final value	DC voltage	24 V= (20 ... 72V); < 3 VA
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V	Wide range	20 ... 100 V= or 15 ... 70V~; < 3 VA
Load R_A	≥ 4 kΩ		AC / DC 90 ... 357 V= or 65 ... 253V~; < 3 ... 6 VA
Load error	≤ 0.1% at 50% load change	**General technical data**	
Residual ripple	≤ 1%eff	Test voltage	2210 V all circuits against housing
Setting time	approx. 500ms, opt. 250ms or 100ms		3536 V all circuits to each other
Open-circuit voltage	≤ 15 V	Working voltage	300 V (nominal mains voltage phase-zero)
Accuracy		Protection class	IP 40 housing, IP 20 terminals
Basic accuracy	± 0.5% of the final value	Protection class	II
Temperature drift	≤ 0.01 %/K	Measurement category	CAT III
		Degree of contamination	2
		Weight	approx. 120 g

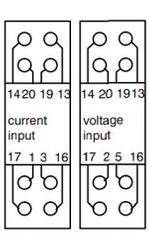


Block circuit diagram

Connections



Terminal assignment



T.	Function	T.	Function
1	I_E (+)		single output:
3	I_E (–)	19	U_A, I_A (+)
2	U_E (+)	20	U_A, I_A (–)
5	U_E (–)		dual output:
16	U_H L1(+)	13	U_A (+)
17	U_H N (–)	14	U_A (–)
		19	I_A (+)
		20	I_A (–)

I_E current input
U_E voltage input
U_H auxiliary voltage input
I_A current output
U_A voltage output

The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

MV-1.1s – Measuring transducer for AC voltage (sinusoidal)

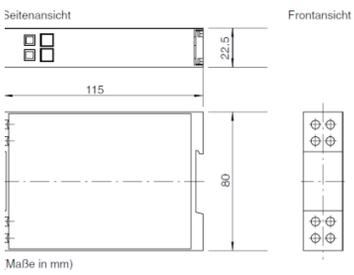
Characteristics	Order number								
MV-1.1s, measuring transducer for sinusoidal AC voltage Order No. UMU05 - xxxxxx	UMU	05 –	X	X	X	X	X	X	X
1. Input voltage									
0 ... 60 mV			1						
0 ... 1 V			2						
0 ... 10 V			3						
0 ... 115 V			4						
0 ... 230 V			5						
0 ... 400 V			6						
Special range up to 519 V AC, up to 300 V DC			9						
2. Frequency range input									
15 ... 18 Hz (16 2/3 Hz)				1					
48 ... 62 Hz (50/60 Hz)				2					
98 ... 102 Hz (100 Hz)				3					
380 ... 420 Hz (400 Hz)				4					
Special frequency				5					
3. Output									
0 ... 20 mA					1				
4 ... 20 mA					2				
0 ... 10 V					3				
2 ... 10 V					4				
0 ... 20 mA and 0 ... 10 V					5				
4 ... 20 mA and 2 ... 10 V					6				
Special ranges					9				
0 ... 10 mA					A				
0 ... 5 mA					B				
-20 ... 0 ... 20 mA					C				
-10 ... 0 ... 10 V					D				
-20 ... 0 ... 20 mA and -10 ... 0 ... 10 V					E				
according to specification					Z				
4. Accuracy									
± 0.5% of the final value						1			
5. Setting time									
500 ms							1		
250 ms							2		
100 ms							3		
6. Auxiliary power supply									
AC 230 V (195 ... 253 V), (48 ... 62 Hz)								1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)								2	
DC 24 V (20 ... 72 V)								3	
DC 20 ... 100 V / AC 15 ... 70 V								4	
DC 90 ... 357 V / AC 65 ... 253 V								5	
7. Without auxiliary energy									
0 ... 57.7 V with output 0 ... 20 mA								A	
0 ... 63.5 V with output 0 ... 20 mA								B	
0 ... 100 V with output 0 ... 20 mA								C	
0 ... 110 V with output 0 ... 20 mA								D	
0 ... 150 V with output 0 ... 20 mA								E	
0 ... 250 V with output 0 ... 20 mA								F	
0 ... 400 V with output 0 ... 20 mA								G	
0 ... 500 V with output 0 ... 20 mA								H	
8. Test reports									
without test report									0
with test report German_English									1

MV-1.1s (eff)

Measuring transducer for non-sinusoidal alternating voltage (true effective value)

Characteristics/uses

- Measuring output 0(4) ... 20 mA, 0(2) ... 10 V
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: non-sinusoidal AC voltage
- Measurement output: Unipolar and live-zero output variables



Application

The measuring transducers convert voltages into an load-independent DC current or an imprinted DC voltage with the correct sign. These can then be displayed, registered and/or used for control at the measurement location or in more distant control rooms.

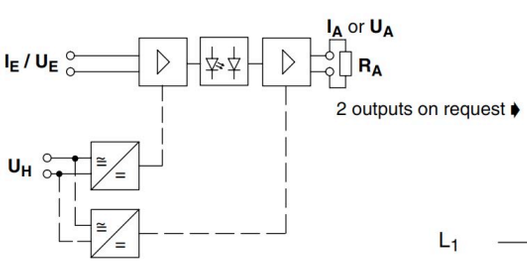
Functional principle

The voltage is measured internally via a voltage divider. After this, the signal is galvanically isolated from the input via an optical path and converted into a proportional imprinted DC voltage or a proportional load-independent DC current.

Technical parameters

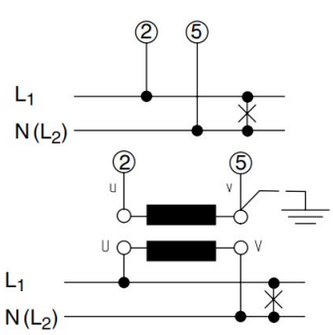
Measuring input	
Nominal frequency f_N	48…62 Hz
Input voltage U_{EN}	U_{EN} = 60 mV – 519 V
Intrinsic consumption	I_E · 0.1 V
Overload capacity	1.2 · U_{EN}, permanent
	2 · U_{EN}, max. 1 sec.
Operating voltage	max. 519 V AC,
	max. 300V phase zero
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 12 V / I_{AN}
Current limitation	to 120 ... 150% of the final value
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.01 %/K

Nominal conditions	
Auxiliary voltage	U_{HN} ±5% (50 Hz with AC)
Load	0.5 R_A max. ±1% with current output
	R_A min ±1% with voltage output
Frequency	50…60 Hz
Waveform	Non-sine, crest factor ≤ 4
Ambient temperature	23°C ±1K
Warm-up time	≥5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 6 VA
	115 V~ (-15% +10%); < 3.5 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 3 … 6 VA
General technical data	
Test voltage	2210 V all circuits against housing
	3536 V all circuits to each other
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 120 g

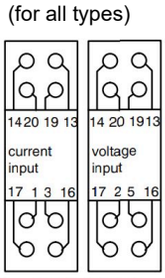


Block circuit diagram
(example)

Connections



Terminal assignment
(for all types)



T.	Function
1	I_E (+)
3	I_E (–)
2	U_E (+)
5	U_E (–)
16	U_H L1(+)
17	U_H N (–)

T.	Function
	single output:
19	U_A, I_A (+)
20	U_A, I_A (–)
	dual output:
13	U_A (+)
14	U_A (–)
19	I_A (+)
20	I_A (–)

I_E current input
U_E voltage input
U_H auxiliary voltage input
I_A current output
U_A voltage output

The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

MV-1.1s (eff) – Measuring transducer for non-sinusoidal AC voltage (true effective value)

Characteristics	Order number								
MV-1.1s (eff), measuring transducer for non-sinusoidal AC voltage Order No. UMU07 - xxxxxx	UMU	07 –	X	X	X	X	X	X	X
1. Input voltage									
0 ... 60 mV			1						
0 ... 1 V			2						
0 ... 10 V			3						
0 ... 115 V			4						
0 ... 230 V			5						
0 ... 400 V			6						
Special range up to 519 V AC, up to 300 V DC			9						
2. Frequency range input									
15 ... 18 Hz (16 2/3 Hz)				1					
48 ... 62 Hz (50/60 Hz)				2					
98 ... 102 Hz (100 Hz)				3					
380 ... 420 Hz (400 Hz)				4					
Special frequency				5					
3. Output									
0 ... 20 mA					1				
4 ... 20 mA					2				
0 ... 10 V					3				
2 ... 10 V					4				
0 ... 20 mA and 0 ... 10 V					5				
4 ... 20 mA and 2 ... 10 V					6				
Special ranges					9				
0 ... 10 mA					A				
0 ... 5 mA					B				
-20 ... 0 ... 20 mA					C				
-10 ... 0 ... 10 V					D				
-20 ... 0 ... 20 mA and -10 ... 0 ... 10 V					E				
according to specification					Z				
4. Accuracy									
± 0.5% of the final value						1			
5. Setting time									
500 ms							1		
6. **Auxiliary power supply**									
AC 230 V (195 ... 253 V), (48 ... 62 Hz)								1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)								2	
DC 24 V (20 ... 72 V)								3	
DC 20 ... 100 V / AC 15 ... 70 V								4	
DC 90 ... 357 V / AC 65 ... 253 V								5	
7. **Test reports**									
without test report									0
with test report German_English									1

MF-1.1

Measuring transducer for frequency

Characteristics/uses

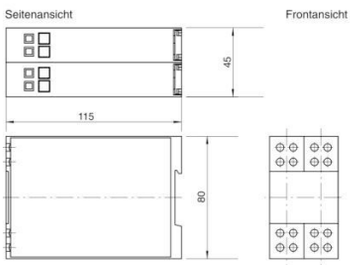
- Measuring output 0(4) ... 20 mA, 0(2) ... 10 V
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Alternating voltages sinusoidal, ≥ 14 Hz ≤ 500 Hz
- Measurement output: Unipolar and live-zero output variables

Application

MF-1.1 measuring transducers using microprocessor technology detect the **frequency** of the input signal and then convert it into load-independent DC current and imprinted DC voltage signals. These can then be displayed, registered and/or used for control at the measurement location or in more distant control rooms.

Functional principle

The input AC voltage is converted into a square wave signal and then fed to and analysed by a microprocessor. Via a D/A converter and an opto-coupler for galvanic isolation, the signal reaches the output stages, which provide an load-independent DC current and a synchronous imprinted DC voltage proportional to the frequency applied to the input.

