# **Measuring Transducers**



www.mbs-ag.com









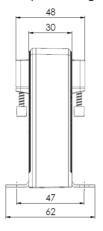
## Contents

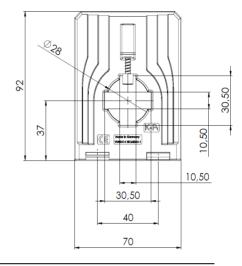
MBS-All curre	ent sensors for the measurer	nent of direct and alternating currents	from page 4	
	CCT 31.3 For bus bar 30x1	0 mm or round conductor 28 mm	From page 4	
11/20		mm resp. 30x15 mm or round conductor 31,5 mm	From page 4 From page 10	
3		mm resp. 50x50 mm or round conductor 50mm	From page 16	
	CC1 63.6 For bus bar 60x30	minresp. 50x50 minror round conductor 50min	From page 16	
Measuring tr	ansducer for alternating curr	ent with integrated current transformer	from page 16	
MANY OF STATE	SWMU 31.5 For bus bar 30x10	mm or round conductor 28 mm	From page 20	
	SWMU 41.5 For bus bar 40x10	bzw. 30x15 or round conductor 27 mm	From page 22	
Clip-on meas	uring transducer for MBS cu	rrent transformers in modular construction	From page 24	
Split-core cur	rent transformers with voltag	e or DC current output (0333 mV / 420 mA)	From page 27	
	KBR 18 Output: 0333 m	V; for round conductor 18 mm	page 27	
	KBR 32 Output: 420 mA	DC or 0333mV; for round conductor 32 mm	page 27	
Vi	KBR 44 Output: 420 mA	DC or 0333 mV; for round conductor 44 mm	page 27	
Measuring tra	ansducers of series EMBSIN	for the following electrical variables	From page28	
THE STATE OF THE S	100 I + 101 I + 201 IE	For AC current, with or without auxiliary voltage supply	ab Seite 30	
General Cardinal Cardina Cardin	120 U + 121 U	For AC voltage , with or without auxiliary supply	ab Seite 36	
Programmable measuring transducer for electrical variables				
	MT 440	Programmable measuring transducer	ab Seite 40	
Measuring tra	ansducers of series MU for th	ne following variables	From page 44	
== /	MA-1.1s	For alternating current transformer connection	ab Seite 44	
	MA-1.1s (eff)	For alternating current of any waveform, True RMS	ab Seite 46	
(C. 1)	MV-1.1s	For AC voltage	ab Seite 48	
	MV-1.1s (eff)	For AC voltage of any waveform, True RMS	ab Seite 50	
	MF-1.1	For frequency	ab Seite 52	
	MPIz.1	For phase angle or power factor	ab Seite 54	
	Typenfindung	For power transducers	Seite 57	
	MW-1.1	For active power	ab Seite 58	
	MWg-x.1 + MWu-x.1	For active power - suitable for frequency inverters	ab Seite 60	
	MBg-x.1	For reactive power - suitable for frequency inverters	ab Seite 68	
	MBu-x.1	For reactive power - suitable for frequency inverters	ab Seite 72	
	MA-G.1	For DC current	ab Seite 76	
	MV-G.1	For DC voltage	ab Seite 78	
	NT-G.1	For standard signals	ab Seite 80	
	Mt-G.oH	For standard signals without auxiliary voltage	ab Seite 82	

## **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:
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 mm<sup>2</sup>

### Technical data:

recililical data.		
Measuring range:	0300 A DC / 0300 A I <sub>RMS</sub> 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:	420 mA DC, RMS measurement	
Max. burden resistance at current output:	$R_B \le 500 \Omega (U_H = 24 V DC)$	
Current limit under overload:	< 25 mA	
Accuracy:	± 1,0 %	
Max. operating voltage U <sub>m</sub> :	0,72 kV, U <sub>eff</sub>	
Isolation test voltage:	6,4 kV, U <sub>eff</sub> , 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 / $\mu$ s):	≤ 200 ms (typ. 150 ms)	
Signal rise speed di/dt:	< 100 A / µs	
Isolation class	Е	
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 <sub>U</sub> < +60° C, 095% rH, without condensation	
Storage temperature:	-40° C < T <sub>L</sub> < +90° C	

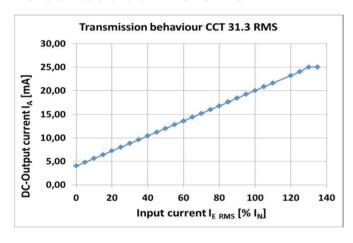
## **Functions of the CCT 31.3 RMS:**

- 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 mm<sup>2</sup>.
- 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.

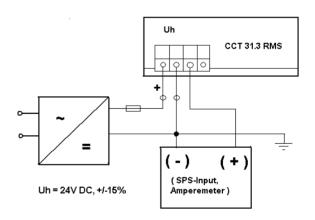
## Advantages and benefits of the CCT 31.3 RMS:

- 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:



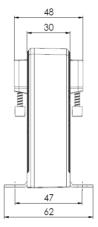
## **Order list:**

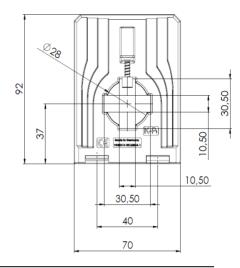
Туре	Primary current I <sub>RMS</sub> [A]	Artno.	Current output
	50	1103-10001	
	100	1103-10003	
CCT 31.3 RMS	150	1103-10005	420 mA DC
CCT 31.3 RIVIS	200	1103-10006	420 IIIA DC
	250	1103-10007	
	300	1103-10008	

## **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)

Applicable technical standards:

Dimensions:
Bus bar: 30x10 mm
Round conductor: 28 mm
Transformer width: 70 mm
Transformer height: 92 mm

Transformer depth: 48 mm

DIN EN 50178, 1997 DIN EN 61010-1, 2002 TOTAL DIN EN 50178, 1997

## Electric connections:

 $U_H$  + 0 (Ground)  $I_A$ Spring clamp terminal

Connection cross sections: 0.08...2.5 mm<sup>2</sup>

#### Technical data:

Measuring range:	0300 A DC / AC I <sub>eff</sub> , depends on varieties! (Nominal current ranges adjusted to standard values according to IEC)
Frequency range:	0100 kHz, any signal curves
Current output at AC-input signal:	AC: 020 mA l <sub>eff</sub> , (± 28.2843 mA l <sub>Peak</sub> )
Current output at DC-input signal:	DC: 0± 20 mA
Max. burden resistance at current output:	$R_{B} \le 200 \ \Omega \ (U_{H} = 24 \ V \ DC)$
Current limit under overload:	< 25 mA
Accuracy:	± 0,5 %
Max. operating voltage U <sub>m</sub> :	0,72 kV, U <sub>eff</sub>
Isolation test voltage:	6,4 kV, U <sub>eff</sub> , 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 / $\mu$ s):	≤ 1 µs (typ. 150 ns)
Signal rise velocity di/dt:	< 100 A / µs
Isolation class	Е
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 <sub>U</sub> < +60° C, 095% rH, without condensation
Storage temperature:	-40° C < T <sub>L</sub> < +90° C

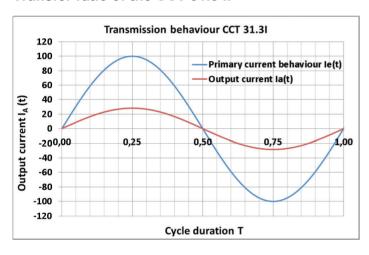
## Functions of the CCT 31.3 I:

- 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 mm<sup>2</sup>.
- 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.

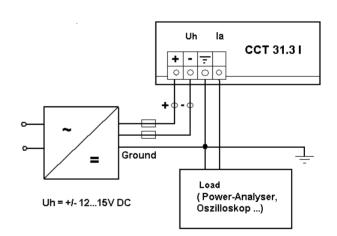
## Advantages and benefits of the CCT 31.3 I:

- 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:



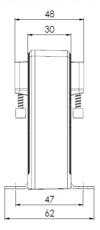
### **Order list:**

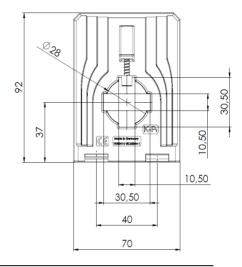
Туре	Primary current [A] DC / AC (I <sub>eff</sub> )	Artno.	Current output
	50	1101-10001	
	100	1101-10003	DC: 0 + 20m4
CCT 31.3 I	150	1101-10005	DC: 0± 20mA
CC1 31.31	200	1101-10006	AC: 020 mA l <sub>eff</sub>
	250	1101-10007	AC. UZU IIIA Ieff
	300	1101-10008	

## **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 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 mm<sup>2</sup>

### Technical data:

	(Nominal current ranges adjusted to standard values according to IEC)
Frequency range:	0100 kHz, any signal curves
Voltage output, AC Input:	2,5 ± 1 V, U <sub>eff</sub> , AC; 2,5 ± 1,414 V (Peak-Peak)
Voltage output, DC Input:	2.5 ± 1 V, DC
Min. burden resistance at current output:	$R_B \ge 100 \text{ k}\Omega$
Current limit under overload:	< 5 V
Accuracy:	± 0,5 %
Max. operating voltage U <sub>m</sub> :	0,72 kV, U <sub>eff</sub>
Isolation test voltage:	6,4 kV, U <sub>eff</sub> , 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 <sub>PN</sub> , di/dt = 100 A / µs):	≤ 1 µs (typ. 150 ns)
Signal rise velocity di/dt:	< 100 A / µs
Isolation class	Е
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 <sub>U</sub> < +60° C, 095% rH, without condensation
Storage temperature:	-40° C < T <sub>L</sub> < +90° C

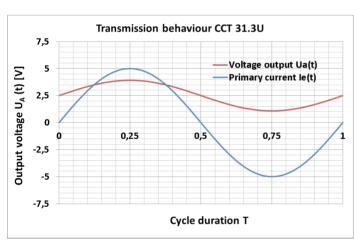
### Functions of the CCT 31.3 U:

- 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.

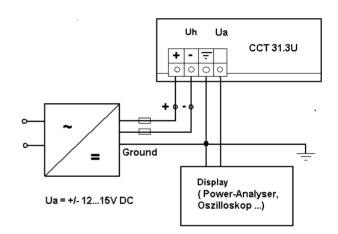
## Advantages and benefits of the CCT 31.3 U:

- 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:



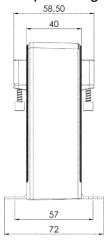
## Order list:

Туре	Primary current I <sub>eff</sub> [A] DC / AC (I <sub>eff</sub> )	Artno.	Voltage output
CCT 31.3 U	50	1102-10001	
	100	1102-10003	DC: 2.5 ± 1V
	150	1102-10005	
	200	1102-10006	AC: 2,5 ± 1,414 V
	250	1102-10007	(Peak-Peak)
	300	1102-10008	

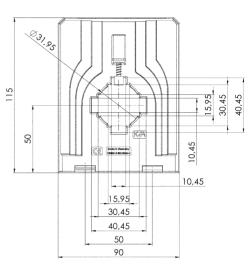
## **CCT 41.4 RMS** (Compensation current transformer, MBS All current sensors) Current transformers for the measurement of direct and alternating currents

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





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



**Dimensions:** 

Bus bar 1: 40x10 mm Bus bar 2: 30x15 mm Round conductor: 31,5 mm

Transformer width: 90 mm Transformer height: 115 mm Transformer depth: 58,5 mm Applicable technical standards:

DIN EN 50178, 1997 DIN EN 61010-1, 2002

**VDE 0160** 

**Electric connections:** 

 $U_H$  + 0 (Ground)  $I_A$ Spring clamp terminal

Connection cross sections: 0.08...2.5 mm<sup>2</sup>

## **Technical data:**

i common data.	
Measuring range:	0500 A DC / 0500 A I <sub>RMS</sub> 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:	420 mA DC, RMS measurement
Max. burden resistance at current output:	$R_{\rm B} \le 500 \ \Omega \ (U_{\rm H} = 24 \ V \ DC)$
Current limit under overload:	< 25 mA
Accuracy:	± 1,0 %
Max. operating voltage U <sub>m</sub> :	0,72 kV, U <sub>eff</sub>
Isolation test voltage:	6,4 kV, U <sub>eff</sub> , 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 / $\mu$ s):	≤ 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 <sub>U</sub> < +60° C, 095% rH, without condensation
Storage temperature:	-40° C < T <sub>L</sub> < +90° C

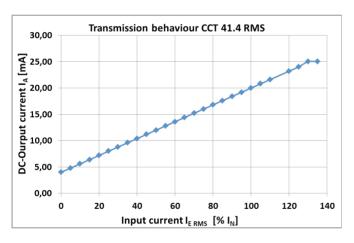
## Functions of the CCT 41.4 RMS:

- 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.

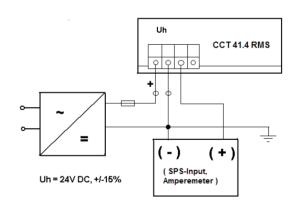
## Advantages and benefits of the CCT 41.4 RMS:

- 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:



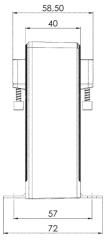
## Order list:

Туре	Primary current I <sub>RMS</sub> [A]	Artno.	Current output
	150	1203-10005	
	200	1203-10006	
CCT 41.4 RMS	250	1203-10007	420 mA DC
CCT 41.4 RIVIS	300	1203-10008	420 IIIA DC
	400	1203-10009	
	500	1203-10010	

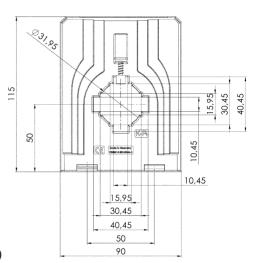
## **CCT 41.4** I (Compensation current transformer, MBS All current sensors) Current transformers for the measurement of direct and alternating currents

- 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 mm<sup>2</sup>

## **Technical data:**

Measuring range:	0500 A DC / AC I <sub>eff</sub> , depends on varieties! (Nominal current ranges adjusted to standard values according to IEC)
Frequency range:	0100 kHz, any signal curves
Current output at AC-input signal:	AC: 020 mA I <sub>eff</sub> , (± 28.2843 mA I <sub>Peak</sub> )
Current output at DC-input signal:	DC: 0± 20 mA
Max. burden resistance at current output:	$R_{B} \le 200 \ \Omega \ (U_{H} = 24 \ V \ DC)$
Current limit under overload:	< 25 mA
Accuracy:	± 0,5 %
Max. operating voltage U <sub>m</sub> :	0,72 kV, U <sub>eff</sub>
Isolation test voltage:	6,4 kV, U <sub>eff</sub> , 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 / $\mu$ s):	≤ 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 <sub>U</sub> < +60° C, 095% rH, without condensation
Storage temperature:	-40° C < T <sub>L</sub> < +90° C

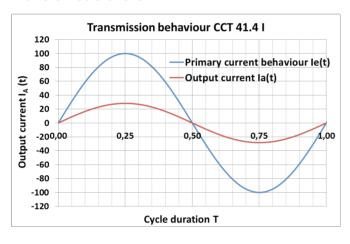
### Functions of the CCT 41.4 I:

- 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 mm<sup>2</sup>.
- 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.

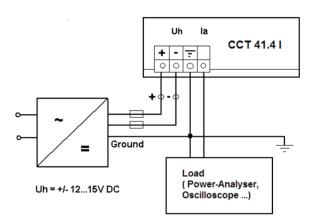
## Advantages and benefits of the CCT 41.4 I:

- 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:



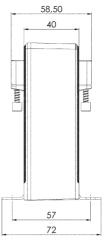
## **Order list:**

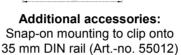
Туре	Primary current [A] DC / AC (I <sub>eff</sub> )	Artno.	Current output
	150	1201-10005	
	200	1201-10006	DC: 0 : 20m A
CCT 41.4 I	250	1201-10007	DC: 0± 20mA
	300	1201-10008	AC: 020 mA l <sub>eff</sub>
	400	1201-10009	AC. U20 IIIA leff
	500	1201-10010	

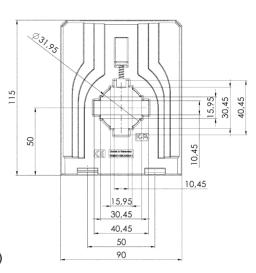
## **CCT 41.4 U** (Compensation current transformer, MBS All current sensors) Current transformers for the measurement of direct and alternating currents

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









**Dimensions:** 

Bus bar 1: 40x10 mm
Bus bar 2: 30x15 mm
Round conductor: 31,5 mm
Transformer width: 90 mm
Transformer beight: 415 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 mm<sup>2</sup>

## **Technical data:**

Measuring range:	0500 A DC / AC I <sub>eff</sub> , depends on varieties! (Nominal current ranges adjusted to standard values according to IEC)	
Frequency range:	0100 kHz, any signal curves	
Voltage output, AC Input:	2,5 ± 1 V, U <sub>eff</sub> , AC; 2,5 ± 1,414 V (Peak-Peak)	
Voltage output, DC Input:	2.5 ± 1 V, DC	
Min. burden resistance at current output:	$R_B \ge 100 \text{ k}\Omega$	
Current limit under overload:	< 5 V	
Accuracy:	± 0,5 %	
Max. operating voltage U <sub>m</sub> :	0,72 kV, U <sub>eff</sub>	
Isolation test voltage:	6,4 kV, U <sub>eff</sub> , 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 <sub>PN</sub> , 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 <sub>U</sub> < +60° C, 095% rH, without condensation	
Storage temperature:	-40° C < T <sub>L</sub> < +90° C	

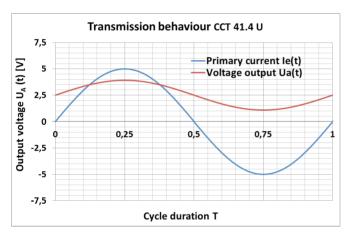
## Functions of the CCT 41.4 U:

- 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.

