

Measuring Transducers



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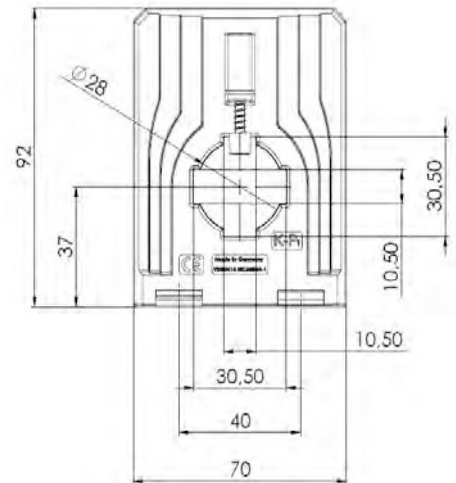
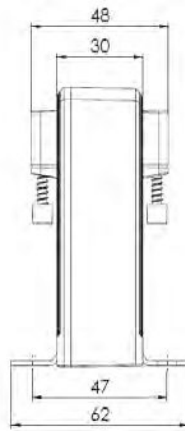
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CCT 31.3 RMS (Compensation current transformer, MBS All current sensors) Current transformers for the measurement of direct and alternating currents

- 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 mm ²
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:	$R_B \leq 500 \Omega$ ($U_H = 24$ V DC)
Current limit under overload:	< 25 mA
Accuracy:	$\pm 1,0 \%$
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 $\pm 15 \%$ 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

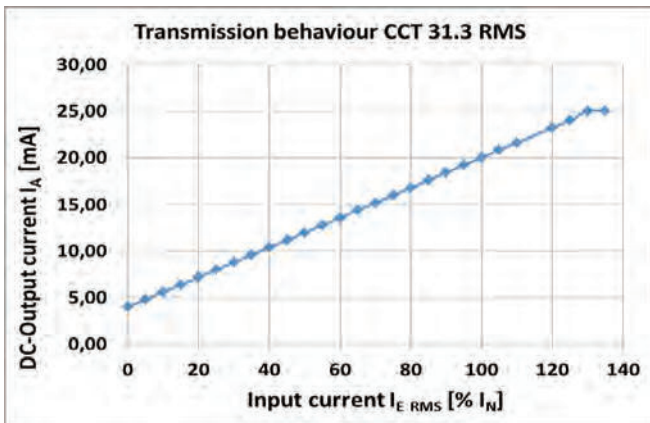
Functions of the CCT 31.3 RMS:

- 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.

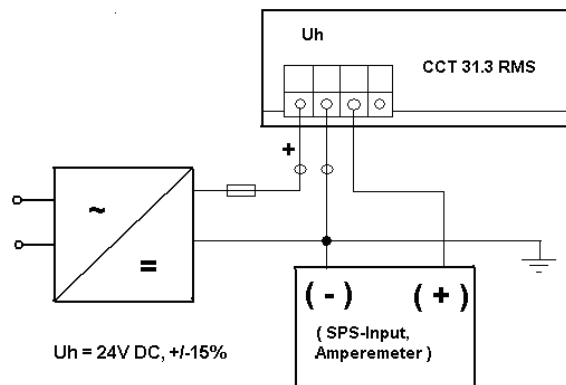
Advantages and benefits of the CCT 31.3 RMS:

- 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:

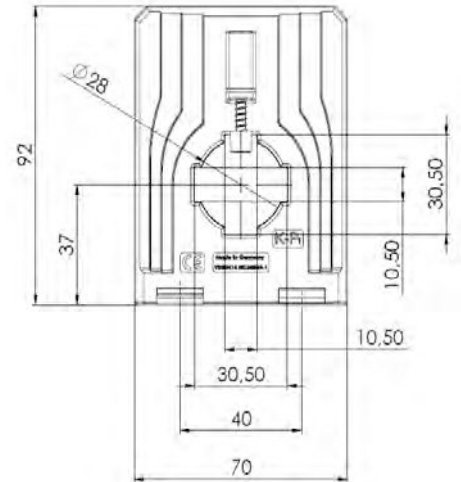
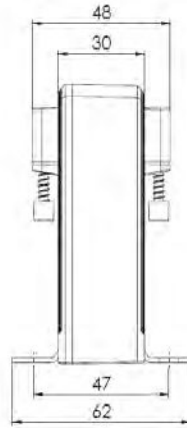


Order list:

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 mm ²
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:	$R_B \leq 200 \Omega$ ($U_H = 24$ V DC)
Current limit under overload:	< 25 mA
Accuracy:	$\pm 0,5 \%$
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, $\pm 15\% < 70$ mA, external protection via microfuse 100 mA / 250 V, fast!
Energia response time (90 % I_{PN} , $di/dt = 100$ A / μs):	$\leq 1 \mu s$ (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

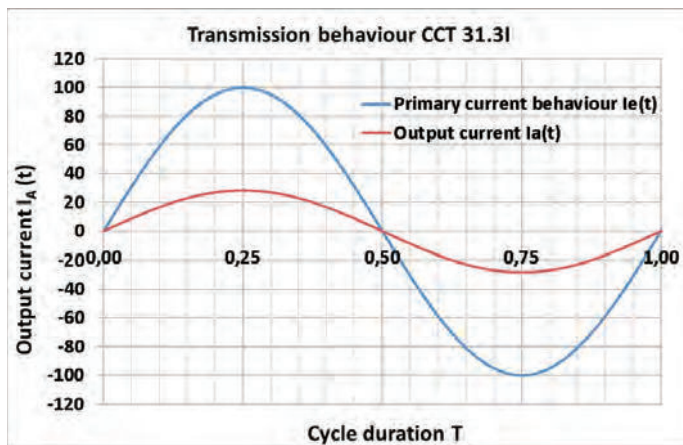
Functions of the CCT 31.3 I:

- 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.

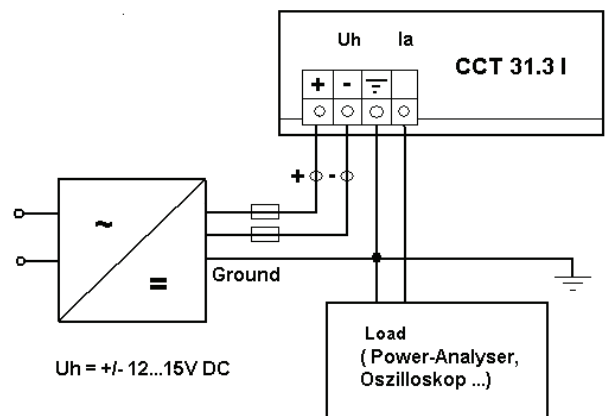
Advantages and benefits of the CCT 31.3 I:

- 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:



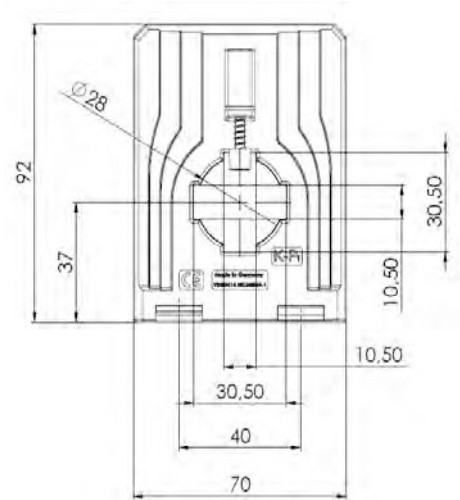
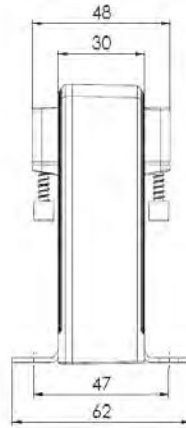
Order list:

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:

Bus bar: 30x10 mm
 Round conductor: 28 mm
 Transformer width: 70 mm
 Transformer height: 92 mm
 Transformer depth: 48 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...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:	$2,5 \pm 1$ V, U_{eff} , AC; $2,5 \pm 1,414$ V (Peak-Peak)
Voltage output, DC Input:	2.5 ± 1 V, DC
Min. burden resistance at current output:	$R_B \geq 100$ k Ω
Current limit under overload:	< 5 V
Accuracy:	$\pm 0,5$ %
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, $\pm 15\%$ < 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

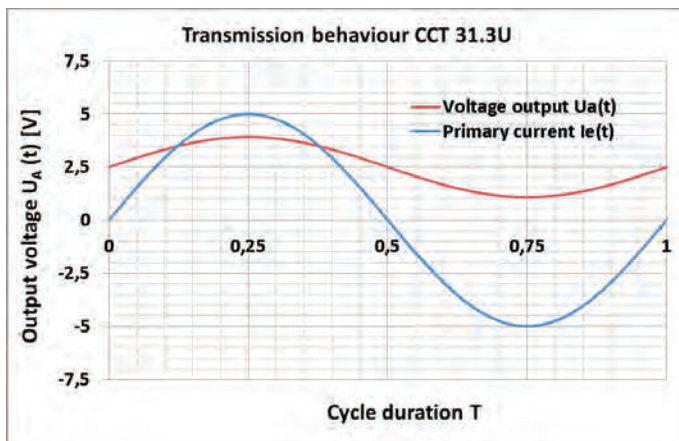
Functions of the CCT 31.3 U:

- 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.

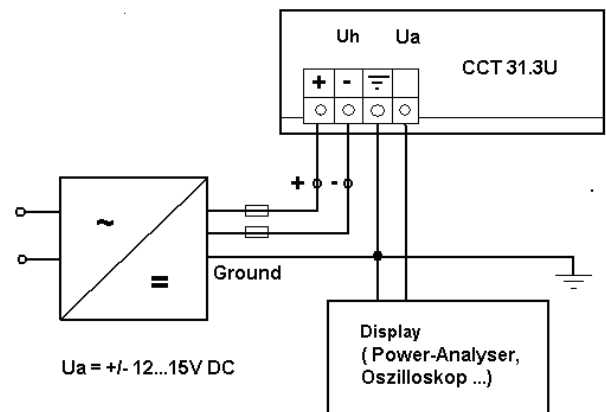
Advantages and benefits of the CCT 31.3 U:

- 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:

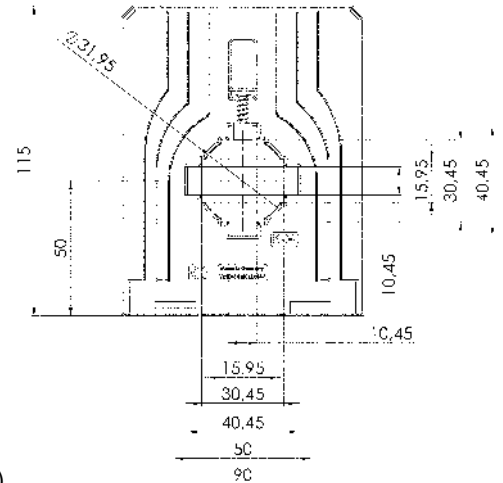
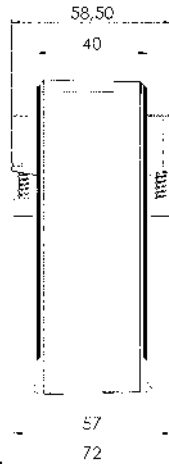


Order list:

Type	Primary current I_{eff} [A] DC / AC (I_{eff})	Art.-no.	Voltage output
CCT 31.3 U	50	1102-10001	DC: 2.5 ± 1 V AC: $2.5 \pm 1,414$ 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:	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 mm ²
Transformer width: 90 mm		
Transformer height: 115 mm		
Transformer depth: 58,5 mm		

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:	$R_B \leq 500 \Omega$ ($U_H = 24$ V DC)
Current limit under overload:	< 25 mA
Accuracy:	$\pm 1,0$ %
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

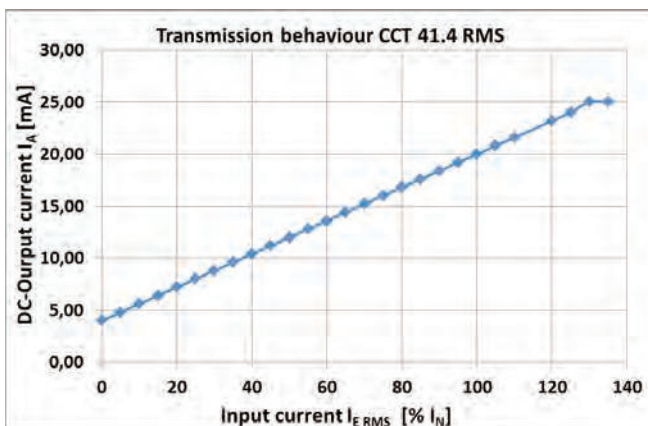
Functions of the CCT 41.4 RMS:

- 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.

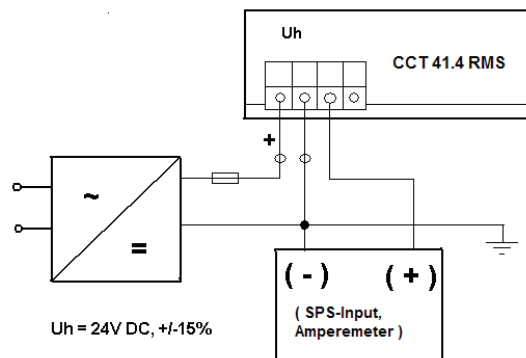
Advantages and benefits of the CCT 41.4 RMS:

- 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:

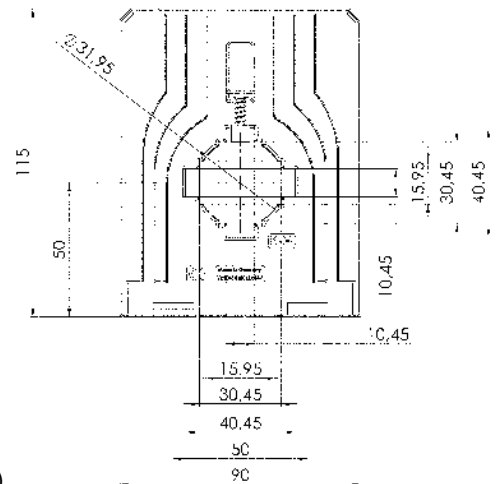
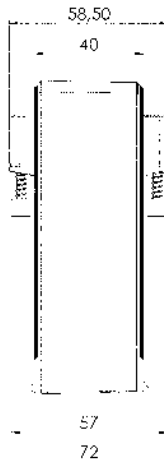


Order list:

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:

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
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:	$R_B \leq 200 \Omega$ ($U_H = 24$ V DC)
Current limit under overload:	< 25 mA
Accuracy:	$\pm 0,5 \%$
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, $\pm 15\% < 70$ mA, external protection via microfuse 100 mA / 250 V, fast!
Energia response time (90 % I_{PN} , $di/dt = 100$ A / μs):	$\leq 1 \mu s$ (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

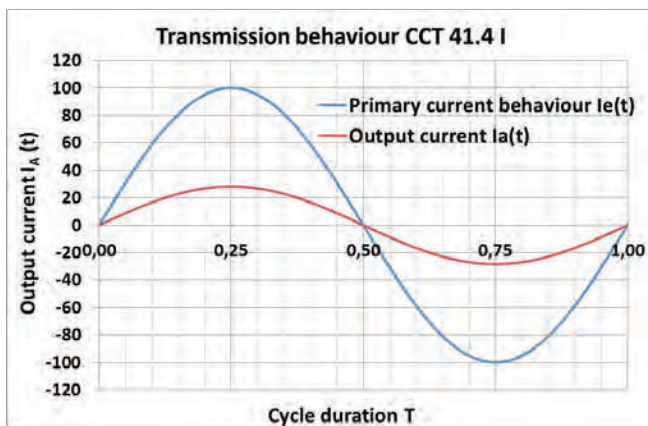
Functions of the CCT 41.4 I:

- 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.