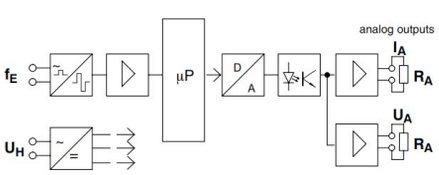


(Maße in mm)

Technical parameters

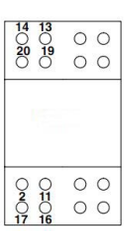
Measuring input	
Nominal frequency f_E	f_{Emin} ≥ 14 Hz
	f_{Emax} ≤ 500 Hz
Input voltage U_{EN}	U_{EN} = 100 V – 519 V
Intrinsic consumption	3 … 7 VA
Overload capacity	1.2 · U_{EN}, permanent
	2 · U_{EN}, max. 1 sec.
Operating voltage	max. 519 V AC,
	max. 300 V phase zero
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 10 V / I_{AN}
Current limitation	to 120 ... 150% of the final value
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.01 %/K

Nominal conditions	
Auxiliary voltage	U_{HN} ±1%, 48 ... 62 Hz
Voltage	U_{EN} ±1%
Frequency	f_N
Waveform	Sine, distortion factor ≤ 0.1%
Ambient temperature	23°C ±1K
Warm-up time	≥5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 7 VA
	115 V~ (-15% +10%); < 4 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 4 … 7 VA
General technical data	
Test voltage	2210 V all circuits against housing
	3536 V measuring circuit and auxiliary voltage against output
	1330 V currents against each other and against Tensions
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 230 g



Block circuit diagram

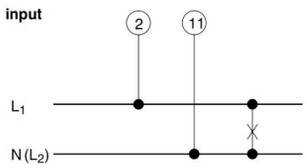
Terminal assignment



terminal	FU 2.2
2	U_E L_1
11	U_E N (L_2)
13	U_A(+)
14	U_A(–)
16	U_H L1(+)
17	U_H N (–)
19	I_A (+)
20	I_A (–)

U_E voltage input
The numbers on the terminals conform to details in connection diagrams (refer to DIN 43 807).
I_A current output
U_A voltage output
U_H auxiliary voltage input

Connections



MF-1.1 – Measuring transducer for frequency

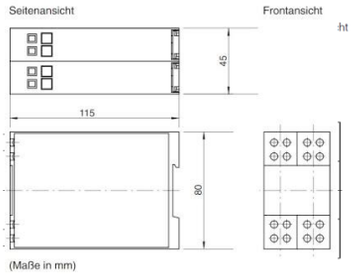
Characteristic	Order number						
MF-1.1, frequency measuring transducer Order No.: FMU08 – xxxxxx	FMU	08 –	X	X	X	X	X
1. Input frequency range							
45 ... 50 ... 55 Hz			1				
48 ... 50 ... 52 Hz			2				
55 ... 60 ... 65 Hz			3				
58 ... 60 ... 65 Hz			4				
360 ... 400 ... 440 Hz			5				
380 ... 400 ... 420 Hz			6				
Special measuring range			9				
2. Input nominal voltage							
100 V				A			
110 V				B			
115 V				C			
120 V				D			
230 V				E			
240 V				F			
380 V				G			
400 V				H			
415 V				I			
440 V				K			
Special nominal voltage				Z			
3. Output							
0 ... 20 mA and 0 ... 10 V					1		
0 ... 10 mA and 0 ... 10 V					2		
0 ... 5 mA and 0 ... 10 V					3		
4 ... 20 mA and 2 ... 10 V					4		
- 20 ... 0 ... 20 mA and - 10 ... 0 ... 10 V					5		
Special output					9		
4. Auxiliary power supply							
AC 230 V (195 ... 253 V), (48 ... 62 Hz)						1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)						2	
DC 24 V (20 ... 72 V)						3	
DC 20 ... 100 V / AC 15 ... 70 V						4	
DC 90 ... 357 V / AC 65 ... 253 V						5	
5. Test reports							
without test report							0
with test report German_English							1

MPLz.1

Measuring transducer for phase angle or power factor

Characteristics/uses

- Measuring output 0(4) ... 20 mA, 0(2) ... 10 V
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal voltages and currents in AC and three-phase mains with an even load
- Measurement output: Unipolar and live-zero output variables



Application

Measuring transducer for detecting the phase angle between current and voltage in the equally loaded AC and three-phase mains. An load-independent DC current and imprinted DC voltage signal are available as output signals, which are proportional to the phase angle or power factor between the measured variables current and voltage.

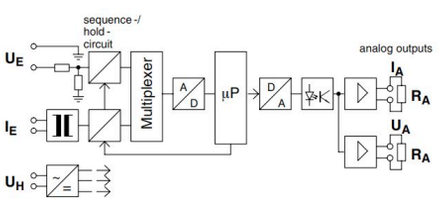
Functional principle

A converter in the current path and a divider in the voltage path adapt the input signals and pass them on to an A/D converter via a multiplexer. A microprocessor processes the digitised signals in real time. The signal reaches the output stages via a D/A converter and an opto-coupler for galvanic isolation.

Technical parameters

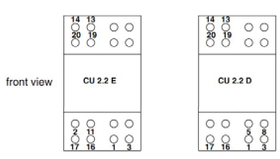
Measuring input	
Measuring ranges	Cap 0.8 ... 1 ...0.8 ind
	Cap 0.5 ... 1 ...0.5 ind
Nominal frequency	48…62 Hz
Input nominal voltage U_{EN}	65,100,110,240,400,415,440,500 V
Intrinsic consumption	approx. 0.25 mA per voltage path
	I2 · 0.01 Ω per current path
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, permanent
	2 · U_{EN}, 10 I_{EN} max. 1 sec.
Operating voltage	max. 519 V
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 10 V / I_{AN}
Current limitation	to 120 ... 140% of the final value
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1% eff
Setting time	approx. 500ms <
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.01 %/K

Nominal conditions	
Auxiliary voltage	UHN ±1%, 48 ... 62 Hz
Input voltage	UEN _0.5%
Power factor	cos ϕ=1
Frequency	50…60 Hz
Waveform	Sine, distortion factor ≤ 0.1%
Ambient temperature	23°C ±1K
Warm-up time	≥5 min
Auxiliary energy	
AC voltage	230 V~ (-15% +10%); < 7 VA
	115 V~ (-15% +10%); < 4 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 4 … 7 VA
General technical data	
Test voltage	2210 V all circuits against housing
	3536 V all circuits to each other
	1330 V currents against each other and against voltage
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 270 g



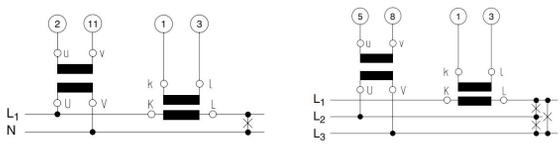
Block circuit diagram

Terminal assignment



terminal	CU 2.2 E	CU 2.2 D
1	I_E L_1	I_E L_1
2	U_E L_1	–
3	I_E L_1	I_E L_1
5	–	U_E L_2
8	–	U_E L_3
11	U_EN	–
13	U_A(+)	U_A(+)
14	U_A(–)	U_A(–)
16	U_H L_1(+)	U_H L_1(+)
17	U_H N (–)	U_H N (–)
19	I_A (+)	I_A (+)
20	I_A (–)	I_A (–)

Connections



I_E current input
U_E voltage input
The numbers on the terminals conform to details in connection diagrams (refer to DIN 43 807).
I_A current output
U_A voltage output
U_H auxiliary voltage input

MPIz.1 – Measuring transducer for phase angle or power factor

Characteristic	Order number									
MPIz.1, measuring transducer for phase angle/ power factor Order No.: GMU09 – xxxxxxxxx	GMU	09 –	X	X	X	X	X	X	X	X
1. Application										
Single-phase alternating current mains			1							
Three-wire three-phase mains with an even load			2							
2. Current input										
1 A				1						
5 A				5						
Special current input				9						
3. Voltage input										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V					5					
415 V					6					
440 V					7					
500 V					8					
Special voltage input					9					
4. Measuring range										
-37° ... 0 ... 37° corresponds to cos ϕ: cap 0.8 ... 1 ... 0.8 ind						A				
-60° ... 0 ... 60° corresponds to cos ϕ: cap 0.5 ... 1 ... 0.5 ind						B				
according to specification in the range of -180° ... 0 ... 180° corresponds to cos ϕ (output): ind. -1 ... 1 ... -1 cap. clear measuring range - 175° to + 175°						C				
5. Input frequency range										
48 ... 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 ... 20 mA and 0 ... 10 V								1		
0 ... 10 mA and 0 ... 10 V								2		
0 ... 5 mA and 0 ... 10 V								3		
4 ... 20 mA and 2 ... 10 V								4		
- 20 ... 0 ... 20 mA and - 10 ... 0 ... 10 V								5		
Special output								9		
7. Auxiliary power supply										
AC 230 V (195 ... 253 V), (48 ... 62 Hz)									1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)									2	
DC 24 V (20 ... 72 V)									3	
DC 20 ... 100 V / AC 15 ... 70 V									4	
DC 90 ... 357 V / AC 65 ... 253 V									5	
8. Test reports										
without test report										0
with test report German_English										1

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Management Service

ZERTIFIKAT

Die Zertifizierungsstelle
der TÜV SÜD Management Service GmbH

bescheinigt, dass das Unternehmen

MBS AG

Eisbachstr. 51 • 74429 Sulzbach-Laufen
Deutschland

einschließlich der
Standorte und Geltungsbereiche
gemäß Anlage

ein Qualitätsmanagementsystem
eingeführt hat und anwendet.

Durch ein Audit, Auftrags-Nr. **70003062**,
wurde der Nachweis erbracht, dass die Forderungen der

ISO 9001:2015

erfüllt sind.

Dieses Zertifikat ist gültig vom **05.04.2019** bis **04.04.2022**.

Zertifikat-Registrier-Nr.: **12 100 20346 TMS**.