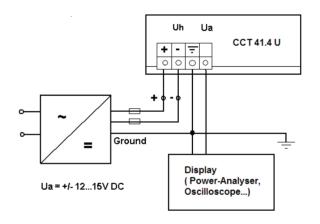
## Advantages and benefits of the CCT 41.4 U:

- 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:



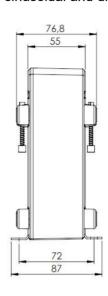
## Order list:

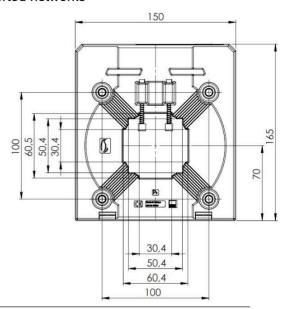
Туре	Primary current I <sub>eff</sub> [A] DC / AC (I <sub>eff</sub> )	Artno.	Voltage output
	150	1202-10005	
	200	1202-10006	DC: 2.5 ± 1V
CCT 41.4 U	250	1202-10007	
	300	1202-10008	AC: 2,5 ± 1,414 V
	400	1202-10009	(Peak-Peak)
	500	1202-10010	

## **CCT 63.6 I** (Compensation current transformer, MBS universal current sensor) Current transformer for measuring both direct and alternating currents

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







#### **Dimensions:**

Rail 1: 60x30 mm Rail 2: 50x50 mm

Round conductors: 50 mm Width: 165 mm

Width: 165 mm Height: 150 mm Total depth: 77 mm

## Applied technical standards:

DIN EN 50178, 1998-04 DIN EN 61326-1, 2013-07

IEC 61000-3/4 DIN EN 61010-1

## **Electrical connections:**

U<sub>H</sub> + U<sub>H</sub> - 0 (Ground) I<sub>A</sub> Plug-in terminal

Connection cross-sections: 0.2 ... 1.5 mm<sup>2</sup>

Stripping length: 10mm

Total depth: // mm	
Technical data:	
Measuring range:	01,500 A DC / AC leff
	(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 leff
Current output with DC input signal	DC: 0 ± 300mA
Max. load resistance at current output:	R <sub>B</sub> ≤ 3 Ω* (U <sub>H</sub> = 24 V DC)
Accuracy:	± 0.5%
Max. operating voltage U <sub>m</sub> :	0.72 kV, U <sub>eff</sub>
Insulation test voltage:	6.4 kV, Ueff, 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 <sub>PN</sub> , di/dt = 100 A / µs):	≤1 µs
Signal slew rate di/dt:	> 100 A / µs
Insulation material class:	E
Protection class:	IP 20
Permitted altitude for operation:	≤ 2000 m (DIN EN 61010-1)
Max. temperature of the primary conductor:	100 °C
Working temperature range:	-25 °C < T∪ < +60 °C, 0 95% rel. humidity, no condensation!
Storage temperature range:	-50 °C < T <sub>L</sub> < +90 °C

<sup>\*</sup> The measurement output must not be operated open!

## Functions of the CCT 63.6 I:

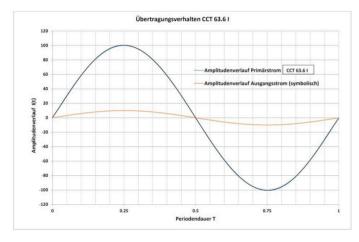
- The magnetic field surrounding a current-carrying conductor is detected by a measuring core surrounding the conductor. The magnetic flux induced in the measuring core, which is directly proportional to the current strength in the primary conductor, is detected by means of a semiconductor component. 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 mm<sup>2</sup>.
- A bipolar DC auxiliary power supply of ± 24 V DC is required to supply the control electronics.
   The auxiliary voltage inputs must be protected by a 300 mA / 250 V / F fine-wire fuse.

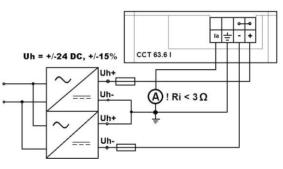
## Advantages and benefits of the CCT 63.6 I:

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

#### Transmission behaviour of the CCT 63.6 I:

## Wiring diagram of the CCT 63.6 I:





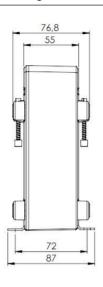
## Ordering table

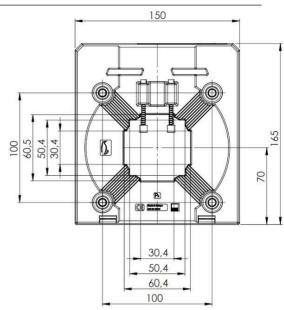
Туре	Primary current [A] DC / AC (Ieff)	Article number	Output signal
CCT 63.6 I	1500	1301-10006	DC: 0 ± 300mA AC: 0 300 mA leff

## **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<sub>H</sub> + U<sub>H</sub> - 0 (Ground) I<sub>A</sub> Plug-in terminal

Connection cross-sections: 0.2 ... 1.5 mm<sup>2</sup>

Stripping length: 10mm

Total depth: 77 mm	
Technical data:	
Measuring range:	0 1,500 A DC / 0 1,500 A I <sub>RMS</sub> 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:	$R_B \le 500 \Omega (U_H = \pm 24 \text{ V DC})$
Output signal limitation in case of overload:	< 30 mA
Accuracy:	± 1.0%
Max. operating voltage U <sub>m</sub> :	0.72 kV, U <sub>eff</sub>
Insulation test voltage:	6.4 kV, Ueff, 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 <sub>PN</sub> , 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 <sub>U</sub> < +60 °C, 0 95% rel. humidity, no condensation!
Storage temperature range:	-50 °C < T∟< +90 °C

### Functions of the CCT 63.6 RMS:

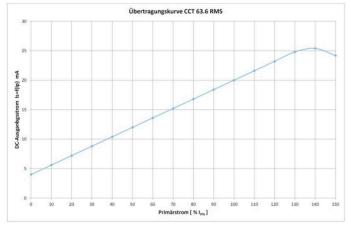
- The magnetic field surrounding a current-carrying conductor is detected by a measuring core surrounding the conductor. The magnetic flux induced in the measuring core, which is directly proportional to the current strength in the primary conductor, is detected by means of a semiconductor component. An electronic control unit integrated in the unit converts the signal supplied by the semiconductor into a DC output current signal proportional to the true effective value of the measured variable. The true effective values are calculating using the delta-sigma method.
- The inductive, contactless acquisition of the measured variable provides an electrically isolated output signal.
- The electrical contact of the secondary circuit of the current transformer is made via an 8-pole plug-in terminal. This terminal is suitable for connecting flexible stranded wires up to 1.5 mm<sup>2</sup>.
- 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.

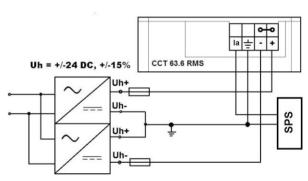
## Advantages and benefits of the CCT 63.6 RMS:

- 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

Туре	Primary current I <sub>RMS</sub> [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).

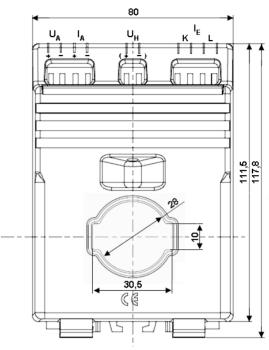
	Technical data SW	MU 31.51/52 SWMU 32.	51/52
measuring input		auxiliary power	
nominal frequency	f <sub>N</sub> 50/60 Hz	AC power supply	230 V ± 10% (5060 Hz)
rated input current I <sub>N</sub>		DC	24 V ± 15%
SWMU 31.52	110 A	power input	≤ 1.5 W (2.5 VA)
SWMU 31.51	15750 A	accuracy	
consumption	≤ 1 VA (2.5 VA with-	reference value	output end value
	out auxiliary voltage)	accuracy class	class 0.5
overload capacity	1.5 · I <sub>N</sub> , constant	warming-up time	≤ 5 min.
	8 · I <sub>N</sub> , 40 sec.	protection	
measuring output		electrocution	IP 40, housing
load-independent DC current	020 mA or	protection	(test wire, EN 60529)
	420 mA*		IP 20, connection terminals
max. burden resistance	≤ 500 Ω		(test digit, EN 60529)
max. burden voltage	≤ 15V	contamination class	2
current limit		test voltages	4 kV, active circuits against housing
under overload	≤ 34 mA	(DIN 57411)	4 kV, auxiliary voltage against
imprinted DC voltage	010 V or		measuring output (230 V AC-version)
	210 V*		500 V, auxiliary voltage against
burden resistance	≥ 10 kΩ		measuring output (24 V DC-version)
max. burden voltage			
under overload	≤ 18 V	*Live-Zero only with a	uxiliary power
voltage limit	≤ 18 V		
residual ripple			
of the output current	≤ 1% p.p.		
response time	≤ 500 ms	Please note: Mounting	g base for direct fitting without use of
operating temperature range	-5° C ≤ δ ≤ +40° C	35mm DIN rail include	ed in the deliveries

## 1. Auxiliary power supply 230 V AC

	Drimary	Measuring output				
Type	Primary current	020mA	420mA	020mA	420mA	
SWMU		and	and	and	and	
	[ \( \sigma \)	010V	010V	210V	210V	
	1	31-1006	31-2006	31-3006	31-4006	
31.52	5	31-1007	31-2007	31-3007	31-4007	
	10	31-1008	31-2008	31-3008	31-4008	
	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	
31.51	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

	Drimary	Measuring output				
Type	Primary current	020mA	420mA	020mA	420mA	
SWMU	[A]	and	and	and	and	
	[ \( \sigma \)	010V	010V	210V	210V	
	1	31-5006	31-6006	31-7006	31-8006	
31.52	5	31-5007	31-6007	31-7007	31-8007	
	10	31-5008	31-6008	31-7008	31-8008	
	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	
31.51	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

		M = = =
		Measuring
Type	Primary	output
Туре	current	020mA
SWMU	[A]	and
		010V
	1	31-9006
32.52	5	31-9007
	10	31-9008
	40	31-9013
	50	31-9014
	60	31-9015
	75	31-9016
	100	31-9017
	150	31-9018
32.51	200	31-9019
	250	31-9020
	300	31-9021
	400	31-9022
	500	31-9023
	600	31-9024
	750	31-9025

power requirements  $P_E \ge 2.5 \text{ VA}$ ! 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).

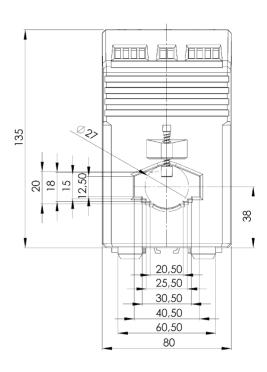
Technical data SWMU 41.51/52 SWMU 42.51/52			
measuring input		auxiliary power	
nominal frequency	f <sub>N</sub> 50/60 Hz	AC power supply	230 V ± 10% (5060 Hz)
rated input current I <sub>N</sub>		DC	24 V ± 15%
SWMU 41.52	110 A	power input	≤ 1.5 W (2.5 VA)
SWMU 41.51	15800 A	accuracy	
consumption	≤ 1 VA (2.5 VA with-	reference value	output end value
	out auxiliary voltage)	accuracy class	class 0.5
overload capacity	1.5 · I <sub>N</sub> , constant	warming-up time	≤ 5 min.
	8 · I <sub>N</sub> , 40 sec.	protection	
measuring output		electrocution	IP 40, housing
load-independent DC current	020 mA or	protection	(test wire, EN 60529)
	420 mA*		IP 20, connection terminals
max. burden resistance	≤ 500 Ω		(test digit, EN 60529)
max. burden voltage	≤ 15V	contamination class	2
current limit		test voltages	4 kV, active circuits against housing
under overload	≤ 34 mA	(DIN 57411)	4 kV, auxiliary voltage against
imprinted DC voltage	010 V or		measuring output (230 V AC-version)
	210 V*		500 V, auxiliary voltage against
burden resistance	≥ 10 kΩ		measuring output (24 V DC-version)
max. burden voltage			
under overload	≤ 18 V	*Live-Zero only with a	uxiliary power
voltage limit	≤ 18 V		
residual ripple			
of the output current	≤ 1% p.p.		
response time	≤ 500 ms	Please note: Mounting	base for direct fitting without use of
operating temperature range	-5° C ≤ δ ≤ +40° C	35mm DIN rail include	d in the deliveries

## 1. Auxiliary power supply 230 V AC

	Drimon		Measurir	ng output	
Type	Primary current	020mA	420mA	020mA	420mA
SWMU	[A]	and	and	and	and
	[ \( 1 \)	010V	010V	210V	210V
	1	61006	62006	63006	64006
41.52	5	61007	62007	63007	64007
	10	61008	62008	63008	64008
	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
41.51	100	61017	62017	63017	64017
41.51	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

	Primary	Measuring output				
Type	current	020mA   420mA		020mA	420mA	
SWMU	[A]	and	and	and	and	
	[ \( \sigma \)	010V	010V	210V	210V	
	1	65006	66006	67006	68006	
41.52	5	65007	66007	67007	68007	
	10	65008	66008	67008	68008	
	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	
41.51	100	65017	66017	67017	68017	
41.51	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

	Primary	Measuring output
Type SWMU	current	020mA
0111110	[A]	and
		010V
	1	69006
42.52	5	69007
	10	69008
	40	69013
	50	69014
	60	69015
	75	69016
	100	69017
	150	69018
42.51	200	69019
42.51	250	69020
	300	69021
	400	69022
	500	69023
	600	69024
	750	69025
	800	69026

power requirements P<sub>E</sub> ≥ 2,5 VA! measuring frequency 50/60 Hz

weight: 600g

operating range 15  $\dots$  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.

$\begin{tabular}{l lllllllllllllllllllllllllllllllllll$
$ \begin{array}{ll} \mbox{Power input from measuring} & \leq 1 \mbox{ VA } (2.5 \mbox{ VA w/o} \\ \mbox{circuit} & \mbox{auxiliary voltage} \\ \mbox{Overload capacity} & 1.2 \cdot I_N, \mbox{ constant} \\ \mbox{ 8} \cdot I_N, \mbox{ 40 sec.} \\ \end{array} $
Overload capacity $1.2 \cdot I_N$ , constant $8 \cdot I_N$ , 40 sec.
8 · I <sub>N</sub> , 40 sec.
Measuring output
Load-independent DC current 0 (4) 20 mA
max. burden resistance $\leq 500 \Omega$
max. burden voltage ≤ 15V
Current limit under ≤ 34 mA
overload
Residual ripple of the $\leq$ 1 % p.p.
output current
Imprinted C voltage 0 (2) 10 V
min. burden resistance $\geq$ 10 k $\Omega$
max. burden voltage ≤ 18 V
under overload
Response time < 500 ms

chnical data	
Accuracy	
Reference value	Output end value
Accuracy class	0.5 %
Accuracy range	1 120 % I <sub>N</sub> (NMC 2/3/4)
	15 120 % I <sub>N</sub> (NMC 0)
Warming-up time	≤ 5 min.
Auxiliary power	
AC power supply	230 V ± 10% (5060 Hz) or
	110 V ± 10% (5060 Hz)
DC	24 V ± 15%
Power input	≤ 1.5 W (2.5 VA)
Protection	
Electrocution	IP 40, housing
protection	(test wire, EN 60529)
	IP 20, Connection terminals
	(Test digit, EN 60529)
Contamination class	2
Test voltages	4 kV, active circuits against housing
(DIN 57411)	4 kV, auxiliary voltage against
	measuring output (230 V AC-version)
	500 V, auxiliary voltage against
	measuring output (24 V DC-version)

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

## Auxiliary power supply 24 V DC, galvanically separated

Type	Me	asuring outp	outs	Primary	Suitable for
Type NMC (2)	020 mA and 010 V	420 mA and 010 V	420 mA and 210 V	current [A]	CTs in the product range
211	39212	39232	39252	1	Α
212	39213	39233	39253	1	В
213	39214	39234	39254	1	С
214	39215	39235	39255	1	D
221	39012	39032	39052	5	Α
222	39013	39033	39053	5	В
223	39014	39034	39054	5	С
224	39015	39035	39055	5	D

Nominal frequency 50/60 Hz; Weight: 80 g; Operating range 0 ... 120 % I<sub>N</sub>

## Auxiliary power supply 230 V AC, galvanically separated

Tymo	Me	asuring outp	outs	Primary	Suitable for
Type NMC (3)	020 mA and 010 V	420 mA and 010 V	420 mA and 210 V	current [A]	CTs in the product range
311	36212	36232	36252	1	Α
312	36213	36233	36253	1	В
313	36214	36234	36254	1	С
314	36215	36235	36255	1	D
321	36041	36032	36052	5	Α
322	36042	36033	36053	5	В
323	36043	36034	36054	5	С
324	36044	36035	36055	5	D

Nominal frequency 50/60 Hz; Weight: 80 g; Operating range 0 ... 120 % I<sub>N</sub>

## Auxiliary power supply 110 V AC, galvanically separated

Туре	Me	asuring outp	Primary	Suitable for	
NMC (4)	020 mA and 010 V	420 mA and 010 V	420 mA and 210 V	current [A]	CTs in the product range
411	76212	76232	76252	1	Α
412	76213	76233	76253	1	В
413	76214	76234	76234 76254		С
414	76215	76235	76255	1	D
421	76012	76032	76052	5	Α
422	76013	76033	76053	5	В
423	76014	76034	76054	5	С
424	76015	76035	76055	5	D

Nominal frequency 50/60 Hz; Weight: 80 g; Operating range 0 ... 120 % I<sub>N</sub>

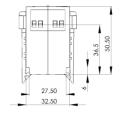
## Without auxiliary power supply, power requirement ≥ 2.5 VA

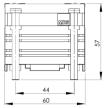
Type NMC (0)	Measuring outputs 020 mA and 010 V	Primary current [A]	Suitable for CTs in the product range		
011	37212	1	Α		
012	37213	1	В		
013	37214	1	С		
014	37215	1	D		
021	37012	5	А		
022	37013	5	В		
023	37014	5	С		
024	37015	5	D		

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

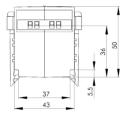
## **Drawings**

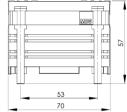
## Construction type "A"



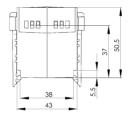


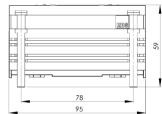
## Construction type "B" / "C"



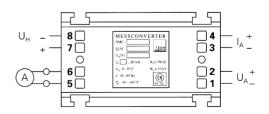


## Construction type "D"









**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			В		С				D		
1															
5						WSK 30									
10						×	WSK 40								
15						Š	×								
20 25							ĬŠ								
25															
30															
40															
50															
60 75															
75										₩					
80										ASK 421.4					
100				ASR 22.3	ASK 21.3					42					
125	<b>ASK 41.3</b> 1 A up to 300 A)	က်	ASK 31.3	13	ý			_	4	×					
150	00	18	က်	K	×			4.	12	γS					
200	က္လ	3	×	Ιĕ	ĕ			4	4						
250 300	<b>ASK 41.3</b> I A up to 3	ASK 318.3	ĕ					ASK 41.4	ASK 412.4						
	dn	ã						AS	ă						
400	S														
500											4				
600	(sec.										7.				
750	(Se										×	4.	4		
800											ASK 61.4	ASK 63.4	ASK 81.4	4	
1000											⋖	×	×	ASK 101.4	(0
1200												Ϋ́	S	2	5.6
1250													< <	SK	10
1500														Ä	ASK 105.6
1600															18
2000															1
2500															
3000															

## **NMC-AD**

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

## Features/benefits

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

Artno.	Application with NMC artno.
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

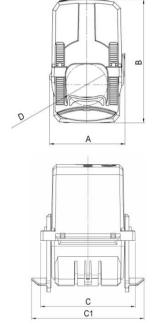


## **Application**

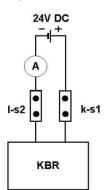
Adaptors of type NMC-KSx are clipped onto current transformers. When the secondary circuit of a current transformer is not being energized the adaptors prevent idling of the transformer, and thus the occurrence of high neutral voltages in the nominal current of the current transformer.