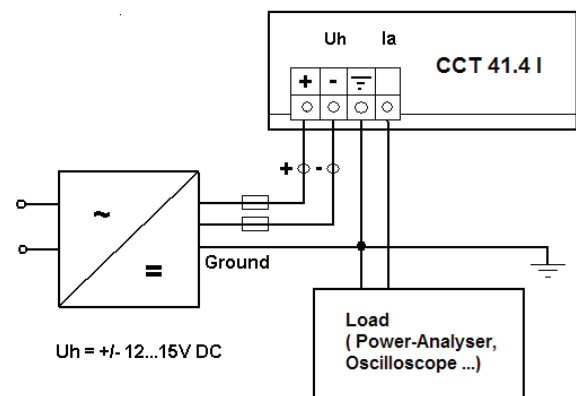
Advantages and benefits of the CCT 41.4 I:

- 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:

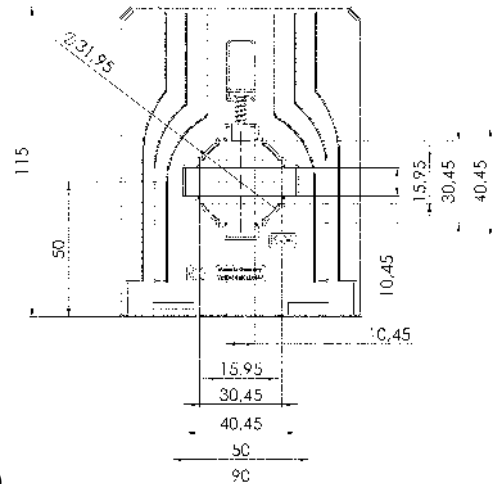
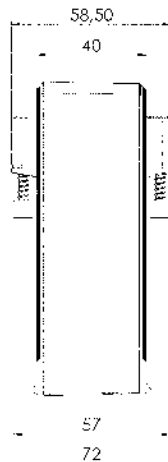


Order list:

Type	Primary current [A] DC / AC (I_{eff})	Art.-no.	Current output
CCT 41.4 I	150	1201-10005	DC: 0... \pm 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:	$2,5 \pm 1$ V, U_{eff} , AC; $2,5 \pm 1,414$ V (Peak-Peak)
Voltage output, DC Input:	$2,5 \pm 1$ V, DC
Min. burden resistance at current output:	$R_B \geq 100$ k Ω
Current limit under overload:	< 5 V
Accuracy:	$\pm 0,5$ %
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 / μ s):	≤ 1 μ s (typ. 150 ns)
Signal rise velocity di/dt :	< 100 A / μ s
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

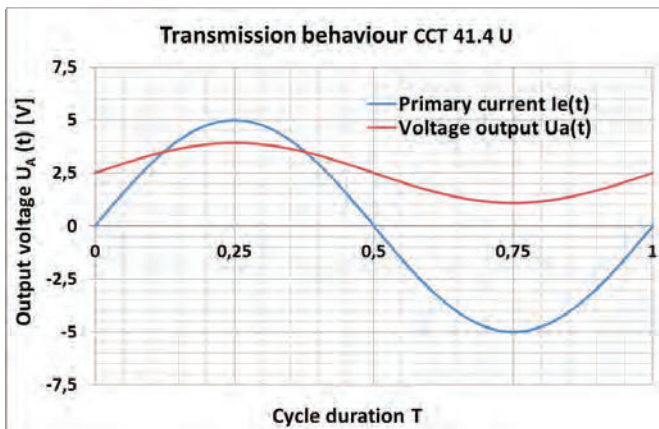
Functions of the CCT 41.4 U:

- 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.

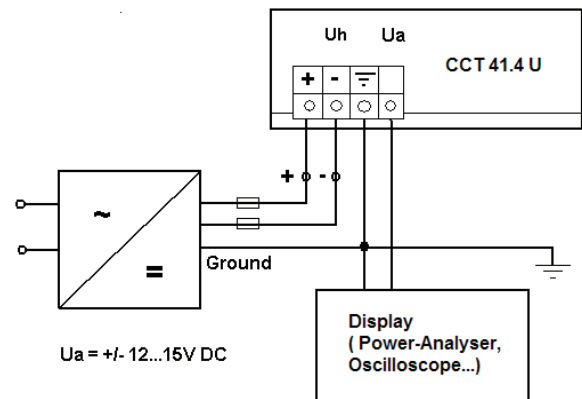
Advantages and benefits of the CCT 41.4 U:

- 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:



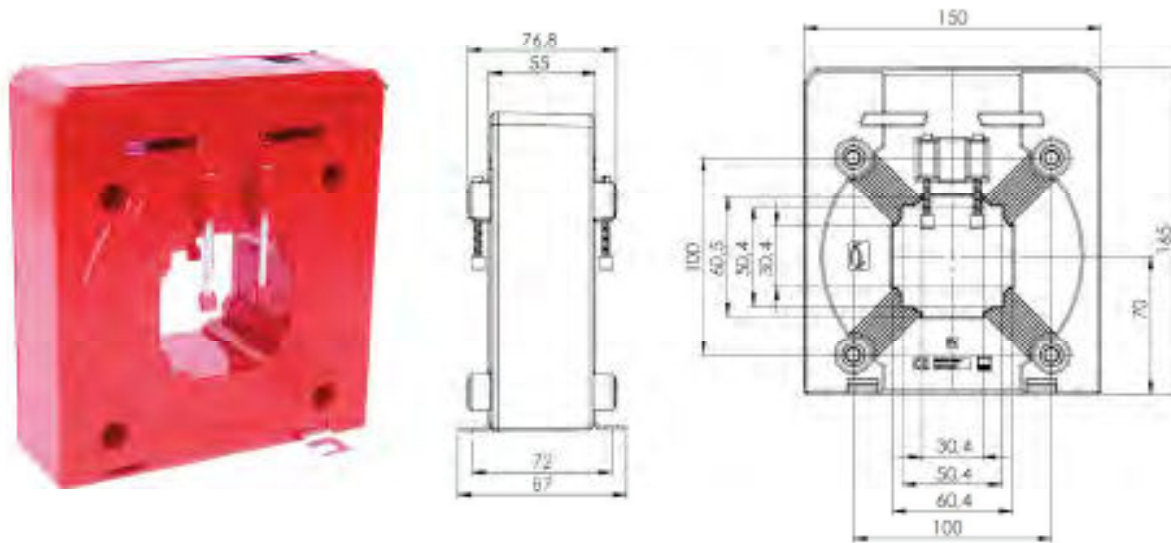
Order list:

Type	Primary current I_{eff} [A] DC / AC (I_{eff})	Art.-no.	Voltage output
CCT 41.4 U	150	1202-10005	DC: 2.5 ± 1 V AC: $2,5 \pm 1,414$ 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:	Applied technical standards:	Electrical connection:
Rail 1: 60x30 mm	DIN EN 50178, 1998-04	$U_H + U_H - 0$ (Ground) I_H
Rail 2: 50x50 mm	DIN EN 61326-1, 2013-07	Plug-in terminal
Round conductors: 50 mm	IEC 61000-3-4	Connection cross-sections: 0.2 ... 1.5 mm ²
Width: 165 mm	DIN EN 61010-1	Stripping length: 10mm
Height: 150 mm		
Total depth: 77 mm		
Technical data:		
Measuring range:	0 ... 1,500 A DC / AC I_H (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_H	
Current output with DC input signal:	DC: 0 ... ± 300 mA	
Max. load resistance at current output:	$R_H \leq 3 \cdot Z^*$ ($U_H = 24$ V DC)	
Output signal limitation in case of overload:	≤ 25 mA	
Accuracy:	± 0.5%	
Max. operating voltage U_H :	0.72 kV, U_H	
Insulation test voltage:	6.4 kV, U_{H2} , 50 Hz, 12 sec., primary conductor against measuring output / housing	
Auxiliary voltage:	± 24 V DC, ± 10%, external fuse protection via one 300 mA line-wise fuse each	
Step response time (90 % I_H , $dI/dt = 100$ A / μ s):	≤ 1 μ s	
Signal slew rate dI/dt :	> 100 A / μ s	
Insulation material class:	E	
Protection class:	IP 20	
Permitted altitude for operation:	≤ 2000 m (DIN EN 61010-1)	
Max. temperature of line primary conductor:	100 °C	
Working temperature range:	-25 °C < T_H < +50 °C, 0 ... 95% rel. humidity, no condensation!	
Storage temperature range:	-50 °C < T_L < +90 °C	

* The measurement output must not be operated open!

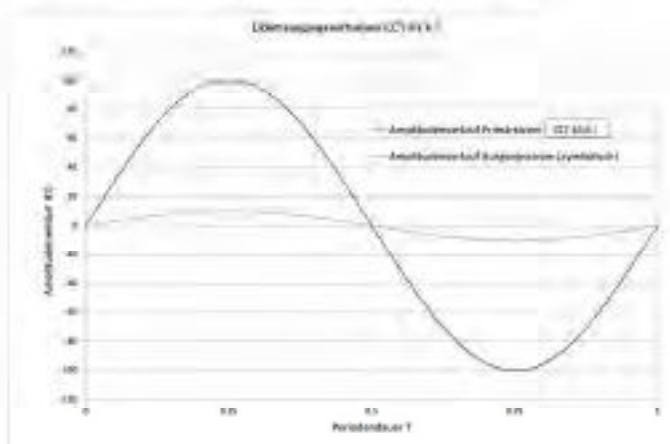
Functions of the CCT 63.6 I:

- 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 line-wire fuse.

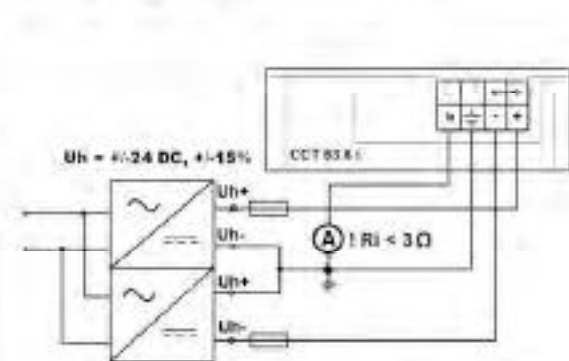
Advantages and benefits of the CCT 63.6 I:

- 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:



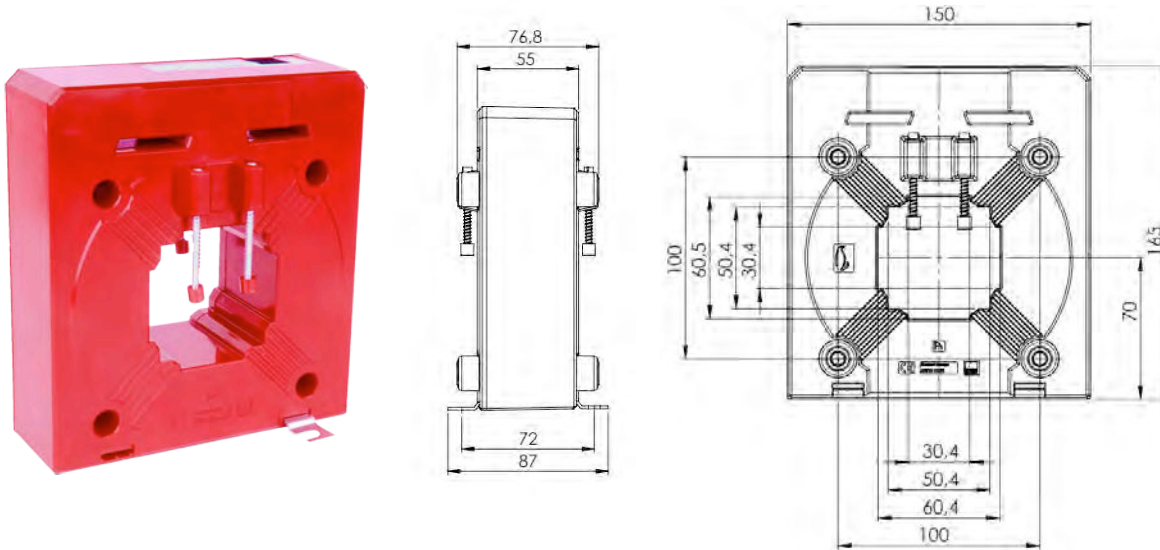
Ordering table

Type	Primary current [A]	Article number	Output signal
	DC / AC (I_{eff})		
CCT 63.6 I	2000	1301-10008	DC: 0 ... ± 300 mA AC: 0 ... 300 mA I_{eff}

CCT 63.6 RMS (Compensation current transformer, 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:

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
IEC 61000-3/4
DIN EN 61010-1, 2002
DIN EN 61326-1, 2013-07

Electrical connections:

$U_H + U_H - 0$ (Ground) Ia
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:	$R_B \leq 500 \Omega$ ($U_H = \pm 24$ 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

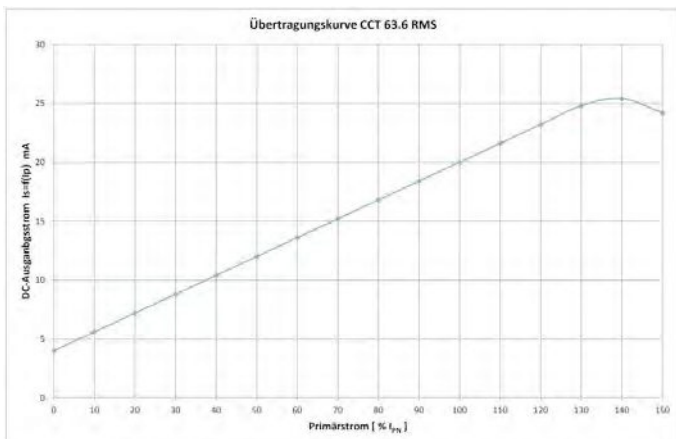
Functions of the CCT 63.6 RMS:

- 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 calculated 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.