Product Compliance Management
München, 08.04.2019

DAkkS Deutsche Akkreditierungsstelle D-ZM-14143-01-00

Seite 1 von 2

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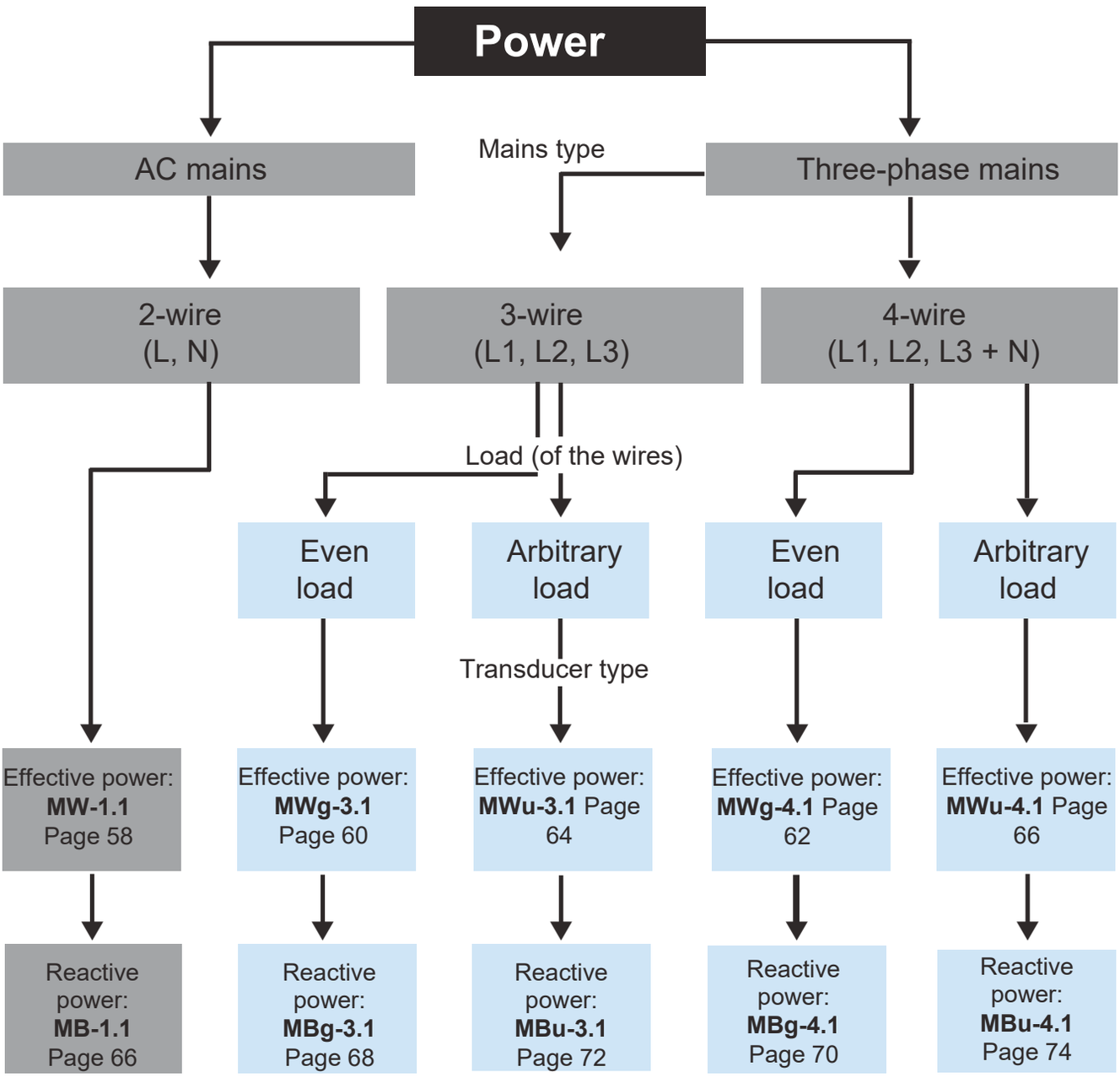
TÜV®

Measuring transducer for power

Type finding for power measuring transducers



Explanation of abbreviations

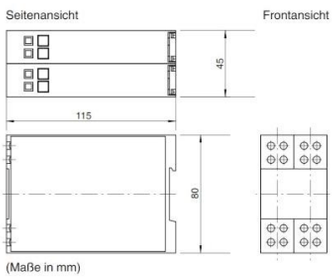
M	Measuring transducer
W	Effective power
B	Reactive power
g	Even load
u	Uneven load
1	Single-phase alternating current
3	Three-wire three-phase current
4	Four-wire three-phase current

MW-1.1

Measuring transducer for effective power
(also suitable for frequency inverters)

Characteristics/uses

- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on AC mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation



(Maße in mm)

Application

Measuring transducer for recording the active power of an AC mains. The output signal is a load-independent DC current or imprinted DC voltage signal that is directly proportional to the active power of the primary mains.

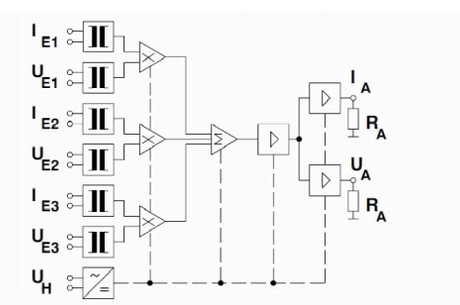
Functional principle

Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the measured values in an analogue way and integrates them with a low-pass filter.

Technical parameters

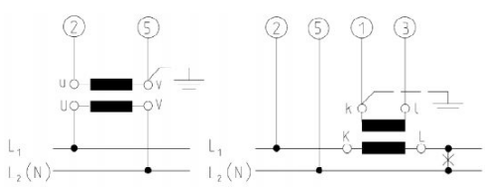
Measuring input	
Nominal frequency	50 or 60 Hz, Harmonic content ≤ 0.2
Nominal input current I_{EN}	0…0.5-5 A
Input nominal voltage U_{EN}	0 … 50-519 V
Intrinsic consumption	approx. 1 mA per voltage path < 0.1 VA per current path at 1 A input < 0.4 VA per current path at 5 A input
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, permanent 2 U_{EN}, 20 I_{EN} max. 1 sec.
Operating voltage	max. 519 V
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 10 V / I_{AN}
Current limitation to approx. 37 mA	
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

Nominal conditions	
Auxiliary voltage	U_{HN} ±2%, 50 ... 60 Hz
Input voltage	U_{EN} ± 0.5%
Power factor	sin ϕ = 1.0 ... 0.8
Frequency	50 / 60 Hz
Waveform	Sine, distortion factor ≤ 0.1%
Ambient temperature	23°C ±1K
Warm-up time	≥ 5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 7 VA 115 V~ (-15% +10%); < 4 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 4 … 7 VA
General technical data	
Test voltage	All circuits against housing: 3510 V_{eff} 5 sec. Measuring circuit and auxiliary voltage against output: 3510 V_{eff} 5 sec. Currents against each other and against voltage: 3510 V_{eff} 5 sec.
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 270 g



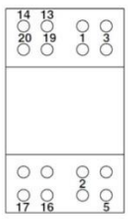
Block circuit diagram
(example)

Connections



Terminal assignment

1	I_E L_1
2	U_E L_1
3	I_E L_1
5	U_E L_2
8	–
11	–
13	U_A(+)
14	U_A(–)
16	$U_H$$L_1$ (+)
17	U_HN (–)
19	I_A (+)
20	I_A (–)



MW-1.1 – Measuring transducer for effective power (also suitable for frequency inverters)

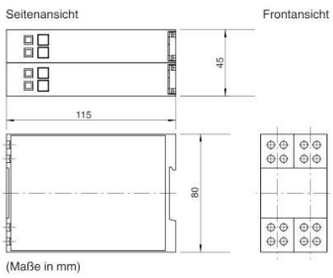
Characteristic	Order number									
MW-1.1, measuring transducer for effective power Order No.: PMU10 – xxxxxxxxx	PMU	10 -	X	X	X	X	X	X	X	X
1. Application										
Single-phase alternating current			1							
2. Current input										
1 A primary current please specify				1						
5 A primary current please specify				5						
Special current input				9						
3.Voltage input Input voltages Um (AC) Please specify translation ratio _____										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
300 V					5					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify___W						1				
5. Frequency range										
48 ... 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 ... 20 mA and 0 ... 10 V								1		
0 ... 10 mA and 0 ... 10 V								2		
0 ... 5 mA and 0 ... 10 V								3		
4 ... 20 mA and 2 ... 10 V								4		
- 20 ... 0 ... 20 mA and - 10 ... 0 ... 10 V								5		
7. Auxiliary power supply										
AC 230 V (195 ... 253 V), (48 ... 62 Hz)									1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)									2	
DC 24 V (20 ... 72 V)									3	
DC 20 ... 100 V / AC 15 ... 70 V									4	
DC 90 ... 357 V / AC 65 ... 253 V									5	
8. Test reports										
without test report										0
with test report German_English										1

MWg-3.1

Measuring transducer for effective power
(also possible for frequency inverters)

Characteristics/uses

- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation



Application

Measuring transducer for recording the active power of a 3-wire three-phase mains with an even phase load. The output signal is a load-independent DC current or imprinted DC voltage signal that is directly proportional to the active power of the primary mains.

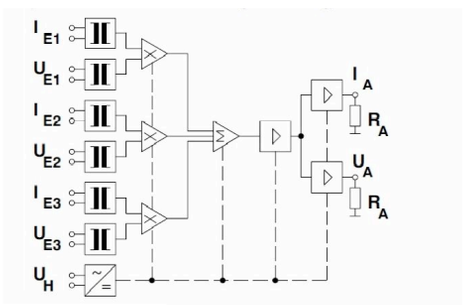
Functional principle

Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the measured values in an analogue way and integrates them with a low-pass filter.

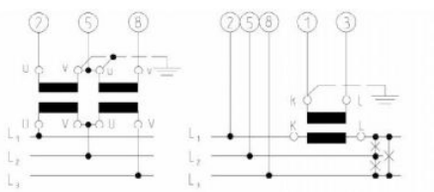
Technical parameters

Measuring input	
Nominal frequency	50 or 60 Hz, Harmonic content ≤ 0.2
Nominal input current I_{EN}	0…0.5-5 A
Input nominal voltage U_{EN}	0 … 50-519 V
Intrinsic consumption	approx. 1 mA per voltage path < 0.1 VA per current path at 1 A < 0.4 VA per current path at 5 A
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, permanent 2 · U_{EN}, 20 I_{EN} max. 1 sec.
Operating voltage	max. 519 V
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 10 V / I_{AN}
Current limitation	to approx. 37 mA
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

Nominal conditions	
Auxiliary voltage	U_{HN} ±2%, 50 ... 60 Hz
Input voltage	U_{EN} ± 0.5%
Power factor	sin ϕ = 1.0 ... 0.8
Frequency	50 / 60 Hz
Waveform	Sine, distortion factor ≤ 0.1%
Ambient temperature	23°C ±1K
Warm-up time	≥ 5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 7 VA 115 V~ (-15% +10%); < 4 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 4 … 7 VA
General technical data	
Test voltage	All circuits against housing: 3510 V_{eff} 5 sec. Measuring circuit and auxiliary voltage against Output: 3510 V_{eff} 5 sec. currents against each other and against Voltage: 3510 V_{eff} 5 sec.
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 270 g

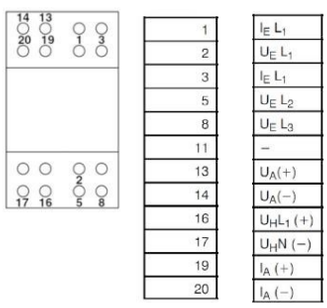


Block circuit diagram
(example)