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





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



## Split-core current transformer, type KBR

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

## Features / benefits

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

## Available measuring ranges

#### KBR 18 (Inner diameter: 18.5 mm):

- Primary current: 50 250 A
- Voltage output: 0...333 mV
- Accuracy class 1

## KBR 32 (Inner diameter: 32.5 mm):

- Primary current: 100 600 A
- Current or voltage output: 4...20 mA DC or 0...333 mV
- Accuracy class 1

### KBR 44 (Inner diameter: 44 mm):

- Primary current: 250 1000 A
- Current or voltage output: 4...20 mA DC or 0...333 mV
- Accuracy class 1

### General technical specifications

- Length of connection cable: 0...333 mV: 2.5 m, cross section 2x0.75 mm<sup>2</sup>

4...20 mA: 2.5 m, cross section 2x0.75 mm<sup>2</sup>

(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  $I_{\text{cth}}\!:$  1.2 x  $I_{N}$
- Therm. nominal short-time current I<sub>th</sub>: 60 x I<sub>N</sub>, 1 sec.
- Max. operating voltage U<sub>m</sub>: 0.72 kV
- Isolation test voltage: 3 kV, U<sub>eff</sub>, 50 Hz, 1 min.
- Rated frequency: 50 Hz
- Isolation class: E
- Applicable technical standard: DIN EN 61869, part 1 + 2

#### **Dimensions**

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

## Technical characteristics for the KBR with output signal 4...20 mA:

- 2-wire connection, auxiliary power via output circuit
- Auxiliary power: 24 V DC ± 15 %, P<sub>V</sub> = max. 1 VA
- Load-independent DC current: Live-zero, 4...20 mA
- External resistance: max. 300  $\Omega$
- Current limit under overload: < 30 mA
- Residual ripple of the output current: ≤ 1 % p.p.
- Response time: < 300 ms

## **EMBSIN**

Measuring transducers for electrical variables



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

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

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

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

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

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

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

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

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

## Safety

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

#### Easy to use

Units with two wide-end auxiliary power ranges 24...65 V AC/DC or 85...230 V AC/DC Auxiliary power, to be connected either on the top or on the bottom  $\cos \phi$  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

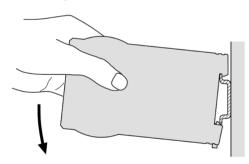
## **Accuracy**

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

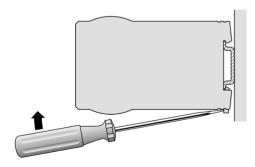
#### **Better**

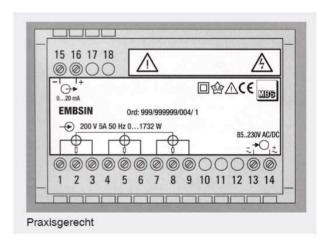
Highest quality and safety at very competitive prices!

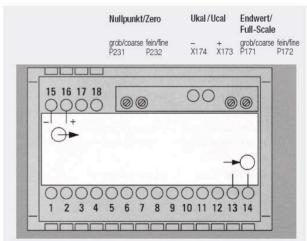
### **Assembly**



## Dismantling

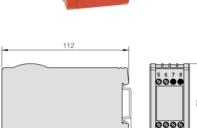






Intermediate circuit calibration





114

## **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.

	Te
Measuring input	
Rated frequency f <sub>N</sub>	50/60 Hz
Rated input current I <sub>N</sub>	1 / 5 A or 1.2 / 6 A
	(selectable at terminal)
Consumption	≤ 2.5 VA
Overload capacity	1.2 · I <sub>N</sub> , constant
	20 ⋅ I <sub>N</sub> , 1 sec.
Measuring output	
Load-independent DC current	05 mA, 010mA
	or 020 mA
Max. burden voltage	≤ 15 V
Voltage limit by	≤ 30 V
R <sub>EXT</sub> = ∞	
Current limit	≤ 34 mA
under overload	
Residual ripple of the	≤ 1 % p.p.
output current	
Response time	< 500 ms
Accuracy	
Reference value	Output end value
Accuracy class	Class 0.5
Measuring range	0100 % I <sub>N</sub>
-	

ес	hnical data	
_	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
	Safety	
	Protection class	II (protection isolated, DIN EN 61010)
_	Electrocution protection	IP 40, housing
_		(test wire, EN 60529)
		IP 20, connection terminals
_		(test digit, EN 60529)
_	Contamination class	2
	Overvoltage category	III
_	Nominal isolation voltage	250 V, input
	(to earth)	40 V, output
_	Test voltages	50 Hz, 1 min., EN 61010-1
		3.7 kV, rms, Measuring input against
_		measuring output and exterior surface
_		490 V, Measuring output against
_		exterior surface
_	Weight	270 g

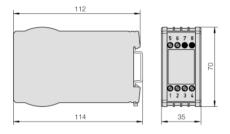
## **Order lists**

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

Features	Order no.					
EMBSIN 100 I, Measuring transducer for AC current						
Order no.: 100 l – Mxxxx	100 l –	М	Χ	Χ	Χ	X
1. Construction						
Housing MBS for 35 mm DIN rail		М				
2. Measuring range						
01/5 A			1			
01.2/6 A			2			
9 Nonstandard (A),			9			
00.5 A up to 07.5 A						
(only one measuring range!) A						
3. Output signal				1		
$05 \text{ mA}, R_3 \leq 3 \text{ k}\Omega$						
010 mA, $R_a \le 1.5$ kΩ				2		
020 mA, $R_a \le 750 \Omega$				3		
4. Measuring range adjustable					0	
Measuring range fixed						
Measuring end value adjustable approx. ±10 %					1	
5. Test certificates						
without test certificate						0
with test certificate in German						D
with test certificate in English						Е

Rated frequency of the measuring signal: 50/60 Hz





## **EMBSIN 100 I**

Measuring transducer for AC current

## Features / benefits

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

## **Application**

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

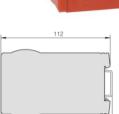
	Te	chnical data	
Measuring input		Temperature influence	
Rated frequency f <sub>N</sub>	50/60 Hz	(-10 +55 °C)	
Rated input current I <sub>N</sub>	1 / 5 A or 1.2 / 6 A	Operating temperature	-
	(selectable at terminal)	Storage temperature	-
Consumption	≤ 2.5 VA	Safety	
Overload capacity	1.2 · I <sub>N</sub> , constant	Protection class	I
	20 · I <sub>N</sub> , 1 sec.	Electrocution protection	I
Measuring output			(
Load-independent DC current	05 mA, 010mA		ı
	or 020 mA		(
Max. burden voltage	≤ 15 V	Contamination class	2
Voltage limit by	≤ 30 V	Overvoltage category	I
R <sub>EXT</sub> = ∞		Nominal isolation voltage	2
Current limit	≤ 34 mA	(to earth)	4
under overload		Test voltages	Ę
Residual ripple of the	≤ 1 % p.p.		3
output current			r
Response time	< 500 ms		4
Accuracy			6
Reference value	Output end value	Weight	2
Accuracy class	Class 0.5		
Measuring range	0100 % I <sub>N</sub>		

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

## EMBSIN 101 I – Measuring transducer for AC current

Features	Order no.						
EMBSIN 101 I, Measuring transducer for AC current							
Order no.: 101 l – Mxx xx	101 I –	М	X	X	Х	X	X
1. Construction							
Housing MBS for 35 mm DIN rail		М					
2. Frequecy of the input voltage / input current							
Rated frequency 50/60 Hz			1				
3. Measuring range							
01 A				Α			
05 A				В			
Z) A ! Z) Nonstandard [A] 00.8 up to 01.2 or 04 up to 06				Z			
4. Output signal							
020 mA					1		
420 mA					2		
420 mA, 2-wire-connection / feed					3		
9) mA					9		
! 9) Nonstandard [mA] 02.5 up to 0< 20							
15 up to < (4 20)							
010 V					Α		
Z)V					Z		
! Z) Nonstandard (V) 05.0 up to 0< 10							
15 up to 210							
5. Auxiliary voltage							
Auxiliary voltage $U_h$ : 24 V AC						1	
Auxiliary voltage $U_h$ : 110 V AC						2	
Auxiliary voltage U <sub>h</sub> : 115 V AC						3	
Auxiliary voltage $U_h$ : 120 V AC						4	
Auxiliary voltage $U_h$ : 230 V AC						5	
Auxiliary voltage U <sub>h</sub> : 400 V AC, ! max. 300 V to earth!						6	
Auxiliary voltage U <sub>h</sub> : 24 V DC						Α	
Auxiliary voltage U <sub>h</sub> : 24 V DC via output circuit						В	
Auxiliary voltage U <sub>h</sub> : 85230 V AC/DC						С	
Auxiliary voltage U <sub>h</sub> : 2460 V AC/DC						D	
U <sub>b</sub> 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							Е







## **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.

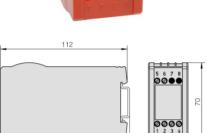
	Te	echnical data	
Measuring input		Accuracy	
Rated frequency f <sub>N</sub>	50/60 Hz	Reference value	Output end value
Rated input current I <sub>N</sub>	1 / 5 A or 1.2 / 6 A	Accuracy class	Class 0.5
	(selectable at terminal)	Peak value factor	√2
Consumption	≤ 1 VA	Warming-up time	≤ 5 min
Overload capacity	1.2 · I <sub>N</sub> , constant	Operating temperature	-10 °C up to +55 °C
	20 ⋅ I <sub>N</sub> , 1 sec.	Storage temperature	-40 °C up to +70 °C
Measuring output		Auxiliary power	
Load-independent DC current	01 mA to 020 mA	Universal power supply	DC or AC (40400 Hz)
	or live-zero	AC/DC ranges	2460 V or 85230 V
	0.21 mA to 420 mA	AC power supply	4565 Hz
Max. burden voltage	≤ 15 V	Power input	≤ 1.5 W (3 VA)
External resistance	$R_{EXT}[k\Omega] \le 15 \text{ V / } I_{AN}[mA]$	Safety	
Current limit	approx. 1.5 x I <sub>AN</sub>	Protection class	II (protection isolated, DIN EN 61010)
under overload		Electrocution protection	IP 40, housing
Imprinted DC voltage	01 V to 010 V		(test wire, EN 60529)
	or live-zero		IP 20, connection terminals
	0.21 V to 210 V		(test digit, EN 60529)
Load capacity	max. 2 mA	Contamination class	2
External resistance	$R_{EXT}[k\Omega] \ge U_{AN}[V] / 2 mA$	Overvoltage category	III
Voltage limit by R <sub>EXT</sub> = ∞	≤ 25 V	Nominal isolation voltage	300 V, input
Current limit	≤ 10 mA	(to earth)	230 V, auxiliary power
under overload			40 V, output
Residual ripple of the	≤ 0.5 % p.p. (300 ms)	Test voltages	50 Hz, 1 min., EN 61010-1
output current	≤ 2 % p.p. (50 ms)		3.7 kV, Measuring input against
Response time	50 ms or 300 ms		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	10.		
EMBSIN 201 IE, Measuring transducer for AC current								
effective value, Order no.: 201 IE - Mxx xx x	201 IE –	М	X	X	X	Х	Х	
4. Construction								
1. Construction Housing MBS for 35 mm DIN rail		M						
2. Frequecy of the input voltage / input current		IVI						
Rated frequency 50/60 Hz			1	1				
Rated frequency 400 Hz			2					
3. Measuring range								
01.0/5.0 A				1				
01.2/6.0 A				2				
9) A				9				
Lower / higher measuring range dependent on connection availability				9				
! Z) Nonstandard [A] 00.1/0.5 up to 0< 1.2/6								
Measuring range end value ratio 1:5								
4. Output signal				1				
020 mA					1			
420 mA					2			
9) mA					9			
! 9) Nonstandard [mA]: 01.00 up to 0< 20					_			
0.21 up to < (420)					i			
A) 010 V					Α			
Z)V					Z			
! Z) Nonstandard (V): 01.00 up to 0< 10					i -	! 		
0,21 up to 210					İ			
5. Auxiliary voltage					<u> </u>			
Auxiliary voltage <i>U<sub>s</sub></i> : 85230 V AC/DC 1						1		
Auxiliary voltage U <sub>s</sub> : 2460 V AC/DC 2						2		
Auxiliary voltage from measuring input (≥ 2460 V AC )						3		
Auxiliary voltage from measuring input (≥ 85230 V AC )						4		
Auxiliary voltage $U_b$ : 24 V AC/2460 V DC from low voltage side						5		-
U <sub>n</sub> rated voltage Tolerances: DC –15+33 %								
AC –15+15 %								
! 3) Not to be combinded with measuring range, order no.: C)L)								
! 4) Not to be combined with measuring range,								
order no.: A, B, L								
6. Respones time								
300 ms (standard)							1	
50 ms							2	
7. Test certificates								
without test certificate								0
with test certificate in German						,		D
with test certificate in German with test certificate in German								E
with test certificate III English	1							-







114

## **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.

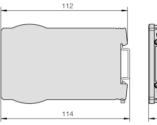
This measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMC) and safety (IEC 1010 and EN 61010). These measuring transducers are designed for indoor use only.

Technical data							
Measuring input		Accuracy					
Rated frequency f <sub>N</sub>	50/60 Hz	Reference value	Output end value				
Rated input voltage U <sub>N</sub>	020 V to 0500 V	Accuracy class	Class 0.5				
	(linked voltage!)	Measuring range	20100 % U <sub>N</sub>				
	max. input voltage to	Temperature influence	0.2 % / 10 K				
	earth 300V (operating	(-10 +55 °C)					
	voltage acc. to EN 61010)	Operating temperature	-10 °C up to +55 °C				
Consumption	≤ 2 VA	Storage temperature	-40 °C up to +70 °C				
Overload capacity	1.2 · U <sub>N</sub> , constant	Safety					
	2.0 · U <sub>N</sub> , 1 sec.	Protection class	II (protection isolated, DIN EN 61010)				
Measuring output		Electrocution protection	IP 40, housing				
Load-independent DC current	05 mA, 010 mA		(test wire, EN 60529)				
	or 020 mA		IP 20, connection terminals				
Max. burden voltage	≤ 15 V		(test digit, EN 60529)				
Max. burden resistance	$R_{EXT}[k\Omega] \le 15 \text{ V / } I_{AN}[mA]$	Contamination class	2				
Voltage limit by	≤ 54 V	Nominal isolation voltage	300 V, rms,				
R <sub>EXT</sub> = ∞			connection category III				
Current limit	≤ 1.7 · I <sub>N</sub>		500 V, rms,				
under overload			connection category II				
Residual ripple of the	≤ 1 % p.p.	Weight	180 g				
output current							
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 –	М	Х	Х	Х	Х
1. Construction						
Housing MBS for 35 mm DIN rail		М				
2. Measuring range						
0100/√3 V			Α			
0110/√3 V			В			
0120/√3 V			С			
0100 V			D			
0110 V			Е			
0116.66 V			F			
0120 V			G			
0125 V			Н			
0133.33 V			J			
0150 V			К			
0250 V			L			
0400 V			М			
0500 V !			N			
Z)V			Z			
! Z) Nonstandard (V): 020 V up to 0500 V						
max. 250 V rated voltage to earth						
(Rated voltages acc. to EN 61010)						
3. Output signal						
$05$ mA, $R_a$ ≤ 3 kΩ				1		
$010 \text{ mA}$ , $R_a$ % ≤ 1,5 kΩ				2		
020 mA, $R_a \le 750 \Omega$				3		
4. Measuring range adjustable						
Measuring range fixed					0	
Measuring end value adjustable approx. ± 10 %					1	
5. Test certificates						
without test certificate						0
with test certificate in German						D
with test certificate in English						Е







