WE MAKE YOUR VALUES VISIBLE.

MEASURING TRANSDUCERS

We make energy measurable and safeguard your future.

- SAFETY APPLIANCE TESTERS
- LOW- AND MEDIUM- VOLTAGE CURRENT TRANSFORMERS
- ENERGY MANAGEMENT
- ANALOGUE PANEL METERS
- DIGITAL PANEL METERS
- MEASURING TRANSDUCERS
- THERMAL PRINTERS
- SHUNTS
- SWITCHBOARD COMPONENTS
- VOLTAGE DIVIDER
- LOW VOLTAGE SWITCHGEAR

CCT 31.3 RMS

(Compensation current transformer)

Current transformer for measuring both direct current and alternating current

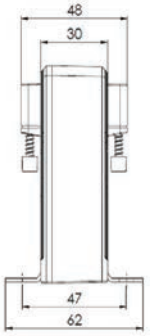
- For current measurement of non-sinusoidal and distorted (constant) grids
- As a current measuring transducer for direct input wiring of PLC input cards

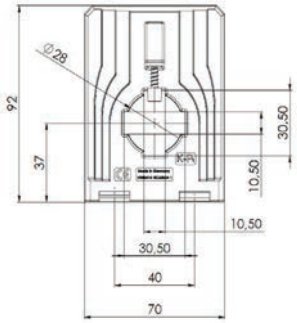
Applied technical standards

DIN EN 50178, 1997
DIN EN 61010-1, 2002
VDE 0160

Electrical connections:

U_H+ 0 (ground) I_A
Spring-type terminal
Connection cross-sections: 0.08 - 2.5 mm²





Dimensions:

Rail: 30 x 10 mm
Circular conductor: 28 mm
Installation width: 70 mm
Installation height: 92 mm
Total installation depth: 48 mm

Accessories:

Snap-on mechanism for attachment to
35 mm DIN top-hat rail
Order. no.: 10055012

Technical data:

Measuring range:	0 - 300 A DC / 0 - 300 A I_{RMS} AC, dependent on variant! (Rated current ranges configured to standard values according to IEC)
Frequency range:	DC, or AC 20 Hz - 6 kHz, crest factor ≤ 4
Current output:	4 - 20 mA DC, true/effective value measurement
Max. load resistance at current output:	R_B ≤ 500 Ω (U_H = 24 V DC)
Output signal restriction upon overload:	< 25 mA
Accuracy:	± 1.0%
Max. operating voltage U_m:	0.72 kV, U_{eff}
Insulation test voltage:	6.4 kV, U_{eff}, 50 Hz, 5 sec., Primary conductor against measurement output/housing
Auxiliary voltage:	24 V DC, ± 15%, < 70 mA, External fusing via micro fuse 250 mA / 250 V, fast acting!
Step response time (90% I_{PN}, di/dt = 100 A / µs):	≤ 200 ms (typ. 150 ms)
Signal rate of rise di/dt:	< 100 A / µs
Insulating material class:	E
Protection class:	IP 20
Application height:	≤ 2000 m (DIN EN 61010-1)
Max. temperature of primary conductor:	100 °C
Operating temperature range:	-25 °C < T_U < +60 °C, 0 - 95% rel. humidity, no condensation!
Storage temperature range:	-40 °C < T_L < +90 °C

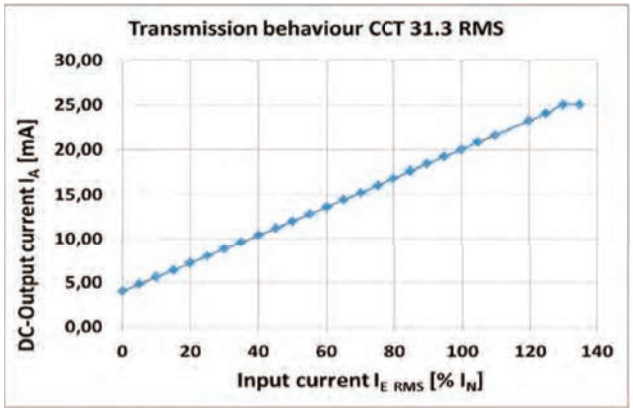
Functions of CCT 31.3 RMS:

- The magnetic field surrounding a conductor through which current flows is recorded by the measurement core enclosing the conductor. The magnetic flow induced in the measurement core and directly proportional to the current strength in the primary conductor is recorded using a semiconductor device. Control electronics integrated in the device convert the signal supplied by the semiconductor into a DC output current signal proportional to the true/effective value of the measured variable. True/effective values are calculated using the delta-sigma method.
- Inductive, contactless recording of the measured variable provides a galvanically isolated output signal.
- Electrical contacting of the secondary circuit of the current transformer occurs via a 4-pin spring-type terminal. This terminal is suitable for connecting flexible stranded wires up to 2.5 mm^2.
- A DC auxiliary power supply of 24 V DC is required to supply the control electronics. The auxiliary power inputs must be fused using a micro fuse 250 mA / 250 V / F.

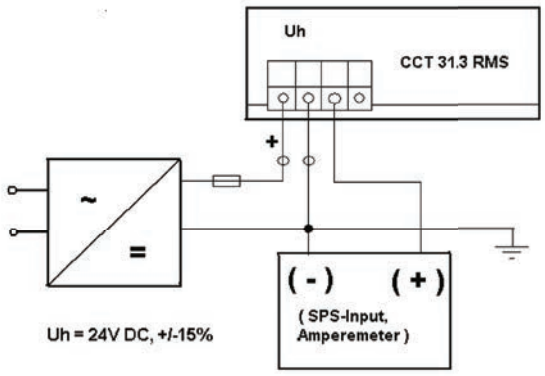
Benefits and advantages of CCT 31.3 RMS:

- Measurement of both direct and alternating currents possible with just one measuring transformer.
- Precise calculation of true/effective values of virtually any time curve of current to be measured.
- Large operating frequency range of 0 Hz (DC) or 20 Hz - 6 kHz (AC).
- High electrical safety owing to galvanically isolated recording of measured variables.
- Low power requirement (≤ 2.5 VA)
- Simple and safe electrical wiring using spring-type terminal technology.
- Direct assembly on busbars using integrated fastening screws on the device.
- Assembly on 35 mm DIN top-hat rails possible using optionally available snap-on mechanism.
- High climatic and mechanical resilience owing to polyurethane potting of all electrical components.

Transmission characteristics of CCT 31.3 RMS:



Connection diagram of CCT 31.3 RMS:



Type	Primary current I_{RMS} (A)	Article number	Output signal
CCT 31.3 RMS	50	1001103-10001	4 - 20 mA DC
	100	1001103-10003	
	150	1001103-10005	
	200	1001103-10006	
	250	1001103-10007	
	300	1001103-10008	

CCT 31.3 I
(Compensation current transformer)

Current transformer for measuring both direct current and alternating current

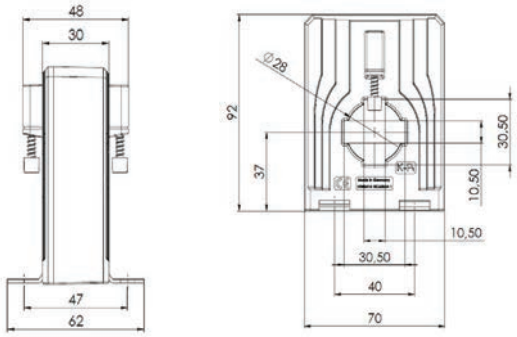
- For use in grid analysis
- For current measurement of non-sinusoidal and distorted grids

Applied technical standards

DIN EN 50178, 1997
DIN EN 61010-1, 2002
VDE 0160

Electrical connections:

U_H+ U_H- 0 (ground) I_A
Spring-type terminal
Connection cross-sections: 0.08 - 2.5 mm²



Dimensions:

Rail: 30 x 10 mm
Circular conductor: 28 mm
Installation width: 70 mm
Installation height: 92 mm
Total installation depth: 48 mm

Accessories:

Snap-on mechanism for attachment to 35 mm DIN top-hat rail
Order. no.: 10055012

Technical data:

Measuring range:	0 - 300 A DC / AC I_{eff}, dependent on variant! (Rated current ranges configured to standard values according to IEC)
Frequency range:	0 - 100 kHz, any signal curves
Current output with AC input signal:	AC: 0 - 20 mA I_{eff}, (± 28.2843 mA I_{Peak})
Current output with DC input signal:	DC: 0 - ± 20 mA
Max. load resistance at current output:	R_B ≤ 200 Ω (U_H = 24 V DC)
Output signal restriction upon overload:	< 25 mA
Accuracy:	± 0.5%
Max. operating voltage U_m:	0.72 kV, U_{eff}
Insulation test voltage:	6.4 kV, U_{eff}, 50 Hz, 5 sec., Primary conductor against measurement output/housing
Auxiliary voltage:	± 12 V DC, ± 15%, < 70 mA, External fusing via micro fuse 100 mA / 250 V, fast acting!
Step response time (90% I_{PN}, di/dt = 100 A / µs):	≤ 1 µs (typ. 150 ns)
Signal rate of rise di/dt:	< 100 A / µs
Insulating material class:	E
Protection class:	IP 20
Application height:	≤ 2000 m (DIN EN 61010-1)
Max. temperature of primary conductor:	100 °C
Operating temperature range:	-25 °C < T_U < +60 °C, 0 - 95% rel. humidity, no condensation!
Storage temperature range:	-40 °C < T_L < +90 °C

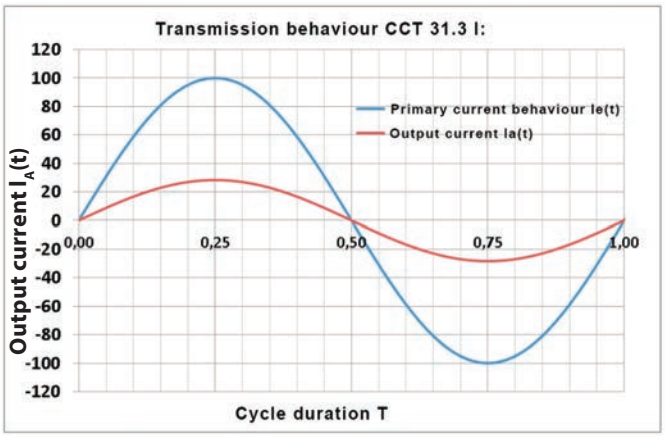
Functions of CCT 31.3 I:

- The magnetic field surrounding a conductor through which current flows is recorded by the measurement core enclosing the conductor. The magnetic flow induced in the measurement core and directly proportional to the current strength in the primary conductor is recorded using a semiconductor device. Control electronics integrated in the device convert the signal supplied by the semiconductor into a DC output current signal proportional to the true/effective value of the measured variable. True/effective values are calculated using the delta-sigma method.
- Inductive, contactless recording of the measured variable provides a galvanically isolated output signal.
- Electrical contacting of the secondary circuit of the current transformer occurs via a 4-pin spring-type terminal. This terminal is suitable for connecting flexible stranded wires up to 2.5 mm^2.
- A DC auxiliary power supply of 24 V DC is required to supply the control electronics. The auxiliary power inputs must be fused using a micro fuse 250 mA / 250 V / F.