Connections

Terminal assignment



MWg-3.1 – Measuring transducer for effective power (also suitable for frequency inverters)

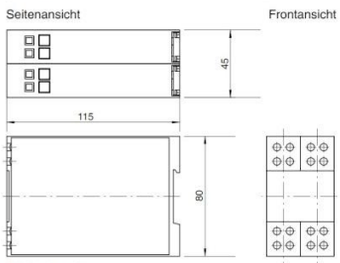
	Order number									
MWg-3.1, measuring transducer for effective power Order No.: PMU11 – xxxxxxxxx	PMU	11 -	X	X	X	X	X	X	X	X
1. Application										
3-wire three-phase current, even load			1							
2. Current input										
1 A primary current please specify				1						
5 A primary current please specify				5						
Special current input				9						
3.Voltage input Input voltages Um (AC) Please specify translation ratio _____										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (Max. 300 V nominal mains voltage phase-zero)					5					
415 V (Max. 300 V nominal mains voltage phase-zero)					6					
440 V (Max. 300 V nominal mains voltage phase-zero)					7					
500 V (Max. 300 V nominal mains voltage phase-zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify____W						1				
5. Frequency range										
48 ... 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 ... 20 mA and 0 ... 10 V								1		
0 ... 10 mA and 0 ... 10 V								2		
0 ... 5 mA and 0 ... 10 V								3		
4 ... 20 mA and 2 ... 10 V								4		
- 20 ... 0 ... 20 mA and - 10 ... 0 ... 10 V								5		
7. Auxiliary power supply										
AC 230 V (195 ... 253 V), (48 ... 62 Hz)									1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)									2	
DC 24 V (20 ... 72 V)									3	
DC 20 ... 100 V / AC 15 ... 70 V									4	
DC 90 ... 357 V / AC 65 ... 253 V									5	
8. Test reports										
without test report										0
with test report German_English										1

MWg-4.1

Measuring transducer for effective power
(also suitable for frequency inverters)

Characteristics/uses

- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation



(Maße in mm)

Application

Measuring transducer for recording the effective power of a 4-wire three-phase mains with an even phase load. The output signal is a load-independent DC current or imprinted DC voltage signal that is directly proportional to the active power of the primary mains.

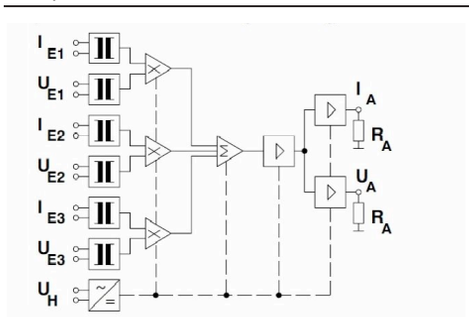
Functional principle

Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the measured values in an analogue way and integrates them with a low-pass filter.

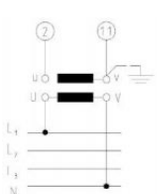
Technical parameters

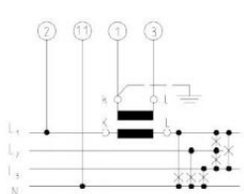
Measuring input	
Nominal frequency	50 or 60 Hz, Harmonic content ≤ 0.2
Nominal input current I_{EN}	0…0.5-5 A
Input nominal voltage U_{EN}	0 … 50-519 V
Intrinsic consumption	approx. 1 mA per voltage path < 0.1 VA per current path at 1 A input < 0.4 VA per current path at 5 A input
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, permanent 2 · U_{EN}, 20 I_{EN} max. 1 sec.
Operating voltage	Max. 519 V
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 10 V / I_{AN}
Current limitation	to approx. 37 mA
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

Nominal conditions	
Auxiliary voltage	U_{HN} ±2%, 50 ... 60 Hz
Input voltage	U_{EN} ± 0.5%
Power factor	sin ϕ = 1.0 ... 0.8
Frequency	50 / 60 Hz
Waveform	Sine, distortion factor ≤ 0.1%
Ambient temperature	23°C ±1K
Warm-up time	≥ 5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 7 VA 115 V~ (-15% +10%); < 4 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 4 … 7 VA
General technical data	
Test voltage	All circuits against housing: 3510 V_{eff} 5 sec Measuring circuit and auxiliary voltage against Output: 3510 V_{eff} 5 sec. currents against each other and against Voltage: 3510 V_{eff} 5 sec.
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 270 g



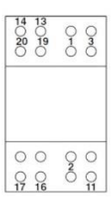
Block circiut diagram
(example)


Connections



Terminal assignment

1	$I_E L_1$
2	$U_E L_1$
3	$I_E L_1$
5	–
8	–
11	$U_E N$
13	$U_A(+)$
14	$U_A(-)$
16	$U_H L_1$ (+)
17	$U_H N$ (−)
19	I_A (+)
20	I_A (−)

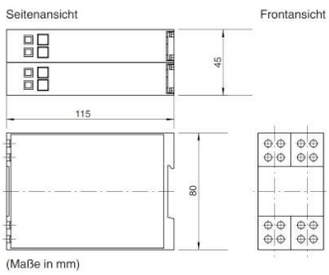


MWg-4.1 – Measuring transducer for effective power (also suitable for frequency inverters)

	Order number									
MWg-4.1, measuring transducer for effective power Order No.: PMU13 – xxxxxxxxx	PMU	13 -	X	X	X	X	X	X	X	X
1. Application										
4-wire three-phase current, even load			1							
2. Current input										
1 A primary current please specify				1						
5 A primary current please specify				5						
Special current input				9						
3.Voltage input Input voltages Um (AC) Please specify translation ratio _____										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (Max. 300 V nominal mains voltage phase-zero)					5					
415 V (Max. 300 V nominal mains voltage phase-zero)					6					
440 V (Max. 300 V nominal mains voltage phase-zero)					7					
500 V (Max. 300 V nominal mains voltage phase-zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify____W						1				
5. Frequency range										
48 ... 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 ... 20 mA and 0 ... 10 V								1		
0 ... 10 mA and 0 ... 10 V								2		
0 ... 5 mA and 0 ... 10 V								3		
4 ... 20 mA and 2 ... 10 V								4		
- 20 ... 0 ... 20 mA and - 10 ... 0 ... 10 V								5		
7. Auxiliary power supply										
AC 230 V (195 ... 253 V), (48 ... 62 Hz)									1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)									2	
DC 24 V (20 ... 72 V)									3	
DC 20 ... 100 V / AC 15 ... 70 V									4	
DC 90 ... 357 V / AC 65 ... 253 V									5	
8. Test reports										
without test report										0
with test report German_English										1

MWu-3.1

Measuring transducer for effective power
(also suitable for frequency inverters)



(Maße in mm)

Characteristics/uses

- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

Application

Measuring transducer for recording the effective power of a 3-wire three-phase mains with an even or arbitrary phase load. The output signal is a load-independent DC current or imprinted DC voltage signal that is directly proportional to the active power of the primary mains.

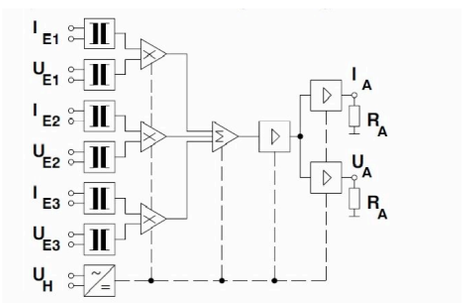
Functional principle

Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the measured values in an analogue way and integrates them with a low-pass filter.

Technical parameters

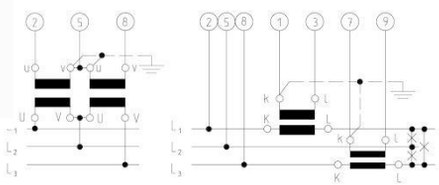
Measuring input	
Nominal frequency	50 or 60 Hz
	Harmonic content ≤ 0.2
Nominal input current I_{EN}	0…0.5-5 A
Input nominal voltage U_{EN}	0 … 50-519 V
Intrinsic consumption	approx. 1 mA per voltage path
	< 0.1 VA per current path at 1 A
	< 0.4 VA per current path at 5 A
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, permanent
	2 · U_{EN}, 20 I_{EN} max. 1 sec.
Operating voltage	max. 519 V
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 10 V / I_{AN}
Current limitation	to approx. 37 mA
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

Nominal conditions	
Auxiliary voltage	U_{HN} ±2%, 50 ... 60 Hz
Input voltage	U_{EN} ± 0.5%
Power factor	sin ϕ = 1.0 ... 0.8
Frequency	50 / 60 Hz
Waveform	Sine, distortion factor ≤ 0.1%
Ambient temperature	23°C ±1K
Warm-up time	≥ 5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 7 VA
	115 V~ (-15% +10%); < 4 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 4 … 7 VA
General technical	**data**
Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
	Measuring circuit and auxiliary voltage against
	Output: 3510 V_{eff} 5 sec.
	currents against each other and against
	Voltage: 3510 V_{eff} 5 sec.
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 290 g



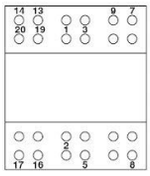
Block circuit diagram
(example)

Connections



Terminal assignment

1	I_E L_1
2	U_E L_1
3	I_E L_1
4	–
5	U_E L_2
6	–
7	I_E L_3
8	U_E L_3
9	I_E L_3
11	–
13	U_A (+)
14	U_A (–)
16	U_H L_1 (+)
17	U_H N (–)
19	I_A (+)
20	I_A (–)

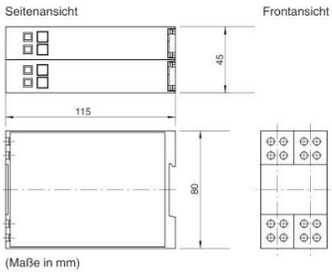


MWu-3.1 – Measuring transducer for effective power (also suitable for frequency inverters)

	Order number									
MWu-3.1, measuring transducer for effective power Order No.: PMU12 – xxxxxxxxx	PMU	12 -	X	X	X	X	X	X	X	X
1. Application										
3-wire three-phase current, arbitrary load			1							
2. Current input										
1 A primary current please specify				1						
5 A primary current please specify				5						
Special current input				9						
3.Voltage input Input voltages Um (AC) Please specify translation ratio _____										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (Max. 300 V nominal mains voltage phase-zero)					5					
415 V (Max. 300 V nominal mains voltage phase-zero)					6					
440 V (Max. 300 V nominal mains voltage phase-zero)					7					
500 V (Max. 300 V nominal mains voltage phase-zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify____W						1				
5. Frequency range										
48 ... 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 ... 20 mA and 0 ... 10 V								1		
0 ... 10 mA and 0 ... 10 V								2		
0 ... 5 mA and 0 ... 10 V								3		
4 ... 20 mA and 2 ... 10 V								4		
- 20 ... 0 ... 20 mA and - 10 ... 0 ... 10 V								5		
7. Auxiliary power supply										
AC 230 V (195 ... 253 V), (48 ... 62 Hz)									1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)									2	
DC 24 V (20 ... 72 V)									3	
DC 20 ... 100 V / AC 15 ... 70 V									4	
DC 90 ... 357 V / AC 65 ... 253 V									5	
8. Test reports										
without test report										0
with test report German_English										1

MWu-4.1

Measuring transducer for effective power
(also suitable for frequency inverters)



Characteristics/uses

- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

Application

Measuring transducer for recording the effective power of a 3-wire three-phase mains with an even or arbitrary phase load. The output signal is a load-independent DC current or imprinted DC voltage signal that is directly proportional to the active power of the primary mains.