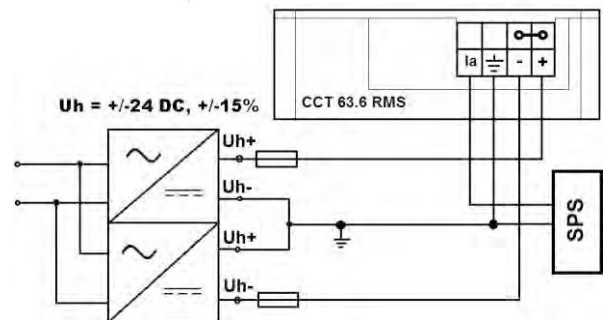
Advantages and benefits of the CCT 63.6 RMS:

- 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).

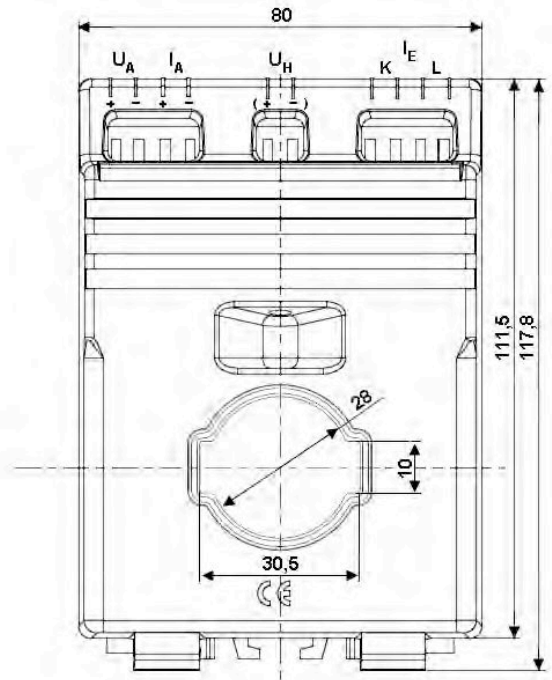
Technical data SWMU 31.51/52 SWMU 32.51/52

measuring input		auxiliary power	
nominal frequency	f_N 50/60 Hz	AC power supply	230 V \pm 10% (50...60 Hz)
rated input current I_N		DC	24 V \pm 15%
SWMU 31.52	1...10 A	power input	\leq 1.5 W (2.5 VA)
SWMU 31.51	15...750 A	accuracy	
consumption	\leq 1 VA (2.5 VA with-out auxiliary voltage)	reference value	output end value
overload capacity	1.5 \cdot I_N , constant 8 \cdot I_N , 40 sec.	accuracy class	class 0.5
measuring output		warming-up time	\leq 5 min.
load-independent DC current	0...20 mA or 4...20 mA*	protection	
max. burden resistance	\leq 500 Ω	electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
max. burden voltage	\leq 15V	contamination class	2
current limit under overload	\leq 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	\geq 10 k Ω		
max. burden voltage under overload	\leq 18 V		
voltage limit	\leq 18 V		
residual ripple of the output current	\leq 1% p.p.		
response time	\leq 500 ms		
operating temperature range	-5° C \leq δ \leq +40° C		
		*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 $P_E \geq 2,5 \text{ VA}$!
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).

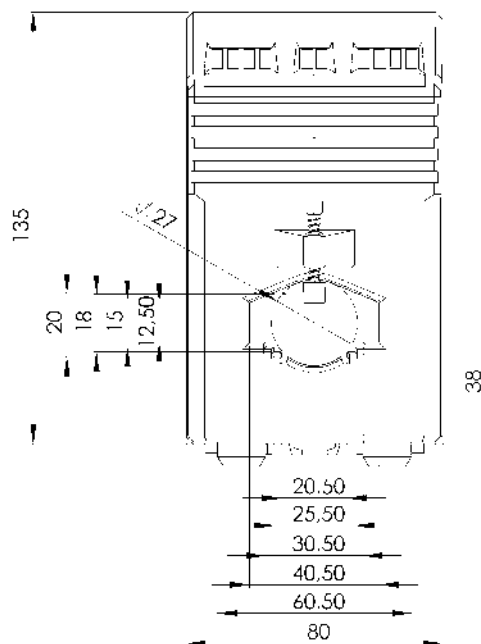
Technical data SWMU 41.51/52 SWMU 42.51/52

measuring input		auxiliary power	
nominal frequency	f_N 50/60 Hz	AC power supply	230 V \pm 10% (50...60 Hz)
rated input current I_N		DC	24 V \pm 15%
SWMU 41.52	1...10 A	power input	\leq 1.5 W (2.5 VA)
SWMU 41.51	15...800 A	accuracy	
consumption	\leq 1 VA (2.5 VA without auxiliary voltage)	reference value	output end value
overload capacity	1.5 \cdot I_N , constant 8 \cdot I_N , 40 sec.	accuracy class	class 0.5
measuring output		warming-up time	\leq 5 min.
load-independent DC current	0...20 mA or 4...20 mA*	protection	
max. burden resistance	\leq 500 Ω	electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
max. burden voltage	\leq 15V	contamination class	2
current limit under overload	\leq 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	\geq 10 k Ω		
max. burden voltage under overload	\leq 18 V		
voltage limit	\leq 18 V		
residual ripple of the output current	\leq 1% p.p.		
response time	\leq 500 ms		
operating temperature range	-5° C \leq δ \leq +40° C		
		*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
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 $P_E \geq 2,5 \text{ VA!}$
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		Accuracy	
Nominal frequency f_N	50/60 Hz	Reference value	Output end value
Rated input current I_N	1 A or 5 A	Accuracy class	0.5 %
Power input from measuring circuit	≤ 1 VA (2.5 VA w/o auxiliary voltage)	Accuracy range	1 ... 120 % I_N (NMC 2/3/4) 15 ... 120 % I_N (NMC 0)
Overload capacity	$1.2 \cdot I_N$, constant $8 \cdot I_N$, 40 sec.	Warming-up time	≤ 5 min.
Measuring output		Auxiliary power	
Load-independent DC current	0 (4) ... 20 mA	AC power supply	230 V $\pm 10\%$ (50...60 Hz) or 110 V $\pm 10\%$ (50...60 Hz)
max. burden resistance	$\leq 500 \Omega$	DC	24 V $\pm 15\%$
max. burden voltage	≤ 15 V	Power input	≤ 1.5 W (2.5 VA)
Current limit under overload	≤ 34 mA	Protection	
Residual ripple of the output current	≤ 1 % p.p.	Electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, Connection terminals (Test digit, EN 60529)
Imprinted C voltage	0 (2) ... 10 V	Contamination class	2
min. burden resistance	≥ 10 k Ω	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)
max. burden voltage under overload	≤ 18 V		
Response time	< 500 ms		

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

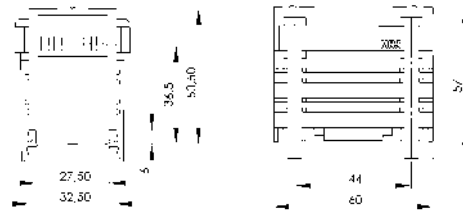
Without auxiliary power supply, power requirement ≥ 2.5 VA

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

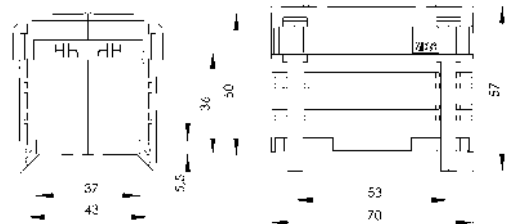
Nominal frequency 50/60 Hz; Weight: 80 g; Operating range 15...120 % I_N

Drawings

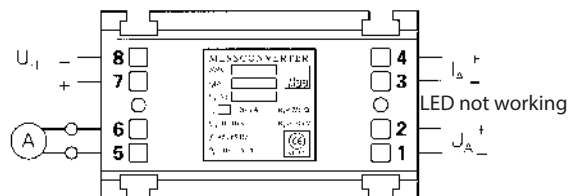
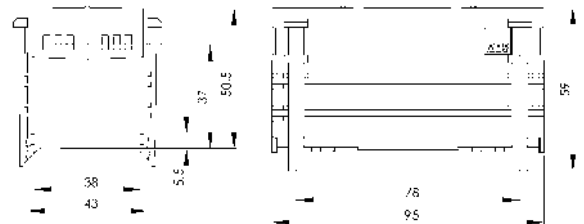
Construction type „A“



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														
5														
10														
15														
20														
25														
30														
40														
50														
60														
75														
80														
100														
125														
150														
200														
250														
300														
400														
500														
600														
750														
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 deviation 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)

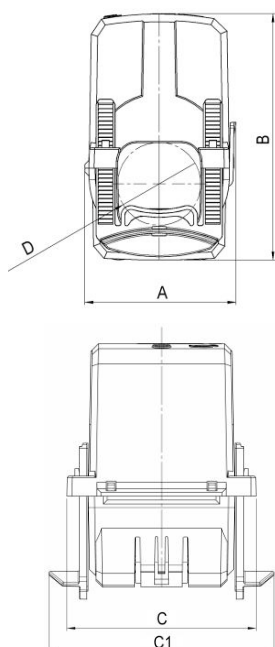
Short circuit adaptor NMC-KSx



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



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

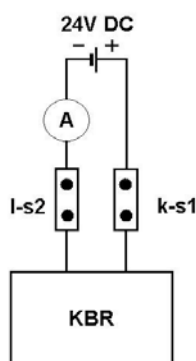
Dimensions

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 \pm 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: \leq 1 % p.p.
- Response time: < 300 ms

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



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
 Housing 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
 $\cos \phi$ 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

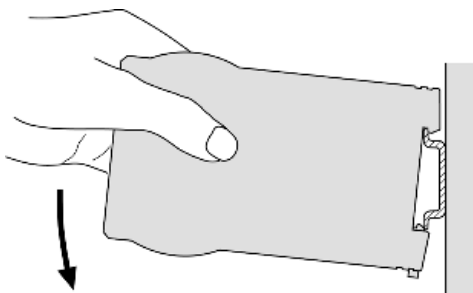
Accuracy

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

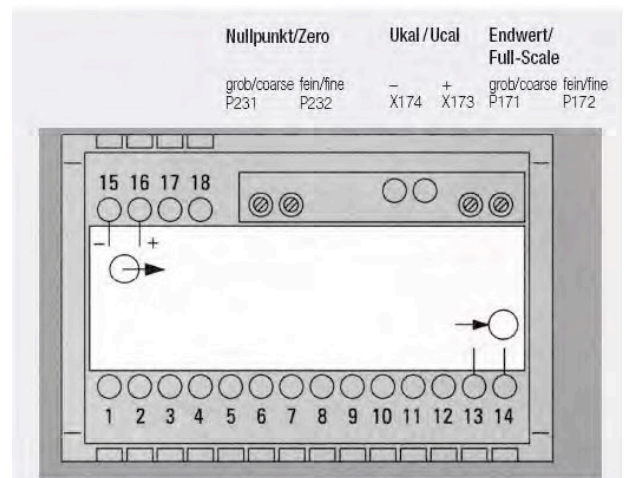
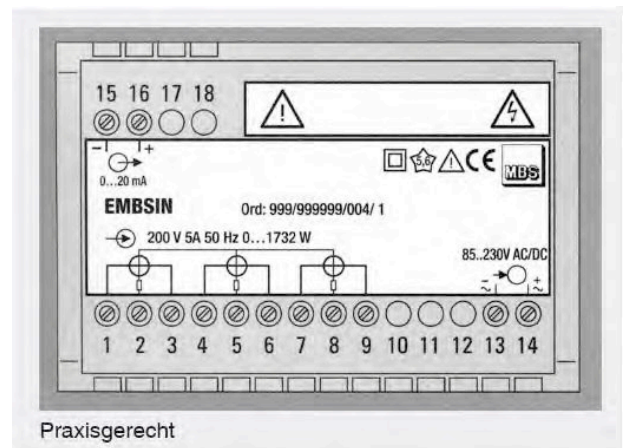
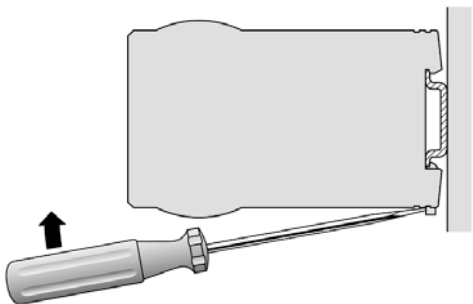
Better

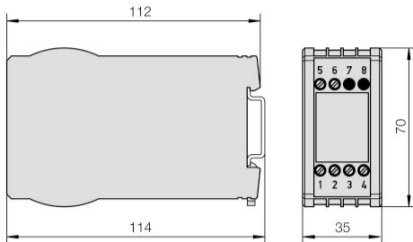
Highest quality and safety at very competitive prices!