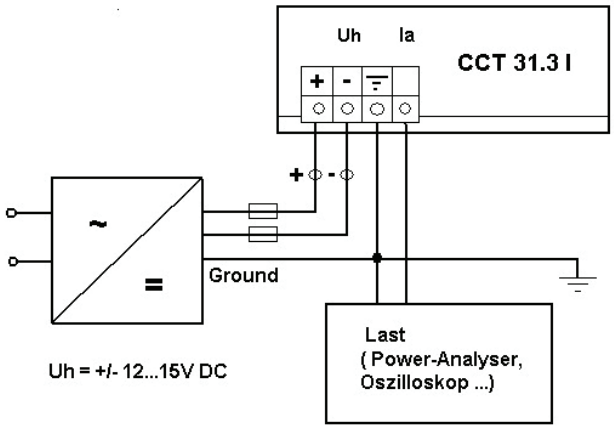
Benefits and advantages of CCT 31.3 I:

- Measurement of both direct and alternating currents possible with just one measuring transformer.
- Large operating frequency range of 0 Hz (DC) - 100 kHz (AC).
- High electrical safety owing to galvanically isolated recording of measured variables.
- Low power requirement (≤ 2.5 VA)
- Simple and safe electrical wiring using spring-type terminal technology.
- Direct assembly on busbars using integrated fastening screws on the device.
- Assembly on 35 mm DIN top-hat rails possible using optionally available snap-on mechanism.
- High climatic and mechanical resilience owing to polyurethane potting of all electrical components.

Transmission characteristics of CCT 31.3 I:



Connection diagram of CCT 31.3 I:



Type	Primary current (A) DC / AC (I_{eff})	Article number	Output signal
CCT 31.3 I	50	1001101-10001	DC: 4 - 20 mA AC: 0 - 20 mA I_{eff}
	100	1001101-10003	
	150	1001101-10005	
	200	1001101-10006	
	250	1001101-10007	
	300	1001101-10008	

CCT 31.3 U
(Compensation current transformer)

Current transformer for measuring both direct current and alternating current

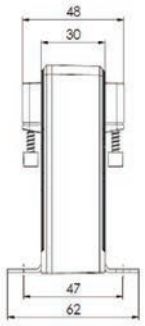
- For use in grid analysis
- For current measurement of non-sinusoidal and distorted grids

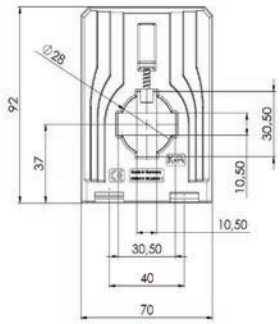
Applied technical standards:

DIN EN 50178, 1997
DIN EN 61010-1, 2002
VDE 0160

Electrical connections:

U_H+ U_H- 0 (ground) U_A
Spring-type terminal
Connection cross-sections: 0.08 - 2.5 mm²





Dimensions:

Rail: 30 x 10 mm
Circular conductor: 28 mm
Installation width: 70 mm
Installation height: 92 mm
Total installation depth: 48 mm

Accessories:

Snap-on mechanism for attachment to
35 mm DIN top-hat rail
Order. no.: 10055012

Technical data:

Measuring range:	0 - 300 A DC / AC I_{eff}, dependent on variant! (Rated current ranges configured to standard values according to IEC)
Frequency range:	0 - 100 kHz, any signal curves
Current output with AC input signal:	2.5 ± 1 V, U_{eff}, AC: 2.5 ± 1.414 V (peak-peak)
Current output with DC input signal:	DC: 0 - ± 20 mA
Max. load resistance at current output:	R_B ≤ 200 Ω (U_H = 24 V DC)
Output signal restriction upon overload:	< 25 mA
Accuracy:	± 0.5%
Max. operating voltage U_m:	0.72 kV, U_{eff}
Insulation test voltage:	6.4 kV, U_{eff}, 50 Hz, 5 sec., Primary conductor against measurement output/housing
Auxiliary voltage:	± 12 V DC, ± 15%, < 70 mA, External fusing via micro fuse 100 mA / 250 V, fast acting!
Step response time (90% I_{PN}, di/dt = 100 A / µs):	≤ 1 µs (typ. 150 ns)
Signal rate of rise di/dt:	< 100 A / µs
Insulating material class:	E
Protection class:	IP 20
Application height:	≤ 2000 m (DIN EN 61010-1)
Max. temperature of primary conductor:	100 °C
Operating temperature range:	-25 °C < T_U < +60 °C, 0 - 95% rel. humidity, no condensation!
Storage temperature range:	-40 °C < T_L < +90 °C

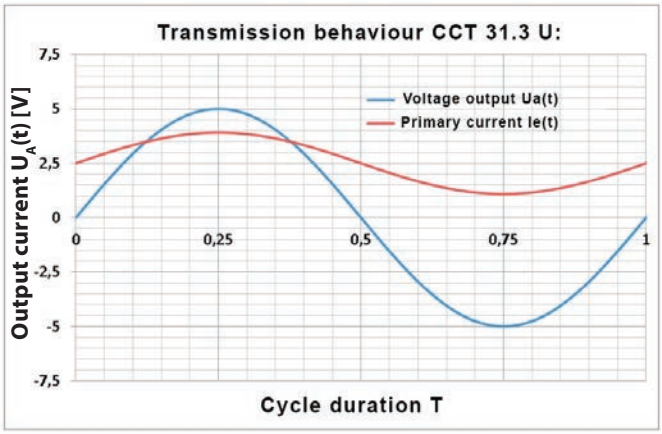
Functions of CCT 31.3 U:

- The magnetic field surrounding a conductor through which current flows is recorded by the measurement core enclosing the conductor. The magnetic flow induced in the measurement core and directly proportional to the current strength in the primary conductor is recorded using a semiconductor device. Control electronics integrated in the device convert the signal supplied by the semiconductor into an output voltage signal directly proportional to the time curve of the measured variable.
- Inductive, contactless recording of the measured variable provides a galvanically isolated output signal.
- Electrical contacting of the secondary circuit of the current transformer occurs via a 4-pin spring-type terminal. This terminal is suitable for connecting flexible stranded wires up to 2.5 mm^2.
- A DC auxiliary power supply of ± 12 V is required to supply the control electronics. The auxiliary power inputs must be fused using a micro fuse 100 mA / 250 V / F.

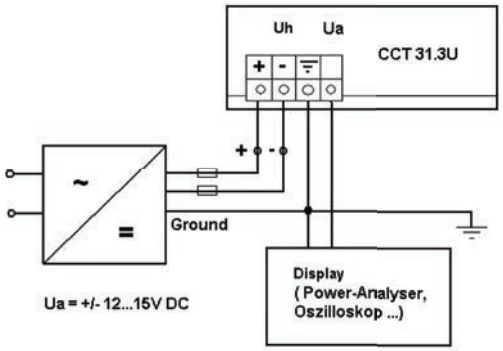
Benefits and advantages of CCT 31.3 U:

- Measurement of both direct and alternating currents possible with just one measuring transformer.
- Large operating frequency range of 0 Hz (DC) - 100 kHz (AC).
- High electrical safety owing to galvanically isolated recording of measured variables.
- Low power requirement (≤ 2.5 VA)
- Simple and safe electrical wiring using spring-type terminal technology.
- Direct assembly on busbars using integrated fastening screws on the device.
- Assembly on 35 mm DIN top-hat rails possible using optionally available snap-on mechanism.
- High climatic and mechanical resilience owing to polyurethane potting of all electrical components.

Transmission characteristics of CCT 31.3 U:



Connection diagram of CCT 31.3 U:



Type	Primary current I_{eff} (A) DC / AC (I_{eff})	Article number	Output signal
CCT 31.3 U	50	1001102-10001	DC: 2.5 ± 1 V AC: 2.5 ± 1.414 V (peak-peak)
	100	1001102-10003	
	150	1001102-10005	
	200	1001102-10006	
	250	1001102-10007	
	300	1001102-10008	

CCT 41.4 RMS

(Compensation current transformer)

Current transformer for measuring both direct current and alternating current

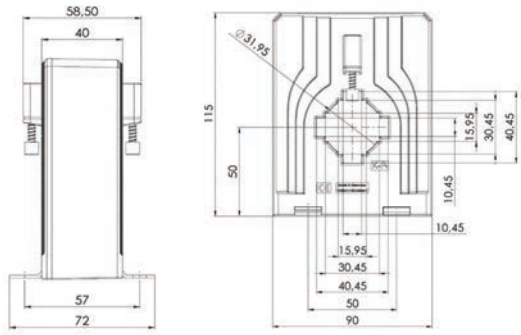
- For current measurement of non-sinusoidal and distorted (constant) grids
- As a current measuring transducer for direct input wiring of PLC input cards

Applied technical standards

DIN EN 50178, 1997
DIN EN 61010-1, 2002
VDE 0160

Electrical connections:

U_H+ 0 (ground) I_A
Spring-type terminal
Connection cross-sections: 0.08 - 2.5 mm²



Dimensions:

Rail 1: 40 x 10 mm
Rail 2: 30 x 15 mm
Circular conductor: 31.5 mm
Installation width: 90 mm
Installation height: 115 mm
Total installation depth: 58.5 mm

Accessories:

Snap-on mechanism for attachment to 35 mm DIN top-hat rail
Order. no.: 10055012

Technical data:

Measuring range:	0 - 500 A DC / 0 - 750 A I_{RMS} AC, dependent on variant! (Rated current ranges configured to standard values according to IEC)
Frequency range:	DC, or AC 20 Hz - 6 kHz, crest factor ≤ 4
Current output:	4 - 20 mA DC, true/effective value measurement
Max. load resistance at current output:	R_B ≤ 500 Ω (U_H = 24 V DC)
Output signal restriction upon overload:	< 25 mA
Accuracy:	± 1.0%
Max. operating voltage U_m:	0.72 kV, U_{eff}
Insulation test voltage:	6.4 kV, U_{eff}, 50 Hz, 5 sec., Primary conductor against measurement output/housing
Auxiliary voltage:	24 V DC, ± 15%, < 70 mA, External fusing via micro fuse 250 mA / 250 V, fast acting!
Step response time (90% I_{PN}, di/dt = 100 A / µs):	≤ 200 ms (typ. 150 ns)
Signal rate of rise di/dt:	< 100 A / µs
Insulating material class:	E
Protection class:	IP 20
Application height:	≤ 2000 m (DIN EN 61010-1)
Max. temperature of primary conductor:	100 °C
Operating temperature range:	-25 °C < T_U < +60 °C, 0 - 95% rel. humidity, no condensation!
Storage temperature range:	-40 °C < T_L < +90 °C

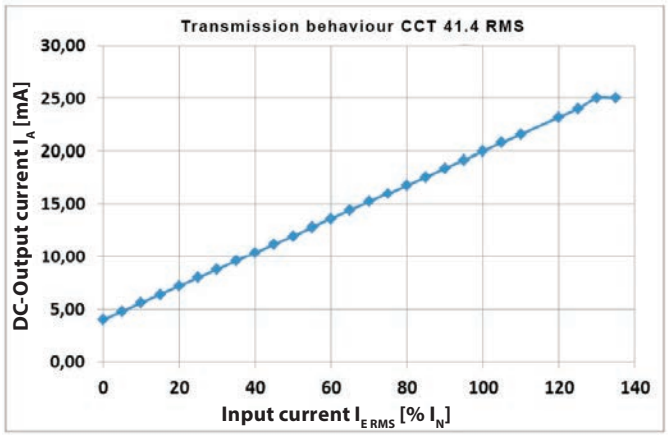
Functions of CCT 41.4 RMS:

- The magnetic field surrounding a conductor through which current flows is recorded by the measurement core enclosing the conductor. The magnetic flow induced in the measurement core and directly proportional to the current strength in the primary conductor is recorded using a semiconductor device. Control electronics integrated in the device convert the signal supplied by the semiconductor into a DC output current signal proportional to the true/effective value of the measured variable. True/effective values are calculated using the delta-sigma method.
- Inductive, contactless recording of the measured variable provides a galvanically isolated output signal.
- Electrical contacting of the secondary circuit of the current transformer occurs via a 4-pin spring-type terminal. This terminal is suitable for connecting flexible stranded wires up to 2.5 mm^2.
- A DC auxiliary power supply of 24 V DC is required to supply the control electronics. The auxiliary power inputs must be fused using a micro fuse 250 mA / 250 V / F.