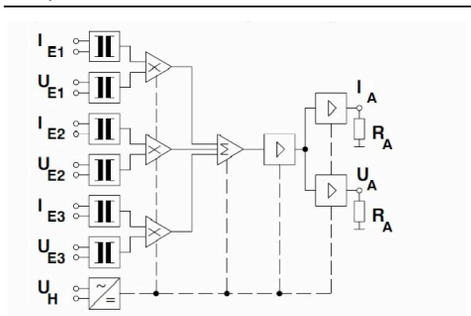
Functional principle

Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the measured values in an analogue way and integrates them with a low-pass filter.

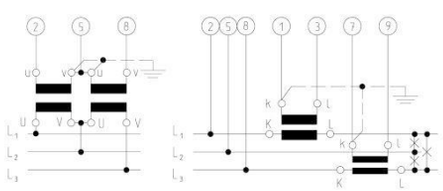
Technical parameters

Measuring input	
Nominal frequency	50 or 60 Hz
	Harmonic content ≤ 0.2
Nominal input current I_{EN}	0…0.5-5 A
Input nominal voltage U_{EN}	0 … 50-519 V
Intrinsic consumption	approx. 1 mA per voltage path
	< 0.1 VA per current path at 1 A
	< 0.4 VA per current path at 5 A
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, permanent
	2 · U_{EN}, 20 I_{EN} max. 1 sec.
Operating voltage	max. 519 V
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 10 V / I_{AN}
Current limitation	to approx. 37 mA
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

Nominal conditions	
Auxiliary voltage	U_{HN} ±2%, 50 ... 60 Hz
Input voltage	U_{EN} ± 0.5%
Power factor	sin ϕ = 1.0 ... 0.8
Frequency	50 / 60 Hz
Waveform	Sine, distortion factor ≤ 0.1%
Ambient temperature	23°C ±1K
Warm-up time	≥ 5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 7 VA
	115 V~ (-15% +10%); < 4 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 4 … 7 VA
General technical	**data**
Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
	Measuring circuit and auxiliary voltage against
	Output: 3510 V_{eff} 5 sec.
	currents against each other and against
	Voltage: 3510 V_{eff} 5 sec.
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 290 g



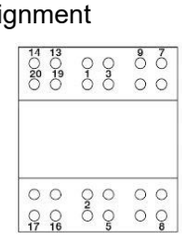
Block circuit diagram
(example)



Connections

Terminal assignment

1	I_E L_1
2	U_E L_1
3	I_E L_1
4	–
5	U_E L_2
6	–
7	I_E L_3
8	U_E L_3
9	I_E L_3
11	–
13	U_A(+)
14	U_A(–)
16	U_H L_1 (+)
17	U_H N (–)
19	I_A (+)
20	I_A (–)



MWu-4.1 – Measuring transducer for effective power (also suitable for frequency inverters)

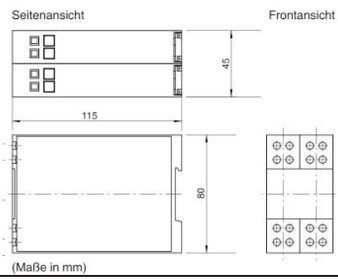
	Order number									
MWu-4.1, measuring transducer for effective power Order No.: PMU14 – xxxxxxxxx	PMU	14 -	X	X	X	X	X	X	X	X
1. Application										
4-wire three-phase current, arbitrary load			1							
2. Current input										
1 A primary current please specify				1						
5 A primary current please specify				5						
Special current input				9						
3.Voltage input Input voltages Um (AC) Please specify translation ratio _____										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (Max. 300 V nominal mains voltage phase-zero)					5					
415 V (Max. 300 V nominal mains voltage phase-zero)					6					
440 V (Max. 300 V nominal mains voltage phase-zero)					7					
500 V (Max. 300 V nominal mains voltage phase-zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify___W						1				
5. Frequency range										
48 ... 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 ... 20 mA and 0 ... 10 V								1		
0 ... 10 mA and 0 ... 10 V								2		
0 ... 5 mA and 0 ... 10 V								3		
4 ... 20 mA and 2 ... 10 V								4		
- 20 ... 0 ... 20 mA and - 10 ... 0 ... 10 V								5		
7. Auxiliary power supply										
AC 230 V (195 ... 253 V), (48 ... 62 Hz)									1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)									2	
DC 24 V (20 ... 72 V)									3	
DC 20 ... 100 V / AC 15 ... 70 V									4	
DC 90 ... 357 V / AC 65 ... 253 V									5	
8. Test reports										
without test report										0
with test report German_English										1

MBg-3.1

Measuring transducer for reactive power
(also suitable for frequency inverters)

Characteristics/uses

- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation



Application

Measuring transducer for recording the reactive power of a 3-wire three-phase mains with an even phase load. The output signal is a load-independent DC current or imprinted DC voltage signal that is directly proportional to the active power of the primary mains.

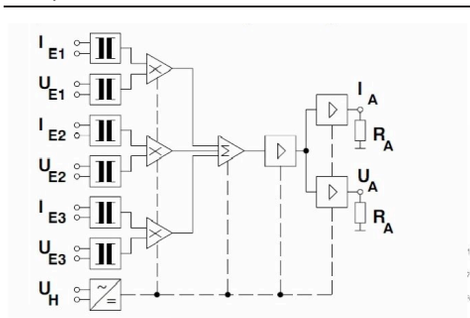
Functional principle

Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the measured values in an analogue way and integrates them with a low-pass filter.

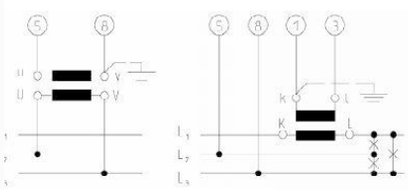
Technical parameters

Measuring input	
Nominal frequency	50 or 60 Hz
	Harmonic content ≤ 0.2
Nominal input current I_{EN}	0…0.5-5 A
Input nominal voltage U_{EN}	0 … 50-519 V
Intrinsic consumption	approx. 1 mA per voltage path
	< 0.1 VA per current path at 1 A
	< 0.4 VA per current path at 5 A
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, permanent
	2 · U_{EN}, 20 I_{EN} max. 1 sec.
Operating voltage	Max. 519 V
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 10 V / I_{AN}
Current limitation	to approx. 37 mA
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

Nominal conditions	
Auxiliary voltage	U_{HN} ±2%, 50 ... 60 Hz
Input voltage	U_{EN} ± 0.5%
Power factor	sin ϕ = 1.0 ... 0.8
Frequency	50 / 60 Hz
Waveform	Sine, distortion factor ≤ 0.1%
Ambient temperature	23°C ±1K
Warm-up time	≥ 5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 7 VA
	115 V~ (-15% +10%); < 4 VA
DC voltage	24 V = (20 … 72V); < 3 VA
	20 … 100 V= or 15 … 70V~; < 3 VA
	90 … 357 V= or 65 … 253V~; < 4 … 7 VA
General technical data	
Test voltage	All circuits against housing: 3510 Veff 5 sec.
	Measuring circuit and auxiliary voltage against
	Output: 3510 Veff 5 sec.
	currents against each other and against
	Voltage: 3510 Veff 5 sec.
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 270 g



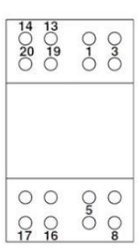
Block circuit diagram
(example)



Connections

Terminal assignment

1	I_E L_1
2	–
3	I_E L_1
5	U_E L_2
8	U_E L_3
11	–
13	U_A(+)
14	U_A(–)
16	$U_H L_1$ (+)
17	$U_H N$ (–)
19	I_A (+)
20	I_A (–)

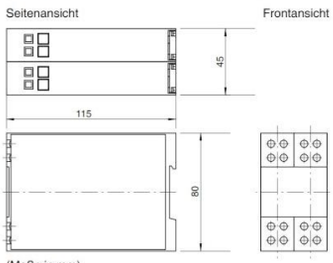


MBg-3.1 – Measuring transducer for reactive power (also suitable for frequency inverters)

	Order number									
MBg-3.1, measuring transducer for reactive power Order No.: PMU15 – xxxxxxxxx	PMU	15 -	X	X	X	X	X	X	X	X
1. Application										
3-wire three-phase current, even load			1							
2. Current input										
1 A primary current please specify				1						
5 A primary current please specify				5						
Special current input				9						
3.Voltage input Input voltages Um (AC) Please specify translation ratio _____										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (Max. 300 V nominal mains voltage phase-zero)					5					
415 V (Max. 300 V nominal mains voltage phase-zero)					6					
440 V (Max. 300 V nominal mains voltage phase-zero)					7					
500 V (Max. 300 V nominal mains voltage phase-zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify____W						1				
5. Frequency range										
48 ... 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 ... 20 mA and 0 ... 10 V								1		
0 ... 10 mA and 0 ... 10 V								2		
0 ... 5 mA and 0 ... 10 V								3		
4 ... 20 mA and 2 ... 10 V								4		
- 20 ... 0 ... 20 mA and - 10 ... 0 ... 10 V								5		
7. Auxiliary power supply										
AC 230 V (195 ... 253 V), (48 ... 62 Hz)									1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)									2	
DC 24 V (20 ... 72 V)									3	
DC 20 ... 100 V / AC 15 ... 70 V									4	
DC 90 ... 357 V / AC 65 ... 253 V									5	
8. Test reports										
without test report										0
with test report German_English										1

MBg-4.1

Measuring transducer for reactive power
(also suitable for frequency inverters)



(Maße in mm)

Characteristics/uses

- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

Application

Measuring transducer for recording the reactive power of a 4-wire three-phase mains with an even phase load. The output signal is a load-independent DC current or imprinted DC voltage signal that is directly proportional to the active power of the primary mains.