Assembly



Dismantling





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		Temperature influence	0.2 % / 10 K (-10 ... +55 °C)
Rated frequency f_N	50/60 Hz	Operating temperature	-10 °C up to +55 °C
Rated input current I_N	1 / 5 A or 1.2 / 6 A (selectable at terminal)	Storage temperature	-40 °C up to +70 °C
Consumption	≤ 2.5 VA	Safety	
Overload capacity	1.2 · I_N , constant 20 · I_N , 1 sec.	Protection class	II (protection isolated, DIN EN 61010)
Measuring output		Electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
Load-independent DC current	0...5 mA, 0...10mA or 0...20 mA	Contamination class	2
Max. burden voltage	≤ 15 V	Overvoltage category	III
Voltage limit by $R_{EXT} = \infty$	≤ 30 V	Nominal isolation voltage (to earth)	250 V, input 40 V, output
Current limit under overload	≤ 34 mA	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
Residual ripple of the output current	≤ 1 % p.p.	Weight	270 g
Response time	< 500 ms		
Accuracy			
Reference value	Output end value		
Accuracy class	Class 0.5		
Measuring range	0...100 % I_N		

Order lists

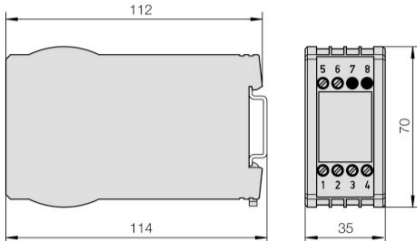
EMBSIN 100 I – Measuring transducer for AC current, without auxiliary power supply

Features	Order no.					
EMBSIN 100 I, Measuring transducer for AC current	100 I –	M	X	X	X	X
Order no.: 100 I – Mxxxx						
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, $R_a \leq 3 \text{ k}\Omega$				1		
0...10 mA, $R_a \leq 1,5 \text{ k}\Omega$				2		
0...20 mA, $R_a \leq 750 \Omega$				3		
4. Measuring range adjustable						0
Measuring range fixed						
Measuring end value adjustable approx. $\pm 10\%$						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 101 I

Measuring transducer for AC current



Features / benefits

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

Application

Measuring transducer for the transformation of sinus-shaped alternating current. A load-independent DC 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		Operating temperature	-10 °C up to +55 °C
Rated frequency f_N	50/60 Hz	Storage temperature	-40 °C up to +70 °C
Rated input current I_N	0...1 A or 0...5 A optionally: 0...1.2 A or 0...6 A	Auxiliary power	
Consumption	$\leq 5 \text{ mV} \times I_N$	AC	24, 110, 115, 120, 230 or 400 V, $\pm 15 \%$, 50/60 Hz; P_V approx. 3 VA
Overload capacity	$2 \cdot I_N$, constant	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
Measuring output		Safety	
Load-independent DC current	0...2.5 mA to 0...20 mA or live-zero 1...5 mA to 4...20 mA	Protection class	II (protection isolated, DIN EN 61010)
Max. burden voltage	$\leq 15 \text{ V}$	Electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
By 2-wire connection	Standard range 4...20 mA External resistance R_{EXT} dependant of the auxiliary supply H (12...32 V DC) $R_{EXT}[\text{k}\Omega] \leq (H-12)\text{V}/20\text{mA}$	Contamination class	2
Imprinted DC voltage	0...5 V to 0...10 V or live-zero 1...5 V to 2...10 V	Overvoltage category	III
Load capacity	max. 20 mA	Nominal isolation voltage (to earth)	300 V, input 300 V, auxiliary power AC 50 V, auxiliary power 24 V DC 50 V, output
Voltage limit by $R_{EXT} = \infty$	$\leq 40 \text{ V}$	Test voltages	50 Hz, 1 min., EN 61010-1 3.7 kV, rms, Measuring input against all other circuits and exterior surface as well as AC auxiliary power input against output and exterior surface; 490 V, Measuring output against exterior surface and DC auxiliary power input against exterior surface
Current limit under overload	$\leq 30 \text{ mA}$	Weight	195 g
Residual ripple of the output current	$\leq 1 \%$ p.p.		
Response time	< 300 ms		
Accuracy			
Reference value	Output end value		
Accuracy class	Class 0.5		

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. Frequency 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_i : 24 V AC						1	
Auxiliary voltage U_i : 110 V AC						2	
Auxiliary voltage U_i : 115 V AC						3	
Auxiliary voltage U_i : 120 V AC						4	
Auxiliary voltage U_i : 230 V AC						5	
Auxiliary voltage U_i : 400 V AC, ! max. 300 V to earth!						6	
Auxiliary voltage U_i : 24 V DC						A	
Auxiliary voltage U_i : 24 V DC via output circuit						B	
Auxiliary voltage U_i : 85...230 V AC/DC						C	
Auxiliary voltage U_i : 24...60 V AC/DC						D	
U_i ...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

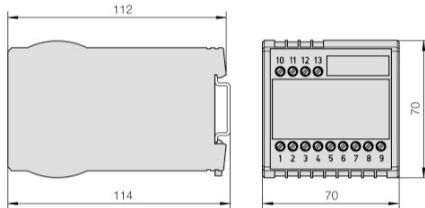
Features / benefits

- 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		Accuracy	
Rated frequency f_N	50/60 Hz	Reference value	Output end value
Rated input current I_N	1 / 5 A or 1.2 / 6 A (selectable at terminal)	Accuracy class	Class 0.5
Consumption	≤ 1 VA	Peak value factor	$\sqrt{2}$
Overload capacity	$1.2 \cdot I_N$, constant $20 \cdot I_N$, 1 sec.	Warming-up time	≤ 5 min
		Operating temperature	-10 °C up to +55 °C
		Storage temperature	-40 °C up to +70 °C
Measuring output		Auxiliary power	
Load-independent DC current	0...1 mA to 0...20 mA or live-zero 0.2...1 mA to 4...20 mA	Universal power supply	DC or AC (40...400 Hz)
Max. burden voltage	≤ 15 V	AC/DC ranges	24...60 V or 85...230 V
External resistance	$R_{EXT} [k\Omega] \leq 15 V / I_{AN} [mA]$	AC power supply	45...65 Hz
Current limit under overload	approx. $1.5 \times I_{AN}$	Power input	≤ 1.5 W (3 VA)
Imprinted DC voltage	0...1 V to 0...10 V or live-zero 0.2...1 V to 2...10 V	Safety	
Load capacity	max. 2 mA	Protection class	II (protection isolated, DIN EN 61010)
External resistance	$R_{EXT} [k\Omega] \geq U_{AN} [V] / 2$ mA	Electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
Voltage limit by $R_{EXT} = \infty$	≤ 25 V	Contamination class	2
Current limit under overload	≤ 10 mA	Overvoltage category	III
Residual ripple of the output current	≤ 0.5 % p.p. (300 ms) ≤ 2 % p.p. (50 ms)	Nominal isolation voltage (to earth)	300 V, input 230 V, auxiliary power 40 V, output
Response time	50 ms or 300 ms	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. Frequency 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 ($\geq 24...60$ V AC)							3	
Auxiliary voltage from measuring input ($\geq 85...230$ 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 combined with measuring range, order no.: C)...L ! 4) Not to be combined with measuring range, order no.: A, B, L								
6. Response 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



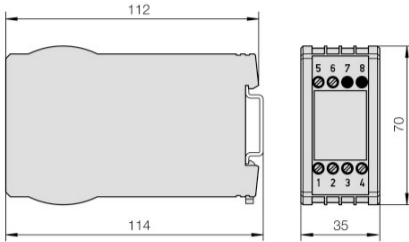
Features / benefits

- 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.

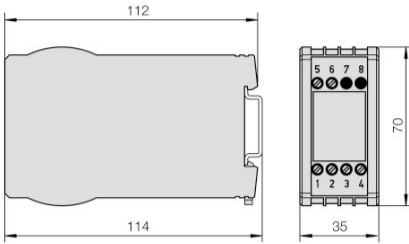


Technical data

Measuring input		Accuracy	
Rated frequency f_N	50/60 Hz	Reference value	Output end value
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)	Accuracy class	Class 0.5
Consumption	≤ 2 VA	Measuring range	20...100 % U_N
Overload capacity	$1.2 \cdot U_N$, constant $2.0 \cdot U_N$, 1 sec.	Temperature influence	0.2 % / 10 K (-10 ... +55 °C)
		Operating temperature	-10 °C up to +55 °C
		Storage temperature	-40 °C up to +70 °C
Measuring output		Safety	
Load-independent DC current	0...5 mA, 0...10 mA or 0...20 mA	Protection class	II (protection isolated, DIN EN 61010)
Max. burden voltage	≤ 15 V	Electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
Max. burden resistance	$R_{EXT} [k\Omega] \leq 15 V / I_{AN} [mA]$	Contamination class	2
Voltage limit by $R_{EXT} = \infty$	≤ 54 V	Nominal isolation voltage	300 V, rms, connection category III 500 V, rms, connection category II
Current limit under overload	$\leq 1.7 \cdot I_N$	Weight	180 g
Residual ripple of the output current	≤ 1 % p.p.		
Response time	< 300 ms		

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, $R_a \leq 3 \text{ k}\Omega$				1		
0...10 mA, $R_a \% \leq 1,5 \text{ k}\Omega$				2		
0...20 mA, $R_a \leq 750 \Omega$				3		
4. Measuring range adjustable						
Measuring range fixed					0	
Measuring end value adjustable approx. $\pm 10\%$					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		Current limit	
Rated frequency f_N	50/60 Hz	Current limit	< 30 mA
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)	under overload	
Consumption	< $U_N \cdot 50\mu\text{A}$ ($U_N \leq 150\text{V}$) < $U_N \cdot 20\mu\text{A}$ ($150 < U_N \leq 400\text{V}$) < $U_N \cdot 5\mu\text{A}$ ($400 < U_N \leq 600\text{V}$)	Residual ripple of the output current	$\leq 1\%$ p.p.
Overload capacity	$1.2 \cdot U_N$, constant $2.0 \cdot U_N$, 1 sec.	Response time	< 300 ms
Measuring output		Accuracy	
Load-independent DC current	0...5 mA to 0...20 mA or live-zero 1...5 mA to 4...20 mA	Reference value	Output end value
Max. burden voltage	$\leq 15\text{V}$	Accuracy class	Class 0.5 ($U_N \leq 500\text{V}$) Class 1 ($U_N > 500\text{V}$)
Max. burden resistance	$R_{EXT} [\text{k}\Omega] \leq 15\text{V} / I_{AN} [\text{mA}]$	Operating temperature	-10 °C up to +55 °C
By 2-wire connection	standard range 4...20 mA External resistance R_{EXT} , dependent of the auxiliary power H (12...32 V DC) $R_{EXT} [\text{k}\Omega] \leq (H-12)\text{V} / 20\text{mA}$	Auxiliary power	
Current limit under overload	< 30 mA	AC	24...400 V ($\pm 15\%$, 50/60 Hz) P_V approx. 3 VA
Voltage limit by $R_{EXT} = \infty$	$\leq 40\text{V}$	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
Residual ripple of the output current	$\leq 1\%$ p.p.	Universal power supply (AC + DC)	24...60 V AC/DC DC -15 / + 33 % Power consumption $P_V \leq 1.5\text{W}$ AC $\pm 15\%$ Power consumption $P_V \leq 3\text{VA}$
Imprinted DC voltage	0...5 V to 0...10 V or live-zero 1...5 V to 2...10 V	Safety	
Min. burden resistance	$R_{EXT} [\text{k}\Omega] \leq U_{AN} [\text{V}] / 10\text{mA}$	Protection class	II (protection isolated, DIN EN 61010)
Voltage limit by $R_{EXT} = \infty$	$\leq 40\text{V}$	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 121 U – Measuring transducer for alternating voltage

Features	Order no.						
EMBSIN 121 U, Measuring transducer for alternating voltage Order no.: 121 U – Mxx xx	101 I –	M	X	X		X	X
1. Construction Housing MBS for 35 mm DIN rail		M					
2. Frequency of the input volt 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 1...5 up to < (4... 20)					9		
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_n : 24 V AC						1	
Auxiliary voltage U_n : 110 V AC						2	
Auxiliary voltage U_n : 115 V AC						3	
Auxiliary voltage U_n : 120 V AC						4	
Auxiliary voltage U_n : 230 V AC						5	
Auxiliary voltage U_n : 400 V AC, ! max. 300 V to earth!						6	
Auxiliary voltage U_n : 24 V DC						A	
Auxiliary voltage U_n : 24 V DC via output circuit						B	
Auxiliary voltage U_n : 85...230 V AC/DC						C	
Auxiliary voltage U_n : 24...60 V AC/DC						D	
U_n ...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

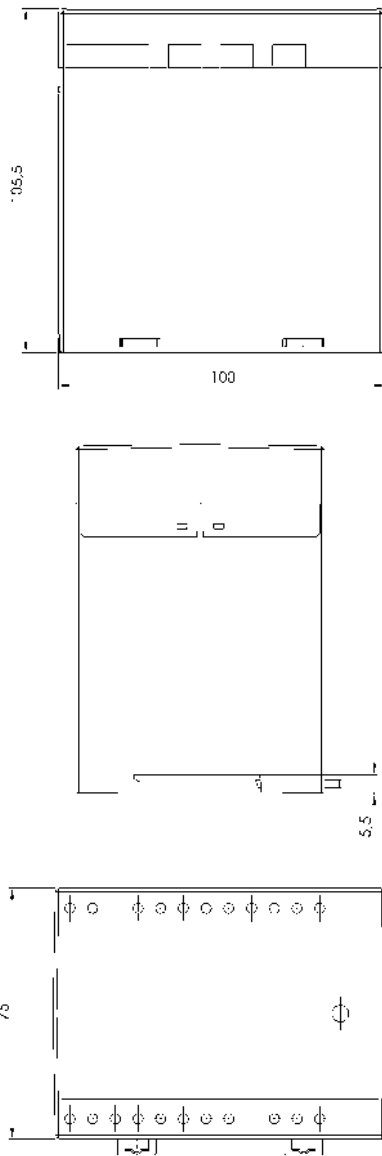
- With auxiliary voltage supply by means of an integrated AC/DC universal power supply
- Housing for 35mm DIN rail mounting
- Monitoring of up to 50 different parameters (V, A, kW, kVA, ...)
- Multifunctional measuring transducer with 4 freely programmable measuring outputs
- Measuring outputs can be 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 $\varphi_1, \varphi_2, \varphi_3$, and φ_{\sim}
	THD of phase voltage U_{t1}, U_{t2} and U_{t3}
	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 $\varphi_{12}, \varphi_{23}, \varphi_{31}$
	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		Reference conditions	
Rated input voltage U_N	500 V (phase against neutral) Automatic selection of the measuring range	Ambient temperature	15...30 °C
Voltage measuring range	62,5 V, 125 V, 250 V, 500 V	Input signal	0...100 % I_N
Rated input current I_N	5 A	Frequency	45...65 Hz
Current measuring range	1 A, 5 A, 10 A	Connection terminals	
Overload capacity		Screw terminals	2.5 mm ² , wire with ferrule 4.0 mm ² , solid conductor
Current input (acc. IEC 60688)	15 A constant, 20 x I_N , 5 x 1 sec.	Setting software	MiQen Software for communication and parameterization of transducer
Voltage input (acc. IEC 60688)	600 V constant, 2 x U_N , 10 sec.	Interfaces (optionally)	RS232 resp. RS485
Measuring output		Operating conditions	
DC current outputs		Ambient temperature	-10 ... 0 ... 45 ... 55 °C
4 output ranges, programmable	-100 % ... 0 ... 100 % -(1...20)mA ...0... (1...20)mA	Operating temperature	-30 ... + 70 °C
Control range	±120% I_{AN}	Storage temperature	-40 ... + 70 °C
Max. burden voltage	≤ 10 V	Average annual humidity	≤ 93 %
Max. output current at overload	35 mA	Altitude	≤ 2000 m
Max. output voltage at open current output	35 V	Safety	
Max. burden resistance	$R_{max} [k\Omega] = 10 V / I_{AN} [mA]$	Electrocution protection	IP 40 (IP 20 for connection terminals)
Response time	≤ 50 ms (Analog FAST)	Contamination class	2
Residual ripple of the output current	≤ 1 % p.p.	Installation category (EN 61010-1)	CAT III; 600 V, measuring inputs CAT III; 300 V, auxiliary voltage Input
DC voltage outputs		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
2 output ranges, programmable	-100 % ... 0 ... 100 % -(1...10) V ...0... (1...10) V	Housing material	PC / ABS / UL 94 V-0
Control range	±120%	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
Max. output voltage at overload	120 % nominal	Dimensions (B x H x T)	100 x 105 x 75 mm
Max. output current	20 mA	Weight	370 g
Min. burden resistance	$R_{BMIN} [k\Omega] \geq U_{AN} / 20 mA$		
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		

MT 440

Programmable measuring transducer for all electrical parameters

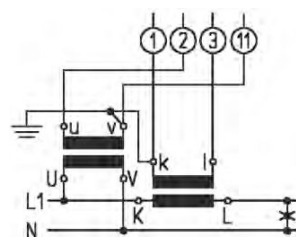
Connection diagram

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.