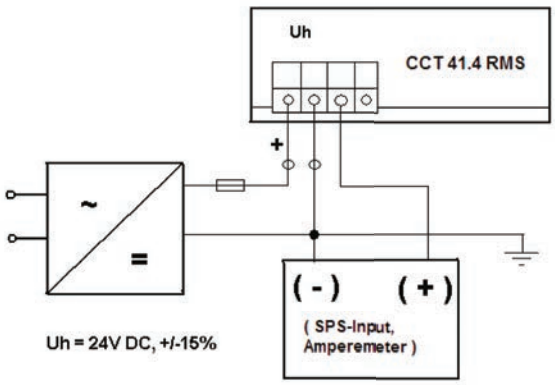
Benefits and advantages of CCT 41.4 RMS:

- Measurement of both direct and alternating currents possible with just one measuring transformer.
- Precise calculation of true/effective values of virtually any time curve of current to be measured.
- Large operating frequency range of 0 Hz (DC) or 20 Hz - 6 kHz (AC).
- High electrical safety owing to galvanically isolated recording of measured variables.
- Low power requirement (≤ 2.5 VA)
- Simple and safe electrical wiring using spring-type terminal technology.
- Direct assembly on busbars using integrated fastening screws on the device.
- Assembly on 35 mm DIN top-hat rails possible using optionally available snap-on mechanism.
- High climatic and mechanical resilience owing to polyurethane potting of all electrical components.

Transmission characteristics of CCT 41.4 RMS:



Connection diagram of CCT 41.4 RMS:



Type	Primary current I_{RMS} (A)	Article number	Output signal
CCT 41.4 RMS	150	1001203-10005	4 - 20 mA DC
	200	1001203-10006	
	250	1001203-10007	
	300	1001203-10008	
	400	1001203-10009	
	500	1001203-10010	

CCT 41.4 I
(Compensation current transformer)

Current transformer for measuring both direct current and alternating current

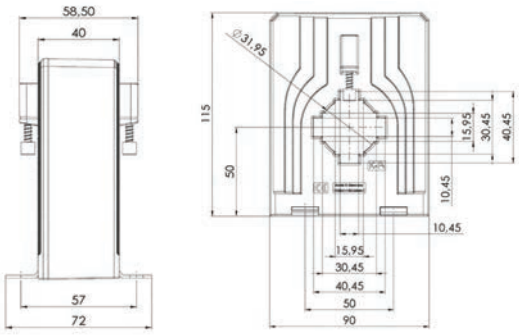
- For use in grid analysis
- For current measurement of non-sinusoidal and distorted grids

Applied technical standards

DIN EN 50178, 1997
DIN EN 61010-1, 2002
VDE 0160

Electrical connections:

U_H+ 0 (ground) I_A
Spring-type terminal
Connection cross-sections: 0.08 - 2.5 mm²



Dimensions:

Rail 1: 40 x 10 mm
Rail 2: 30 x 15 mm
Circular conductor: 31.5 mm
Installation width: 90 mm
Installation height: 115 mm
Total installation depth: 58.5 mm

Accessories:

Snap-on mechanism for attachment to 35 mm DIN top-hat rail
Order. no.: 10055012

Technical data:

Measuring range:	0 - 500 A DC / AC I_{eff}, dependent on variant! (Rated current ranges configured to standard values according to IEC)
Frequency range:	0 - 100 kHz, any signal curves
Current output with AC input signal:	AC: 0 - 20 mA I_{eff} (± 28.2843 mA I_{Peak})
Current output with DC input signal:	DC: 0 - ± 20 mA
Max. load resistance at current output:	$R_B \leq 200\ \Omega$ (U_H = 24 V DC)
Output signal restriction upon overload:	< 25 mA
Accuracy:	± 0.5%
Max. operating voltage U_m:	0.72 kV, U_{eff}
Insulation test voltage:	6.4 kV, U_{eff}, 50 Hz, 5 sec., Primary conductor against measurement output/housing
Auxiliary voltage:	± 12 V DC, ± 15%, < 70 mA, External fusing via micro fuse 100 mA / 250 V, fast acting!
Step response time (90% I_{PN}, di/dt = 100 A / µs):	≤ 1 µs (typ. 150 ns)
Signal rate of rise di/dt:	< 100 A / µs
Insulating material class:	E
Protection class:	IP 20
Application height:	≤ 2000 m (DIN EN 61010-1)
Max. temperature of primary conductor:	100 °C
Operating temperature range:	-25 °C < T_U < +60 °C, 0 - 95% rel. humidity, no condensation!
Storage temperature range:	-40 °C < T_L < +90 °C

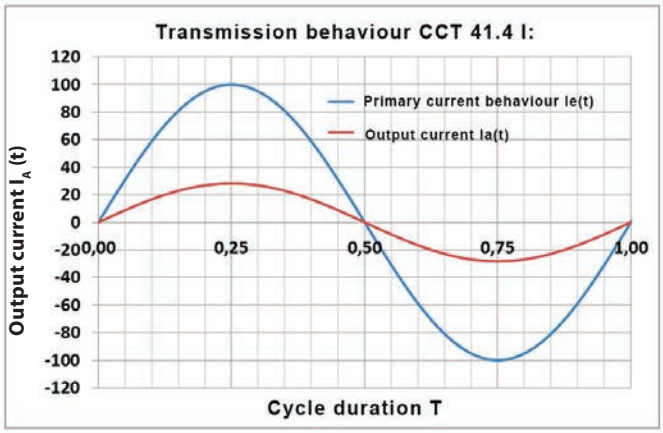
Functions of CCT 41.4 I:

- The magnetic field surrounding a conductor through which current flows is recorded by the measurement core enclosing the conductor. The magnetic flow induced in the measurement core and directly proportional to the current strength in the primary conductor is recorded using a semiconductor device. Control electronics integrated in the device convert the signal supplied by the semiconductor into an output current signal directly proportional to the time curve of the measured variable.
- Inductive, contactless recording of the measured variable provides a galvanically isolated output signal.
- Electrical contacting of the secondary circuit of the current transformer occurs via a 4-pin spring-type terminal. This terminal is suitable for connecting flexible stranded wires up to 2.5 mm^2.
- A DC auxiliary power supply of ±12 V is required to supply the control electronics. The auxiliary power inputs must be fused using a micro fuse 100 mA / 250 V / F.

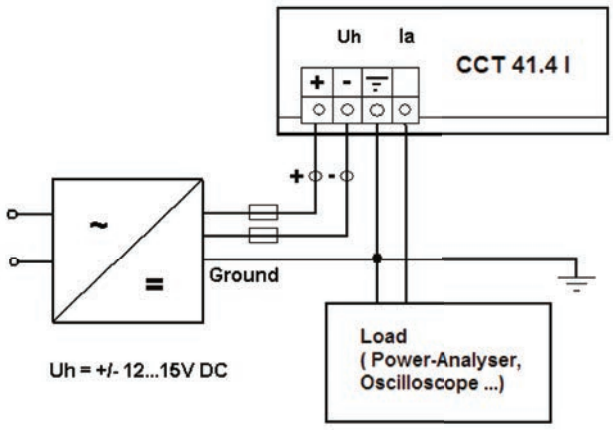
Benefits and advantages of CCT 41.4 I:

- Measurement of both direct and alternating currents possible with just one measuring transformer.
- Large operating frequency range of 0 Hz (DC) - 100 kHz (AC).
- High electrical safety owing to galvanically isolated recording of measured variables.
- Low power requirement (≤ 2.5 VA)
- Simple and safe electrical wiring using spring-type terminal technology.
- Direct assembly on busbars using integrated fastening screws on the device.
- Assembly on 35 mm DIN top-hat rails possible using optionally available snap-on mechanism.
- High climatic and mechanical resilience owing to polyurethane potting of all electrical components.

Transmission characteristics of CCT 41.4 I:



Connection diagram of CCT 41.4 I:



Type	Primary current (A) DC / AC (I_{eff})	Article number	Output signal
CCT 41.4 I	150	1001201-10005	DC: 0 - ± 20 mA AC: 0 - 20 mA I_{eff}
	200	1001201-10006	
	250	1001201-10007	
	300	1001201-10008	
	400	1001201-10009	
	500	1001201-10010	

CCT 41.4 U
(Compensation current transformer)

Current transformer for measuring both direct current and alternating current

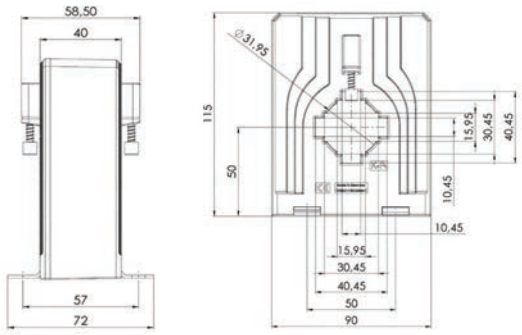
- For use in grid analysis
- For current measurement of non-sinusoidal and distorted grids

Applied technical standards

DIN EN 50178, 1997
DIN EN 61010-1, 2002
VDE 0160

Electrical connections:

U_H+ U_H- 0 (ground) U_A
Spring-type terminal
Connection cross-sections: 0.08 - 2.5 mm²



Dimensions:

Rail 1: 40 x 10 mm
Rail 2: 30 x 15 mm
Circular conductor: 31.5 mm
Installation width: 90 mm
Installation height: 115 mm
Total installation depth: 58.5 mm

Accessories:

Snap-on mechanism for attachment to 35 mm DIN top-hat rail
Order. no.: 10055012

Technical data:

Measuring range:	0 - 500 A DC / AC I_{eff}, dependent on variant! (Rated current ranges configured to standard values according to IEC)
Frequency range:	0 - 100 kHz, any signal curves
Current output with AC input signal:	2.5 ± 1 V, U_{eff}, AC: 2.5 ± 1.414 V (peak-peak)
Current output with DC input signal:	2.5 ± 1 V, DC
Min. load resistance at current output:	R_B ≥ 100 kΩ
Output signal restriction upon overload:	< 5 V
Accuracy:	± 0.5%
Max. operating voltage U_m:	0.72 kV, U_{eff}
Insulation test voltage:	6.4 kV, U_{eff}, 50 Hz, 5 sec., Primary conductor against measurement output/housing
Auxiliary voltage:	± 12 V DC, ± 15%, < 70 mA, External fusing via micro fuse 100 mA / 250 V, fast acting!
Step response time (90% I_{PN}, di/dt = 100 A / µs):	≤ 1 µs (typ. 150 ns)
Signal rate of rise di/dt:	< 100 A / µs
Insulating material class:	E
Protection class:	IP 20
Application height:	≤ 2000 m (DIN EN 61010-1)
Max. temperature of primary conductor:	100 °C
Operating temperature range:	-25 °C < T_U < +60 °C, 0 - 95% rel. humidity, no condensation!
Storage temperature range:	-40 °C < T_L < +90 °C