### **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.

	Ted	chnical data	
Measuring input	50/60 Hz	Current limit	< 30 mA
Rated frequency f <sub>N</sub> Rated input voltage U <sub>N</sub>	050 V to 0600 V (linked voltage!)	under overload  Residual ripple of the output current	≤ 1 % p.p.
	max. input voltage to	Response time	< 300 ms
	earth 300V (operating	Accuracy	
	voltage acc. to EN 61010)	Reference value	Output end value
Consumption	$< U_N \cdot 50\mu A (U_N \le 150 \text{ V})$ $< U_N \cdot 20\mu A (150 < U_N \le 400 \text{V})$	Accuracy class	Class 0.5 ( $U_N \le 500 \text{ V}$ ) Class 1 ( $U_N > 500 \text{ V}$ )
	$< U_N \cdot 5 \mu\text{A} (400 < U_N \le 600 \text{V})$	Operating temperature	-10 °C up to +55 °C
Overload capacity	1.2 · U <sub>N</sub> , constant	Auxiliary power	<u> </u>
	2.0 · U <sub>N</sub> , 1 sec.	AC	24400 V (±15 %, 50/60 Hz)
Measuring output			P <sub>V</sub> approx. 3 VA
Load-independent DC	05 mA to 020 mA	DC	24 V, -15 / +33 % or
current	or live-zero 15 mA to 420 mA		24 V, -50 / +33 % by 2-wire feed and output
Max. burden voltage	≤ 15 V		420 mA; P <sub>V</sub> approx. 1.5 W
Max. burden resistance By 2-wire connection	$R_{EXT}[k\Omega] \le 15 \text{ V / I}_{AN}[mA]$ standard range 420 mA External resistance $R_{EXT}$ .	Universal power supply (AC + DC)	2460 V AC/DC DC -15 / + 33 % Power consumption $P_V \le 1.5$ W
	dependent of the auxiliary		AC ±15 %
	power H (1232 V DC)		Power consumption P <sub>V</sub> ≤ 3 VA
	$R_{EXT}[k\Omega] \le (H-12)V / 20mA$	Safety	
Current limit	< 30 mA	Protection class	II (protection isolated, DIN EN 61010)
under overload		Electrocution protection	IP 40, housing
Voltage limit by R <sub>EXT</sub> = ∞	≤ 40 V		(test wire, EN 60529) IP 20, connection terminals
Residual ripple of the	≤ 1 % p.p.		(test digit, EN 60529)
output current		Contamination class	2
Imprinted DC voltage	05 V to 010 V	Overvoltage category	
	or live-zero	Nominal isolation voltage	300 V, input
Min. bundan nasiata : : :	15 V to 210 V	(to earth)	300 V, auxiliary power AC
Min. burden resistance	$R_{EXT}[k\Omega] \le U_{AN}[V] / 10 \text{ mA}$		50 V, auxiliary power 24 V DC
Voltage limit by	≤ 40 V	M/-1-1-(	50 V, output
R <sub>EXT</sub> = ∞		Weight	195 g

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

Features				Order	no.		
EMBSIN 101 I, Measuring transducer for AC current							
Order no.: 101 I – Mxx xx	101 I –	М	X	X		Х	X
1. Construction		M					
Housing MBS for 35 mm DIN rail		171					
2. Frequecy of the input voltage / input current			1				
Rated frequency 50/60 Hz							
3. Measuring range							
0100 V				Α			
0250 V				В			
0500 V				С			
Z)V				Z	ļ		
! Z) Nonstandard (V) 050 bis 0500				_			
Max. 300 V rated voltage to earth							
(Rated voltages acc. to EN 61010)							
4. Output signal							
020 mA					1		
420 mA					2		
420 mA, 2-wire-connection / feed					3		
9) mA					9		
! 9) Nonstandard [mA] 02.5 up to 0< 20							
15 up to < (4 20)							
010 V 15 up to 210		-			Α		
Z)V					Z		
! Z) Nonstandard (V) 05.0 up to 0< 10							
5. Auxiliary voltage							
Auxiliary voltage $U_{\rm h}$ : 24 V AC						1	
Auxiliary voltage U <sub>b</sub> : 110 V AC						2	
Auxiliary voltage U <sub>b</sub> : 115 V AC						3	
Auxiliary voltage U <sub>b</sub> : 120 V AC						4	
Auxiliary voltage U <sub>b</sub> : 230 V AC						5	
Auxiliary voltage U <sub>h</sub> : 400 V AC, ! max. 300 V to earth!						6	
Auxiliary voltage U <sub>b</sub> : 24 V DC						Α	
Auxiliary voltage $U_{\rm h}$ : 24 V DC via output circuit						В	
Auxiliary voltage U <sub>b</sub> : 85230 V AC/DC						С	
Auxiliary voltage U <sub>b</sub> : 2460 V AC/DC		-				D	
U <sub>b</sub> 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
<b>3</b> ·							

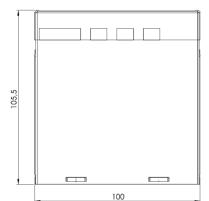




Programmable measuring transducer for all electrical parameters

#### 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

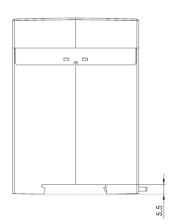


#### **Application**

The programmable measuring transducer MT 440 enables to capture up to 50 different electrical parameters of the connected network.

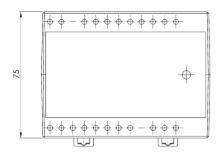
Large input ranges of the input volumes allow for the monitoring of almost all standardized electrical parameters.

Four integrated, freely programmable measuring outputs permit the simultaneous use of the assigned measuring value for control and monitoring purposes.



#### Supported measurements

	Basic measurements					
	Voltage U <sub>1</sub> , U <sub>2</sub> , U <sub>3</sub> and U <sup>~</sup>					
	Current I <sub>1</sub> , I <sub>2</sub> , I <sub>3</sub> , I <sub>n</sub> , I <sub>t</sub> and I <sub>a</sub>					
	Active power P <sub>1</sub> , P <sub>2</sub> , P <sub>3</sub> and P <sub>t</sub>					
	Re-active power Q <sub>1</sub> , Q <sub>2</sub> , Q <sub>3</sub> and Q <sub>t</sub>					
Phase	Apparent power S <sub>1</sub> , S <sub>2</sub> , S <sub>3</sub> and S <sub>t</sub>					
	Power factor PF <sub>1</sub> , PF <sub>2</sub> , PF <sub>3</sub> and PF <sup>~</sup>					
	Phase angle $\phi_1$ , $\phi_2$ , $\phi_3$ , and $\phi^{\sim}$					
	THD of phase voltage U <sub>f1</sub> , U <sub>f2</sub> and U <sub>f3</sub>					
	THD of phase angle I <sub>1</sub> , I <sub>2</sub> and I <sub>3</sub>					
	Phase-to-phase voltage U <sub>12</sub> , U <sub>23</sub> , U <sub>31</sub>					
Phase-to-phase	Average phase-to-phase voltage U <sub>ff</sub>					
Filase-to-pilase	Phase-to-phase angle) $\varphi_{12}$ , $\varphi_{23}$ , $\varphi_{31}$					
	THD of phase-to-phase voltage					
	Counter 1					
	Counter 2					
Energy	Counter 3					
	Counter 4					
	Active tariff					
	Other measurements					
	Phase current I <sub>1</sub> , I <sub>2</sub> , I <sub>3</sub>					
	Active power P (positive)					
MD values	Active power P (negative)					
IIID Values	Re-active power Q – L					
	Re-active power Q – C					
	Apparent power S					
Measurements	Frequency					
Micasarcinents	Internal temperature					



	Te
Measuring input	500.1/
Rated input voltage U <sub>N</sub>	500 V
	(phase against neutral)
	Automatic selection of the
	measuring range
Voltage measuring range	62,5 V, 125 V, 250 V, 500 V
Rated input current I <sub>N</sub>	5 A
Current measuring range	1 A, 5 A, 10 A
Overload capacity	
Current input	15 A constant,
(acc. IEC 60688)	20 x I <sub>N</sub> , 5 x 1 sec.
Voltage input	600 V constant,
(acc. IEC 60688)	2 x U <sub>N</sub> , 10 sec.
Measuring output	
DC current outputs	
4 output ranges,	-100 % 0 100 %
programmable	-(120)mA0 (120)mA
Control range	±120% I <sub>AN</sub>
Max. burden voltage	≤ 10 V
Max. output current at	35 mA
overload	
Max. output voltage at open	35 V
current output	
Max. burden resistance	$R_{\text{max}} [k\Omega] = 10 \text{ V} / I_{AN} [mA]$
Response time	≤ 50 ms (Analog FAST)
Residual ripple of the	≤ 1 % p.p.
output current	. ve pope
DC voltage outputs	
2 output ranges,	-100 % 0 100 %
programmable	-(110) V0 (110) V
Control range	±120%
Max. output voltage at	120 % nominal
overload	,,
Max. output current	20 mA
Min. burden resistance	$R_{BMIN} [k\Omega] \ge U_{AN} / 20 \text{ mA}$
Response time	≤ 50 ms (Analog FAST)
Residual ripple of the	≤ 1 % p.p.
output voltage	- 1 /0 μ.μ.
Accuracy IEC 60688	Class 0.5
	UI035 U.U
Auxiliary power	AC 40 276 \/ (45 65 LI=\
Universal power supply	AC 40276 V, (4565 Hz)
	DC 24300 V

Reference conditions	
Ambient temperature	1530 °C
Input signal	0100 % I <sub>N</sub>
Frequency	4565 Hz
Connection terminals	
Screw terminals	2.5 mm <sup>2</sup> , wire with ferrule
	4.0 mm², solid conductor
Setting software	MiQen
	Software for communication and
	parameterization of transducer
Interfaces (optionally)	RS232 resp. RS485
Operating conditions	
Ambient temperature	-10 <u>0 45</u> 55 °C
Operating temperature	-30 + 70 °C
Storage temperature	-40 + 70 °C
Average annual humidity	≤ 93 %
Altitude	≤ 2000 m
Safety	
Electrocution protection	IP 40
	(IP 20 for connection terminals)
Contamination class	2
Installation category	CAT III; 600 V, measuring inputs
(EN 61010-1)	CAT III; 300 V, auxiliary voltage
	Input
Test voltages	3320 V AC <sub>RMS</sub> , Auxiliary power
(DIN 57411)	against input / output / interface
	3320 V AC <sub>RMS</sub> , Auxiliary power
	against current input / voltage
	Input
	3320 V AC <sub>RMS</sub> current input against
	voltage input
Housing material	PC / ABS / UL 94 V-0
Standards	EN 61010-1; 2001
	EN 60688; 1995 / A2; 2001
	EN 61326-1; 2006
	EN 60529; 1997 / A1; 2000
	EN 60068-2-1/ -2/ -6/ -27/ -30
Dimensions (B x H x T)	100 x 105 x 75 mm

### MT 440

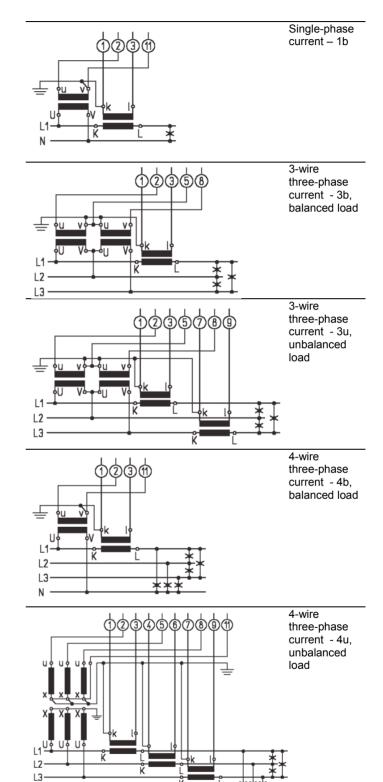
#### Programmable measuring transducer for all electrical parameters

#### **Connection diagram**

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

Function			Connection
		I <sub>L1</sub>	1/3
	AC current	$I_{L2}$	4/6
Managemina		I <sub>L3</sub>	7/9
Measuring input		U <sub>L1</sub>	2
iliput	AC voltage	U <sub>L2</sub>	5
	AC voltage	U <sub>L3</sub>	8
		N	11
	Output 1	ω+	15
	Output 1	ωθ	16
	Output 2	ω+	17
Measuring	Output 2	ωθ	18
outputs	Outrout 2	ω+	19
	Output 3	ωθ	20
	Output 4	ω+	21
	Output 4	ωθ	22
Auvilianuvalt	eac ounnly	+ / AC (L)	13
Auxiliary volt	age supply	- / AC (N)	14
	DC222 /	R <sub>X</sub> A	23
Interface	RS232 /	GND / NC <sup>1)</sup>	24
	RS485	T <sub>X</sub> / B	25

<sup>1) -</sup>NC- do not connect



N

# MT 440 – Programmable measuring transducer for all electrical values

Features			0	rder	no.			
MT 440, programmable measuring transducer								
all eletrical values								
Order no.: 440 – xxxxxxx	440 –	Х	X	X	X	X	Χ	Χ
1. Auxiliary voltage							•	
Universal (40276 V AC, 4565 Hz; 24300 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**

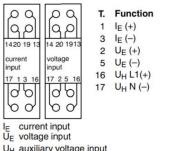
The current is measured internally via a shunt resistor, after which the signal is galvanically isolated from the input via an optical path and converted into a proportional imprinted DC voltage or a proportional load-independent DC current.

(Maße in mm)	
	Techn
Measuring input	_
Nominal frequency f <sub>N</sub>	4862 Hz
Nominal input current IN	200 μA – 5 A
Intrinsic consumption	IE · 0.1 V
Overload capacity	1.2 · I <sub>EN</sub> , permanent
	10 · I <sub>EN</sub> , max. 1 sec.
Operating voltage	max. 519 V AC,
	max. 300V phase zero
Measurement output	
Nominal current IAN	0 20 mA or 4 20 mA
Load range RA	0 12 V / IAN
Current limitation	to 120 150% of the final value
Nominal voltage UAN	0 10 V or 2 10 V
Load RA	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms, 250ms, 100ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.01 %/K
·	·

i de la companya de	
IE / UE S	or U <sub>A</sub> Weight
	outputs on request ▶
U <sub>H</sub> O E =	① ③ Connections
	L <sub>1</sub> L <sub>1</sub>
Block circuit diagram	N (L <sub>2</sub> ) N
Diook offedit diagram	
	L <sub>1</sub>
	N (L <sub>2</sub> ) — N
	with transformer

nical parameters	
Nominal conditions	
Auxiliary voltage	Uнn ±5% (50 Hz with AC)
Load	0.5 R <sub>A</sub> max. ±1% with current output
	R <sub>A</sub> min ±1% with voltage output
Frequency	5060 Hz
Waveform	Sine, distortion factor ≤ 0.1%
Ambient temperature	23°C ±1K
Warm-up time	≥5 min
Auxiliary energy	
AC voltage	230 V~ (-15% +10%); < 6 VA
	115 V~ (-15% +10%); < 3.5 VA
DC voltage	24 V = (20 72V); < 3 VA
Wide range	20 100 V= or 15 70V~; < 3 VA
AC / DC	90 357 V= or 65 253V~; < 3 6 VA
General technical data	
Test voltage	2210 V all circuits against housing
	3536 V all circuits to each other
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 120 g

#### Terminal assignment



T. Function

 $U_A$ ,  $I_A$  (+)

U<sub>A</sub>, I<sub>A</sub> (-)

13 U<sub>A</sub> (+) 14 U<sub>A</sub> (-)

dual output:

current output voltage output

19

20

19 IA (+)

20 I<sub>A</sub> (-)

single output:

 $\rm U_H$  auxiliary voltage input The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

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

Characteristics	Order number								
MA-1.1s, measuring transducer for sinusoidal alternating current									
Order No. IMU02 - xxxxxx	IMU	02 –	Χ	Х	Х	Х	Х	Х	Х
Nominal input current									
0 200 μΑ			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					Α				
0 5 mA					В				
-20 0 20 mA					С				
-10 0 10 V					D				
-20 0 20 mA and -10 0 10 V					Е				
according to specification					Z				
4. Accuracy					1	ı			
± 0.5% of the final value						1			
5. Setting time						<u> </u>			
500 ms							1		
250 ms							2		
100 ms							3		
6. Auxiliary power supply							1	1	
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 01 A / 0 5 A and output 0 20 mA								6	
7. Test reports									1
without test report									0
with test report German_English									1
men test report derman_engish	1								



# 

### **MA-1.1s (eff)**

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

#### Characteristics/uses

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

#### Application:

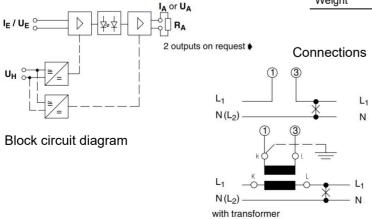
The measuring transducers convert currents into a load-independent DC current or an imprinted DC voltage with the correct sign. These can then be displayed, registered and/or used for control at the measurement location or in more distant control rooms.

#### Functional principle

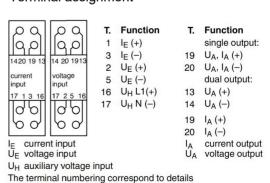
The current is measured internally via a shunt resistor. After this, the signal is galvanically isolated from the input via an optical path and converted into a proportional imprinted DC voltage or a proportional load-independent DC current.

(Maße in mm)	
	Tec
Measuring input	
Nominal frequency f <sub>N</sub>	4862 Hz
Nominal input current IN	$I_{EN} = 200 \ \mu A - 5 \ A$
Intrinsic consumption	IE · 0.1 V
Overload capacity	1.2 ⋅ I <sub>N</sub> , permanent
	10 · In, max. 1 sec.
Operating voltage	max. 519 V AC,
	max. 300V phase zero
Measurement output	
Nominal current IAN	0 20 mA or 4 20 mA
Load range RA	0 12 V / IAN
Current limitation	to 120 150% of the final value
Nominal voltage UAN	0 10 V or 2 10 V
Load RA	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.01 %/K
	-

nical	parameters	
No	minal conditions	
Au	xiliary voltage	Uнх ±5% (50 Hz with AC)
Loa	ad	0.5 R <sub>A</sub> max. ±1% with current output
		Ramin ±1% with voltage output
Fre	equency	5060 Hz
Wa	aveform	Non-sine, crest factor ≤ 4
Am	nbient temperature	23°C ±1K
Wa	arm-up time	≥5 min
Au	xiliary 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
Wie	de range	20 100 V= or 15 70V~; < 3 VA
AC	C / DC	90 357 V= or 65 253V~; < 3 6 VA
Ge	neral technical data	
Tes	st voltage	2210 V all circuits against housing
		3536 V all circuits to each other
Wo	orking voltage	300 V (nominal mains voltage phase-zero)
Pro	otection class	IP 40 housing, IP 20 terminals
Pro	otection class	II
Ме	easurement category	CAT III
De	gree of contamination	2
We	eight	approx. 120 g



#### Terminal assignment

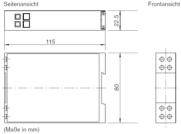


in the connection diagrams (to DIN 43 807).

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

Characteristics	Order number								
MA-1.1s (eff), transducer for non-sinusoidal									
alternating current									
Order No. IMU04 - xxxxxx	IMU	04 –	Х	Х	Х	Х	Х	Х	Х
1. Nominal input current									
0 200 μΑ			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					Α				
0 5 mA					В				
-20 0 20 mA					С				
-10 0 10 V					D				
-20 0 20 mA and -10 0 10 V					Е				
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

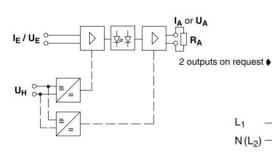
The measuring transducers convert voltages into an load-independent DC current or an imprinted DC voltage with the correct sign. These can then be displayed, registered and/or used for control at the measurement location or in more distant control rooms.