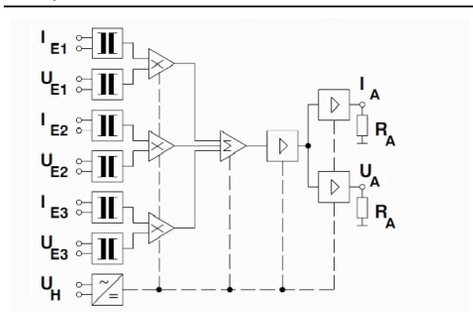
Functional principle

Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the measured values in an analogue way and integrates them with a low-pass filter.

Technical parameters

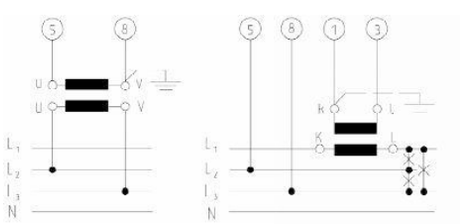
Measuring input	
Nominal frequency	50 or 60 Hz
	Harmonic content ≤ 0.2
Nominal input current I_{EN}	0…0.5-5 A
Input nominal voltage U_{EN}	0 … 50-519 V
Intrinsic consumption	approx. 1 mA per voltage path
	< 0.1 VA per current path at 1 A
	< 0.4 VA per current path at 5 A
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, permanent
	2 · U_{EN}, 20 I_{EN} max. 1 sec.
Operating voltage	Max. 519 V
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 10 V / I_{AN}
Current limitation to approx. 37 mA	
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

Nominal conditions	
Auxiliary voltage	U_{HN} ±2%, 50 ... 60 Hz
Input voltage	U_{EN} ± 0.5%
Power factor	sin ϕ = 1.0 ... 0.8
Frequency	50 / 60 Hz
Waveform	Sine, distortion factor ≤ 0.1%
Ambient temperature	23°C ±1K
Warm-up time	≥ 5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 7 VA
	115 V~ (-15% +10%); < 4 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 4 … 7 VA
General technical data	
Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
	Measuring circuit and auxiliary voltage against
	Output: 3510 V_{eff} 5 sec.
	currents against each other and against
	Voltage: 3510 V_{eff} 5 sec.
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 270 g



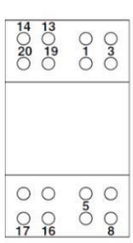
Block circuit diagram
(example)

Connections



Terminal assignment

1	I_E L_1
2	–
3	I_E L_1
5	U_E L_2
8	U_E L_3
11	–
13	U_A(+)
14	U_A(–)
16	U_H L_1 (+)
17	U_H N (–)
19	I_A (+)
20	I_A (–)



MBg-4.1 – Measuring transducer for reactive power (also suitable for frequency inverters)

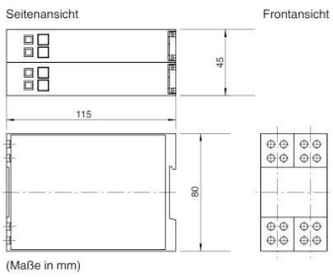
	Order number									
MBg-4.1, measuring transducer for reactive power Order No.: PMU17 – xxxxxxxxx	PMU	17 -	X	X	X	X	X	X	X	X
1. Application										
4-wire three-phase current, even load			1							
2. Current input										
1 A primary current please specify				1						
5 A primary current please specify				5						
Special current input				9						
3.Voltage input Input voltages Um (AC) Please specify translation ratio _____										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (Max. 300 V nominal mains voltage phase-zero)					5					
415 V (Max. 300 V nominal mains voltage phase-zero)					6					
440 V (Max. 300 V nominal mains voltage phase-zero)					7					
500 V (Max. 300 V nominal mains voltage phase-zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify____W						1				
5. Frequency range										
48 ... 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 ... 20 mA and 0 ... 10 V								1		
0 ... 10 mA and 0 ... 10 V								2		
0 ... 5 mA and 0 ... 10 V								3		
4 ... 20 mA and 2 ... 10 V								4		
- 20 ... 0 ... 20 mA and - 10 ... 0 ... 10 V								5		
7. Auxiliary power supply										
AC 230 V (195 ... 253 V), (48 ... 62 Hz)									1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)									2	
DC 24 V (20 ... 72 V)									3	
DC 20 ... 100 V / AC 15 ... 70 V									4	
DC 90 ... 357 V / AC 65 ... 253 V									5	
8. Test reports										
without test report										0
with test report German_English										1

MBu-3.1

Measuring transducer for reactive power
(also suitable for frequency inverters)

Characteristics/uses

- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation



(Maße in mm)

Application

Measuring transducer for recording the reactive power in a 3-wire three-phase mains with an even or arbitrary phase load. The output signal is a load-independent DC current or imprinted DC voltage signal that is directly proportional to the active power of the primary mains.

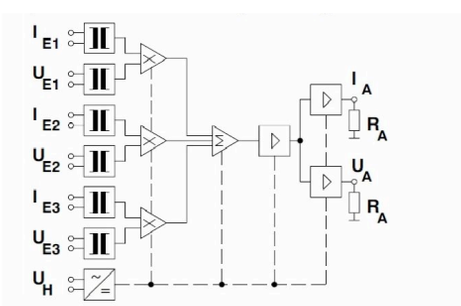
Functional principle

Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the measured values in an analogue way and integrates them with a low-pass filter.

Technical parameters

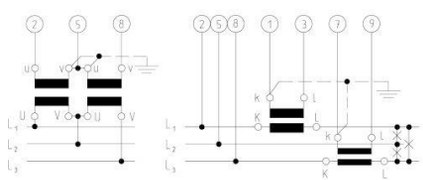
Measuring input	
Nominal frequency	50 or 60 Hz
	Harmonic content ≤ 0.2
Nominal input current I_{EN}	0…0.5-5 A
Input nominal voltage U_{EN}	0 … 50-519 V
Intrinsic consumption	approx. 1 mA per voltage path
	< 0.1 VA per current path at 1 A
	< 0.4 VA per current path at 5 A
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, permanent
	2 · U_{EN}, 20 I_{EN} max. 1 sec.
Operating voltage	Max. 519 V
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 10 V / I_{AN}
Current limitation	to approx. 37 mA
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

Nominal conditions	
Auxiliary voltage	U_{HN} ±2%, 50 ... 60 Hz
Input voltage	U_{EN} ± 0.5%
Power factor	sin ϕ = 1.0 ... 0.8
Frequency	50 / 60 Hz
Waveform	Sine, distortion factor ≤ 0.1%
Ambient temperature	23°C ±1K
Warm-up time	≥ 5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 7 VA
	115 V~ (-15% +10%); < 4 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 4 … 7 VA
General technical data	
Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
	Measuring circuit and auxiliary voltage against
	Output: 3510 V_{eff} 5 sec.
	currents against each other and against
	Voltage: 3510 V_{eff} 5 sec.
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 290 g



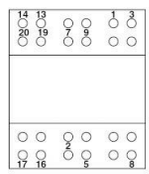
Block circuit diagram
(example)

Connections



Terminal assignment

1	I_E L_1
2	U_E L_1
3	I_E L_1
4	–
5	U_E L_2
6	–
7	I_E L_3
8	U_E L_3
9	I_E L_3
11	–
13	U_A(+)
14	U_A(–)
16	U_H L_1 (+)
17	U_H N (–)
19	I_A (+)
20	I_A (–)



MBu-3.1 – Measuring transducer for reactive power (also suitable for frequency inverters)

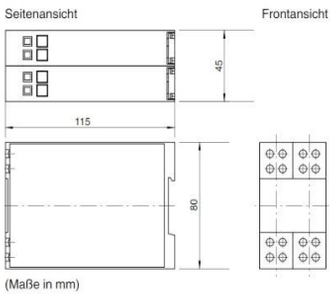
	Order number									
MBu-3.1, measuring transducer for reactive power Order No.: PMU16 – xxxxxxxxx	PMU	16	X	X	X	X	X	X	X	X
1. Application										
3-wire three-phase current, arbitrary load			1							
2. Current input										
1 A primary current please specify				1						
5 A primary current please specify				5						
Special current input				9						
3.Voltage input Input voltages Um (AC) Please specify translation ratio _____										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (Max. 300 V nominal mains voltage phase-zero)					5					
415 V (Max. 300 V nominal mains voltage phase-zero)					6					
440 V (Max. 300 V nominal mains voltage phase-zero)					7					
500 V (Max. 300 V nominal mains voltage phase-zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify____W						1				
5. Frequency range										
48 ... 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 ... 20 mA and 0 ... 10 V								1		
0 ... 10 mA and 0 ... 10 V								2		
0 ... 5 mA and 0 ... 10 V								3		
4 ... 20 mA and 2 ... 10 V								4		
- 20 ... 0 ... 20 mA and - 10 ... 0 ... 10 V								5		
7. Auxiliary power supply										
AC 230 V (195 ... 253 V), (48 ... 62 Hz)									1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)									2	
DC 24 V (20 ... 72 V)									3	
DC 20 ... 100 V / AC 15 ... 70 V									4	
DC 90 ... 357 V / AC 65 ... 253 V									5	
8. Test reports										
without test report										0
with test report German_English										1

MBu-4.1

Measuring transducer for reactive power
(also suitable for frequency inverters)

Characteristics/uses

- Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation



(Maße in mm)

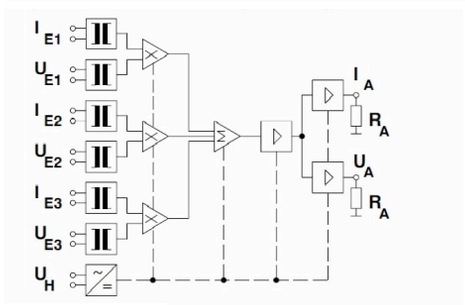
Application
Measuring transducer for recording the reactive power of a 4-wire three-phase mains with an even or arbitrary phase load. The output signal is a load-independent DC current or imprinted DC voltage signal that is directly proportional to the active power of the primary mains.

Functional principle
Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the measured values in an analogue way and integrates them with a low-pass filter.