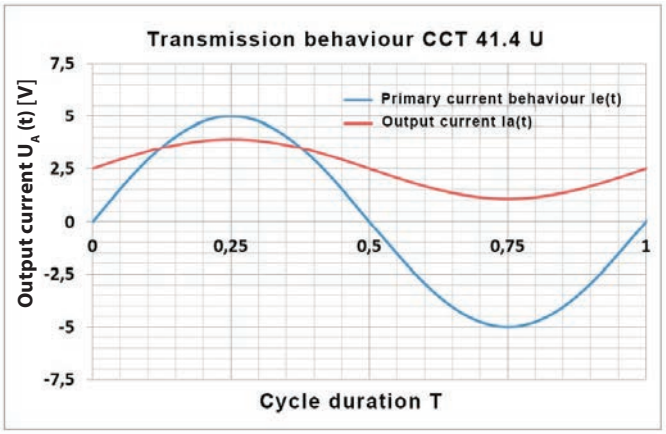
Functions of CCT 41.4 U:

- The magnetic field surrounding a conductor through which current flows is recorded by the measurement core enclosing the conductor. The magnetic flow induced in the measurement core and directly proportional to the current strength in the primary conductor is recorded using a semiconductor device. Control electronics integrated in the device convert the signal supplied by the semiconductor into an output voltage signal directly proportional to the time curve of the measured variable.
- Inductive, contactless recording of the measured variable provides a galvanically isolated output signal.
- Electrical contacting of the secondary circuit of the current transformer occurs via a 4-pin spring-type terminal. This terminal is suitable for connecting flexible stranded wires up to 2.5 mm^2.
- A DC auxiliary power supply of ± 12 V is required to supply the control electronics. The auxiliary power inputs must be fused using a micro fuse 100 mA / 250 V / F.

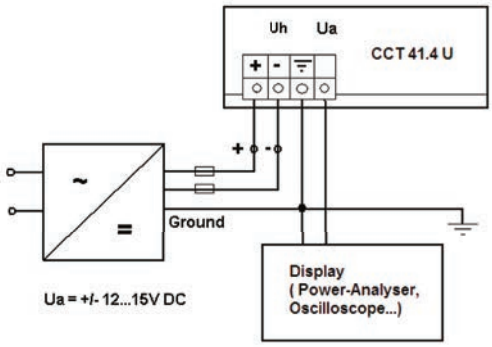
Benefits and advantages of CCT 41.4 U:

- Measurement of both direct and alternating currents possible with just one measuring transformer.
- Large operating frequency range of 0 Hz (DC) - 100 kHz (AC).
- High electrical safety owing to galvanically isolated recording of measured variables.
- Low power requirement (≤ 2.5 VA)
- Simple and safe electrical wiring using spring-type terminal technology.
- Direct assembly on busbars using integrated fastening screws on the device.
- Assembly on 35 mm DIN top-hat rails possible using optionally available snap-on mechanism.
- High climatic and mechanical resilience owing to polyurethane potting of all electrical components.

Transmission characteristics of CCT 41.4 U:

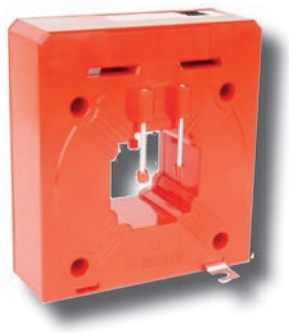


Connection diagram of CCT 41.4 U:



Type	Primary current I_{eff} (A) DC / AC (I_{eff})	Article number	Output signal
CCT 41.4 U	150	1001202-10005	DC: 2.5 ± 1 V AC: 2.5 ± 1.414 V (peak-peak)
	200	1001202-10006	
	250	1001202-10007	
	300	1001202-10008	
	400	1001202-10009	
	500	1001202-10010	

CCT 63.6 I
(Compensation current transformer)

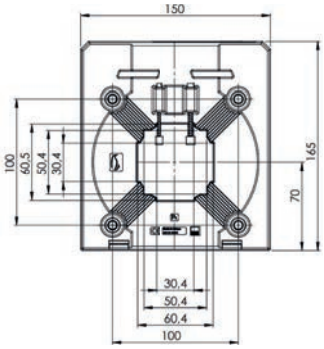


Current transformer for measuring both direct current and alternating current

- For use in grid analysis
- For current measurement of non-sinusoidal and distorted grids

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

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



Dimensions:
Rail 1: 60 x 30 mm
Rail 2: 50 x 50 mm
Circular conductor: 50 mm
Installation width: 165 mm
Installation height: 150 mm
Total installation depth: 77 mm

Technical data:

Measuring range:	0 - 1500 A DC / AC I_{eff} (Rated current ranges configured to standard values according to IEC)
Frequency range:	DC or 16.7 Hz - 100 kHz, greater than 400 Hz small signal only
Current output with AC input signal:	AC: 0 - 300 mA I_{eff}
Current output with DC input signal:	DC: 0 - ± 300 mA
Max. load resistance at current output:	R_B ≤ 3Ω* (UH = 24 V DC)
Output signal restriction upon overload:	< 25 mA
Accuracy:	± 0.5%
Max. operating voltage U_m:	0.72 kV, U_{eff}
Insulation test voltage:	6.4 kV, U_{eff}, 50 Hz, 12 sec., Primary conductor against measurement output/housing
Auxiliary voltage:	± 24 V DC, ± 10% External fusing via micro fuse 300 mA
Step response time (90% I_{PN}, di/dt = 100 A / µs):	≤ 1 µs
Signal rate of rise di/dt:	> 100 A / µs
Insulating material class:	E
Protection class:	IP 20
Application height:	≤ 2000 m (DIN EN 61010-1)
Max. temperature of primary conductor:	100 °C
Operating temperature range:	-25 °C < T_U < +60 °C, 0 - 95% rel. humidity, no condensation!
Storage temperature range:	-50 °C < T_L < +90 °C

* The measurement output must not be operated open!

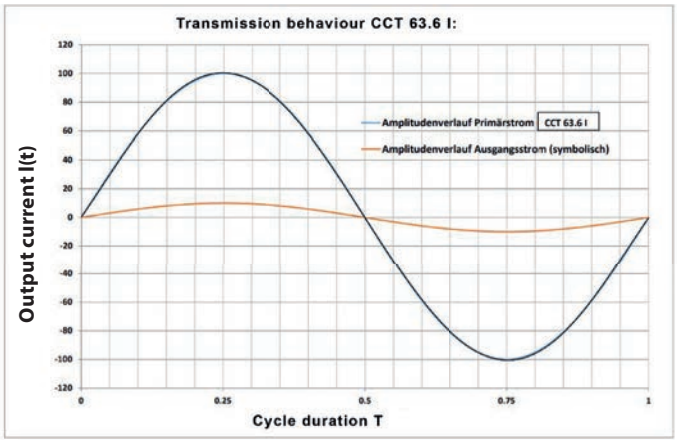
Functions of CCT 63.6 I:

- The magnetic field surrounding a conductor through which current flows is recorded by the measurement core enclosing the conductor. The magnetic flow induced in the measurement core and directly proportional to the current strength in the primary conductor is recorded using a semiconductor device. Control electronics integrated in the device convert the signal supplied by the semiconductor into an output voltage signal directly proportional to the time curve of the measured variable.
- Inductive, contactless recording of the measured variable provides a galvanically isolated output signal.
- Electrical contacting of the secondary circuit of the current transformer occurs via an 8-pin plug-in terminal. This terminal is suitable for connecting flexible stranded wires up to 1.5 mm^2.
- A bipolar DC auxiliary power supply of ± 24 V DC is required to supply the control electronics. The auxiliary power inputs must be fused using a micro fuse 300 mA / 250 V / F.

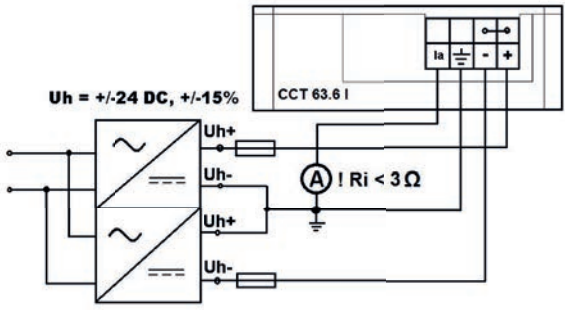
Benefits and advantages of CCT 63.6 I:

- Measurement of both direct and alternating currents possible with just one measuring transformer.
- Large operating frequency range of 0 Hz (DC) - 100 kHz (AC).
- High electrical safety owing to galvanically isolated recording of measured variables.
- Low power requirement (≤ 2.5 VA)
- Simple and safe electrical wiring using proven plug-in terminal technology.
- Direct assembly on busbars using integrated fastening screws on the device.
- Assembly on 35 mm DIN top-hat rails possible using optionally available snap-on mechanism.
- High climatic and mechanical resilience owing to polyurethane potting of all electrical components.

Transmission characteristics of CCT 63.6 I:



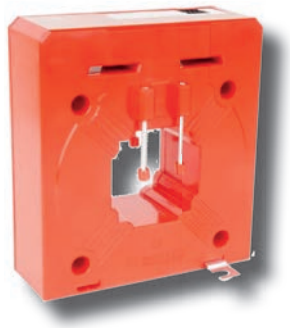
Connection diagram of CCT 63.6 I:



Type	Primary current (A) DC / AC (I_{eff})	Article number	Output signal
CCT 63.6 I	1500	1001301-10006	DC: 0 - ± 300 mA AC: 0 - 300 mA I_{eff}

CCT 63.6 RMS

(Compensation current transformer)



Current transformer for measuring both direct current and alternating current

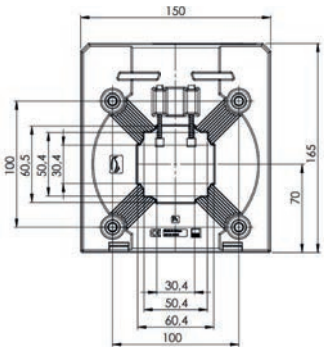
- For current measurement of non-sinusoidal and distorted grids
- As a current measuring transducer for direct input wiring of PLC input cards

Applied technical standards

DIN EN 50178, 1998-04
IEC 61000-3/4
DIN EN 61010-1, 2002
DIN EN 61326-1, 2013-07

Electrical connections:

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



Dimensions:

Rail 1: 60 x 30 mm
Rail 2: 50 x 50 mm
Circular conductor: 50 mm
Installation width: 165 mm
Installation height: 150 mm
Total installation depth: 77 mm

Technical data:

Measuring range:	0 - 1500 A DC / 0 - 1500 A I_{RMS} AC, dependent on variant! (Rated current ranges configured to standard values according to IEC)
Frequency range:	DC or 16.7 Hz - 6 kHz, crest factor ≤ 4
Current output:	4 - 20 mA DC, true/effective value measurement
Max. load resistance at current output:	R_B ≤ 500 Ω (UH = ± 24 V DC)
Output signal restriction upon overload:	< 30 mA
Accuracy:	± 1.0%
Max. operating voltage U_m:	0.72 kV, U_{eff}
Insulation test voltage:	6.4 kV, U_{eff}, 50 Hz, 12 sec., Primary conductor against measurement output/housing
Auxiliary voltage:	± 24 V DC, ± 10% External fusing via micro fuse 300 mA
Step response time (90% I_{PN}, di/dt = 100 A / µs):	≤ 200 ms
Signal rate of rise di/dt:	> 100 A / µs
Insulating material class:	E
Protection class:	IP 20
Application height:	≤ 2000 m (DIN EN 61010-1)
Max. temperature of primary conductor:	100 °C
Operating temperature range:	-25 °C < T_U < +60 °C, 0 - 95% rel. humidity, no condensation!
Storage temperature range:	-50 °C < T_L < +90 °C