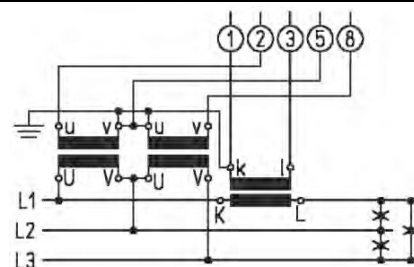
The current inputs of the measuring transducer can be connected directly to a low-voltage network via a low-voltage current transformer or to a high-voltage network via a high-voltage current transformer.

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	$\omega +$	15
		$\omega \vartheta$	16
	Output 2	$\omega +$	17
		$\omega \vartheta$	18
	Output 3	$\omega +$	19
		$\omega \vartheta$	20
	Output 4	$\omega +$	21
		$\omega \vartheta$	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

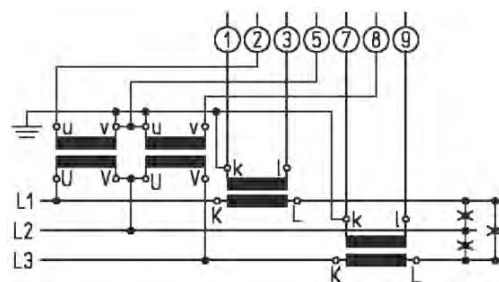
¹⁾ -NC- do not connect



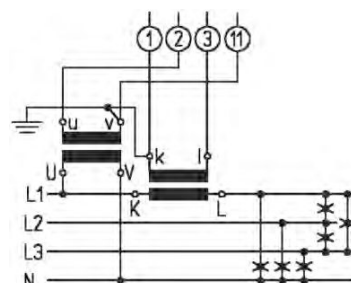
Single-phase current - 1b



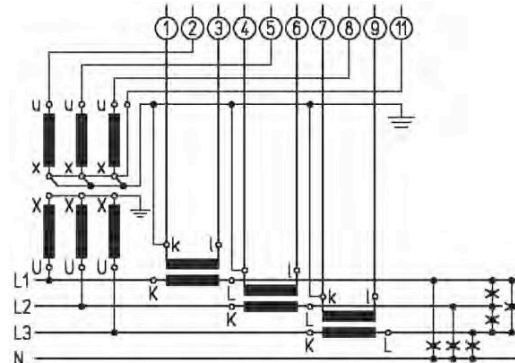
3-wire three-phase current - 3b, balanced load



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 electrical 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

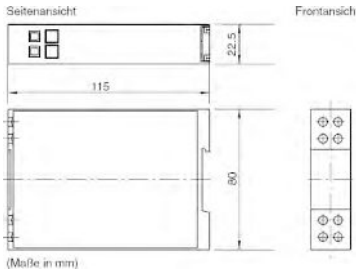
- Measuring output 0(4) ... 20 mA, 0(2) ... 10 V
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal alternating current
- Measurement output: Unipolar and live-zero output variables
- Standard current inputs 1 A and 5 A with output 0 ... 20 mA without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

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

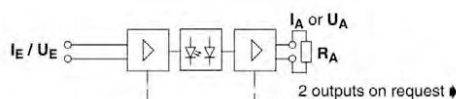
The current is measured internally via a shunt resistor, after which the signal is galvanically isolated from the input via an optical path and converted into a proportional imprinted DC voltage or a proportional load-independent DC current.



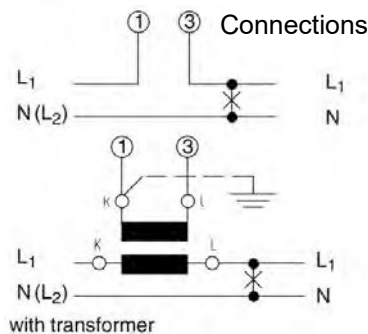
Technical parameters

Measuring input	
Nominal frequency f_N	48...62 Hz
Nominal input current I_N	200 μ A – 5 A
Intrinsic consumption	$I_E \cdot 0.1$ 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 k Ω
Load error	$\leq 0.1\%$ at 50% load change
Residual ripple	$\leq 1\%$ eff
Setting time	approx. 500ms, 250ms, 100ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	$\pm 0.5\%$ of the final value
Temperature drift	≤ 0.01 %/K

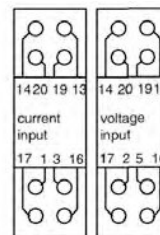
Nominal conditions	
Auxiliary voltage	$U_{HN} \pm 5\%$ (50 Hz with AC)
Load	0.5 R_A max. $\pm 1\%$ with current output R_A min $\pm 1\%$ with voltage output
Frequency	50...60 Hz
Waveform	Sine, distortion factor $\leq 0.1\%$
Ambient temperature	23°C ± 1 K
Warm-up time	≥ 5 min
Auxiliary energy	
AC voltage	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



Terminal assignment



I_E current input
 U_E voltage input
 U_H auxiliary voltage input

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

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

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) - 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

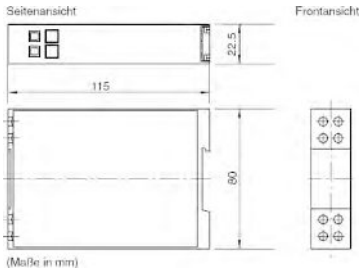
- Measuring output 0(4) ... 20 mA, 0(2) ... 10 V
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal alternating voltage
- Measurement output: Unipolar and live-zero output variables
- Standard voltage inputs with output 0 ... 20 mA without auxiliary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

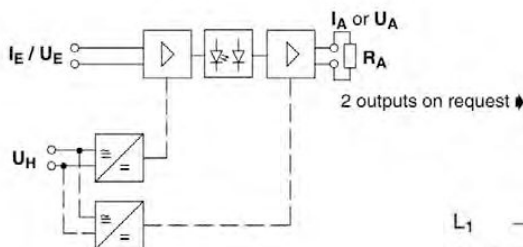
Functional principle

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.



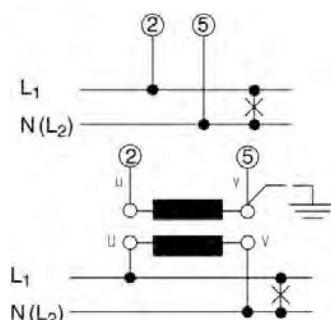
Technical parameters

Measuring input		Nominal conditions	
Nominal frequency f _N	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 / I _{AN}		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

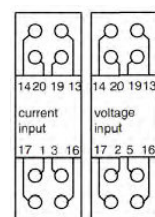


Block circuit diagram

Connections



Terminal assignment



T.	Function	T.	Function
1	I _E (+)	19	U _A , I _A (+)
3	I _E (-)	20	U _A , I _A (-)
2	U _E (+)		dual output:
5	U _E (-)	13	U _A (+)
16	U _H L1(+)	14	U _A (-)
17	U _H N (-)	19	I _A (+)
		20	I _A (-)
		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 according to specification					E				
					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

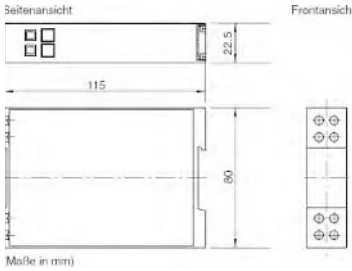
- Measuring output 0(4) ... 20 mA, 0(2) ... 10 V
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: non-sinusoidal AC voltage
- Measurement output: Unipolar and live-zero output variables

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.

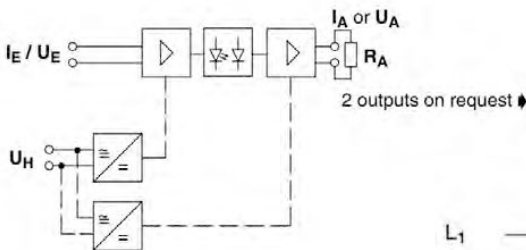
Functional principle

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.



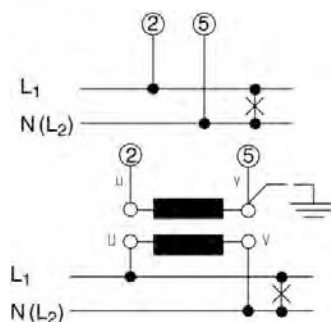
Technical parameters

Measuring input		Nominal conditions	
Nominal frequency f_N	48...62 Hz	Auxiliary voltage	$U_{HN} \pm 5\%$ (50 Hz with AC)
Input voltage U_{EN}	$U_{EN} = 60 \text{ mV} - 519 \text{ V}$	Load	0.5 R_A max. $\pm 1\%$ with current output R_A min $\pm 1\%$ with voltage output
Intrinsic consumption	$I_E \cdot 0.1 \text{ V}$	Frequency	50...60 Hz
Overload capacity	$1.2 \cdot U_{EN}$, permanent $2 \cdot U_{EN}$, max. 1 sec.	Waveform	Non-sine, crest factor ≤ 4
Operating voltage	max. 519 V AC, max. 300V phase zero	Ambient temperature	$23^\circ\text{C} \pm 1\text{K}$
		Warm-up time	≥ 5 min
Measurement output		Auxiliary power supply	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA	AC voltage	230 V~ (-15% +10%); < 6 VA 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	$\geq 4 \text{ k}\Omega$	General technical data	
Load error	$\leq 0.1\%$ at 50% load change	Test voltage	2210 V all circuits against housing 3536 V all circuits to each other
Residual ripple	$\leq 1\%$ eff	Working voltage	300 V (nominal mains voltage phase-zero)
Setting time	approx. 500ms	Protection class	IP 40 housing, IP 20 terminals
Open-circuit voltage	$\leq 15 \text{ V}$	Protection class	II
Accuracy		Measurement category	CAT III
Basic accuracy	$\pm 0.5\%$ of the final value	Degree of contamination	2
Temperature drift	$\leq 0.01 \%/K$	Weight	approx. 120 g

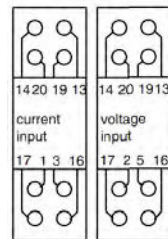


Block circuit diagram (example)

Connections



Terminal assignment (for all types)



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	$I_A (-)$
			current output
			U_A
			voltage output

I_E current input
 U_E voltage input
 U_H auxiliary voltage input
 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

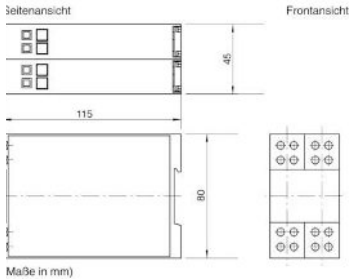
- Measuring output 0(4) ... 20 mA, 0(2) ... 10 V
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Alternating voltages sinusoidal, $\geq 14 \text{ Hz} \leq 500 \text{ Hz}$
- Measurement output: Unipolar and live-zero output variables

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.



Technical parameters

Measuring input

Nominal frequency f_E	$f_{Emin} \geq 14 \text{ Hz}$ $f_{Emax} \leq 500 \text{ Hz}$
Input voltage U_{EN}	$U_{EN} = 100 \text{ V} - 519 \text{ V}$
Intrinsic consumption	3 ... 7 VA
Overload capacity	$1.2 \cdot U_{EN}$, permanent $2 \cdot U_{EN}$, 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	$\geq 4 \text{ k}\Omega$
Load error	$\leq 0.1\%$ at 50% load change
Residual ripple	$\leq 1\%$ eff
Setting time	approx. 500ms
Open-circuit voltage	$\leq 15 \text{ V}$

Accuracy

Basic accuracy	$\pm 0.5\%$ of the final value
Temperature drift	$\leq 0.01 \text{ \%}/\text{K}$

Nominal conditions

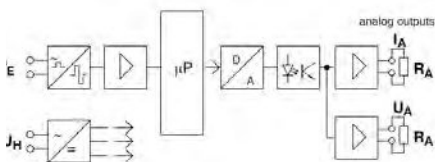
Auxiliary voltage	$U_{HN} \pm 1\%$, 48 ... 62 Hz
Voltage	$U_{EN} \pm 1\%$
Frequency	f_N
Waveform	Sine, distortion factor $\leq 0.1\%$
Ambient temperature	$23^\circ\text{C} \pm 1\text{K}$
Warm-up time	$\geq 5 \text{ min}$

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

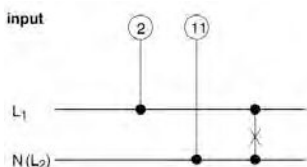
General technical data

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

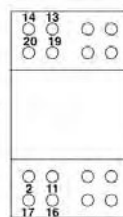


Block circuit diagram

Connections



front view



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

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

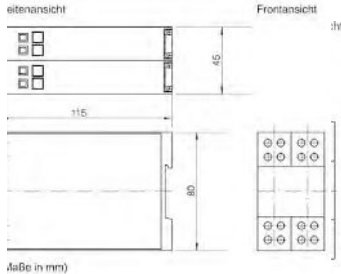
- Measuring output 0(4) ... 20 mA, 0(2) ... 10 V
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal voltages and currents in AC and three-phase mains with an even load
- Measurement output: Unipolar and live-zero output variables

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

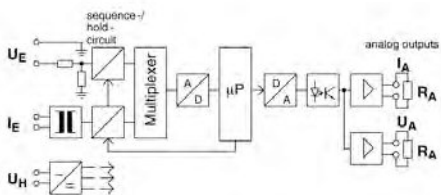
A converter in the current path and a divider in the voltage path adapt the input signals and pass them on to an A/D converter via a multiplexer. A microprocessor processes the digitised signals in real time. The signal reaches the output stages via a D/A converter and an opto-coupler for galvanic isolation.