#### **Functional principle**

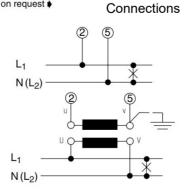
The voltage is measured internally via a voltage divider. After this, the signal is galvanically isolated from the input via an optical path and converted into a proportional imprinted DC voltage or a proportional load-independent DC current.

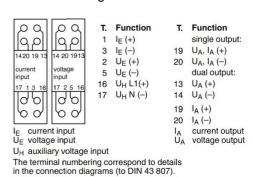
<u> </u>	parameters					
Measuring input						
Nominal frequency fN	4862 Hz	Auxiliary vo				
Nominal input voltage U <sub>EN</sub>	U <sub>EN</sub> = 60 mV - 519 V	Load				
Intrinsic consumption I <sub>E</sub> ·	0.1 V	R <sub>A</sub> min ±1%				
Overload capacity	1.2 · U <sub>EN</sub> , permanent	Frequency				
	2 U <sub>EN</sub> , max. 1 sec.	Waveform				
Operating voltage	max. 519 V AC,	Ambient te				
	max. 300 V phase zero	Warm-up ti				
Measuring output	·	Auxiliary				
Nominal current I <sub>AN</sub>	0 20 mA or 4 20 mA	AC voltage				
Load range R <sub>A</sub>	0 12 V / IAN					
Current limitation	to 120 150% of final value	DC voltage				
Nominal voltage U <sub>AN</sub>	0 10 V or 2 10 V	Wide range				
Load R <sub>A</sub>	≥ 4 kΩ					
Load error	≤ 0.1% at 50% load change	General te				
Residual ripple	≤ 1%eff	Test voltag				
Setting time	approx. 500ms, opt. 250ms or 100ms					
Open-circuit voltage	≤ 15 V	Working vo				
Accuracy		Protection				
Basic accuracy	± 0.5% of the final value	Protection				
Temperature drift	≤ 0.01 %/K	Measurem				
		D of				

Nominal conditions	
Auxiliary voltage	U <sub>HN</sub> ±5% (50 Hz for AC)
Load	0.5 R <sub>A</sub> max. ±1% for current output
R <sub>A</sub> min ±1% for voltage	output
Frequency	50 60 Hz
Waveform	sinus, distortion factor ≤ 0.1%
Ambient temperature	23 °C ± 1 K
Warm-up time	≥5 min
Auxiliary power suppl	У
_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	ı
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









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

Characteristics				Oı	rder nu	mber			
MV-1.1s, measuring transducer for sinusoidal AC voltage									
Order No. UMU05 - xxxxxx	UMU	05 –	Х	Х	Х	Х	Х	X	Х
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					Α				
0 5 mA					В				
-20 0 20 mA					С				
-10 0 10 V					D				
-20 0 20 mA and -10 0 10 V					Е				
according to specification					Z				
4. Accuracy						I			
± 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								Α	
0 63.5 V with output 0 20 mA								В	
0 100 V with output 0 20 mA								С	
0 110 V with output 0 20 mA								D	
0 150 V with output 0 20 mA								Е	
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								Н	
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

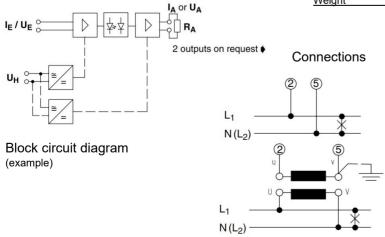
The measuring transducers convert voltages into an load-independent DC current or an imprinted DC voltage with the correct sign. These can then be displayed, registered and/or used for control at the measurement location or in more distant control rooms.

#### **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.

Maße in mm)	'	
	Te	echnical parameters
Measuring input		Nominal condition
Nominal frequency f <sub>N</sub>	4862 Hz	Auxiliary voltage
Input voltage UEN	U <sub>EN</sub> = 60 mV - 519 V	Load
Intrinsic consumption	IE · 0.1 V	_
Overload capacity	1.2 · U <sub>EN</sub> , permanent	Frequency
	2 · UEN, max. 1 sec.	Waveform
Operating voltage	max. 519 V AC,	Ambient temperat
	max. 300V phase zero	Warm-up time
Measurement output		Auxiliary power s
Nominal current IAN	0 20 mA or 4 20 mA	AC voltage
Load range RA	0 12 V / IAN	_
Current limitation	to 120 150% of the final value	DC voltage
Nominal voltage UAN	0 10 V or 2 10 V	Wide range
Load RA	≥ 4 kΩ	AC / DC
Load error	≤ 0.1% at 50% load change	General technica
Residual ripple	≤ 1%eff	Test voltage
Setting time	approx. 500ms	_
Open-circuit voltage	≤ 15 V	Working voltage
Accuracy		Protection class
Basic accuracy	± 0.5% of the final value	Protection class
Temperature drift	≤ 0.01 %/K	Measurement cate

illical parameters	
Nominal conditions	
Auxiliary voltage	Uнх ±5% (50 Hz with AC)
Load	0.5 Ramax. ±1% with current output
	R <sub>A</sub> min ±1% with voltage output
Frequency	5060 Hz
Waveform	Non-sine, crest factor ≤ 4
Ambient temperature	23°C ±1K
Warm-up time	≥5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 6 VA
	115 V~ (-15% +10%); < 3.5 VA
DC voltage	24 V = (20 72V); < 3 VA
Wide range	20 100 V= or 15 70V~; < 3 VA
AC / DC	90 357 V= or 65 253V~; < 3 6 VA
General technical data	
Test voltage	2210 V all circuits against housing
	3536 V all circuits to each other
Working voltage	300 V (nominal mains voltage phase-zero)
Protection class	IP 40 housing, IP 20 terminals
Protection class	II
Measurement category	CAT III
Degree of contamination	2
Weight	approx. 120 g



# Terminal assignment (for all types)

(IOI all ty	(lor all types)					
1420 19 13	0 Q 14 20 1913					
current input	voltage input					
17 1 3 16	17 2 5 16					
100 100 100 100 100 100						

T.	Function
1	I <sub>E</sub> (+)
3	I <sub>E</sub> (-)
2	U <sub>E</sub> (+)
5	U <sub>E</sub> (-)
16	U <sub>H</sub> L1(+)
17	U <sub>H</sub> N (-)

T. Function single output:
19 U<sub>A</sub>, I<sub>A</sub> (+)
20 U<sub>A</sub>, I<sub>A</sub> (-) dual output:

13 U<sub>A</sub> (+) 14 U<sub>A</sub> (-) 19 I<sub>A</sub> (+)

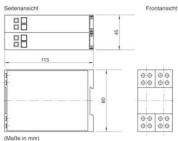
U<sub>H</sub> auxiliary voltage input

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)

MV-1.1s (eff), measuring transducer for non-sinusoidal	Characteristics	Order number								
Order No. UMU07 - xxxxx	MV-1.1s (eff), measuring transducer for non-sinusoidal									
1. Input voltage	AC voltage									İ
D 60 mV	Order No. UMU07 - xxxxxx	UMU	07 –	Χ	Х	Х	Х	Х	Х	Х
01V 010V 015V 015V 4 4 0230V 0230V 0400V 5 5 0400V 8 5 5 1 1 2 2 8 810 2 Hz (16 2/3 Hz) 1 1 4862 Hz (50/60 Hz) 9 8102 Hz (100 Hz) 1 3 3 3 3 3 3 3 3 3 3 3 4 4 4 4 4 5 5 5 6 6 7 7 8 8 8 7 8 7 8 8 7 8 8 8 8 8 8 8	1. Input voltage									
0 10 V 0 115 V 0 115 V 0 120 V 0 230 V 0 230 V 0 230 V 0 400 V Special range up to 519 V AC, up to 300 V DC 2. Frequency range input 15 18 Hz (16 2/3 Hz) 48 62 Hz (50/60 Hz) 9	0 60 mV			1						
0 115 V	0 1 V			2						
0 230 V 0 400 V 0 400 V 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	0 10 V			3						
O 400 V   Special range up to 519 V AC, up to 300 V DC   Special range up to 519 V AC, up to 300 V DC   Special range up to 519 V AC, up to 300 V DC   Special range up to 519 V AC, up to 300 V DC   Special range up to 519 V AC, up to 300 V DC   Special range v AC, up to 300 V DC   Special range v AC, up to 300 V AC 15 18 Hz (16 2/3 Hz)   1	0 115 V			4						
Special range up to 519 V AC, up to 300 V DC   9	0 230 V			5						
2. Frequency range input  15 18 Hz (16 2/3 Hz)	0 400 V			6						
15 18 Hz (16 2/3 Hz)	Special range up to 519 V AC, up to 300 V DC			9						
48 62 Hz (50/60 Hz) 98 102 Hz (100 Hz) 33 380 420 Hz (400 Hz) 44  Special frequency 5 3. Output  0 20 mA 4 20 mA 2 10 V 5	2. Frequency range input				•	•	•			
98 102 Hz (100 Hz) 3 380 420 Hz (400 Hz) 4 4 59ecial frequency 5 3. Output 0 20 mA 1 1 4 4 20 mA 2 2 0 6 10 V 3 3 2 7 10 V 4 4 0 7 20 mA and 0 10 V 5 7 20 mA and 2 10 V 5 7 20 mA and 2 10 V 6 7 20 mA and 2 10 V 7 7 20 mA and 2 10 V 7 7 20 mA and 2 10 V 7 7 20 mA and 2 10 V 7 7 20 mA and 2 10 V 7 7 20 mA and 3 mA 2 mA 3 mA 4 mA 5 7 20 mA and 3 mA 4 mA 7 7 20 mA and 4 mA 7 7 20 mA and 5 mA 7 7 20 mA 8 mA 8 mA 7 7 20 mA 8 mA 8 mA 7 7 20 mA 8 mA 8 mA 7 7 20 mA 8 mA 8 mA 8 mA 7 7 20 mA 8 mA 8 mA 8 mA 8 mA 8 mA 8 mA 8 mA	15 18 Hz ( 16 2/3 Hz )				1					
380 420 Hz (400 Hz)	48 62 Hz ( 50/60 Hz )				2					
Special frequency   S   Substituting   S   Substituting   Substi	98 102 Hz ( 100 Hz )				3					
3. Output 0 20 mA 4 20 mA 9 10 V 9 20 mA and 0 10 V 9 20 mA and 0 10 V 9 20 mA and 2 10 V 9 20 mA and 2 10 V 9 20 mA and 2 10 V 9 20 mA and 2 10 V 9 30 mA and 2 10 V 9 30 mA 9 5 mA 9 5 mA 9 20 mA 9 20 mA 9 20 mA 9 20 mA 9 20 mA 9 20 mA 9 20 mA 9 20 mA 9 20 mA 9 20 mA 9 20 mA 9 20 mA 9 30 mA 9	380 420 Hz ( 400 Hz )				4					
0 20 mA 4 20 mA 2 10 V 3 20 mA and 0 10 V 4 20 mA and 2 10 V 5 4 20 mA and 2 10 V 5 4 20 mA and 2 10 V 5 10 mA 6 5 mA 7.0 0 10 mA 7.0 10 mA 7.0 0 10 V 7.0 0 10 V 7.0 0 10 V 7.0 0 10 V 7.0 0 10 V 7.0 0 10 V 7.0 0 10 V 7.0 0 10 V 7.0 10 mA 8 8 8 7.0 10 mA 9 8 8 7.0 10 mA 9 8 8 7 8 8 8 7 8 8 8 8 8 8 8 8 8 8 8 8	Special frequency				5					
4 20 mA 0 10 V 2 10 V 3 C 10 V 4 C 20 mA and 0 10 V 5 C 10 V 6 C 20 mA and 2 10 V 6 C 20 mA and 2 10 V 6 C 20 mA and 2 10 V 7 C 10 mA 7 C 10 mA 8 C 20 mA 8 C 20 mA 9 C.	3. Output									
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       1         ± 0.5% of the final value       1         5. Setting fime       5         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       0	0 20 mA					1				
2 10 V	4 20 mA					2				
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       1         ± 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       0	0 10 V					3				
4 20 mA and 2 10 V  Special ranges  9  0 10 mA  A  0 5 mA  -20 0 20 mA  -10 0 10 V  -20 0 20 mA and -10 0 10 V  E  according to specification  2  4. Accuracy  ± 0.5% of the final value  5. Setting time  500 ms  6. Auxiliary power supply  AC 230 V (195 253 V), (48 62 Hz)  AC 115 V (98 126 V), (48 62 Hz)  DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  7. Test reports  without test report     B	2 10 V					4				
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       1         ± 0.5% of the final value       1         5. Setting time       1         500 ms       1         6. Auxiliary power supply       1         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       0	0 20 mA and 0 10 V					5				
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       1         ± 0.5% of the final value       1         5. Setting time       1         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)       1         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       0	4 20 mA and 2 10 V					6				
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       5.% of the final value         5. Setting time       1         500 ms       1         6. Auxiliary power supply       1         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       0	Special ranges					9				
-20 0 20 mA	0 10 mA					Α				
-10 0 10 V	0 5 mA					В				
-20 20 mA and -10 0 10 V  according to specification  4. Accuracy  ± 0.5% of the final value  5. Setting time  500 ms  6. Auxiliary power supply  AC 230 V (195 253 V), (48 62 Hz)  AC 115 V (98 126 V), (48 62 Hz)  DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  7. Test reports  without test report  E	-20 0 20 mA					С				
according to specification       Z         4. Accuracy       ± 0.5% of the final value       1         5. Setting time       5. Setting time         500 ms       1         6. Auxiliary power supply       3         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       0						D				
# 0.5% of the final value 1  5. Setting time  500 ms	-20 0 20 mA and -10 0 10 V					Е				
# 0.5% of the final value 1  5. Setting time  500 ms	according to specification					Z				
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	4. Accuracy					•	•			
500 ms  6. Auxiliary power supply  AC 230 V (195 253 V), (48 62 Hz)  AC 115 V (98 126 V), (48 62 Hz)  DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  7. Test reports  without test report  1  1  4  Comparison of the power supply  1  1  2  3  5  7. Test reports	± 0.5% of the final value						1			
6. Auxiliary power supply  AC 230 V (195 253 V), (48 62 Hz)  AC 115 V (98 126 V), (48 62 Hz)  DC 24 V (20 72 V)  3  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  7. Test reports  without test report  0		•					•	•		
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								1		
AC 115 V (98 126 V), (48 62 Hz)  DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  7. Test reports  without test report  0		•								
DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  7. Test reports  without test report  0	AC 230 V (195 253 V), (48 62 Hz)								1	
DC 20 100 V / AC 15 70 V									2	
DC 90 357 V / AC 65 253 V  7. <b>Test reports</b> without test report  0									3	
7. Test reports without test report 0	DC 20 100 V / AC 15 70 V								4	
without test report 0									5	
	without test report									0
with test report German_English 1	with test report German_English									1





### MF-1.1

Measuring transducer for frequency

#### Characteristics/uses

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

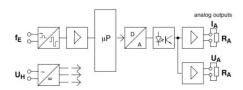
#### Application

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

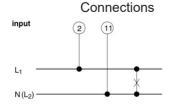
#### **Functional principle**

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

(Maße in mm)	
	Tech
Measuring input	
Nominal frequency f <sub>E</sub>	f <sub>Emin</sub> ≥ 14 Hz
	f <sub>Emax</sub> ≤ 500 Hz
Input voltage UEN	U <sub>EN</sub> = 100 V - 519 V
Intrinsic consumption	3 7 VA
Overload capacity	1.2 · UEN, permanent
	2 · U <sub>EN</sub> , max. 1 sec.
Operating voltage	max. 519 V AC,
	max. 300 V phase zero
Measurement output	
Nominal current IAN	0 20 mA or 4 20 mA
Load range RA	0 10 V / IAN
Current limitation	to 120 150% of the final value
Nominal voltage UAN	0 10 V or 2 10 V
Load RA	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.01 %/K
<del></del>	

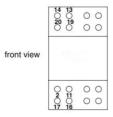


#### Block circuit diagram



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

#### Terminal assignment



assign	mont
terminal	FU 2.2
2	U <sub>E</sub> L <sub>1</sub>
11	U <sub>E</sub> N (L <sub>2</sub> )
13	U <sub>A</sub> (+)
14	U <sub>A</sub> (-)
16	U <sub>H</sub> L1(+)
17	U <sub>H</sub> N (–)
19	I <sub>A</sub> (+)
20	I <sub>A</sub> (–)

UE

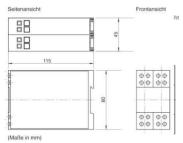
voltage input
The numbers on the terminals conform to details in connection diagrams (refer to DIN 43 807).

current output voltage output auxiliary voltage input I<sub>A</sub> U<sub>A</sub>