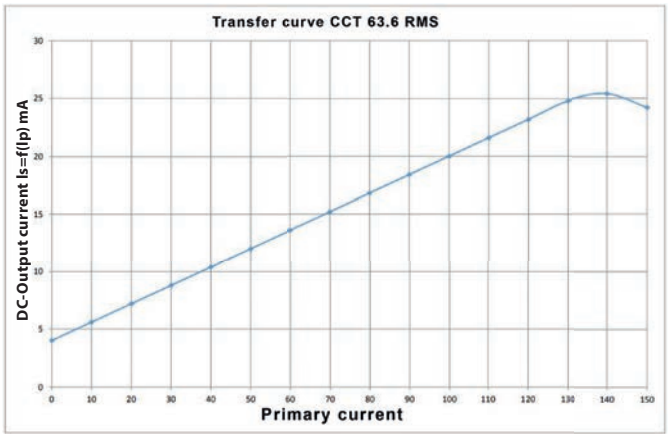
Functions of CCT 63.6 RMS:

- The magnetic field surrounding a conductor through which current flows is recorded by the measurement core enclosing the conductor. The magnetic flow induced in the measurement core and directly proportional to the current strength in the primary conductor is recorded using a semiconductor device. Control electronics integrated in the device convert the signal supplied by the semiconductor into a DC output current signal proportional to the true/effective value of the measured variable. True/effective values are calculated using the delta-sigma method.
- Inductive, contactless recording of the measured variable provides a galvanically isolated output signal.
- Electrical contacting of the secondary circuit of the current transformer occurs via an 8-pin plug-in terminal. This terminal is suitable for connecting flexible stranded wires up to 1.5 mm^2.
- A bipolar DC auxiliary power supply of ± 24 V DC is required to supply the control electronics. The auxiliary power inputs must be fused using a micro fuse 300 mA / 250 V / F.

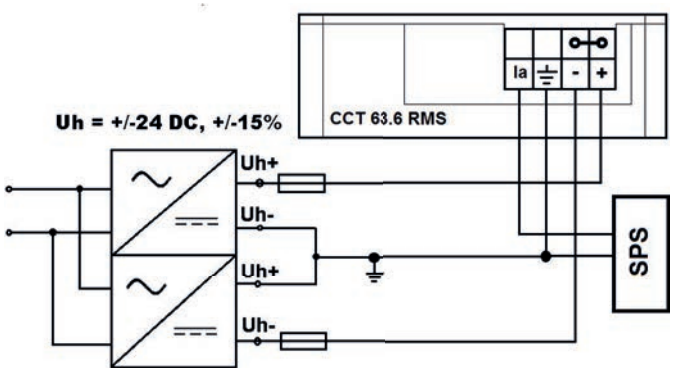
Benefits and advantages of CCT 63.6 RMS:

- Measurement of both direct and alternating currents possible with just one measuring transformer.
- Precise calculation of true/effective values of virtually any time curve of current to be measured.
- Large operating frequency range of 0 Hz (DC) or 20 Hz - 6 kHz (AC).
- High electrical safety owing to galvanically isolated recording of measured variables.
- Low power requirement (≤ 2.5 VA).
- Simple and safe electrical wiring using proven plug-in terminal technology.
- Direct assembly on busbars using integrated fastening screw on the device.
- High climatic and mechanical resilience owing to polyurethane potting of all electrical components.

Transmission characteristics of CCT 63.6 RMS:



Connection diagram of CCT 63.6 RMS:



Type	Primary current I_{RMS} (A)	Article number	Output signal
CCT 63.6 RMS	1500	1001303-10006	4 - 20 mA DC

SWMU 31.5

Measuring transducer for alternating current

With or without auxiliary power supply
With integrated current transformer Assembly enclosure
for 35 mm DIN top-hat rail

Characteristics / benefits

- Measurement input: Sinusoidal alternating current (1 A - 750 A), arithmetic average measurement effective value calibrated
- Measurement output: Unipolar output variable
- Measurement principle: Rectifier method
- With integrated current transformer
- Reduced wiring outlay

Application:

Measuring transducer for converting sinusoidal alternating current. A load-independent direct current signal and impressed direct voltage signal with action proportional to the measured value of the input variable are available as output signal. This signal can be used for displaying, registering, monitoring and/or controlling purposes. The measuring transducer satisfies the requirements and regulations with respect to electromagnetic compatibility (EMC) and safety (IEC 1010 or EN 61010).

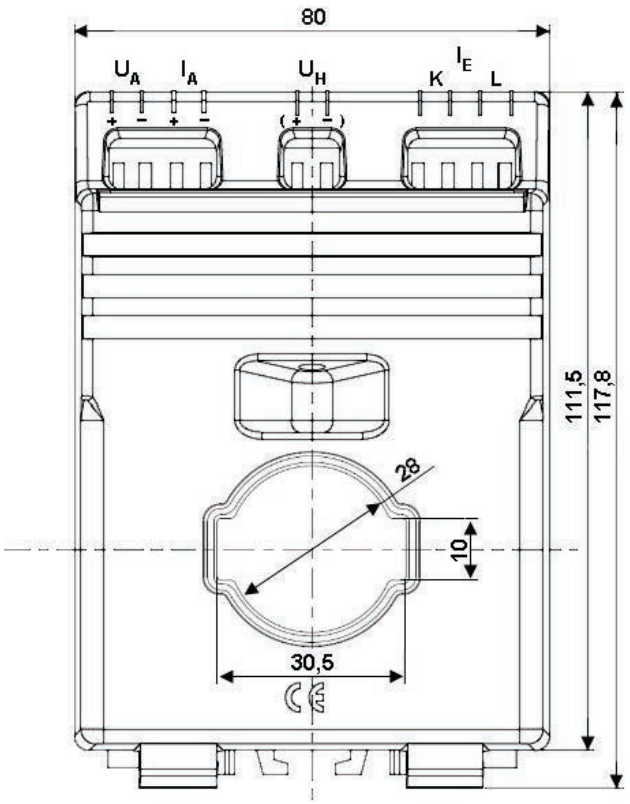
Technical parameters:

Measurement input		Auxiliary energy	
Rated frequency	f_N 50 or 60 Hz	AC power supply unit	230 V ± 10% (50 - 60 Hz)
Input rated current I_{EN}		DC	24 V ± 15%
SWMU 31.52	0 - 0.5 - 5 A	Power consumption	≤ 1.5 W (2.5 VA)
SWMU 31.51	15 - 750 A	**Accuracy**	
Internal consumption	≤ 1 VA (2.5 VA without auxiliary voltage)	Reference value	Output full scale
Overload capacity	1.5 · I_N, continuous 8· I_N, 40 sec.	Basic accuracy	0.5 min class
Measurement output		Warm-up time	≤ 5 min.
Load-independent direct current	0 - 20 mA or 4 - 20 mA	**Safety**	
Max. load resistance	≤ 500 Ω	Contact protection	IP 40, housing (test wire, EN 60529)
Max. load voltage	≤ 15 V		IP 20, connection terminals (test finger, EN 60529)
Current limitation upon overload	≤ 34 mA	Degree of pollution	2
Impressed direct voltage	0 - 10 V or 2 - 10 V*	Test voltage (DIN 57411)	4 kV, active circuits against housing
Load resistance	≥ 10 kΩ		4 kV, auxiliary voltage against measurement output (230 V version)
Max. load voltage upon overload	≤ 18 V		500 V, auxiliary voltage against measurement output (24 V DC version)
Voltage limitation	≤ 18 V	* live-zero characteristic curve only with auxiliary voltage	
Ripple voltage of output current	≤ 1% p.p		
Setting time	≤ 500 ms	Fastening element included in delivery for direct assembly without using a 35 mm top-hat rail	
Operating temperature range	-5° C ≤ δ ≤ +40° C		

1. Auxiliary voltage 230 V AC

Type SWMU	Primary current [A]	Measurement output			
		0 - 20 mA and 0 - 10 V	4 - 20 mA and 0 - 10 V	0 - 20 mA and 2 - 10 V	4 - 20 mA and 2 - 10 V
31.52	1	10031-1006	10031-2006	10031-3006	10031-4006
	5	10031-1007	10031-2007	10031-3007	10031-4007
	10	10031-1008	10031-2008	10031-3008	10031-4008
31.51	15	10031-1009	10031-2009	10031-3009	10031-4009
	20	10031-1010	10031-2010	10031-3010	10031-4010
	25	10031-1011	10031-2011	10031-3011	10031-4011
	30	10031-1012	10031-2012	10031-3012	10031-4012
	40	10031-1013	10031-2013	10031-3013	10031-4013
	50	10031-1014	10031-2014	10031-3014	10031-4014
	60	10031-1015	10031-2015	10031-3015	10031-4015
	75	10031-1016	10031-2016	10031-3016	10031-4016
	100	10031-1017	10031-2017	10031-3017	10031-4017
	150	10031-1018	10031-2018	10031-3018	10031-4018
	200	10031-1019	10031-2019	10031-3019	10031-4019
	250	10031-1020	10031-2020	10031-3020	10031-4020
	300	10031-1021	10031-2021	10031-3021	10031-4021
	400	10031-1022	10031-2022	10031-3022	10031-4022
	500	10031-1023	10031-2023	10031-3023	10031-4023
	600	10031-1024	10031-2024	10031-3024	10031-4024
	750	10031-1025	10031-2025	10031-3025	10031-4025

Measuring frequency 50/60 Hz
Weight: 350 g



Installation depth: 50 (72) mm

2. Auxiliary voltage 24 V AC

Type SWMU	Primary current [A]	Measurement output			
		0 - 20 mA and 0 - 10 V	4 - 20 mA and 0 - 10 V	0 - 20 mA and 2 - 10 V	4 - 20 mA and 2 - 10 V
31.52	1	10031-5006	10031-6006	10031-7006	10031-8006
	5	10031-5007	10031-6007	10031-7007	10031-8007
	10	10031-5008	10031-6008	10031-7008	10031-8008
31.51	15	10031-5009	10031-6009	10031-7009	10031-8009
	20	10031-5010	10031-6010	10031-7010	10031-8010
	25	10031-5011	10031-6011	10031-7011	10031-8011
	30	10031-5012	10031-6012	10031-7012	10031-8012
	40	10031-5013	10031-6013	10031-7013	10031-8013
	50	10031-5014	10031-6014	10031-7014	10031-8014
	60	10031-5015	10031-6015	10031-7015	10031-8015
	75	10031-5016	10031-6016	10031-7016	10031-8016
	100	10031-5017	10031-6017	10031-7017	10031-8017
	150	10031-5018	10031-6018	10031-7018	10031-8018
	200	10031-5019	10031-6019	10031-7019	10031-8019
	250	10031-5020	10031-6020	10031-7020	10031-8020
	300	10031-5021	10031-6021	10031-7021	10031-8021
	400	10031-5022	10031-6022	10031-7022	10031-8022
	500	10031-5023	10031-6023	10031-7023	10031-8023
	600	10031-5024	10031-6024	10031-7024	10031-8024
	750	10031-5025	10031-6025	10031-7025	10031-8025

Measuring frequency 50/60 Hz
Weight: 250 g

3. Without auxiliary voltage supply

Type SWMU	Primary current [A]	Measurement output
		0 - 20 mA and 0 - 10 V
32.52	1	10031-9006
	5	10031-9007
	10	10031-9008
32.51	40	10031-9013
	50	10031-9014
	60	10031-9015
	75	10031-9016
	100	10031-9017
	150	10031-9018
	200	10031-9019
	250	10031-9020
	300	10031-9021
	400	10031-9022
	500	10031-9023
	600	10031-9024
	750	10031-9025

!Internal power requirement $P_E \geq 2.5$ VA !
Measuring frequency 50/60 Hz
Weight: 600 g
Operating range 15 - 120% I_N

SWMU 41.5

Measuring transducer for alternating current

With or without auxiliary power supply
With integrated current transformer Assembly enclosure for 35 mm DIN top-hat rail

Characteristics / benefits

- Measurement input: Sinusoidal alternating current (1 A - 800 A), arithmetic average measurement
- Measurement output: Unipolar output variable
- Measurement principle: Rectifier method
- With integrated current transformer
- Reduced wiring outlay

Application:

Measuring transducer for converting sinusoidal alternating current. A load-independent direct current signal and impressed direct voltage signal with action proportional to the measured value of the input variable are available as output signal. This signal can be used for displaying, registering, monitoring and/or controlling purposes. The measuring transducer satisfies the requirements and regulations with respect to electromagnetic compatibility (EMC) and safety (IEC 1010 or EN 61010).