Technical parameters

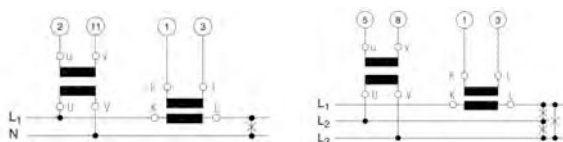
Measuring input	
Measuring ranges	Cap 0.8 ... 1 ... 0.8 ind Cap 0.5 ... 1 ... 0.5 ind
Nominal frequency	48...62 Hz
Input nominal voltage U _{EN}	65,100,110,240,400,415,440,500 V
Intrinsic consumption	approx. 0.25 mA per voltage path I ₂ · 0.01 Ω per current path
Overload capacity	1.2 · U _{EN} or 1.2 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	U _{HN} ±1%, 48 ... 62 Hz
Input voltage	U _{EN} 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

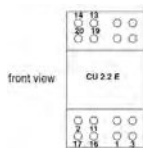


Block circuit diagram

Connections



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 _E N	-
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 (-)

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

CERTIFICAT

CERTIFICADO

СЕРТИФИКАТ

認證證書

CERTIFICATE

ZERTIFIKAT



Management Service

CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH

certifies that



MBS AG

Eisbachstr. 51 • 74429 Sulzbach-Laufen
Germany

including the
sites and scope of application
see enclosure

has established and applies
a Quality Management System.

An audit was performed, Order No. 70003062.

Proof has been furnished that the requirements
according to

ISO 9001:2015

are fulfilled.

The certificate is valid from 2019-04-05 until 2022-04-04.

Certificate Registration No.: 12 100 20346 TMS.

Product Compliance Management
Munich, 2019-04-08



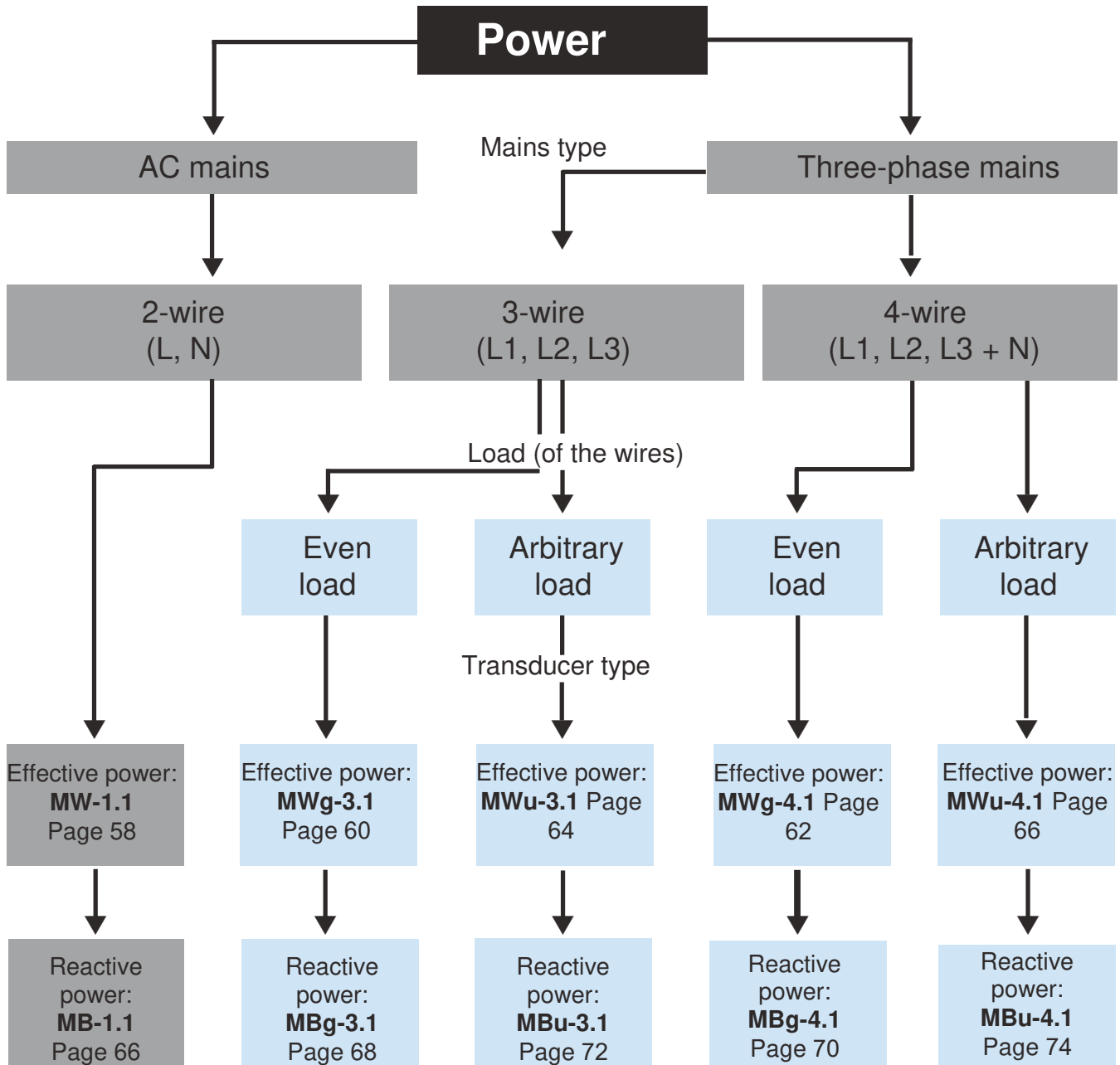
Page 1 of 2

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www.tuev-sued.de/certificate-validity-check

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

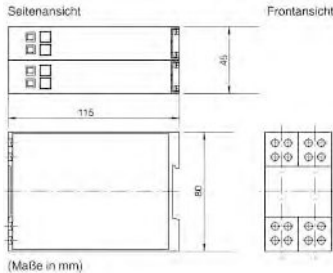
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on AC mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

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.

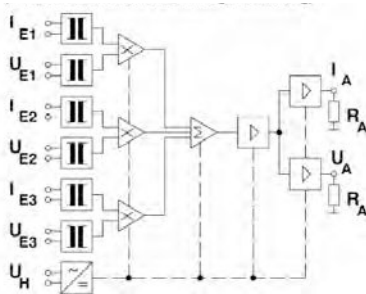
Functional principle

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.



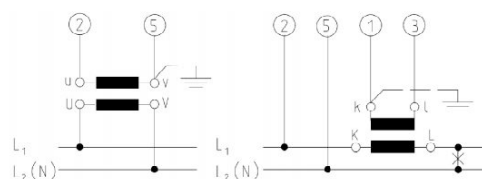
Technical parameters

Measuring input		Nominal conditions	
Nominal frequency	50 or 60 Hz, Harmonic content ≤ 0.2	Auxiliary voltage	$U_{HN} \pm 2\%$, 50 ... 60 Hz
Nominal input current I_{EN}	0...0.5-5 A	Input voltage	$U_{EN} \pm 0.5\%$
Input nominal voltage U_{EN}	0 ... 50-519 V	Power factor	$\sin \phi = 1.0 \dots 0.8$
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	Frequency	50 / 60 Hz
Overload capacity	$1.2 \cdot U_{EN}$ or $1.2 I_{EN}$, permanent $2 U_{EN}$, $20 I_{EN}$ max. 1 sec.	Waveform	Sine, distortion factor $\leq 0.1\%$
Operating voltage	max. 519 V	Ambient temperature	$23^\circ\text{C} \pm 1\text{K}$
Measurement output		Warm-up time	≥ 5 min
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA	Auxiliary power supply	
Load range R_A	0 ... 10 V / I_{AN}	AC voltage	230 V~ (-15% +10%); < 7 VA 115 V~ (-15% +10%); < 4 VA
Current limitation to approx. 37 mA		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 k Ω	AC / DC	90 ... 357 V= or 65 ... 253V~; < 4 ... 7 VA
Load error	$\leq 0.1\%$ at 50% load change	General technical data	
Residual ripple	$\leq 1\%$ eff	Test voltage	All circuits against housing: 3510 V _{eff} 5 sec. Measuring circuit and auxiliary voltage against output: 3510 V _{eff} 5 sec.
Setting time	approx. 500ms	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	$\pm 0.5\%$ of the final value	Measurement category	CAT III
Temperature drift	≤ 0.02 %/K	Degree of contamination	2
		Weight	approx. 270 g



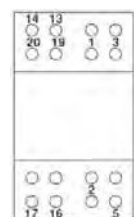
Block circuit diagram
(example)

Connections



Terminal assignment

1	$I_E L_1$
2	$U_E L_1$
3	$I_E L_2$
5	$U_E L_2$
8	-
11	-
13	$U_{A1} (+)$
14	$U_{A1} (-)$
16	$U_{A2} (+)$
17	$U_{A2} (-)$
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 – xxxxxxxx	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

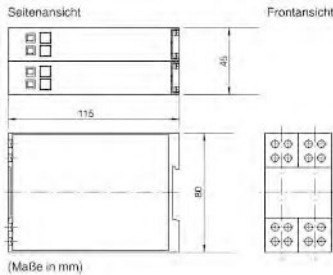
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

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.

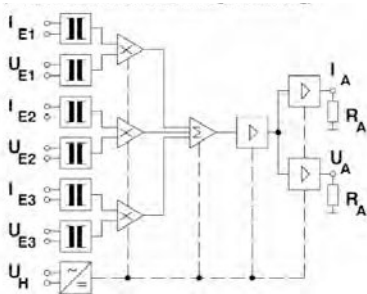
Functional principle

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.

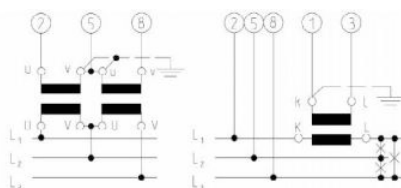


Technical parameters

Measuring input		Nominal conditions	
Nominal frequency	50 or 60 Hz, Harmonic content ≤ 0.2	Auxiliary voltage	$U_{HN} \pm 2\%$, 50 ... 60 Hz
Nominal input current I_{EN}	0 ... 0.5-5 A	Input voltage	$U_{EN} \pm 0.5\%$
Input nominal voltage U_{EN}	0 ... 50-519 V	Power factor	$\sin \phi = 1.0 \dots 0.8$
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	Frequency	50 / 60 Hz
Overload capacity	$1.2 \cdot U_{EN}$ or $1.2 I_{EN}$, permanent $2 \cdot U_{EN}$, 20 I_{EN} max. 1 sec.	Waveform	Sine, distortion factor $\leq 0.1\%$
Operating voltage	max. 519 V	Ambient temperature	$23^\circ\text{C} \pm 1\text{K}$
Measurement output		Warm-up time	≥ 5 min
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA	Auxiliary power supply	
Load range R_A	0 ... 10 V / I_{AN}	AC voltage	230 V~ (-15% +10%); < 7 VA 115 V~ (-15% +10%); < 4 VA
Current limitation	to approx. 37 mA	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 k Ω	AC / DC	90 ... 357 V= or 65 ... 253V~; < 4 ... 7 VA
Load error	$\leq 0.1\%$ at 50% load change	General technical data	
Residual ripple	$\leq 1\%$ eff	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.
Setting time	approx. 500ms	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	$\pm 0.5\%$ of the final value	Measurement category	CAT III
Temperature drift	≤ 0.02 %/K	Degree of contamination	2
		Weight	approx. 270 g



Block circuit diagram
(example)



Connections

Terminal assignment

14	13	1	$I_E L_1$
20	19	2	$U_E L_1$
		3	$I_E L_2$
		5	$U_E L_2$
		6	$U_E L_3$
		11	-
		13	$U_A(+)$
		14	$U_A(-)$
		16	$U_{HN1}(+)$
		17	$U_{HN}(-)$
		19	$I_A(+)$
		20	$I_A(-)$

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

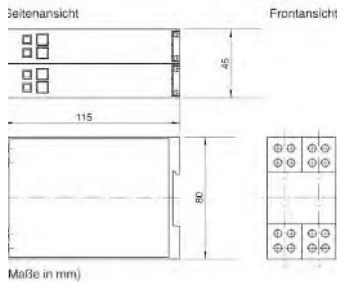
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

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 k Ω
Load error	$\leq 0.1\%$ at 50% load change
Residual ripple	$\leq 1\%$ eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V

Accuracy

Basic accuracy	$\pm 0.5\%$ of the final value
Temperature drift	≤ 0.02 %/K

Nominal conditions

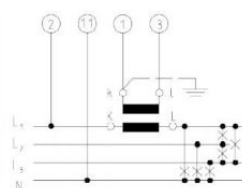
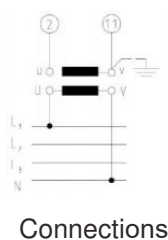
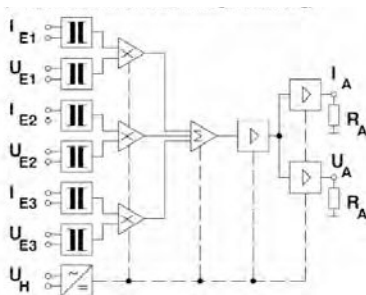
Auxiliary voltage	$U_{HN} \pm 2\%$, 50 ... 60 Hz
Input voltage	$U_{EN} \pm 0.5\%$
Power factor	$\sin \phi = 1.0 \dots 0.8$
Frequency	50 / 60 Hz
Waveform	Sine, distortion factor $\leq 0.1\%$
Ambient temperature	23°C ± 1 K
Warm-up time	≥ 5 min

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

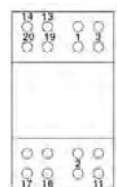
General technical data

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



Terminal assignment

1	$I_E L_1$
2	$U_E L_1$
3	$I_E L_2$
5	-
8	-
11	$U_E N$
13	$U_A (+)$
14	$U_A (-)$
16	$U_{I1} L_1 (+)$
17	$U_{I1} N (-)$
19	$I_A (+)$
20	$I_A (-)$



Block circuit diagram
(example)

Connections

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)

Characteristics/uses

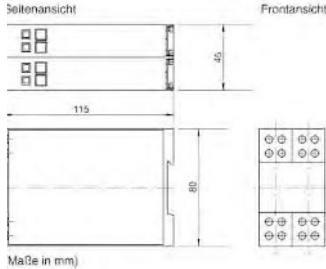
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

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.