# MF-1.1 – Measuring transducer for frequency

1. Input frequency range  45 50 55 Hz  48 50 52 Hz  55 60 65 Hz  58 60 65 Hz  30 400 440 Hz  380 400 420 Hz  Special measuring range  2. Input nominal voltage  100 V  115 V  120 V  230 V  240 V  380 V  440 V  Special nominal voltage  3. Output  0 20 mA and 0 10 V  0 5 mA and 0 10 V  0 5 mA and 0 10 V  0 5 mA and 0 10 V	A B C D E F	X	X	X
1. Input frequency range  45 50 55 Hz  48 50 52 Hz  55 60 65 Hz  58 60 65 Hz  30 400 440 Hz  380 400 420 Hz  Special measuring range  2. Input nominal voltage  100 V  115 V  120 V  230 V  240 V  380 V  440 V  Special nominal voltage  3. Output  0 20 mA and 0 10 V  0 5 mA and 0 10 V  0 5 mA and 0 10 V  0 5 mA and 0 10 V	A B C D E	X	X	X
45 50 55 Hz	B C D			
48 50 52 Hz	B C D			
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 110 V 115 V 120 V 230 V 240 V 380 V 400 V 415 V 440 V Special nominal voltage 3. Output 0 20 mA and 0 10 V 0 5 mA and 0 10 V 0 5 mA and 0 10 V	B C D			
58 60 65 Hz  360 400 440 Hz  5	B C D			
360 400 440 Hz	B C D			
380 400 420 Hz  Special measuring range  2. Input nominal voltage  100 V  110 V  115 V  120 V  230 V  240 V  380 V  400 V  415 V  440 V  Special nominal voltage  3. Output  0 20 mA and 0 10 V  0 5 mA and 0 10 V  0 5 mA and 0 10 V	B C D			
Special measuring range	B C D			
2. Input nominal voltage  100 V  110 V  115 V  120 V  230 V  240 V  380 V  400 V  415 V  440 V  Special nominal voltage  3. Output  0 20 mA and 0 10 V  0 10 mA and 0 10 V  0 5 mA and 0 10 V	B C D			
110 V 115 V 120 V 230 V 240 V 380 V 400 V 415 V 440 V Special nominal voltage 3. Output  0 20 mA and 0 10 V 0 10 mA and 0 10 V 0 5 mA and 0 10 V	B C D			
110 V  115 V  120 V  230 V  240 V  380 V  400 V  415 V  440 V  Special nominal voltage  3. Output  0 20 mA and 0 10 V  0 10 mA and 0 10 V  0 5 mA and 0 10 V	B C D			
115 V 120 V 230 V 240 V 380 V 400 V 415 V 440 V Special nominal voltage 3. Output 0 20 mA and 0 10 V 0 10 mA and 0 10 V 0 5 mA and 0 10 V	C D E			
120 V 230 V 240 V 380 V 400 V 415 V 440 V Special nominal voltage 3. Output  0 20 mA and 0 10 V 0 10 mA and 0 10 V 0 5 mA and 0 10 V	D E			
230 V 240 V 380 V 400 V 415 V 440 V Special nominal voltage 3. Output 0 20 mA and 0 10 V 0 10 mA and 0 10 V 0 5 mA and 0 10 V	Е			
240 V 380 V 400 V 415 V 440 V Special nominal voltage 3. Output 0 20 mA and 0 10 V 0 10 mA and 0 10 V 0 5 mA and 0 10 V				
380 V 400 V 415 V 440 V Special nominal voltage 3. Output 0 20 mA and 0 10 V 0 10 mA and 0 10 V 0 5 mA and 0 10 V	F			
400 V 415 V 440 V Special nominal voltage  3. Output  0 20 mA and 0 10 V  0 10 mA and 0 10 V  0 5 mA and 0 10 V				
415 V  440 V  Special nominal voltage  3. Output  0 20 mA and 0 10 V  0 10 mA and 0 10 V  0 5 mA and 0 10 V	G			
440 V Special nominal voltage  3. Output  0 20 mA and 0 10 V  0 10 mA and 0 10 V  0 5 mA and 0 10 V	Н			
Special nominal voltage  3. Output  0 20 mA and 0 10 V  0 10 mA and 0 10 V  0 5 mA and 0 10 V	Ι			
3. Output  0 20 mA and 0 10 V  0 10 mA and 0 10 V  0 5 mA and 0 10 V	K			
0 20 mA and 0 10 V 0 10 mA and 0 10 V 0 5 mA and 0 10 V	Z			
0 10 mA and 0 10 V 0 5 mA and 0 10 V				
0 5 mA and 0 10 V		1		
		2		
		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
- Measurement output: Unipolar and live-zero output variables

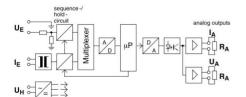
#### **Application**

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.

	Technic	al parameters	
Measuring input		Nominal conditions	
Measuring ranges	Cap 0.8 10.8 ind	Auxiliary voltage	UHN ±1%, 48 62 Hz
	Cap 0.5 10.5 ind	Input voltage	UEN _0.5%
Nominal frequency	4862 Hz	Power factor	cos φ=1
		Frequency	5060 Hz
Input nominal voltage UEN	65,100,110,240,400,415,440,500 V	Waveform	Sine, distortion factor ≤ 0.1%
		Ambient temperature	23°C ±1K
Intrinsic consumption	approx. 0.25 mA per voltage path	Warm-up time	≥5 min
	I2 · 0.01 $\Omega$ per current path	Auxiliary energy	
		AC voltage	230 V~ (-15% +10%); < 7 VA
Overload capacity	1.2 · U <sub>EN</sub> or 1.2 I <sub>EN</sub> , permanent		115 V~ (-15% +10%); < 4 VA
	2 · U <sub>EN</sub> , 10 I <sub>EN</sub> max. 1 sec.	DC voltage	24 V = (20 72V); < 3 VA
Operating voltage	max. 519 V	Wide range	20 100 V= or 15 70V~; < 3 VA
Measurement output		AC / DC	90 357 V= or 65 253V~; < 4 7 VA
Nominal current IAN	0 20 mA or 4 20 mA	General technical data	
Load range RA	0 10 V / I <sub>AN</sub>	Test voltage	2210 V all circuits against housing
Current limitation	to 120 140% of the final value		3536 V all circuits to each other
Nominal voltage UAN	0 10 V or 2 10 V		1330 V currents against each other and against voltage
Load R <sub>A</sub>	≥ 4 kΩ	Working voltage	300 V (nominal mains voltage phase-zero)
Load error	≤ 0.1% at 50% load change		
Residual ripple	≤ 1% eff	Protection class	IP 40 housing, IP 20 terminals
Setting time	approx. 500ms <		
Open-circuit voltage	≤ 15 V	Protection class	II
Accuracy		Measurement category	CAT III
Basic accuracy	± 0.5% of the final value	Degree of contamination	2
Temperature drift	≤ 0.01 %/K	Weight	approx. 270 g



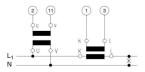


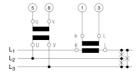
14 13 ○ ○ 20 19 ○ ○	00
CU 2	.2 D
00	0 0 0 0 0 0

Terminal assignment

terminal	CU 2.2 E	CU 2.2 D
1	I <sub>E</sub> L <sub>1</sub>	I <sub>E</sub> L <sub>1</sub>
2	U <sub>E</sub> L <sub>1</sub>	-
3	I <sub>E</sub> L <sub>1</sub>	I <sub>E</sub> L <sub>1</sub>
5	-	U <sub>E</sub> L <sub>2</sub>
8	1	U <sub>E</sub> L <sub>3</sub>
11	U <sub>E</sub> N	-
13	U <sub>A</sub> (+)	U <sub>A</sub> (+)
14	U <sub>A</sub> (-)	U <sub>A</sub> (-)
16	U <sub>H</sub> L <sub>1</sub> (+)	U <sub>H</sub> L <sub>1</sub> (+)
17	U <sub>H</sub> N (-)	U <sub>H</sub> N (-)
19	I <sub>A</sub> (+)	I <sub>A</sub> (+)
20	1 ()	1 ()

#### Block circuit diagram





Connections

Current input voltage input The numbers on the terminals conform to details in connection diagrams (refer to DIN 43 807).

auxiliary voltage input

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

Characteristic				Orde	er nu	mber				
MPIz.1, measuring transducer for phase angle/ power										
factor	GMU	09 –	Х	Х	Х	Х	Х	Χ	Х	Χ
Order No.: GMU09 – xxxxxxxxx										
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°						Α				
corresponds to cos $\phi$ : cap 0.8 1 0.8 ind						'`				
-60° 0 60°						В				
corresponds to cos φ: cap 0.5 1 0.5 ind						"				
according to specification in the range of -180° 0 180°						С				
corresponds to cos φ (output): ind11 cap.										
clear measuring range - 175° to + 175°										
5. Input frequency range							l			
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	
90 357 V / AC 65 253 V					5					
8. Test reports									J	
without test report										0
with test report with test report German_English										1
with test report definal_clighsh										Т



# **ZERTIFIKAT**

# Die Zertifizierungsstelle der TÜV SÜD Management Service GmbH

bescheinigt, dass das Unternehmen



#### **MBS AG**

Eisbachstr. 51 • 74429 Sulzbach-Laufen Deutschland

einschließlich der Standorte und Geltungsbereiche gemäß Anlage

ein Qualitätsmanagementsystem eingeführt hat und anwendet.

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

ISO 9001:2015

erfüllt sind.

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

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



Product Compliance Management München, 08.04.2019





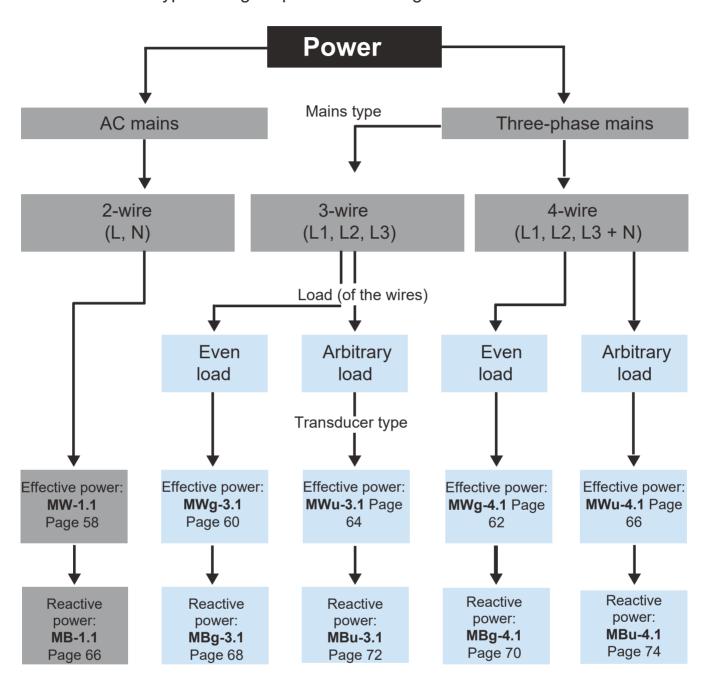
Seite 1 von 2

TÜV SÜD Management Service GmbH • Zertifizierungsstelle • Ridlerstrasse 57 • 80339 München • Germany www.tuev-sued.de/certificate-validity-check



# Measuring transducer for power

Type finding for power measuring transducers



#### **Explanation of abbreviations**

M	Measuring transducer	
W	Effective power	
В	Reactive power	
g Even load		
u	Uneven load	
1	1 Single-phase alternating current	
3	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

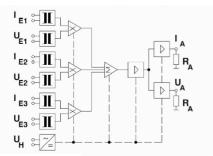
Measuring transducer for recording the active power of an AC mains. The output signal is a loadindependent DC current or imprinted DC voltage signal that is directly proportional to the active power of the primary mains.

#### **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.

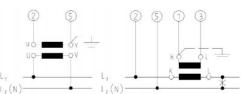
	rechnic	al parameters
Measuring input		Nominal cor
Nominal frequency	50 or 60 Hz,	Auxiliary volt
	Harmonic content ≤ 0.2	Input voltage
Nominal input current IEN	00.5-5 A	Power factor
Input nominal voltage UEN	0 50-519 V	Frequency
Intrinsic consumption	approx. 1 mA per voltage path	Waveform
	< 0.1 VA per current path at 1 A input	Ambient tem
	< 0.4 VA per current path at 5 A input	Warm-up tim
Overload capacity	1.2 · Uen or 1.2 len, permanent	Auxiliary po
	2 Uen, 20 Ien max. 1 sec.	AC voltage
Operating voltage	max. 519 V	
Measurement output		DC voltage
Nominal current IAN	0 20 mA or 4 20 mA	Wide range
Load range RA	0 10 V / Ian	AC / DC
Current limitation to approx. 37	7 mA	General tecl
Nominal voltage UAN	0 10 V or 2 10 V	Test voltage
Load RA	≥ 4 kΩ	
Load error	≤ 0.1% at 50% load change	
Residual ripple	≤ 1%eff	
Setting time	approx. 500ms	
Open-circuit voltage	≤ 15 V	Working volta
Accuracy		Protection cla
Basic accuracy	± 0.5% of the final value	Protection cla
Temperature drift	≤ 0.02 %/K	Measuremen
		Dograp of co

pa	
Nominal conditions	
Auxiliary voltage	Uнn ±2%, 50 60 Hz
Input voltage	UEN ± 0.5%
Power factor	sin φ = 1.0 0.8
Frequency	50 / 60 Hz
Waveform	Sine, distortion factor ≤ 0.1%
Ambient temperature	23°C ±1K
Warm-up time	≥ 5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 7 VA
	115 V~ (-15% +10%); < 4 VA
DC voltage	24 V = (20 72V); < 3 VA
Wide range	20 100 V= or 15 70V~; < 3 VA
AC / DC	90 357 V= or 65 253V~; < 4 7 VA
General technical data	
Test voltage	All circuits against housing: 3510 Veff 5 sec.
	Measuring circuit and auxiliary voltage against output: 3510 Veff 5 sec.
	Currents against each other and against voltage: 3510 $V_{\text{eff}}5$ 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. 270 g

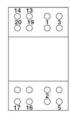


Block circuit diagram (example)

#### Connections



1	IE L1
2	U <sub>E</sub> L <sub>1</sub>
3	I <sub>E</sub> L <sub>1</sub>
5	U <sub>E</sub> L <sub>2</sub>
8	-
11	-
13	U <sub>A</sub> (+)
14	$U_A(-)$
16	U <sub>H</sub> L <sub>1</sub> (+)
17	U <sub>H</sub> N (-)
19	I <sub>A</sub> (+)
20	I <sub>A</sub> (-)



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

Characteristic	Order number									
MW-1.1, measuring transducer for effective power										
Order No.: PMU10 – xxxxxxxxx	PMU	10 -	Х	Х	Х	Х	Х	Χ	Χ	Х
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 specifyW						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



### Seitenansicht Frontansicht 115 (Maße in mm)

### 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

**Nominal conditions** 

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**

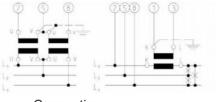
Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the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

	Toohnis	al parameters
Magazina innut	Technic	Nominal cor
Measuring input		
Nominal frequency	50 or 60 Hz,	Auxiliary volta
	Harmonic content ≤ 0.2	Input voltage
Nominal input current IEN	00.5-5 A	Power factor
Input nominal voltage UEN	0 50-519 V	Frequency
Intrinsic consumption	approx. 1 mA per voltage path	Waveform
	< 0.1 VA per current path at 1 A	Ambient temp
	< 0.4 VA per current path at 5 A	Warm-up time
Overload capacity	1.2 · Uen or 1.2 len, permanent	Auxiliary po
	2 · Uen, 20 len max. 1 sec.	AC voltage
Operating voltage	max. 519 V	•
Measurement output		DC voltage
Nominal current IAN	0 20 mA or 4 20 mA	Wide range
Load range RA	0 10 V / Ian	AC / DC
Current limitation	to approx. 37 mA	General tech
Nominal voltage UAN	0 10 V or 2 10 V	Test voltage
Load R <sub>A</sub>	≥ 4 kΩ	•
Load error	≤ 0.1% at 50% load change	
Residual ripple	≤ 1%eff	
Setting time	approx. 500ms	•
Open-circuit voltage	≤ 15 V	Working volta
Accuracy		Protection cla
Basic accuracy	± 0.5% of the final value	Protection cla
Temperature drift	≤ 0.02 %/K	Measuremen

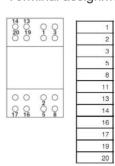
|--|

Block circuit diagram (example)

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



Connections



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

				Orde	er nui	mber				
MWg-3.1, measuring transducer for effective power										
Order No.: PMU11 – xxxxxxxxxx	PMU	11 -	Χ	Х	Χ	Х	Х	Χ	Χ	Χ
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 specifyW						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
<del>-</del> -										



# Seitenansicht 115 (Maße in mm)

### 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

**Nominal conditions** Auxiliary voltage

Ambient temperature

**Auxiliary power supply** 

General technical data

Warm-up time

Working voltage

Protection class Protection class

Measurement category Degree of contamination 2

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.

U<sub>HN</sub> ±2%, 50 ... 60 Hz

Sine, distortion factor ≤ 0.1%

230 V~ (-15% +10%); < 7 VA 115 V~ (-15% +10%); < 4 VA

24 V = (20 ... 72V); < 3 VA 20 ... 100 V= or 15 ... 70V~; < 3 VA

Output: 3510 Veff 5 sec.

Voltage: 3510 Veff 5 sec.

CAT III

approx. 270 g

IP 40 housing, IP 20 terminals

90 ... 357 V= or 65 ... 253V~; < 4 ... 7 VA

All circuits against housing: 3510 Veff 5 sec Measuring circuit and auxiliary voltage against

currents against each other and against

300 V (nominal mains voltage phase-zero)

**UEN ± 0.5%** 

50 / 60 Hz

23°C ±1K

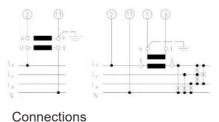
≥ 5 min

 $\sin \phi = 1.0 ... 0.8$ 

	Technica	I parameters
Measuring input		Nominal co
Nominal frequency	50 or 60 Hz,	Auxiliary vol
	Harmonic content ≤ 0.2	Input voltage
Nominal input current IEN	00.5-5 A	Power facto
Input nominal voltage UEN	0 50-519 V	Frequency
Intrinsic consumption	approx. 1 mA per voltage path	Waveform
	< 0.1 VA per current path at 1 A input	Ambient ten
	< 0.4 VA per current path at 5 A input	Warm-up tin
Overload capacity	1.2 · Uen or 1.2 len, permanent	Auxiliary po
	2 · Uen, 20 Ien max. 1 sec.	AC voltage
Operating voltage	Max. 519 V	
Measurement output		DC voltage
Nominal current IAN	0 20 mA or 4 20 mA	Wide range
Load range R <sub>A</sub>	0 10 V / IAN	AC / DC
Current limitation	to approx. 37 mA	General tec
Nominal voltage UAN	0 10 V or 2 10 V	Test voltage
Load R <sub>A</sub>	≥ 4 kΩ	
Load error	≤ 0.1% at 50% load change	
Residual ripple	≤ 1%eff	
Setting time	approx. 500ms	
Open-circuit voltage	≤ 15 V	Working vol
Accuracy		Protection c
Basic accuracy	± 0.5% of the final value	Protection c
Temperature drift	≤ 0.02 %/K	Measureme

I <sub>E1</sub> SII	
U <sub>E1</sub> SII	□ I A
I <sub>E2</sub> SII	I I I I
U <sub>E2</sub> ∷ II	U
I E3	H PR
U <sub>E3</sub>	
U <sub>H</sub> :	- <b>-</b>

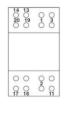
(example)



Weight

Terminal	assignment

1	I <sub>E</sub> L <sub>1</sub>
2	U <sub>E</sub> L <sub>1</sub>
3	IE L1
5	-
8	-
11	UEN
13	U <sub>A</sub> (+
14	U <sub>A</sub> (-
16	U <sub>H</sub> L <sub>1</sub>
17	U <sub>H</sub> N
19	I <sub>A</sub> (+
20	I <sub>A</sub> (-

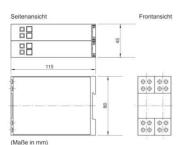


Block	circiut	diagram	

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

				Orde	er nur	mber				
MWg-4.1, measuring transducer for effective power										
Order No.: PMU13 – xxxxxxxxx	PMU	13 -	Х	Χ	Χ	Х	Х	Х	Х	Х
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						l				
Measuring range: please specify W						1				
5. Frequency range						l	l			
48 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output							I	l		
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
	ı									





#### 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

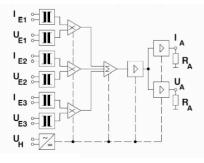
Measuring transducer for recording the effective power of a 3-wire three-phase mains with an even or arbitrary phase load. The output signal is a load-independent DC current or imprinted DC voltage signal that is directly proportional to the active power of the primary mains.