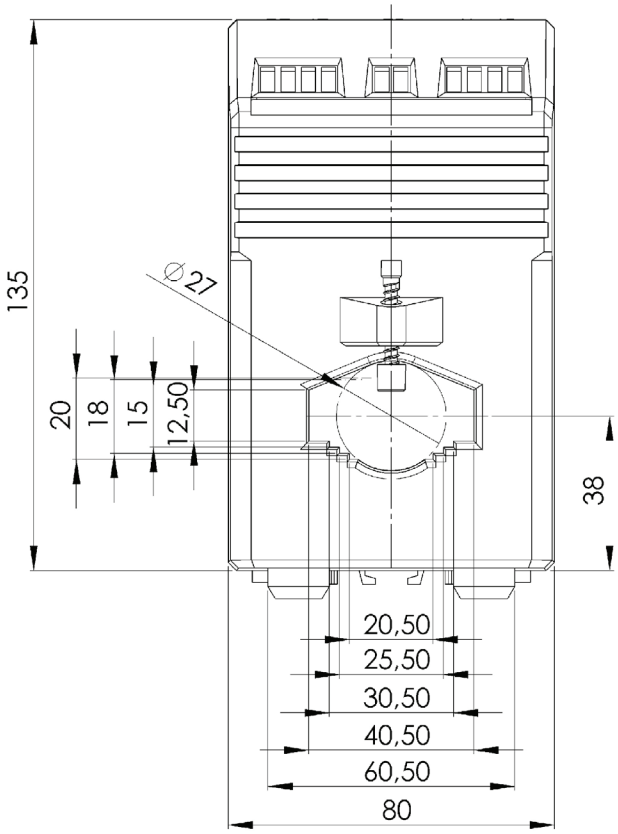
Technical parameters:

Measurement input		Auxiliary energy	
Rated frequency	f_N 50 or 60 Hz	AC power supply unit	230 V ± 10% (50 - 60 Hz)
Input rated current I_{EN}		DC	24 V ± 15%
SWMU 41.52	1 - 10 A	Power consumption	≤ 1.5 W (2.5 VA)
SWMU 41.51	15 - 800 A	**Accuracy**	
Internal consumption	≤ 1 VA (2.5 VA without auxiliary voltage)	Reference value	Output full scale
Overload capacity	1.5 · I_N, continuous 8· I_N, 40 sec.	Basic accuracy	0.5 min class
Measurement output		Warm-up time	≤ 5 min.
Load-independent direct current	0 - 20 mA or 4 - 20 mA	**Safety**	
Max. load resistance	≤ 500 Ω	Contact protection	IP 40, housing (test wire, EN 60529)
Max. load voltage	≤ 15 V		IP 20, connection terminals (test finger, EN 60529)
Current limitation upon overload	≤ 34 mA	Degree of pollution	2
Impressed direct voltage	0 - 10 V or 2 - 10 V*	Test voltage (DIN 57411)	4 kV, active circuits against housing
Load resistance	≥ 10 kΩ		4 kV, auxiliary voltage against measurement output (230 V version)
Max. load voltage upon overload	≤ 18 V		500 V, auxiliary voltage against measurement output (24 V DC version)
Voltage limitation	≤ 18 V	* live-zero characteristic curve only with auxiliary voltage	
Ripple voltage of output current	≤ 1% p.p		
Setting time	≤ 500 ms	Fastening element included in delivery for direct assembly without using a 35 mm top-hat rail	
Operating temperature range	-5° C ≤ δ ≤ +40° C		

1. Auxiliary voltage 230 V AC

Type SWMU	Primary current [A]	Measurement output			
		0 - 20 mA and 0 - 10 V	4 - 20 mA and 0 - 10 V	0 - 20 mA and 2 - 10 V	4 - 20 mA and 2 - 10 V
41.52	1	10061006	10062006	10063006	1006400
	5	10061007	10062007	10063007	10064007
	10	10061008	10062008	10063008	10064008
41.51	15	10061009	10062009	10063009	10064009
	20	10061010	10062010	10063010	10064010
	25	10061011	10062011	10063011	10064011
	30	10061012	10062012	10063012	10064012
	40	10061013	10062013	10063013	10064013
	50	10061014	10062014	10063014	10064014
	60	10061015	10062015	10063015	10064015
	75	10061016	10062016	10063016	10064016
	100	10061017	10062017	10063017	10064017
	150	10061018	10062018	10063018	10064018
	200	10061019	10062019	10063019	10064019
	250	10061020	10062020	10063020	10064020
	300	10061021	10062021	10063021	10064021
	400	10061022	10062022	10063022	10064022
	500	10061023	10062023	10063023	10064023
	600	10061024	10062024	10063024	10064024
	750	10061025	10062025	10063025	10064025
	800	10061026	10062026	10063026	10064026

Measuring frequency 50/60 Hz
Weight: 350 g



Installation depth: 50 (72) mm

2. Auxiliary voltage 24 V AC

Type SWMU	Primary current [A]	Measurement output			
		0 - 20 mA and 0 - 10 V	4 - 20 mA and 0 - 10 V	0 - 20 mA and 2 - 10 V	4 - 20 mA and 2 - 10 V
41.52	1	10065006	10066006	10067006	10068006
	5	10065007	10066007	10067007	10068007
	10	10065008	10066008	10067008	10068008
41.51	15	10065009	10066009	10067009	10068009
	20	10065010	10066010	10067010	10068010
	25	10065011	10066011	10067011	10068011
	30	10065012	10066012	10067012	10068012
	40	10065013	10066013	10067013	10068013
	50	10065014	10066014	10067014	10068014
	60	10065015	10066015	10067015	10068015
	75	10065016	10066016	10067016	10068016
	100	10065017	10066017	10067017	10068017
	150	10065018	10066018	10067018	10068018
	200	10065019	10066019	10067019	10068019
	250	10065020	10066020	10067020	10068020
	300	10065021	10066021	10067021	10068021
	400	10065022	10066022	10067022	10068022
	500	10065023	10066023	10067023	10068023
	600	10065024	10066024	10067024	10068024
	750	10065025	10066025	10067025	10068025
	800	10065026	10066026	10067026	10068026

Measuring frequency 50/60 Hz
Weight: 250 g

3. Without auxiliary voltage supply

Type SWMU	Primary current [A]	Measurement output
		0 - 20 mA and 0 - 10 V
42.52	1	10069006
	5	10069007
	10	10069008
42.51	40	10069013
	50	10069014
	60	10069015
	75	10069016
	100	10069017
	150	10069018
	200	10069019
	250	10069020
	300	10069021
	400	10069022
	500	10069023
	600	10069024
	750	10069025
	800	10069026

!Internal power requirement $P_E \geq 2.5$ VA !
Measuring frequency 50/60 Hz
Weight: 600 g
Operating range 15 - 120% I_N

NMC

Measuring transducer for alternating current

Attachable measuring transducer current transformer in modular design. Versions with (NMC 2/3/4) or without (NMC 0) auxiliary power supply.

Characteristics / benefits

- Measurement input: Sinusoidal alternating current (1A - 5 A), arithmetic average measurement effective value calibrated
- Measurement output: Unipolar output variable
- Measurement principle: Rectifier method
- Direct contacting current transformers via pin contacts
- Low wiring outlay

Application:

Measuring transducer for recording sinusoidal alternating current. A load-independent direct current signal and impressed direct voltage signal with action proportional to the measured value of the input variable are available as output signal. This signal can be used for displaying, registering, monitoring and/or controlling purposes. Simultaneously, the secondary current of the current transformer can be used to operate conventional indicator instruments. The measuring transducer satisfies the requirements and regulations with respect to electromagnetic compatibility (EMC) and safety (IEC 1010 or EN 61010). Manufacture is consistent with the technical requirements of standard IEC 60688.

The product is developed, manufactured and tested according to ISO 9001.

Technical parameters:

Measurement input		Accuracy	
Rated frequency	f_N 50 or 60 Hz	Reference value	Output full scale
Input rated current I_{EN}	1 A or 5 A	Basic accuracy	0.5%
Power consumption of measurement circuit	≤ 1 VA (2.5 VA without auxiliary voltage)	Accuracy range	1 - 120% I_N (NMC 2/3/4) 15 - 120% I_N (NMC 0)
Overload capacity	1.2 · I_N, continuous 8· I_N, 40 sec.	Warm-up time	≤ 5 min.
Measurement output		**Auxiliary energy**	
Load-independent direct current	0 (4) - 20 mA	AC power supply unit	230 V ± 10% (50 - 60 Hz) or
Max. load resistance	≤ 500 Ω		110 V ± 10% (50 - 60 Hz)
Max. load voltage	≤ 15 V	DC	24 V ± 15%
Current limitation upon overload	≤ 34 mA	Power consumption	≤ 1.5 W (2.5 VA)
Ripple voltage of output current	≤ 1% p.p	**Safety**	
Impressed direct voltage	0 (2) - 10 V	Contact protection	IP 40, housing (test wire, EN 60529)
Min. load resistance	≥ 10 kΩ		IP 20, connection terminals (test finger, EN 60529)
Max. load voltage upon overload	≤ 18 V	Degree of pollution	2
Setting time	≤ 500 ms	Test voltage (DIN 57411)	4 kV, active circuits against housing
			4 kV, auxiliary voltage against measurement output (230 V version)
			500 V, auxiliary voltage against measurement output (24 V DC version)

Auxiliary voltage 24 V DC, galvanically isolated

Type NMC (2)	Measurement output				
	0 - 20 mA and 0 - 10 V	4 - 20 mA and 0 - 10 V	4 - 20 mA and 2 - 10 V	Primary current [A]	Suitable for current transformers of series
211	10039212	10039232	10039252	1	A
212	10039213	10039233	10039253	1	B
213	10039214	10039234	10039254	1	C
214	10039215	10039235	10039255	1	D
221	10039012	10039032	10039052	5	A
222	10039013	10039033	10039053	5	B
223	10039014	10039034	10039054	5	C
224	10039015	10039035	10039055	5	D