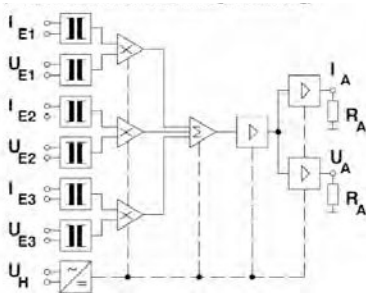
Functional principle

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.



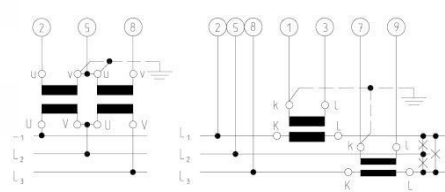
Technical parameters

Measuring input		Nominal conditions	
Nominal frequency	50 or 60 Hz Harmonic content ≤ 0.2	Auxiliary voltage	$U_{HN} \pm 2\%$, 50 ... 60 Hz
Nominal input current I_{EN}	0...0.5-5 A	Input voltage	$U_{EN} \pm 0.5\%$
Input nominal voltage U_{EN}	0 ... 50-519 V	Power factor	$\sin \phi = 1.0 \dots 0.8$
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	Frequency	50 / 60 Hz
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN} , permanent 2 · U_{EN} , 20 I_{EN} max. 1 sec.	Waveform	Sine, distortion factor $\leq 0.1\%$
Operating voltage	max. 519 V	Ambient temperature	23°C ± 1 K
Measurement output		Warm-up time	≥ 5 min
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA	Auxiliary power supply	
Load range R_A	0 ... 10 V / I_{AN}	AC voltage	230 V~ (-15% +10%); < 7 VA 115 V~ (-15% +10%); < 4 VA
Current limitation	to approx. 37 mA	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 k Ω	AC / DC	90 ... 357 V= or 65 ... 253V~; < 4 ... 7 VA
Load error	$\leq 0.1\%$ at 50% load change	General technical data	
Residual ripple	$\leq 1\%$ eff	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.
Setting time	approx. 500ms	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	$\pm 0.5\%$ of the final value	Measurement category	CAT III
Temperature drift	$\leq 0.02\%$ /K	Degree of contamination	2
		Weight	approx. 290 g



Block circuit diagram
(example)

Connections



Terminal assignment

1	I_{E1}
2	U_{E1}
3	I_{E2}
4	-
5	U_{E2}
6	-
7	I_{E3}
8	U_{E3}
9	I_{EN}
10	-
11	-
12	-
13	$U_{AN}(+)$
14	$U_{AN}(-)$
15	-
16	$U_{HL1}(+)$
17	$U_{HN}(-)$
18	-
19	$I_{AN}(+)$
20	$I_{AN}(-)$

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

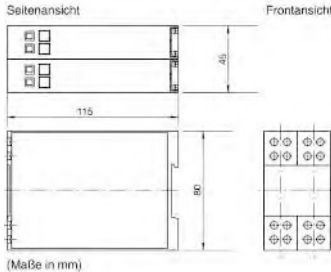
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

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

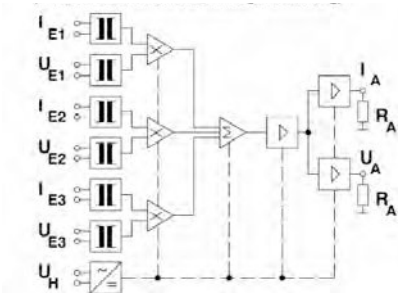
Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the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



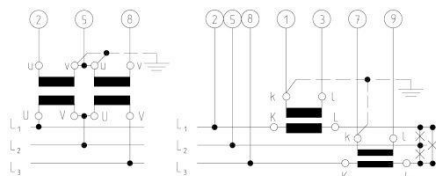
Technical parameters

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 k Ω
Load error	$\leq 0.1\%$ at 50% load change
Residual ripple	$\leq 1\%$ eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	$\pm 0.5\%$ of the final value
Temperature drift	≤ 0.02 %/K

Nominal conditions	
Auxiliary voltage	$U_{HN} \pm 2\%$, 50 ... 60 Hz
Input voltage	$U_{EN} \pm 0.5\%$
Power factor	$\sin \phi = 1.0 \dots 0.8$
Frequency	50 / 60 Hz
Waveform	Sine, distortion factor $\leq 0.1\%$
Ambient temperature	23°C ± 1 K
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	$I_{E L_1}$	14	$U_{E L_1}$	8	7
2	$U_{E L_1}$	15	$I_{E L_2}$	9	6
3	$I_{E L_1}$	16	$U_{E L_2}$	10	5
4	-	17	$I_{E L_3}$	11	4
5	$U_{E L_2}$	18	$U_{E L_3}$	12	3
6	-	19	-	13	2
7	$I_{E L_3}$	20	$U_{A (+)}$	14	1
8	$U_{E L_3}$		$U_{A (-)}$	15	
9	$I_{E L_3}$		$U_{H L_1 (+)}$	16	
10	-		$U_{H N (-)}$	17	
11	-		$I_{A (+)}$	18	
12	-		$I_{A (-)}$	19	
13	$U_{A (+)}$			20	
14	$U_{A (-)}$				
15	$U_{H L_1 (+)}$				
16	$U_{H N (-)}$				
17	$I_{A (+)}$				
18	$I_{A (-)}$				
19					
20					

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

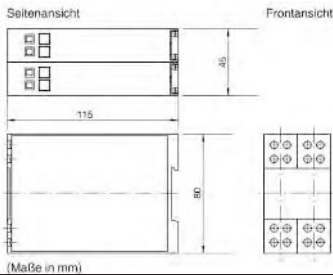
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

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.

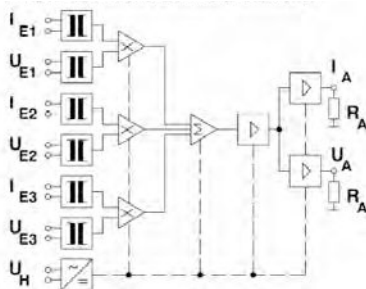
Functional principle

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.

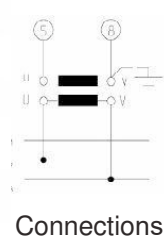


Technical parameters

Measuring input		Nominal conditions	
Nominal frequency	50 or 60 Hz	Auxiliary voltage	$U_{HN} \pm 2\%$, 50 ... 60 Hz
	Harmonic content ≤ 0.2	Input voltage	$U_{EN} \pm 0.5\%$
Nominal input current I_{EN}	0...0.5-5 A	Power factor	$\sin \phi = 1.0 \dots 0.8$
Input nominal voltage U_{EN}	0 ... 50-519 V	Frequency	50 / 60 Hz
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	Waveform	Sine, distortion factor $\leq 0.1\%$
Overload capacity	$1.2 \cdot U_{EN}$ or $1.2 I_{EN}$, permanent $2 \cdot U_{EN}$, 20 I_{EN} max. 1 sec.	Ambient temperature	$23^\circ\text{C} \pm 1\text{K}$
Operating voltage	Max. 519 V	Warm-up time	≥ 5 min
Measurement output		Auxiliary power supply	
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA	AC voltage	230 V~ (-15% +10%); < 7 VA
Load range R_A	0 ... 10 V / I_{AN}		115 V~ (-15% +10%); < 4 VA
Current limitation	to approx. 37 mA	DC voltage	24 V = (20 ... 72V); < 3 VA
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V		20 ... 100 V= or 15 ... 70V~; < 3 VA
Load R_A	$\geq 4 \text{ k}\Omega$		90 ... 357 V= or 65 ... 253V~; < 4 ... 7 VA
Load error	$\leq 0.1\%$ at 50% load change	General technical data	
Residual ripple	$\leq 1\%$ eff	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.
Setting time	approx. 500ms	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	$\pm 0.5\%$ of the final value	Measurement category	CAT III
Temperature drift	$\leq 0.02 \%$ /K	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	$U_E L_2$
6	$U_E L_3$
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)

MBg-3.1, measuring transducer for reactive power Order No.: PMU15 – xxxxxxxxx	Order number									
	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)

Characteristics/uses

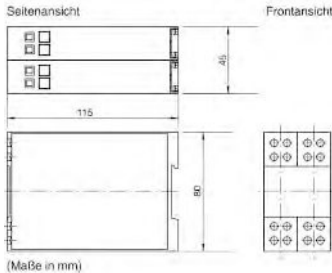
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

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.

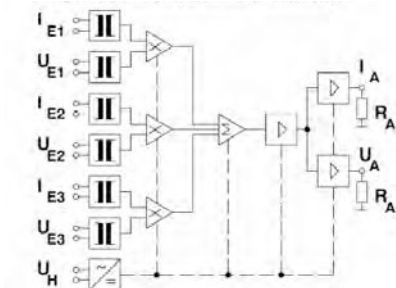
Functional principle

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.



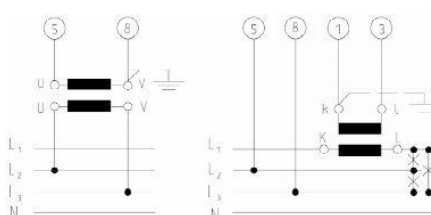
Technical parameters

Measuring input		Nominal conditions	
Nominal frequency	50 or 60 Hz	Auxiliary voltage	$U_{HN} \pm 2\%$, 50 ... 60 Hz
	Harmonic content ≤ 0.2	Input voltage	$U_{EN} \pm 0.5\%$
Nominal input current I_{EN}	0...0.5-5 A	Power factor	$\sin \phi = 1.0 \dots 0.8$
Input nominal voltage U_{EN}	0 ... 50-519 V	Frequency	50 / 60 Hz
Intrinsic consumption	approx. 1 mA per voltage path	Waveform	Sine, distortion factor $\leq 0.1\%$
	< 0.1 VA per current path at 1 A	Ambient temperature	23°C ± 1 K
	< 0.4 VA per current path at 5 A	Warm-up time	≥ 5 min
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN} , permanent	Auxiliary power supply	
	2 · U_{EN} , 20 I_{EN} max. 1 sec.	AC voltage	230 V~ (-15% +10%); < 7 VA
Operating voltage	Max. 519 V		115 V~ (-15% +10%); < 4 VA
Measurement output		DC voltage	24 V = (20 ... 72V); < 3 VA
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA	Wide range	20 ... 100 V~ or 15 ... 70V~; < 3 VA
Load range R_A	0 ... 10 V / I_{AN}	AC / DC	90 ... 357 V~ or 65 ... 253V~; < 4 ... 7 VA
Current limitation to approx. 37 mA		General technical data	
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V	Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
Load R_A	≥ 4 k Ω		Measuring circuit and auxiliary voltage against
Load error	$\leq 0.1\%$ at 50% load change		Output: 3510 V_{eff} 5 sec.
Residual ripple	$\leq 1\%$ eff		currents against each other and against
Setting time	approx. 500ms		Voltage: 3510 V_{eff} 5 sec.
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	$\pm 0.5\%$ of the final value	Protection class	II
Temperature drift	≤ 0.02 %/K	Measurement category	CAT III
		Degree of contamination	2
		Weight	approx. 270 g



Block circuit diagram
(example)

Connections



Terminal assignment

1	$I_E L_1$	14	13
2	-	20	19
3	$I_E L_1$	1	3
5	$U_E I_2$		
8	$U_E L_3$		
11	-		
13	$U_A(+)$		
14	$U_A(-)$		
16	$U_{H-L1}(+)$		
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

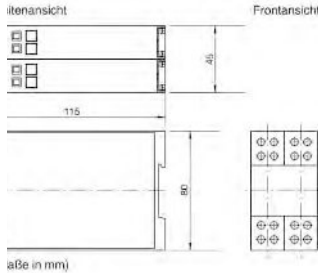
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

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

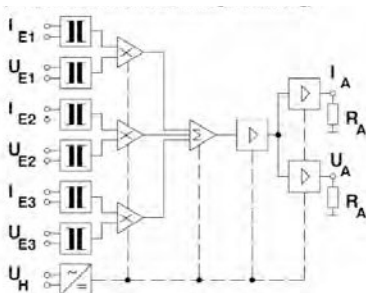
Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the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



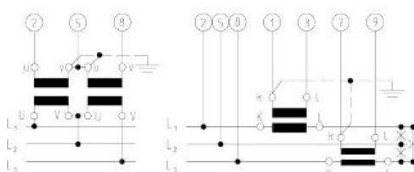
Technical parameters

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	$1.2 \cdot U_{EN}$ or $1.2 I_{EN}$, permanent $2 \cdot U_{EN}$, $20 I_{EN}$ 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	$\geq 4 \text{ k}\Omega$
Load error	$\leq 0.1\%$ at 50% load change
Residual ripple	$\leq 1\%$ eff
Settling time	approx. 500ms
Open-circuit voltage	$\leq 15 \text{ V}$
Accuracy	
Basic accuracy	$\pm 0.5\%$ of the final value
Temperature drift	$\leq 0.02 \text{ \%}/\text{K}$

Nominal conditions	
Auxiliary voltage	$U_{HN} \pm 2\%$, 50 ... 60 Hz
Input voltage	$U_{EN} \pm 0.5\%$
Power factor	$\sin \phi = 1.0 \dots 0.8$
Frequency	50 / 60 Hz
Waveform	Sine, distortion factor $\leq 0.1\%$
Ambient temperature	$23^\circ\text{C} \pm 1\text{K}$
Warm-up time	$\geq 5 \text{ min}$
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: $3510 \text{ V}_{\text{eff}}$ 5 sec. Measuring circuit and auxiliary voltage against Output: $3510 \text{ V}_{\text{eff}}$ 5 sec. currents against each other and against Voltage: $3510 \text{ V}_{\text{eff}}$ 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