Technical parameters

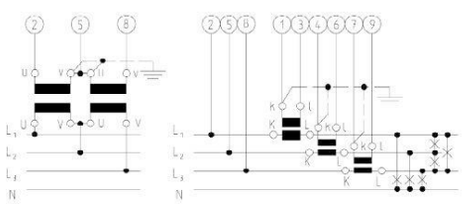
Measuring input	
Nominal frequency	50 or 60 Hz
	Harmonic content ≤ 0.2
Nominal input current I_{EN}	0…0.5-5 A
Input nominal voltage U_{EN}	0 … 50-519 V
Intrinsic consumption	approx. 1 mA per voltage path
	< 0.1 VA per current path at 1 A
	< 0.4 VA per current path at 5 A
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, permanent
	2 · U_{EN}, 20 I_{EN} max. 1 sec.
Operating voltage	max. 519 V
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 10 V / I_{AN}
Current limitation	to approx. 37 mA
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

Nominal conditions	
Auxiliary voltage	U_{HN} ±2%, 50 ... 60 Hz
Input voltage	U_{EN} ± 0.5%
Power factor	sin ϕ = 1.0 ... 0.8
Frequency	50 / 60 Hz
Waveform	Sine, distortion factor ≤ 0.1%
Ambient temperature	23°C ±1K
Warm-up time	≤ 5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 7 VA
	115 V~ (-15% +10%); < 4 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 4 … 7 VA
General technical data	
Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
	Measuring circuit and auxiliary voltage against
	Output: 3510 V_{eff} 5 sec.
	currents against each other and against
	Voltage: 3510 V_{eff} 5 sec.
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 310 g



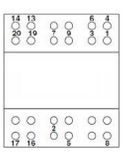
Block circuit diagram
(example)

Connections



Terminal assignment

1	I_E L_1
2	U_E L_1
3	I_E L_1
4	I_E L_2
5	U_E L_2
6	I_E L_2
7	I_E L_3
8	U_E L_3
9	I_E L_3
11	–
13	U_A(+)
14	U_A(–)
16	U_H L_1 (+)
17	U_H N (–)
19	I_A (+)
20	I_A (–)



MBu-4.1 – Measuring transducer for reactive power (also suitable for frequency inverters)

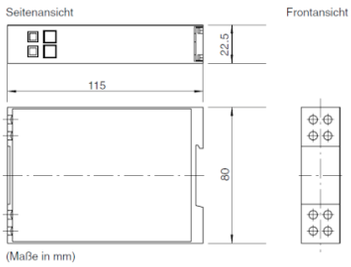
	Order number									
MBu-4.1, measuring transducer for reactive power Order No.: PMU18 – xxxxxxxxx	PMU	18 -	X	X	X	X	X	X	X	X
1. Application										
4-wire three-phase current, arbitrary load			1							
2. Current input										
1 A primary current please specify				1						
5 A primary current please specify				5						
Special current input				9						
3.Voltage input Input voltages Um (AC) Please specify translation ratio _____										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (Max. 300 V nominal mains voltage phase-zero)					5					
415 V (Max. 300 V nominal mains voltage phase-zero)					6					
440 V (Max. 300 V nominal mains voltage phase-zero)					7					
500 V (Max. 300 V nominal mains voltage phase-zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify____W						1				
5. Frequency range										
48 ... 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 ... 20 mA and 0 ... 10 V								1		
0 ... 10 mA and 0 ... 10 V								2		
0 ... 5 mA and 0 ... 10 V								3		
4 ... 20 mA and 2 ... 10 V								4		
- 20 ... 0 ... 20 mA and - 10 ... 0 ... 10 V								5		
7. Auxiliary power supply										
AC 230 V (195 ... 253 V), (48 ... 62 Hz)									1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)									2	
DC 24 V (20 ... 72 V)									3	
DC 20 ... 100 V / AC 15 ... 70 V									4	
DC 90 ... 357 V / AC 65 ... 253 V									5	
8. Test reports										
without test report										0
with test report German_English										1

MA-G.1

Measuring transducer for direct current

Characteristics/uses

- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Direct current
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation



Application

The measuring transducers convert currents into an load-independent DC current or an imprinted DC voltage with the correct sign. These can then be displayed, registered and/or used for control at the measurement location or in more distant control rooms.

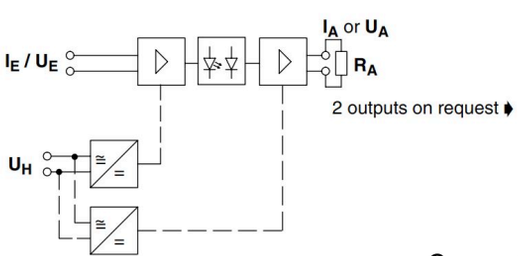
Functional principle

The current is measured internally via a shunt resistor. After this, the signal is galvanically isolated from the input via an optical path and converted into a proportional imprinted DC voltage or a proportional load-independent DC current.

Technical parameters

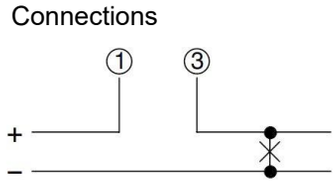
Measuring input	
Nominal input current I_N	200 µA – 5 A
Intrinsic consumption	IE • 0.1 V
Overload capacity	1.2 · IEN permanent
	10 · IEN max. 1 sec
Operating voltage	max. 519 V
	max. 300 V phase zero
Measurement output	
Nominal current IAN	0 ... 20 mA or 4 ... 20 mA
Load range RA	0 ... 12 V / IAN
Current limitation	to 120 ... 150% of the final value
Nominal voltage UAN	0 ... 10 V or 2 ... 10 V
Load RA	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms, 250ms, 100ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

Nominal conditions	
Auxiliary voltage	UHN ±5 %, 50 Hz with AC
Load	0.5 RA max. ±1% with current output
	RA min ±1% with voltage output
Ambient temperature	23°C ±1K
Warm-up time	≥ 5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 6 VA 115 V~ (-15% +10%); < 3.5 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 3 … 6 VA
General technical data	
Test voltage	2210 V all circuits against housing
Working voltage	3536 V all circuits to each other 300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 120 g

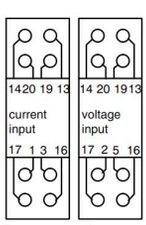


Block circuit diagram
(example)

Connections



Terminal assignment



T.	Function	T.	Function
1	I_E (+)		single output:
3	I_E (–)	19	U_A, I_A (+)
2	U_E (+)	20	U_A, I_A (–)
5	U_E (–)		dual output:
16	U_H L1(+)	13	U_A (+)
17	U_H N (–)	14	U_A (–)
		19	I_A (+)
		20	I_A (–)

I_E current input
U_E voltage input
U_H auxiliary voltage input
I_A current output
U_A voltage output

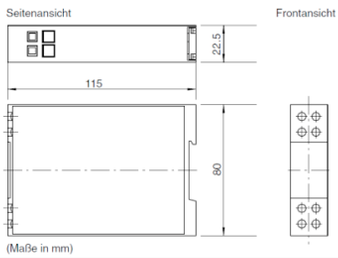
The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

MA-G.1 – Measuring transducer for direct current

Characteristics	Order number								
MA-G.1, measuring transducer for direct current Order No. IMU28 - xxxxxx	IMU	28 –	X	X	X	X	X	X	X
1. Nominal input current									
0 ... 200 µA			1						
0 ... 20 mA			2						
0 ... 0.5 A			3						
0 ... 1 A			4						
0 ... 2 A			5						
-5 ... 0 ... +5 A			6						
Special range up to ± 5 A			9						
2. Frequency range input									
DC				0					
3. Output									
0 ... 20 mA					1				
4 ... 20 mA					2				
0 ... 10 V					3				
2 ... 10 V					4				
0 ... 20 mA and 0 ... 10 V					5				
4 ... 20 mA and 2 ... 10 V					6				
Special ranges					9				
0 ... 10 mA					A				
0 ... 5 A					B				
-20 ... 0 ... 20 mA					C				
-10 ... 0 ... 10 V					D				
-20 ... 0 ... 20 mA and -10 ... 0 ... 10 V					E				
according to specification					Z				
4. Accuracy									
± 0.5% of the final value						1			
± 0.2% of the final value						2			
5. Setting time									
500 ms							1		
250 ms							2		
100 ms							3		
6. Auxiliary power supply									
AC 230 V (195 ... 253 V), (48 ... 62 Hz)								1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)								2	
DC 24 V (20 ... 72 V)								3	
DC 20 ... 100 V / AC 15 ... 70 V								4	
DC 90 ... 357 V / AC 65 ... 253 V								5	
7. Test reports									
without test report									0
with test report German_English									1

MV-G.1

Measuring transducer for DC voltage



Characteristics/uses

- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: DC voltage
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

Application

The measuring transducers convert voltages into an load-independent DC current or an imprinted DC voltage with the correct sign. These can then be displayed, registered and/or used for control at the measurement location or in more distant control rooms.

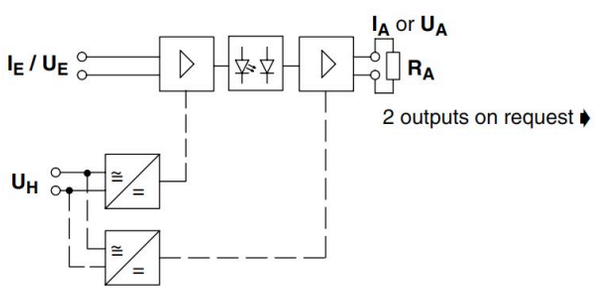
Functional principle

The voltage is measured internally via a voltage divider. After this, the signal is galvanically isolated from the input via an optical path and converted into a proportional imprinted DC voltage or a proportional load-independent DC current.