Rated frequency 50/60 Hz; weight: 80 g; Operating range: 0 - 120% I_N

Auxiliary voltage 230 V AC, galvanically isolated

Type NMC (3)	Measurement output				
	0 - 20 mA and 0 - 10 V	4 - 20 mA and 0 - 10 V	4 - 20 mA and 2 - 10 V	Primary current [A]	Suitable for current transformers of series
311	10036212	10036232	10036252	1	A
312	10036213	10036233	10036253	1	B
313	10036214	10036234	10036254	1	C
314	10036215	10036235	10036255	1	D
321	10036041	10036032	10036052	5	A
322	10036042	10036033	10036053	5	B
323	10036043	10036034	10036054	5	C
324	10036044	10036035	10036055	5	D

Rated frequency 50/60 Hz; weight: 80 g; Operating range: 0 - 120% I_N

Auxiliary voltage 110 V AC, galvanically isolated

Type NMC (4)	Measurement output				
	0 - 20 mA and 0 - 10 V	4 - 20 mA and 0 - 10 V	4 - 20 mA and 2 - 10 V	Primary current [A]	Suitable for current transformers of series
411	10076212	10076232	10076252	1	A
412	10076213	10076233	10076253	1	B
413	10076214	10076234	10076254	1	C
414	10076215	10076235	10076255	1	D
421	10076012	10076032	10076052	5	A
422	10076013	10076033	10076053	5	B
423	10076014	10076034	10076054	5	C
424	10076015	10076035	10076055	5	D

Rated frequency 50/60 Hz; weight: 80 g; Operating range: 0 - 120% I_N

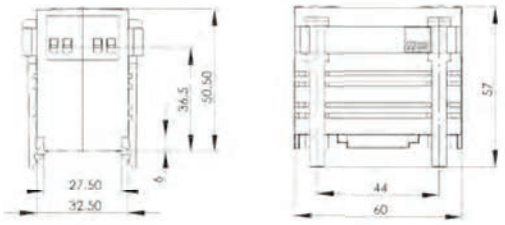
Without auxiliary voltage supply, internal power requirement ≥ 2.5 VA

Type NMC (0)	Measurement output		
	0 - 20 mA and 0 - 10 V	Primary current [A]	Suitable for current transformers of series
011	10037212	1	A
012	10037213	1	B
013	10037214	1	C
014	10037215	1	D
021	10037012	5	A
022	10037013	5	B
023	10037014	5	C
024	10037015	5	D

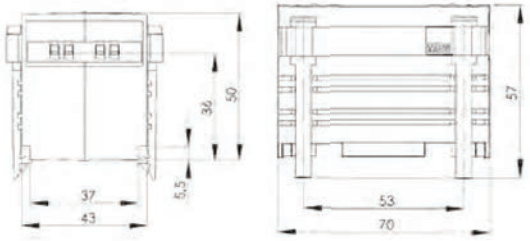
Rated frequency 50/60 Hz; weight: 80 g; Operating range: 0 - 120% I_N

Drawings

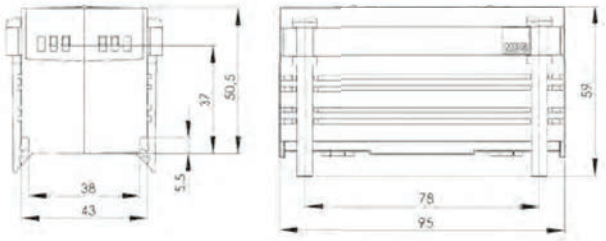
Construction type „A“

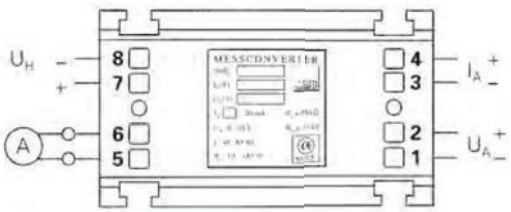


Construction type „B“ / „C“



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 table

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

NMC-AD

Adapter for current transformer use independent of manufacturer – attachable on 35 mm DIN top-hat rail

Characteristics / benefits

- Manufacturer-independent use of current transformers in conjunction with measuring transducer of type NMC
- Assembly of measuring transducer with spacial separation from measuring table using a standard-compliant 35 mm DIN top-hat rail

Order no.:	Application with NMC order no.:
10036011	10039xx2; 10036xx1/2; 10037xx2; 10076xx2

Pin assignment	Description
6, 7	Input terminals 5 A or 1 A (coming from current transformer)

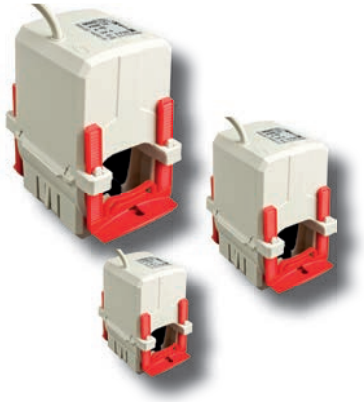
Short circuit adapter NMC-KSx

Intended purpose

Adapters NMC-KS x fixed onto current transformer. If a current transformer's secondary circuit is not wired, open-circuit operation of the transducer is precluded and consequently the occurrence of high open-circuit voltages in the rated current range of the current transformer.

Type NMC-KSx	Order no.:	Usable with AMS current transformer types												Di-mensional dia-gram
		WSK 30	WSK 40	ASR 22.3	ASK 21.3	ASK 31.3	ASK 41.3	ASK 41.4	ASK 421.4	ASK 61.4	ASK 63.4	ASK 81.4	ASK 101.4	ASK 105.6	
0	10039090	✓		✓	✓	✓	✓								A
1	10039091		✓												B / C
2	10039092							✓	✓						B / C
3	10039093									✓	✓	✓	✓	✓	D

Wiring harness current transformer, KBR



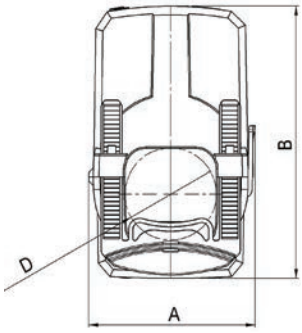
With voltage output 0 - 333 mV or

With direct current output 4 - 20 mA DC

Characteristics / benefits

- Ideal for subsequent installation in existing systems
- One-handed assembly possible thanks to "click" system
- Available as current sensor (0 - 333 mV) or measuring transducer (4 - 20 mA DC) or with AC current output 5 A / 1 A
- Auxiliary power supply via output circuit (two-wire technology)
- Three different designs

Available measuring ranges:



KBR 18 (internal diameter: 18.5 mm):

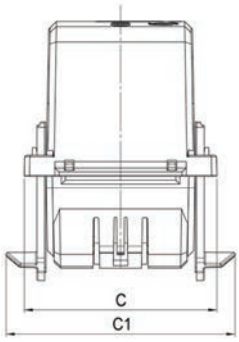
- Primary current: 50 – 250 A
- Voltage output: 0 - 333 mV
- Accuracy class 1

KBR 32 (internal 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 (internal diameter: 44 mm):

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



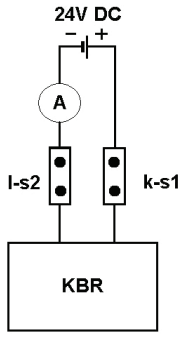
Technical data:

• Length of connection cables:	0 ... 333 mV:	2,5m, cross-section 2x0,75 mm²
	4 ... 20 mA:	2,5m, cross-section 2x0,75 mm²
		(other cable lengths on request)
• Operating temperature range:	-5°C < T < +50°C	
• Storage temperature range:	-25°C < T < +70°C	
• Therm. rated continuous current I_{cth}:	1,2 x I_N	
• Therm. rated short-time current I_{th}:	60 x I_N, 1 Sek.	
• Max. operating voltage U_m:	0,72 kV	
• Insulation test voltage:	3 kV, U_{eff} 50 Hz, 1 Min.	
• Rated frequency:	50 Hz	
• Insulating material class:	E	
• Applied technical standards	DIN EN 61869, 1 + 2 (formerly DIN EN 60044/1) VDE 0414 Teil 1	

Technical parameters for KBR with output signal 4 - 20 mA:

- Two-wire technology, auxiliary voltage via output circuit
- Auxiliary energy: 24 V DC ± 15%, PV = max. 1 VA
- Load-independent direct current: Live-zero, 4 - 20 mA
- External resistance: max. 300 Ω
- Current limitation upon overload: < 30 mA
- Ripple voltage: ≤ 1% p.p.
- Setting time: < 300 ms

Connection diagram of KBR 32 + 44 with direct current output 4 - 20 mA



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

EMBSIN

Measuring transducer for electrical variables

EMBSIN-series measuring transducers convert an input alternating voltage and/or input alternating current originating as a standard signal from a current or voltage transformer or directly from the power mains into a load-independent output current or impressed output voltage.

The various EMBSIN devices facilitate the recording of all measured variables required to monitor and control electrical grids and consumers, and to display or transfer output variables to other measurement and control technology devices.

Multiple devices such as indicators, recorders and signal-processing systems can be connected at the output.

The devices are designed to ensure safe galvanic isolation between inputs and outputs for all functions.

The main applications of the measuring transducers are in energy generation, energy distribution and in plant and apparatus engineering.

All devices are based on an entirely newly designed housing system, now in five different housing widths. The housing material used, a high-quality polycarbonate, ensures that the devices are free of silicone and halogen and are flame-retardant. Inputs and outputs can be connected securely with high-quality screw terminals.

Attachment to the mounting panel is usually via a 35 mm DIN top-hat rail.

All electrical connections can be accessed easily and safely on the top of the device.

The devices bear the CE mark.

They offer maximum protection to persons, machines and the environment, and of course are fully compliant with all relevant safety regulations.

The production of high-quality heavy-current measuring transducers has a long-standing tradition and an excellent reputation worldwide.

With their sealed housings, the materials selected and the design principles, the measuring transducers are protected against climatic effects (temperature and moisture), the atmosphere (chemical processes, airborne dust and salt), vibrations and impacts, electrical and magnetic interference fields, RF influences (radio transceivers) and permanent or transient interference voltage at all electrical connections.

• Compact • Safe • Practice-oriented • Precise • Superior •

Safe:

EN 61010 including at terminals!

690 V max. input voltage

Housing material: Polycarbonate

Fire class V-0 as per UL94

(self-extinguishing, halogen-free, silicone-free)

Practice-oriented:

Devices with two wide auxiliary energy ranges 24 - 65 V AC/DC or 85 - 230 V AC/DC auxiliary energy optionally connectible at top or bottom!

cos φ or linear

Recalibration/fine-tuning without opening device and without AC calibrators!

Assembly on 35 mm DIN top-hat rail.

Device includes operating instructions.