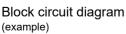
#### **Functional principle**

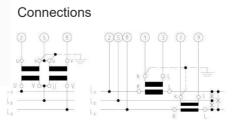
Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the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

	Technic
Measuring input	
Nominal frequency	50 or 60 Hz
	Harmonic content ≤ 0.2
Nominal input current IEN	00.5-5 A
Input nominal voltage UEN	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 · Uen or 1.2 len, permanent
	2 · Uen, 20 Ien max. 1 sec.
Operating voltage	max. 519 V
Measurement output	
Nominal current IAN	0 20 mA or 4 20 mA
Load range R <sub>A</sub>	0 10 V / Ian
Current limitation	to approx. 37 mA
Nominal voltage UAN	0 10 V or 2 10 V
Load R <sub>A</sub>	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

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







1	I <sub>E</sub> L <sub>1</sub>	14	13	0.0	0 0
2	U <sub>E</sub> L <sub>1</sub>	20	0	000	
3	I <sub>E</sub> L <sub>1</sub>	0	0	0 0	00
4	-				
5	U <sub>E</sub> L <sub>2</sub>				
6	-				
7	I <sub>E</sub> L <sub>3</sub>				
8	U <sub>E</sub> L <sub>3</sub>	0	0	00	00
9	I <sub>E</sub> L <sub>3</sub>	0	0	000	00
11	-	17	16	5	8
13	U <sub>A</sub> (+)				
14	U <sub>A</sub> (-)				
16	U <sub>H</sub> L <sub>1</sub> (+)				
17	Dir N (-)				

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

				Orde	er nu	mber				
MWu-3.1, measuring transducer for effective power										
Order No.: PMU12 – xxxxxxxxxx	PMU	12 -	Χ	Χ	Х	Х	Χ	Х	Χ	Х
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 specifyW						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 toot roport										0
without test report										



# 

### 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.

Maria da		al parameters
Measuring input		Nominal cor
Nominal frequency	50 or 60 Hz	Auxiliary volt
	Harmonic content ≤ 0.2	Input voltage
Nominal input current IEN	00.5-5 A	Power factor
Input nominal voltage UEN	0 50-519 V	Frequency
Intrinsic consumption	approx. 1 mA per voltage path	Waveform
	< 0.1 VA per current path at 1 A	Ambient tem
	< 0.4 VA per current path at 5 A	Warm-up tim
Overload capacity	1.2 · Uen or 1.2 len, permanent	Auxiliary po
	2 · Uen, 20 Ien max. 1 sec.	AC voltage
Operating voltage	max. 519 V	
Measurement output		DC voltage
Nominal current IAN	0 20 mA or 4 20 mA	Wide range
Load range R <sub>A</sub>	0 10 V / Ian	AC / DC
Current limitation	to approx. 37 mA	General tecl
Nominal voltage UAN	0 10 V or 2 10 V	Test voltage
Load R <sub>A</sub>	≥ 4 kΩ	
Load error	≤ 0.1% at 50% load change	
Residual ripple	≤ 1%eff	
Setting time	approx. 500ms	
Open-circuit voltage	≤ 15 V	Working volta
Accuracy		Protection cla
Basic accuracy	± 0.5% of the final value	Protection cla
Temperature drift	≤ 0.02 %/K	Measuremer
		Degree of co
I ⊶ <b>I</b> I		

2	(5)	(8)	258	90	9 0	9
uo	vQ-Qu	- tv=		<i></i> -		
L, U &	V O O U	Q V	, 🕌	K O	D L L	01 * 1
L <sub>2</sub> —	•	I :	2			<b>3</b> . * * *

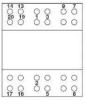
# Block circuit diagram (example)

Connections

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

#### Terminal assignment

1	I <sub>E</sub> L <sub>1</sub>
2	U <sub>E</sub> L <sub>1</sub>
3	I <sub>E</sub> L <sub>1</sub>
4	-
5	U <sub>E</sub> L <sub>2</sub>
6	-
7	I <sub>E</sub> L <sub>3</sub>
8	U <sub>E</sub> L <sub>3</sub>
9	I <sub>E</sub> L <sub>3</sub>
11	-
13	U <sub>A</sub> (+)
14	U <sub>A</sub> (-)
16	U <sub>H</sub> L <sub>1</sub> (+)
17	U <sub>H</sub> N (-)
19	I <sub>A</sub> (+)
20	I <sub>A</sub> (-)



U<sub>E1</sub> ∷ II

<sup>U</sup>E3 ≒∏ Ա ⇔″≟

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

				Orde	er nui	mber				
MWu-4.1, measuring transducer for effective power										
Order No.: PMU14 – xxxxxxxxxx	PMU	14 -	Х	Χ	Χ	Х	Х	Х	Χ	Х
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 specifyW						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

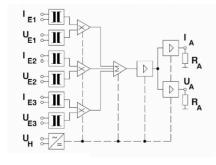
Measuring transducer for recording the reactive power of a 3-wire three-phase mains with an even phase load. The output signal is a load-independent DC current or imprinted DC voltage signal that is directly proportional to the active power of the primary mains.

#### **Functional principle**

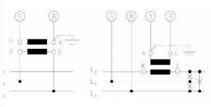
Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the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

(Maße in mm)	Techn
Manager lawy	
Measuring input	
Nominal frequency	50 or 60 Hz
	Harmonic content ≤ 0.2
Nominal input current IEN	00.5-5 A
Input nominal voltage UEN	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 · Uen or 1.2 Ien, permanent
	2 · Uen, 20 Ien max. 1 sec.
Operating voltage	Max. 519 V
Measurement output	
Nominal current IAN	0 20 mA or 4 20 mA
Load range RA	0 10 V / IAN
Current limitation	to approx. 37 mA
Nominal voltage UAN	0 10 V or 2 10 V
Load RA	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

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



Block circuit diagram (example)



Connections

1   I <sub>E</sub> L <sub>1</sub>   -	
3 I <sub>E</sub> L <sub>1</sub>	
5 U <sub>E</sub> L <sub>2</sub> 14	
8 U <sub>E</sub> L <sub>3</sub> 20	
11 -	
13 U <sub>A</sub> (+)	
14 U <sub>A</sub> (-)	
16 U <sub>H</sub> L <sub>1</sub> (+)	
17 U <sub>H</sub> N (-)	
19 I <sub>A</sub> (+) Q	
20 I <sub>A</sub> (-)	

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

				Orde	er nur	mber				
MBg-3.1, measuring transducer for reactive power										
Order No.: PMU15 – xxxxxxxxx	PMU	15 -	Х	Х	Х	Х	Х	Х	Χ	Х
1. Application										
3-wire three-phase current, even load			1							
2. Current input									1	
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 specifyW						1				
5. Frequency range	1									
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



# Seitenansicht Frontansicht 
### **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

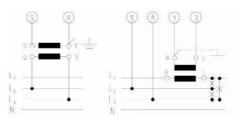
Measuring transducers for active and reactive power operate with an integrated analogue multiplier. The two converters in the current and voltage path galvanically separate the high-current circuits from the electronics and adjust the input current and voltage to the multiplier, which multiplies the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

	Tec
Measuring input	
Nominal frequency	50 or 60 Hz
	Harmonic content ≤ 0.2
Nominal input current IEN	00.5-5 A
Input nominal voltage UEN	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 · UEN or 1.2 IEN, permanent
	2 · Uen, 20 Ien max. 1 sec.
Operating voltage	Max. 519 V
Measurement output	
Nominal current IAN	0 20 mA or 4 20 mA
Load range RA	0 10 V / IAN
Current limitation to approx. 3	37 mA
Nominal voltage UAN	0 10 V or 2 10 V
Load RA	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

Block circuit diagram (example)

Uнn ±2%, 50 60 Hz
UEN ± 0.5%
sin φ = 1.0 0.8
50 / 60 Hz
Sine, distortion factor ≤ 0.1%
23°C ±1K
≥ 5 min
230 V~ (-15% +10%); < 7 VA
115 V~ (-15% +10%); < 4 VA
24 V = (20 72V); < 3 VA
20 100 V= or 15 70V~; < 3 VA
90 357 V= or 65 253V~; < 4 7 VA
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.
300 V (nominal mains voltage phase-zero)
IP 40 housing, IP 20 terminals
II
CAT III
2
approx. 270 g

#### Connections



		,	
1	I <sub>E</sub> L <sub>1</sub>	14 13	
2	-	20 19	0 0
3	I <sub>E</sub> L <sub>1</sub>	00	00
5	U <sub>E</sub> L <sub>2</sub>		
8	U <sub>E</sub> L <sub>3</sub>		
11	-		
13	$U_A(+)$		
14	U <sub>A</sub> (-)	00	00
16	U <sub>H</sub> L <sub>1</sub> (+)	0 0	0 0
17	U <sub>H</sub> N (-)	17 16	8
19	I <sub>A</sub> (+)		
20	I <sub>A</sub> (-)		

# 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 -	Х	Х	Х	Х	Χ	Χ	Χ	Х
1. Application										
4-wire three-phase current, even load			1							
2. Current input	l.									
1 A primary current please specify				1						
5 A primary current please specify				5						
Special current input				9						
3. Voltage input	l.									
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	l.									
Measuring range: please specifyW						1				
5. Frequency range	l.									
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	<b>†</b>									1



# 115 (Maße in mm)

### 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

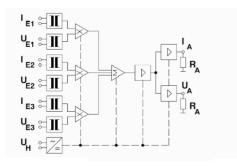
Measuring transducer for recording the reactive power in a 3-wire three-phase mains with an even or arbitrary phase load. The output signal is a load-independent DC current or imprinted DC voltage signal that is directly proportional to the active power of the primary mains.

#### **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.

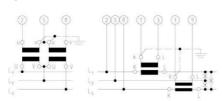
	cal parameters	
Measuring input		Nominal con
Nominal frequency	50 or 60 Hz	Auxiliary volta
	Harmonic content ≤ 0.2	Input voltage
Nominal input current IEN	00.5-5 A	Power factor
Input nominal voltage UEN	0 50-519 V	Frequency
Intrinsic consumption	approx. 1 mA per voltage path	Waveform
	< 0.1 VA per current path at 1 A	Ambient temp
	< 0.4 VA per current path at 5 A	Warm-up time
Overload capacity	1.2 · Uen or 1.2 len, permanent	Auxiliary pov
	2 · Uen, 20 Ien max. 1 sec.	AC voltage
Operating voltage	Max. 519 V	_
Measurement output		DC voltage
Nominal current IAN	0 20 mA or 4 20 mA	Wide range
Load range RA	0 10 V / IAN	AC / DC
Current limitation	to approx. 37 mA	General tech
Nominal voltage UAN	0 10 V or 2 10 V	Test voltage
Load RA	≥ 4 kΩ	_
Load error	≤ 0.1% at 50% load change	_
Residual ripple	≤ 1%eff	_
Setting time	approx. 500ms	_
Open-circuit voltage	≤ 15 V	Working volta
Accuracy		Protection cla
Basic accuracy	± 0.5% of the final value	Protection cla
Temperature drift	≤ 0.02 %/K	Measuremen
		D

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



Block circuit diagram (example)

#### Connections



1	I <sub>E</sub> L <sub>1</sub>	14	13	99	000	
2	U <sub>E</sub> L <sub>1</sub>	0	0	60	00	
3	I <sub>E</sub> L <sub>1</sub>					
4	-					
5	U <sub>E</sub> L <sub>2</sub>					
6	-					
7	I <sub>E</sub> L <sub>3</sub>	0	0	00	00	
8	U <sub>E</sub> L <sub>3</sub>	0	0	000	00	
9	I <sub>E</sub> L <sub>3</sub>	17	10	3	0	
11	-					
13	$U_A(+)$					
14	U <sub>A</sub> (-)					
16	U <sub>H</sub> L <sub>1</sub> (+)					
17	U <sub>H</sub> N (-)					
19	I <sub>A</sub> (+)					
20	I <sub>A</sub> (-)					

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

MBu-3.1, measuring transducer for reactive power   Order Not.: PMUL 16   X   X   X   X   X   X   X   X   X		Order number									
1	•										
3-wire three-phase current, arbitrary load  2. Current input  1.		PMU	16	Х	Х	Х	Х	Х	Х	Х	Х
2. Current input  1 A primary current please specify 5 A primary current please specify 5 Special current input 3. Voltage input Input voltages Um (AC) Please specify translation ratio 65 V 100 V 100 V 12 V 110 V 13 Special current input 44 V (Max. 300 V nominal mains voltage phase-zero) 440 V (Max. 300 V nominal mains voltage phase-zero) 440 V (Max. 300 V nominal mains voltage phase-zero) 440 V (Max. 300 V nominal mains voltage phase-zero) 55 V 45 V V 1 V 15 V 16 V 17 V 18 V 18 V 18 V 18 V 18 V 18 V 18 V 18	• •										
1 A primary current please specify 5 A primary current please specify 5 A primary current please specify 5 Special current input 1 pput voltages Um (AC) Please specify translation ratio 65 V				1							
S A primary current please specify   S   Special current input   9   9     Special current input   Special current   Special curre	· · · · · · · · · · · · · · · · · · ·										
Special current input   9					1						
Second Second					5						
Input voltages Um (AC) Please specify translation ratio  65 V					9						
Please specify translation ratio	3.Voltage input										
1   1   1   1   1   1   1   1   1   1											
100 V	Please specify translation ratio										
110 V 240 V 400 V (Max. 300 V nominal mains voltage phase-zero) 415 V (Max. 300 V nominal mains voltage phase-zero) 415 V (Max. 300 V nominal mains voltage phase-zero) 415 V (Max. 300 V nominal mains voltage phase-zero) 500 V (Max. 300 V nominal mains voltage phase-zero) 7 500 V (Max. 300 V nominal mains voltage phase-zero) 8 Special voltage input 4. Measuring range  Measuring range Please specifyW  5. Frequency range 48 62 Hz (50/60 Hz) 5. Frequency range 48 62 Hz (50/60 Hz) 5. Frequency 6. Output 0 20 mA and 0 10 V 0 20 mA and 0 10 V 1 0 20 mA and 0 10 V 2 0 5 mA and 0 10 V 2 0 5 mA and 0 10 V 3 4 20 mA and 2 10 V 4 20 mA and 2 10 V 7. Auxiliary power supply AC 230 V (195 253 V), (48 62 Hz) DC 24 V (20 72 V) 3 DC 20 100 V / AC 15 70 V DC 90 357 V / AC 65 253 V 8. Test reports	65 V					1					
240 V	100 V					2					
400 V (Max. 300 V nominal mains voltage phase-zero) 415 V (Max. 300 V nominal mains voltage phase-zero) 440 V (Max. 300 V nominal mains voltage phase-zero) 500 V (Max. 300 V nominal mains voltage phase-zero) 500 V (Max. 300 V nominal mains voltage phase-zero) 8 Special voltage input 9  4. Measuring range  Measuring range:  ### M	110 V					3					
415 V (Max. 300 V nominal mains voltage phase-zero)	240 V					4					
A40 V (Max. 300 V nominal mains voltage phase-zero)   7	400 V (Max. 300 V nominal mains voltage phase-zero)					5					
Special voltage input   9   9	415 V (Max. 300 V nominal mains voltage phase-zero)					6					
Special voltage input   9	440 V (Max. 300 V nominal mains voltage phase-zero)					7					
4. Measuring range       1         Measuring range: please specifyW       1         5. Frequency range       48 62 Hz (50/60 Hz)       1         Special frequency       9         6. Output       1         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 215 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	500 V (Max. 300 V nominal mains voltage phase-zero)					8					
Measuring range: please specifyW       1         5. Frequency range       48 62 Hz (50/60 Hz)       1         Special frequency       9         6. Output       1         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	Special voltage input					9					
5. Frequency range       1         48 62 Hz (50/60 Hz)       9         5. Special frequency       9         6. Output       1         0 20 mA and 0 10 V       2         0 10 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	4. Measuring 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 V 5  7. Auxiliary power supply  AC 230 V (195 253 V), (48 62 Hz) 1	Measuring range: please specifyW						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	5. Frequency range	•									
6. Output  0 20 mA and 0 10 V  0 10 mA and 0 10 V  2 20 mA and 0 10 V  3 20 mA and 2 10 V  4 20 mA and 2 10 V  5 20 0 20 mA and - 10 0 10 V  7. Auxiliary power supply  AC 230 V (195 253 V), (48 62 Hz)  AC 115 V (98 126 V), (48 62 Hz)  DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  8. Test reports	48 62 Hz (50/60 Hz)							1			
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	Special frequency							9			
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	6. Output	•									
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       8         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									1		
4 20 mA and 2 10 V - 20 0 20 mA and - 10 0 10 V  7. Auxiliary power supply  AC 230 V (195 253 V), (48 62 Hz)  AC 115 V (98 126 V), (48 62 Hz)  DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  8. Test reports	0 10 mA and 0 10 V								2		
- 20 0 20 mA and - 10 0 10 V  7. Auxiliary power supply  AC 230 V (195 253 V), (48 62 Hz)  AC 115 V (98 126 V), (48 62 Hz)  DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  8. Test reports	0 5 mA and 0 10 V								3		
7. Auxiliary power supply  AC 230 V (195 253 V), (48 62 Hz)  AC 115 V (98 126 V), (48 62 Hz)  DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  8. Test reports	4 20 mA and 2 10 V								4		
AC 230 V (195 253 V), (48 62 Hz)  AC 115 V (98 126 V), (48 62 Hz)  DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  8. Test reports	- 20 0 20 mA and - 10 0 10 V								5		
AC 115 V (98 126 V), (48 62 Hz)  DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  8. Test reports	7. Auxiliary power supply										
DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  8. Test reports	AC 230 V (195 253 V), (48 62 Hz)									1	
DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  8. Test reports										2	
DC 20 100 V / AC 15 70 V DC 90 357 V / AC 65 253 V  8. Test reports										3	
8. Test reports	· · · · · · · · · · · · · · · · · · ·									4	
8. Test reports	DC 90 357 V / AC 65 253 V									5	
·	•										
without test report 0	without test report										0
with test report German_English 1	· · · · · · · · · · · · · · · · · · ·										



### 

(Maße in mm)

#### 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 threephase 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.