Technical parameters

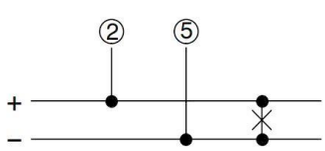
Measuring input	
Nominal frequency f_N	48…62 Hz
Input nominal voltage U_{EN}	U_{EN} = 60 mV – 300 V
Intrinsic consumption	U_E^2 / R_E
Overload capacity	1.2 · U_{EN} permanent
	2 · U_{EN} max. 1 sec.
Operating voltage	max. 300 V
Measurement output	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA
Load range R_A	0 ... 12 V / I_{AN}
Current limitation	to 120 ... 150% of the final value
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

Nominal conditions	
Auxiliary voltage	U_{HN} ±5 %, 50 Hz with AC
Load	0.5 RA max. ±1% with current output
	R_A min ±1% with voltage output
Ambient temperature	23°C ±1K
Warm-up time	≥5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 6 VA
	115 V~ (-15% +10%); < 3.5 VA
DC voltage	24 V = (20 … 72V); < 3 VA
Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
AC / DC	90 … 357 V= or 65 … 253V~; < 3 … 6 VA
General technical data	
Test voltage	2210 V all circuits against housing
	3536 V all circuits to each other
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 120 g

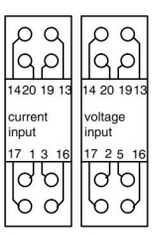


Block circuit diagram
(example)

Connections



Terminal assignment (for all types)



T.	Function
1	I_E (+)
3	I_E (–)
2	U_E (+)
5	U_E (–)
16	U_H L1(+)
17	U_H N (–)

T.	Function
	single output:
19	U_A, I_A (+)
20	U_A, I_A (–)
	dual output:
13	U_A (+)
14	U_A (–)
19	I_A (+)
20	I_A (–)

I_E current input
U_E voltage input
U_H auxiliary voltage input
I_A current output
U_A voltage output

The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

MV-G.1 – Measuring transducer for direct current

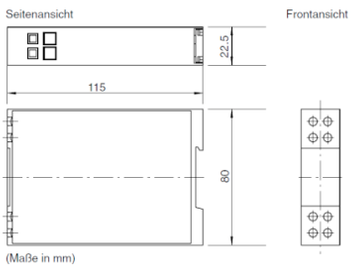
Characteristics	Order number								
MV-G.1, measuring transducer for DC voltage Order No. UMU30 - xxxxxx	UMU	30 –	X	X	X		X	X	X
1. Nominal input current									
0 ... 60 mV			1						
0 ... 1 V			2						
0 ... 10 V			3						
0 ... 115 V			4						
0 ... 230 V			5						
Special range up to ± 300 V			9						
2. Frequency range input									
DC				0					
3. Output									
0 ... 20 mA					1				
4 ... 20 mA					2				
0 ... 10 V					3				
2 ... 10 V					4				
0 ... 20 mA and 0 ... 10 V					5				
4 ... 20 mA and 2 ... 10 V					6				
Special ranges					9				
0 ... 10 mA					A				
0 ... 5 A					B				
-20 ... 0 ... 20 mA					C				
-10 ... 0 ... 10 V					D				
-20 ... 0 ... 20 mA and -10 ... 0 ... 10 V					E				
according to specification					Z				
4. Accuracy									
± 0.5% of the final value						1			
± 0.2% of the final value						2			
5. Setting time									
500 ms							1		
250 ms							2		
100 ms							3		
6. Auxiliary power supply									
AC 230 V (195 ... 253 V), (48 ... 62 Hz)								1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)								2	
DC 24 V (20 ... 72 V)								3	
DC 20 ... 100 V / AC 15 ... 70 V								4	
DC 90 ... 357 V / AC 65 ... 253 V								5	
7. Test reports									
without test report									0
with test report German_English									1

NT-G.1

Measuring transducer for DC standard signals

Characteristics/uses

- With auxiliary power supply
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Direct current and direct voltage
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation



Application

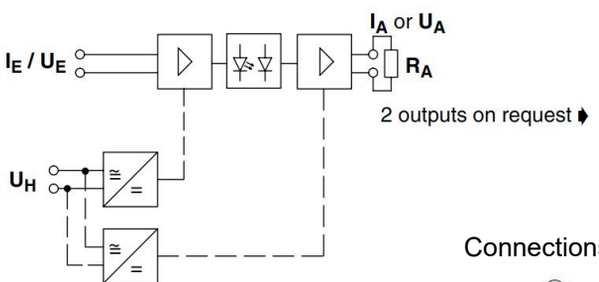
The isolation amplifier detects a standard signal (direct current 0/4 ... 20 mA or DC voltage 0 /2 ... 10 V), amplifies it with galvanic isolation and converts it into a load-independent DC current signal or an imprinted DC voltage signal.

Functional principle

The current measurement is carried out internally via a shunt resistor, the voltage measurement via a voltage divider. After this, the signal is galvanically isolated from the input via an optical path and converted into a proportional imprinted DC voltage or a proportional load-independent DC current.

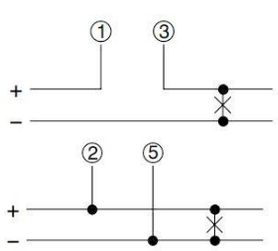
Technical parameters

Measuring input		**Nominal conditions**	
Input parameter	I_{EN} = 0 ... 20 mA, 4 ... 20 mA	Auxiliary voltage	U_{HN} ±5 %, 50 Hz with AC
	U_{EN} = 0 … 10 V, 2 … 10 V	Load	0.5 RA max. ±1% with current output
Intrinsic consumption	I_E • 0.1 V		RA min ±1% with voltage output
Overload capacity	1.2 · I_{EN} permanent	Ambient temperature	23°C ±1K
	2 · I_{EN} max. 1 sec.	Warm-up time	≥5 min
Operating voltage	Max. 300 V	**Auxiliary power supply**	
Measurement output		AC voltage	230 V~ (-15% +10%); < 6 VA
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA		115 V~ (-15% +10%); < 3.5 VA
Load range R_A	0 ... 12 V / I_{AN}	DC voltage	24 V = (20 … 72V); < 3 VA
Current limitation	to 120 ... 150% of the final value	Wide range	20 … 100 V= or 15 … 70V~; < 3 VA
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V	AC / DC	90 … 357 V= or 65 … 253V~; < 3 … 6 VA
Load R_A	≥ 4 kΩ	**General technical data**	
Load error	≤ 0.1% at 50% load change	Test voltage	2210 V all circuits against housing
Residual ripple	≤ 1%eff		3536 V all circuits to each other
Setting time	approx. 500ms, 250ms, 100ms	Working voltage	300 V (nominal mains voltage phase-zero)
Open-circuit voltage	≤ 15 V	Protection class	IP 40 housing, IP 20 terminals
Accuracy		Protection class	II
Basic accuracy	± 0.5% of the final value	Measurement category	CAT III
Temperature drift	≤ 0.02 %/K	Degree of contamination	2
		Weight	approx. 120 g

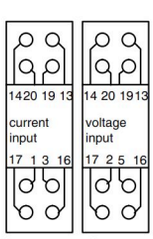


Block circuit diagram
(example)

Connections



Terminal assignment (for all types)



T.	Function
1	I_E (+)
3	I_E (–)
2	U_E (+)
5	U_E (–)
16	U_H L1(+)
17	U_H N (–)

T.	Function
	single output:
19	U_A, I_A (+)
20	U_A, I_A (–)
	dual output:
13	U_A (+)
14	U_A (–)
19	I_A (+)
20	I_A (–)

I_E current input
U_E voltage input
U_H auxiliary voltage input
I_A current output
U_A voltage output

The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

NT-G.1 – Measuring transducer for DC standard signals

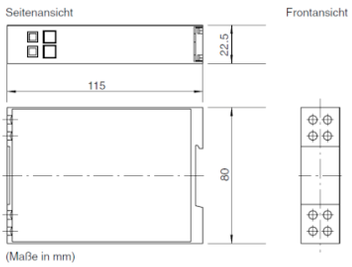
Characteristics	Order number								
NT-G.1, measuring transducer for DC standard signals Order No. NMU31 - xxxxxx	NMU	31 –	X	X	X		X	X	X
1. Nominal input current									
0 ... 20 mA			1						
0 ... 10 V			2						
4 ... 20 mA			3						
2 ... 10 V			4						
0 ... 60 mV			5						
2. Frequency range input									
DC				0					
3. Output									
0 ... 20 mA					1				
4 ... 20 mA					2				
0 ... 10 V					3				
2 ... 10 V					4				
0 ... 20 mA and 0 ... 10 V					5				
4 ... 20 mA and 2 ... 10 V					6				
Special ranges					9				
0 ... 10 mA					A				
0 ... 5 mA					B				
-20 ... 0 ... 20 mA					C				
-10 ... 0 ... 10 V					D				
-20 ... 0 ... 20 mA and -10 ... 0 ... 10 V					E				
according to specification					Z				
4. Accuracy									
± 0.5% of the final value						1			
± 0.2% of the final value						2			
5. Setting time									
500 ms							1		
250 ms							2		
100 ms							3		
6. Auxiliary power supply									
AC 230 V (195 ... 253 V), (48 ... 62 Hz)								1	
AC 115 V (98 ... 126 V), (48 ... 62 Hz)								2	
DC 24 V (20 ... 72 V)								3	
DC 20 ... 100 V / AC 15 ... 70 V								4	
DC 90 ... 357 V / AC 65 ... 253 V								5	
7. Test reports									
without test report									0
with test report German_English									1

Mt-G.oH

Isolating transducer for standard signals without auxiliary energy

Characteristics/uses

- Without auxiliary power supply
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Direct current
- Measurement output: Unipolar, live-zero and bipolar output parameters, as well as output with direct current



Application

The isolating transducer detects a standard direct current (0 ... 20 mA) and converts it back into a **galvanically isolated** load-independent DC current.

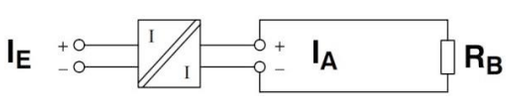
Functional principle

Input and output current are galvanically isolated from each other without additional auxiliary energy. The energy required for this is extracted from the input signal. The input resistance is therefore dependent on the input current and the connected load resistance RB.

Technical parameters

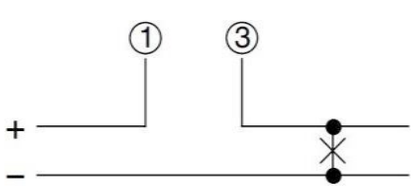
Measuring input	
Input parameter IEN	IEN = 20 mA
Intrinsic consumption	2.4 V at 20 mA
Overload capacity	Max. 2 I_{EN} permanent
Measurement output	
Nominal current I_{AN}	0 ... 20 mA
Load range R_A	0 … 500 Ω
Accuracy	
Basic accuracy	±0.2% (at 0 ... IEN)
Temperature drift	≤ 0.03 %/K
Nominal conditions	
Load	250 Ω ± 1%
Ambient temperature	23°C ±1K
Warm-up time	≥ 5 min
Test voltage	2210 V all circuits against housing
Protection class	3536 V Measuring circuit against output
	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 120 g

Bock circuit diagram



Terminal assignment

Connections



A	1	I_E (+)
B	3	I_E (–)
C		I_A (+)
D		I_A (–)
E		–
F		–
G		–
H		–

I_E Current input
I_A Current output

Mt-G.oH – Measuring transducer for standard signals without auxiliary energy

Characteristics	Order number					
Mt-G.oH, measuring transducer for standard signals without auxiliary energy Order No. NMU32 - xxxxxx	NMU	32 –	X	X	X	X
1. Application						
0 ... 20 mA for 1 standard signal			1			
2. Input measuring range						
0 ... 20 mA				A		
3. Output						
0 ... 20 mA					1	
4. Test reports						
without test report						0
with test report German_English						1

- Current transformers for industry
- Current transformers for tariffs
- Accessories for current transformers
- Medium-voltage transformers

- Bus bar insulators / -supports
- Shunts
- Voltage transformers
- All current sensors
- Measuring transducers
- Energy meters with or without MID approval
- Accessories for energy meters
- Panel board heaters, filter fans, roof fans and control units

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