Connections



Terminal assignment

1	$I_E L_1$	14	$U_A(+)$
2	$U_E L_1$	15	$U_A(-)$
3	$I_E L_2$	16	$U_{N1} L_1 (+)$
4	-	17	$U_{N1} N (-)$
5	$U_E L_2$	18	$I_A (+)$
6	-	19	$I_A (-)$
7	$I_E L_3$	20	
8	$U_E L_3$		
9	$I_E L_3$		
11	-		
13	$U_H(+)$		
14	$U_H(-)$		
16	$U_{N1} L_1 (+)$		
17	$U_{N1} N (-)$		
18	$I_A (+)$		
19	$I_A (-)$		
20			

Block circuit diagram
(example)

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

MBu-3.1, measuring transducer for reactive power Order No.: PMU16 – xxxxxxxxxx	Order number									
	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

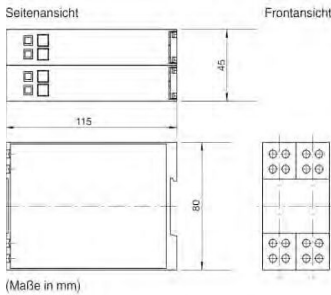
- Sinusoidal as well as non-sinusoidal voltages and currents on three-phase mains of any curve shape
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

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

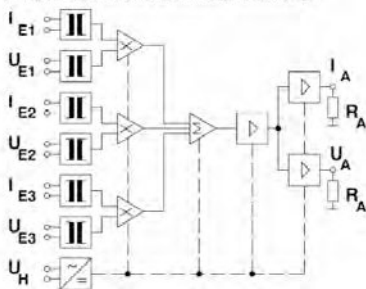
Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the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



Technical parameters

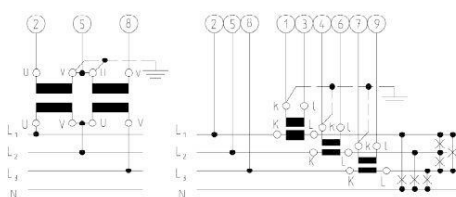
Measuring input	
Nominal frequency	50 or 60 Hz Harmonic content ≤ 0.2
Nominal input current I_{EN}	0...0.5-5 A
Input nominal voltage U_{EN}	0 ... 50-519 V
Intrinsic consumption	approx. 1 mA per voltage path < 0.1 VA per current path at 1 A < 0.4 VA per current path at 5 A
Overload capacity	1.2 · U_{EN} 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 k Ω
Load error	$\leq 0.1\%$ at 50% load change
Residual ripple	$\leq 1\%$ eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	$\pm 0.5\%$ of the final value
Temperature drift	≤ 0.02 %/K

Nominal conditions	
Auxiliary voltage	$U_{HN} \pm 2\%$, 50 ... 60 Hz
Input voltage	$U_{EN} \pm 0.5\%$
Power factor	$\sin \phi = 1.0$... 0.8
Frequency	50 / 60 Hz
Waveform	Sine, distortion factor $\leq 0.1\%$
Ambient temperature	23°C ± 1 K
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



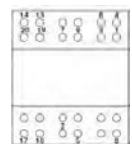
Block circuit diagram
(example)

Connections



Terminal assignment

1	I_{E1}
2	U_{E1}
3	I_{E2}
4	U_{E2}
5	I_{E3}
6	U_{E3}
7	I_{E3}
8	U_{E3}
9	I_{E3}
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)

MBu-4.1, measuring transducer for reactive power Order No.: PMU18 – xxxxxxxxx	Order number									
	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

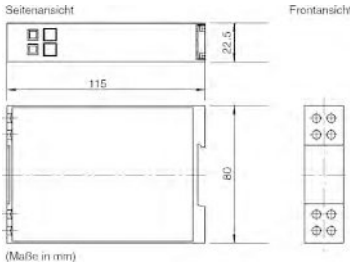
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Direct current
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

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 μ A – 5 A
Intrinsic consumption	$I_E \cdot 0.1$ 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 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 k Ω
Load error	$\leq 0.1\%$ at 50% load change
Residual ripple	$\leq 1\%$ eff
Setting time	approx. 500ms, 250ms, 100ms
Open-circuit voltage	≤ 15 V

Accuracy

Basic accuracy	$\pm 0.5\%$ of the final value
Temperature drift	$\leq 0.02\%$ /K

Nominal conditions

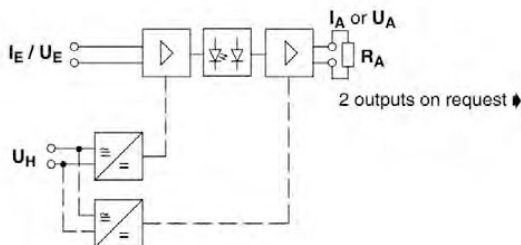
Auxiliary voltage	UHN $\pm 5\%$, 50 Hz with AC
Load	0.5 R_A max. $\pm 1\%$ with current output R_A min $\pm 1\%$ with voltage output
Ambient temperature	23°C ± 1 K
Warm-up time	≥ 5 min

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

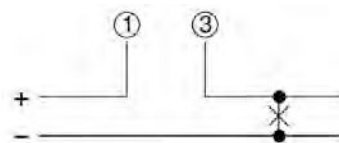
General technical data

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

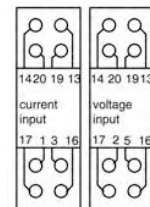


Block circuit diagram (example)

Connections



Terminal assignment



I_E current input
 U_E voltage input
 U_H auxiliary voltage input

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

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

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

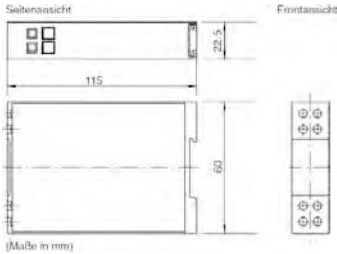
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: DC voltage
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

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.

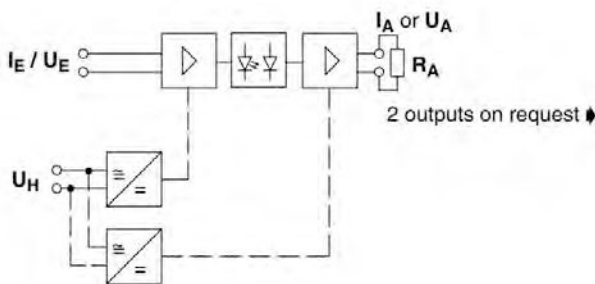
Functional principle

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.



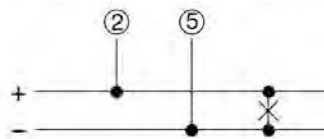
Technical parameters

Measuring input		Nominal conditions	
Nominal frequency f_N	48...62 Hz	Auxiliary voltage	$U_{HN} \pm 5\%$, 50 Hz with AC
Input nominal voltage U_{EN}	$U_{EN} = 60 \text{ mV} - 300 \text{ V}$	Load	0.5 R_A max. $\pm 1\%$ with current output R_A min $\pm 1\%$ with voltage output
Intrinsic consumption	U_E^2 / R_E	Ambient temperature	23°C ± 1 K
Overload capacity	1.2 · U_{EN} permanent 2 · U_{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 115 V~ (-15% +10%); < 3.5 VA
Nominal current I_{AN}	0 ... 20 mA or 4 ... 20 mA	DC voltage	24 V = (20 ... 72V); < 3 VA
Load range R_A	0 ... 12 V / I_{AN}	Wide range	20 ... 100 V= or 15 ... 70V~; < 3 VA
Current limitation	to 120 ... 150% of the final value	AC / DC	90 ... 357 V= or 65 ... 253V~; < 3 ... 6 VA
Nominal voltage U_{AN}	0 ... 10 V or 2 ... 10 V	General technical data	
Load R_A	$\geq 4 \text{ k}\Omega$	Test voltage	2210 V all circuits against housing 3536 V all circuits to each other
Load error	$\leq 0.1\%$ at 50% load change	Working voltage	300 V (nominal mains voltage phase-zero)
Residual ripple	$\leq 1\%$ eff	Protection class	IP 40 housing, IP 20 terminals
Setting time	approx. 500ms	Protection class	II
Open-circuit voltage	$\leq 15 \text{ V}$	Measurement category	CAT III
Accuracy		Degree of contamination	2
Basic accuracy	$\pm 0.5\%$ of the final value	Weight	approx. 120 g
Temperature drift	$\leq 0.02\%$ /K		



Block circuit diagram (example)

Connections



Terminal assignment (for all types)

T.	Function	T.	Function
1	$I_E (+)$	19	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_A	current output
		U_A	voltage output

I_E current input
 U_E voltage input
 U_H auxiliary voltage input
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									
$\pm 0.5\%$ of the final value						1			
$\pm 0.2\%$ 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

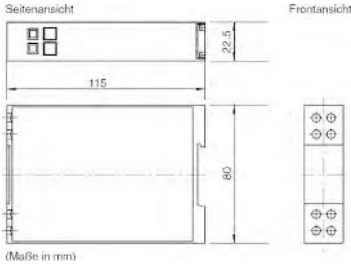
- With auxiliary power supply
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Direct current and direct voltage
- Measurement output: Unipolar, live-zero and bipolar output variables, as well as output with zero elevation

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

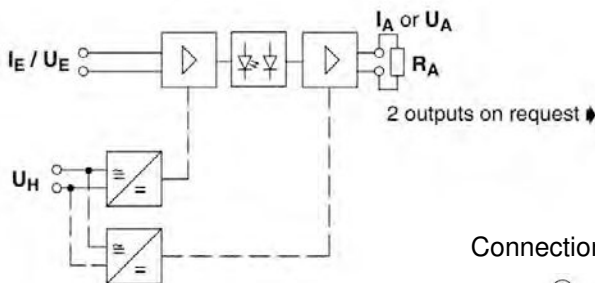
The current measurement is carried out internally via a shunt resistor, the voltage measurement via a voltage divider. After this, the signal is galvanically isolated from the input via an optical path and converted into a proportional imprinted DC voltage or a proportional load-independent DC current.



Technical parameters

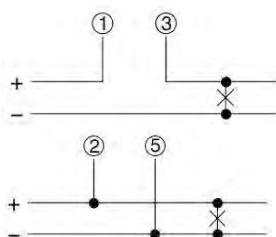
Measuring input	
Input parameter	$I_{EN} = 0 \dots 20 \text{ mA}$, $4 \dots 20 \text{ mA}$ $U_{EN} = 0 \dots 10 \text{ V}$, $2 \dots 10 \text{ V}$
Intrinsic consumption	$I_E \cdot 0.1 \text{ V}$
Overload capacity	$1.2 \cdot I_{EN}$ permanent $2 \cdot I_{EN}$ max. 1 sec.
Operating voltage	Max. 300 V
Measurement output	
Nominal current I_{AN}	$0 \dots 20 \text{ mA}$ or $4 \dots 20 \text{ mA}$
Load range R_A	$0 \dots 12 \text{ V} / I_{AN}$
Current limitation	to 120 ... 150% of the final value
Nominal voltage U_{AN}	$0 \dots 10 \text{ V}$ or $2 \dots 10 \text{ V}$
Load R_A	$\geq 4 \text{ k}\Omega$
Load error	$\leq 0.1\%$ at 50% load change
Residual ripple	$\leq 1\%$ eff
Setting time	approx. 500ms, 250ms, 100ms
Open-circuit voltage	$\leq 15 \text{ V}$
Accuracy	
Basic accuracy	$\pm 0.5\%$ of the final value
Temperature drift	$\leq 0.02 \text{ \%}/\text{K}$

Nominal conditions	
Auxiliary voltage	$U_{HN} \pm 5 \%$, 50 Hz with AC
Load	$0.5 R_A$ max. $\pm 1\%$ with current output R_A min $\pm 1\%$ with voltage output
Ambient temperature	$23^\circ\text{C} \pm 1\text{K}$
Warm-up time	$\geq 5 \text{ min}$
Auxiliary power supply	
AC voltage	$230 \text{ V} \sim (-15\% +10\%)$; $< 6 \text{ VA}$ $115 \text{ V} \sim (-15\% +10\%)$; $< 3.5 \text{ VA}$
DC voltage	$24 \text{ V} = (20 \dots 72\text{V})$; $< 3 \text{ VA}$
Wide range	$20 \dots 100 \text{ V} =$ or $15 \dots 70\text{V} \sim$; $< 3 \text{ VA}$
AC / DC	$90 \dots 357 \text{ V} =$ or $65 \dots 253\text{V} \sim$; $< 3 \dots 6 \text{ VA}$
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

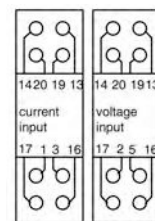


Block circuit diagram (example)

Connections



Terminal assignment (for all types)



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

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

NFG.1 – Measuring transducer for DC standard signals

Characteristics	Ordernumber								
NFG.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

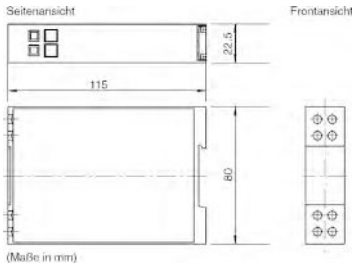
- Without auxiliary power supply
- Surface-mounted housing for top-hat rail TH 35 according to DIN EN 60 715
- Measuring input: Direct current
- Measurement output: Unipolar, live-zero and bipolar output parameters, as well as output with direct current

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

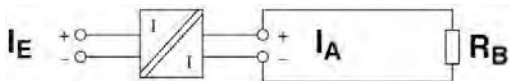
Input and output current are galvanically isolated from each other without additional auxiliary energy. The energy required for this is extracted from the input signal. The input resistance is therefore dependent on the input current and the connected load resistance R_B .



Technical parameters

Measuring input	
Input parameter I_{EN}	$I_{EN} = 20 \text{ mA}$
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	$\pm 0.2\%$ (at 0 ... I_{EN})
Temperature drift	$\leq 0.03 \text{ \%}/\text{K}$
Nominal conditions	
Load	250 $\Omega \pm 1\%$
Ambient temperature	23°C $\pm 1\text{K}$
Warm-up time	$\geq 5 \text{ min}$
Test voltage	2210 V all circuits against housing
Protection class	3536 V Measuring circuit against output
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 120 g

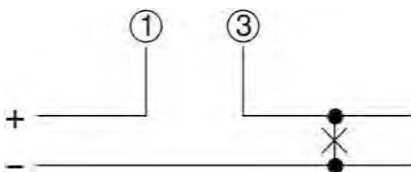
Block circuit diagram



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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