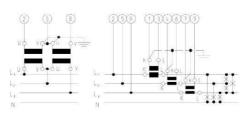
	Tech
Measuring input	
Nominal frequency	50 or 60 Hz
	Harmonic content ≤ 0.2
Nominal input current len	00.5-5 A
Input nominal voltage UEN	0 50-519 V
Intrinsic consumption	approx. 1 mA per voltage path
	< 0.1 VA per current path at 1 A
	< 0.4 VA per current path at 5 A
Overload capacity	1.2 · UEN or 1.2 IEN, permanent
	2 · Uen, 20 Ien max. 1 sec.
Operating voltage	max. 519 V
Measurement output	
Nominal current IAN	0 20 mA or 4 20 mA
Load range RA	0 10 V / IAN
Current limitation	to approx. 37 mA
Nominal voltage UAN	0 10 V or 2 10 V
Load RA	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

E1 E	
U <sub>E1</sub>	I A
I E2 E	R <sub>A</sub>
U <sub>E2</sub>	U
I E3 EI	R
U <sub>E3</sub> : II	
U <sub>H</sub> =	

Block circuit diagram (example)

Uнn ±2%, 50 60 Hz
UEN ± 0.5%
sin φ = 1.0 0.8
50 / 60 Hz
Sine, distortion factor ≤ 0.1%
23°C ±1K
≤ 5 min
230 V~ (-15% +10%); < 7 VA
115 V~ (-15% +10%); < 4 VA
24 V = (20 72V); < 3 VA
20 100 V= or 15 70V~; < 3 VA
90 357 V= or 65 253V~; < 4 7 VA
All circuits against housing: 3510 Veff 5 sec.
Measuring circuit and auxiliary voltage against
Output: 3510 V <sub>eff</sub> 5 sec.
currents against each other and against
Voltage: 3510 Veff 5 sec.
300 V (nominal mains voltage phase-zero)
IP 40 housing, IP 20 terminals
II
CAT III
2
approx. 310 g

#### Connections



#### Terminal assignment

renni	iliai as	SI
1	I <sub>E</sub> L <sub>1</sub>	1
2	U <sub>E</sub> L <sub>1</sub>	1
3	I <sub>E</sub> L <sub>1</sub>	1
4	I <sub>E</sub> L <sub>2</sub>	1
5	U <sub>E</sub> L <sub>2</sub>	1
6	I <sub>E</sub> L <sub>2</sub>	1
7	I <sub>E</sub> L <sub>3</sub>	1
8	U <sub>E</sub> L <sub>3</sub>	1
9	I <sub>E</sub> L <sub>3</sub>	1
11	-	1
13	U <sub>A</sub> (+)	1
14	U <sub>A</sub> (-)	1
16	U <sub>H</sub> L <sub>1</sub> (+)	1
17	U <sub>H</sub> N (-)	1
19	I <sub>A</sub> (+)	1
20	IA (-)	1



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

				Orde	er nui	mber				
MBu-4.1, measuring transducer for reactive power										
Order No.: PMU18 – xxxxxxxxx	PMU	18 -	Х	Χ	Χ	Х	Χ	Χ	Χ	Χ
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 specifyW						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.

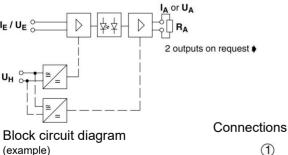
#### **Functional principle**

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

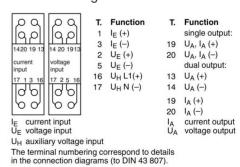
Measuring input	
Nominal input current I <sub>N</sub>	200 μA – 5 A
Intrinsic consumption	IE • 0.1 V
Overload capacity	1.2 · IEN permanent
	10 · IEN max. 1 sec
Operating voltage	max. 519 V
	max. 300 V phase zero
Measurement output	
Nominal current IAN	0 20 mA or 4 20 mA
Load range RA	0 12 V / IAN
Current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

Nominal conditions	
Auxiliary voltage	UHN ±5 %, 50 Hz with AC
Load	0.5 RA max. ±1% with current output
	RA min ±1% with voltage output
Ambient temperature	23°C ±1K
Warm-up time	≥ 5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 6 VA 115 V~ (-15% +10%); < 3.5 VA
DC voltage	24 V = (20 72V); < 3 VA
Wide range	20 100 V= or 15 70V~; < 3 VA
AC / DC	90 357 V= or 65 253V~; < 3 6 VA
General technical data	
Test voltage	2210 V all circuits against housing
	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



# + 3

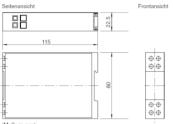
#### Terminal assignment



#### MA-G.1 – Measuring transducer for direct current

MA-G-1, measuring fransducer for direct current   IMU   28	Characteristics	Order number								
1. Nominal input current	MA-G.1, measuring transducer for direct current									
0 200 μA  0 20 πA  0 20 πA  0 1A  0 2A  0 2A  0 5		IMU	28 –	Х	Х	Х	Х	Х	Х	Х
D 20 mA	1. Nominal input current									
00.5 A				1						
01A 02A 1.5045A 1.6.6 1.5045A 1.6.6 1.5045A 1.6.6 1.6.	0 20 mA			2						
0 2 A   5 0 +5 A   5	0 0.5 A			3						
Special range up to ± 5 A				4						
Special range up to ± 5 A  2. Frequency range input  DC  3. Output  0 20 mA  4 20 mA  0 10 V  2 10 V  3 10 V  4 20 mA and 0 10 V  4 20 mA and 2 10 V  5. 5. 4  -20 0 20 mA  0 5 A  8. 8  -20 0 20 mA  -20				5						
2. Frequency range input  DC  0  3. Output  0 20 mA  4 20 mA  2 10 V  3 20 mA and 0 10 V  4 20 mA and 0 10 V  5 20 mA and 0 10 V  6 20 mA and 0 10 V  7. Special ranges  9  0 10 mA  9  0 10 mA  1  1  1  1  1  1  1  1  1  1  1  1  1				6						
DC   3. Output   Special range up to ± 5 A			9							
3. Output 020 mA 1	2. Frequency range input				•	•		•		
0 20 mA 4 20 mA 2 10 V 2 10 V 3 20 mA and 0 10 V 4 20 mA and 2 10 V 5 20 mA and 2 10 V 6 20 mA and 2 10 V 6 20 mA and 2 10 V 7 20 mA and 2 10 V 8 20 mA and 2 10 V 9 10 mA A 0 5 A C 0 10 mA C 0 20 mA C 0 20 mA C 10 0 20 mA C 2 10 V 2	DC				0					
4 20 mA 0 10 V 0 20 mA and 0 10 V 5	3. Output	•			•	•				
0 10 V 2 10 V 0 20 mA and 0 10 V 4 20 mA and 2 10 V 5 pecial ranges 9 0 10 mA 0 5 A 8 B -20 0 20 mA 0 10 V D -20 0 20 mA 0 10 V D -20 0 20 mA 0 10 V D -20 0 20 mA 0 10 V D -20 0 20 mA 0 10 V D -20 0 20 mA 0 10 V D -20 0 20 mA and -10 0 10 V E according to specification 2	0 20 mA					1				
2 10 V	4 20 mA					2				
0 20 mA and 0 10 V 4 20 mA and 2 10 V 5 pecial ranges 9 0 0 10 mA 0 10 mA 0 5 A 8 8 -20 0 20 mA -20 0 20 mA -20 0 20 mA -20 0 20 mA -20 0 10 V -20 0 20 mA and -10	0 10 V					3				
4 20 mA and 2 10 V  Special ranges  9 10 mA  0 10 mA  0 5 A  -20 0 20 mA  -10 0 10 V  -20 0 20 mA  -10 0 10 V  -20 0 20 mA and -10 0 10 V  -20 20 mA and -10 10 V  -20 20 mA and -10 0 10 V  -20 20 mA and -10 10 V  -20 .	2 10 V					4				
Special ranges       9         0 10 mA       A         0 5 A       8         -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       1         ± 0.5% of the final value       2         ± 0.2% of the final value       2         5. Setting time         500 ms       1         50 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       0	0 20 mA and 0 10 V					5				
0 10 mA 0 5 A -20 0 20 mA -10 0 10 V -10 0 10 V -20 0 20 mA and -10 0 10 V according to specification 4. Accuracy ± 0.5% of the final value ± 0.2% of the final value ± 0.2% of the final value 5. Setting time 500 ms 1 1 250 ms 100 ms 1 2 5. Auxiliary power supply AC 230 V (195 253 V), (48 62 Hz) AC 115 V (98 126 V), (48 62 Hz) DC 24 V (20 72 V) DC 20 100 V / AC 15 70 V DC 90 357 V / AC 65 253 V 7. Test reports without test report	4 20 mA and 2 10 V					6				
0 5 A B C C C C C C C C C C C C C C C C C C	Special ranges					9				
-20 0 20 mA	0 10 mA					Α				
-10 0 10 V	0 5 A					В				
-20 0 20 mA and -10 0 10 V  according to specification  4. Accuracy  ± 0.5% of the final value  ± 0.2% of the final value  ± 0.2% of the final value  5. Setting time  500 ms  1	-20 0 20 mA					С				
according to specification       Z         4. Accuracy       ± 0.5% of the final value       1         ± 0.2% of the final value       2         5. Setting time       1         500 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	-10 0 10 V					D				
### Accuracy ####################################	-20 0 20 mA and -10 0 10 V					Е				
# 0.5% of the final value	according to specification					Z				
### 0.2% of the final value ### 2  5. Setting time  500 ms  250 ms  100 ms  6. Auxiliary power supply  AC 230 V (195 253 V), (48 62 Hz)  AC 115 V (98 126 V), (48 62 Hz)  DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  7. Test reports  without test report	4. Accuracy	•				•	•			
5. Setting time  500 ms  250 ms  20 ms  20 ms  6. Auxiliary power supply  AC 230 V (195 253 V), (48 62 Hz)  AC 115 V (98 126 V), (48 62 Hz)  DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  7. Test reports  without test report  0	± 0.5% of the final value						1			
500 ms       1         250 ms       2         100 ms       3         6. Auxiliary power supply       AC 230 V (195 253 V), (48 62 Hz)         AC 115 V (98 126 V), (48 62 Hz)       1         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       0	± 0.2% of the final value						2			
250 ms 2 3 3 4 5 6	5. Setting time	•								
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	500 ms							1		
6. Auxiliary power supply  AC 230 V (195 253 V), (48 62 Hz)  AC 115 V (98 126 V), (48 62 Hz)  DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  7. Test reports  without test report  0	250 ms							2		
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								3		
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										
DC 24 V (20 72 V)  DC 20 100 V / AC 15 70 V  DC 90 357 V / AC 65 253 V  7. Test reports  without test report  0									1	
DC 20 100 V / AC 15 70 V									2	
DC 90 357 V / AC 65 253 V 5 <b>7. Test reports</b> without test report 0									3	
7. Test reports without test report 0									4	
without test report 0									5	
	7. Test reports									
with test report German_English 1										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

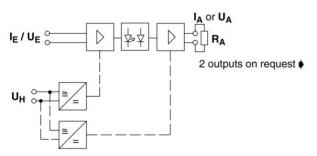
Application
The measuring transducers convert voltages into an load-independent DC current or an imprinted DC voltage with the correct sign. These can then be displayed, registered and/or used for control at the measurement location or in more distant control rooms.

#### **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.

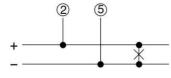
(Maße in mm)	'
	Technica
Measuring input	
Nominal frequency f <sub>N</sub>	4862 Hz
Input nominal voltage UEN	U <sub>EN</sub> = 60 mV - 300 V
Intrinsic consumption	Ue² / Re
Overload capacity	1.2 · U <sub>EN</sub> permanent
	2 · UEN max. 1 sec.
Operating voltage	max. 300 V
Measurement output	
Nominal current IAN	0 20 mA or 4 20 mA
Load range RA	0 12 V / IAN
Current limitation	to 120 150% of the final value
Nominal voltage UAN	0 10 V or 2 10 V
Load RA	≥ 4 kΩ
Load error	≤ 0.1% at 50% load change
Residual ripple	≤ 1%eff
Setting time	approx. 500ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	± 0.5% of the final value
Temperature drift	≤ 0.02 %/K

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



#### Block circuit diagram (example)

#### Connections



#### Terminal assignment (for all types)

1420 19 13 14 20 1913 voltage input 17 1 3 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	T. Function  1 I <sub>E</sub> (+)  3 I <sub>E</sub> (-)  2 U <sub>E</sub> (+)  5 U <sub>E</sub> (-)  16 U <sub>H</sub> L1(+)  17 U <sub>H</sub> N (-)	T. 19 20 13 14 19 20 I <sub>A</sub>	Function single output: $U_A$ , $I_A$ (+) $U_A$ , $I_A$ (-) dual output: $U_A$ (+) $U_A$ (-) $I_A$ (+) $I_A$ (-) current output
U <sub>E</sub> voltage input		UA	voltage output

U<sub>H</sub> 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 –	Χ	Х	Х		Х	Х	Х
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					А				
0 5 A					В				
-20 0 20 mA				С					
-10 0 10 V					D				
-20 0 20 mA and -10 0 10 V					Е				
according to specification				Z					
4. Accuracy									
± 0.5% of the final value						1			
± 0.2% of the final value						2			
5. Setting time						I			
500 ms							1		
250 ms							2		
100 ms							3		
6. Auxiliary power supply	1							I	
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	I								0
with test report German_English									1
1 2 2 2 2									



# Frontansicht | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Comparison | Co

#### 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

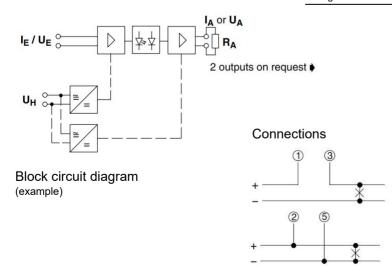
The isolation amplifier detects a standard signal (direct current 0/4 ... 20 mA or DC voltage 0 /2 ... 10 V), amplifies it with galvanic isolation and converts it into a load-independent DC current signal or an imprinted DC voltage signal.

#### **Functional principle**

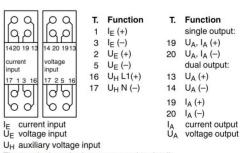
The current measurement is carried out internally via a shunt resistor, the voltage measurement via a voltage divider. After this, the signal is galvanically isolated from the input via an optical path and converted into a proportional imprinted DC voltage or a proportional load-independent DC current

(Maße in mm)		
	To	ech
Measuring input		
Input parameter	I <sub>EN</sub> = 0 20 mA, 4 20 mA	
	U <sub>EN</sub> = 0 10 V, 2 10 V	
Intrinsic consumption	IE • 0.1 V	
Overload capacity	1.2 · I <sub>EN</sub> permanent	
	2 · I <sub>EN</sub> max. 1 sec.	
Operating voltage	Max. 300 V	
Measurement output		
Nominal current IAN	0 20 mA or 4 20 mA	
Load range RA	0 12 V / Ian	
Current limitation	to 120 150% of the final value	
Nominal voltage UAN	0 10 V or 2 10 V	
Load RA	≥ 4 kΩ	
Load error	≤ 0.1% at 50% load change	_
Residual ripple	≤ 1%eff	
Setting time	approx. 500ms, 250ms, 100ms	
Open-circuit voltage	≤ 15 V	
Accuracy		
Basic accuracy	± 0.5% of the final value	_
Temperature drift	≤ 0.02 %/K	_

hnical parameters	
Nominal conditions	
Auxiliary voltage	U <sub>HN</sub> ±5 %, 50 Hz with AC
Load	0.5 RA max. ±1% with current output
	RA min ±1% with voltage output
Ambient temperature	23°C ±1K
Warm-up time	≥5 min
Auxiliary power supply	
AC voltage	230 V~ (-15% +10%); < 6 VA
	115 V~ (-15% +10%); < 3.5 VA
DC voltage	24 V = (20 72V); < 3 VA
Wide range	20 100 V= or 15 70V~; < 3 VA
AC / DC	90 357 V= or 65 253V~; < 3 6 VA
General technical data	
Test voltage	2210 V all circuits against housing
_	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



#### Terminal assignment (for all types)



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

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

Characteristics	Order number								
NT-G.1, measuring transducer for DC standard signals									
Order No. NMU31 - xxxxxx	NMU	31 –	Х	X	Х		X	Х	Х
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					Α				
0 5 mA					В				
-20 0 20 mA					С				
-10 0 10 V					D	!			
-20 0 20 mA and -10 0 10 V					Е				
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



# 115

#### Mt-G.oH

Isolating transducer for standard signals without auxiliary energy

#### Characteristics/uses

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

#### Application

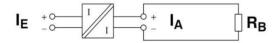
The isolating transducer detects a standard direct current (0 ... 20 mA) and converts it back into a galvanically isolated load-independent DC current.

#### Functional principle

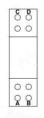
Input and output current are galvanically isolated from each other without additional auxiliary energy. The energy required for this is extracted from the input signal. The input resistance is therefore dependent on the input current and the connected load resistance RB.

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

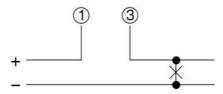
#### Bock circuit diagram



#### Terminal assignment



#### Connections



	Α	1	I <sub>E</sub> (+)
	В	3	I <sub>E</sub> (-)
	С		I <sub>A</sub> (+)
	D		I <sub>A</sub> (–)
	E		=
	F		-
	G		=
	Н		_
E			Current input

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	NMU	32 –	Х	X	Х	Х
Order No. NMU32 - xxxxxx						
1. Application						
0 20 mA for 1 standard signal			1			
2. Input measuring range						
0 20 mA				Α		
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



#### **MBS AG**

Eisbachstraße 51 74429 Sulzbach-Laufen Germany Phone: +49 7976 9851-0 Telefax: +49 7976 9851-90 info@mbs-ag.com www.mbs-ag.com