Compact:

Installation height:	60 mm	
Installation depth:	112 mm	
Installation width:	105 mm	For power
	70 mm	For frequency and phase, and *U* and *I* with wide-range auxiliary energy
	35 mm	With two-wire feed
		24 V DC or 230 V AC
	35 mm	For current and voltage without auxiliary power supply

Precise:

All devices Class 0.5

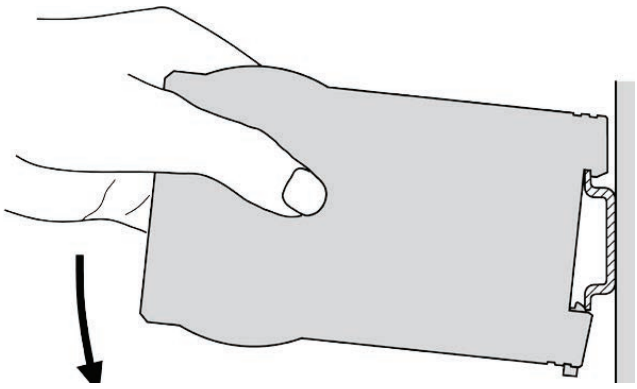
EMBSIN 241 F Class 0.2

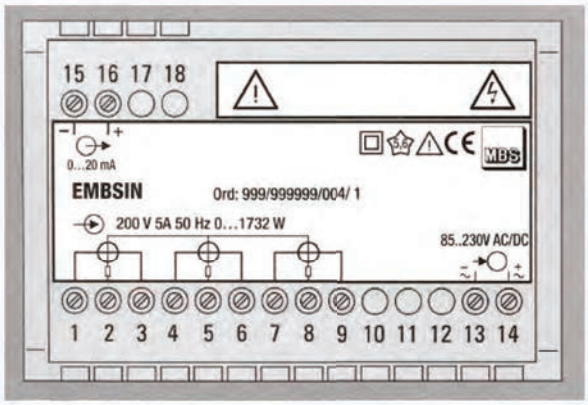
EMBSIN Class 0.2

Superior:

Maximum quality and safety competitively priced!

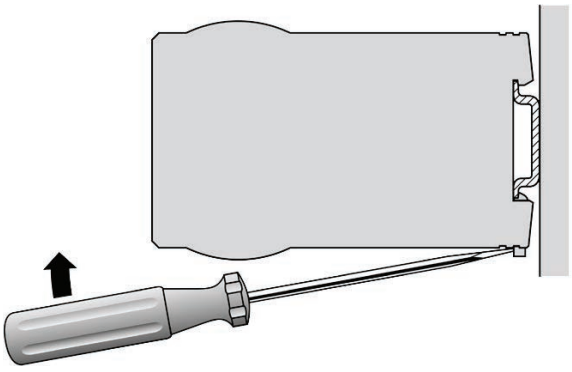
Assembly

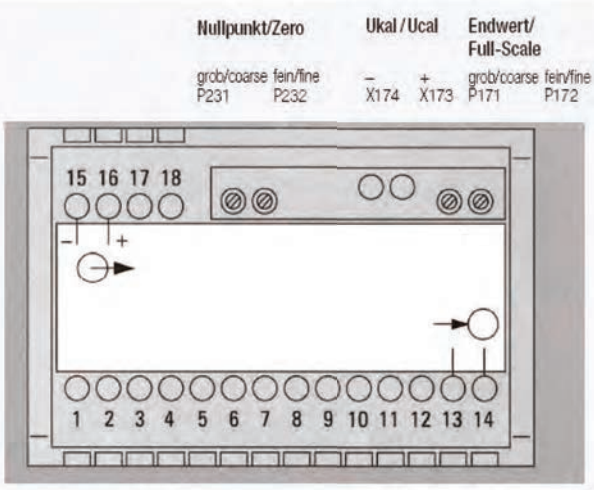




Practical

Disassembly





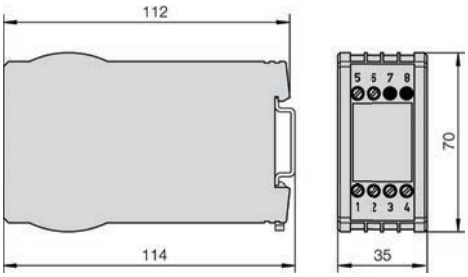
Intermediate circuit calibration

EMBSIN 100 I

Measuring transducer for alternating current

Characteristics / benefits

- Without auxiliary power supply
- Two measuring ranges selectable via input terminals
- Assembly enclosure for 35 mm DIN top-hat rail
- Measured variable: Sinusoidal alternating current (0 - 1/5 A or 0 - 1.2/6 A, switchable), arithmetic average measurement effective value calibrated
- Measurement output: Unipolar output variables
- Measurement principle: Rectified average measuring method
- Low wiring outlay



Application:

Measuring transducer for converting sinusoidal alternating current. A load-independent direct current signal proportional to the measured value of the input variable is available as output signal for displaying, registering, monitoring and/or controlling purposes.

The measuring transducer satisfies all requirements and regulations with respect to electromagnetic compatibility (EMC) and safety (IEC 1010 or EN 61010). The measuring transducers are solely intended for use indoors.

Technical parameters:

Measurement input		**Accuracy**	
Rated frequency f_N	50/60 Hz	Temperature influence (-10 - +55 °C)	0.2% / 10 K
Input rated current I_N	1/5 A or 1.2/6 A (switchable)	Operating temperature range	-10 °C to +55 °C
Power consumption of measurement circuit	≤ 2.5 VA	Storage temperature range	-40 °C to +70 °C
Overload capacity	1.2 · I_N, continuous	**Safety**	
	20 · I_N, 1 sec.	Protection class	II (protective insulation, DIN EN 61010)
Measurement output		Contact protection	IP 40, housing (test wire, EN 60529)
Load-independent direct current	0 - 5 mA, 0 - 10 mA		IP 20, connection terminals (test finger, EN 60529)
	or 0 - 20 mA	Degree of pollution	2
Max. load voltage	≤ 15 V	Overvoltage category	III
Voltage limitation at $R_{EXT} = \infty$	≤ 30 V	Rated insulation voltage	250 V, input
Current limitation upon overload	≤ 34 mA	(to earth)	40 V, output
Ripple voltage of output current	≤ 1% p.p.	Test voltage	50 Hz, 1 min., EN 61010-1
Setting time	≤ 500 ms		3.7 kV, rms, measurement input against measurement output and outer surface
Accuracy			490 V, measurement output against outer surface
Reference value	Output full scale	Weight	270 g
Basic accuracy	Class 0.5		
Measuring range	0 - 100% I_N		

EMBSIN 100 I – measuring transducer for alternating current, without auxiliary power supply

Features	Order number					
EMBSIN 100 I, measuring transducer for alternating current Order no.: 100 I – Mxxxx	100 I –	M	X	X	X	X
1. Design Assembly enclosure, for 35 mm DIN top-hat rail		M				
2. Measuring range 0 - 1/5 A			1			
0 - 1.2/6 A			2			
9 Non-standard (A), 0 - 0.5 A to 0 - 7.5 A (one measuring range only!) _____ A			9			
3. Output signal 0 - 5 mA, $R_a \leq 3\ k\Omega$				1		
0 - 10 mA, $R_a \leq 1.5\ k\Omega$				2		
0 - 20 mA, $R_a \leq 750\ \Omega$				3		
4. Measuring range adjustable Measuring range fixed					0	
Measuring range full scale adjustable approx. ±10%					1	
5. Test protocols without test protocols						0
With German test protocol						D
With English test protocol						E

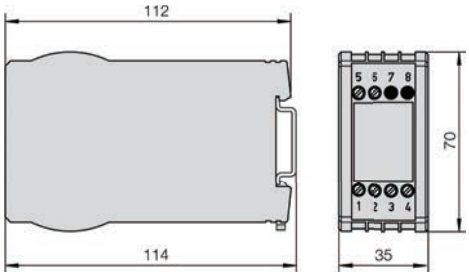
Rated frequency of measured variable: 50/60 Hz

EMBSIN 101 I

Measuring transducer for alternating current

Characteristics / benefits

- With auxiliary power supply
- Optionally with measurement output 4 - 320 mA and/or 2-wire technology
- Assembly enclosure for 35 mm DIN top-hat rail
- Measurement input: Sinusoidal alternating current, arithmetic average measurement, effective value calibrated
- Measurement output: Unipolar and live-zero output variables
- Measurement principle: Rectified method
- AC or DC auxiliary energy



Application:

Measuring transducer for converting sinusoidal alternating current. A load-independent direct current signal or impressed direct voltage signal with action proportional to the measured value of the input variable is available as output signal.

The measuring transducer satisfies all requirements and regulations with respect to electromagnetic compatibility (EMC) and safety (IEC 1010 or EN 61010).
The measuring transducers are solely intended for use indoors.

Technical parameters:

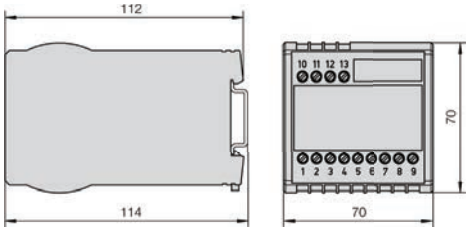
Measurement input		**Accuracy**	
Rated frequency f_N	50/60 Hz	Operating temperature range	-10 °C to +55 °C
Input rated current I_N	0 - 1 A or 0 - 5 A	Storage temperature range	-40 °C to +70 °C
	Optional: 0 - 1.2 A or 0 - 6 A	**Auxiliary energy**	
Internal consumption	≤ 5 mV x I_N	AC	24, 110, 115, 120, 230 or 400 V
Overload capacity	2 · I_N, continuous		± 15%, 50/60 Hz; P_V approx. 3 VA
Measurement output		DC	24 V, -15 / +33% or 24 V, -50 / +33%
Load-independent direct current	0 - 2.5 mA to 0 - 20 mA or live-zero		For 2-wire supply and output 4 - 20 mA; P_V approx. 1.5 W
	1 - 5 mA to 4 - 20 mA	**Safety**	
Max. load voltage	≤ 15 V	Protection class	II (protective insulation, DIN EN 61010)
For 2-wire connection	Standard range 4 - 20 mA	Contact protection	IP 40, housing (test wire, EN 60529)
	External resistance R_{EXT}		IP 20, connection terminals (test finger, EN 60529)
	Dependent on auxiliary energy H (12 - 32 V DC)	Degree of pollution	2
	R_{EXT} [kΩ] ≤ (H-12) V/20 mA	Overvoltage category	III
Impressed direct voltage	0 - 5 V to 0 - 10 V	Rated insulation voltage (to earth)	300 V, input
	or live-zero		300 V, auxiliary energy AC
	1 - 5 V to 2 - 10 V		50 V, auxiliary energy 24 V DC
Load capacity	max. 20 mA		50 V, output
Voltage limitation at $R_{EXT} = \infty$	≤ 40 V	Test voltage	50 Hz, 1 min, EN 61010-1
Current limitation upon overload	≤ 30 mA		3.7 kV, rms, measurement input against all others
Ripple voltage of output current	≤ 1% p.p.		Circuits and outer surface and AC auxiliary power input
Setting times	< 300 ms		AC auxiliary power input against output and outer surface
Accuracy			490 V, measurement output against outer surface and
Reference value	Output rated value		DC auxiliary power input against output and outer surface
Basic accuracy	Class 0.5	Weight	195 g

EMBSIN 101 I – measuring transducer for alternating current

Features	Order number							
EMBSIN 101 I, measuring transducer for alternating current Order no. 101 I – Mxx xx	101 I –	M	X	X		X	X	X
1. Design Assembly enclosure, SP1, for 35 mm DIN top-hat rail mounting		M						
2. Frequency of input voltage of input current								
Rated frequency 50/60 Hz			1					
3. Measuring range								
0 - 1 A				A				
0 - 5 A				B				
Z) _____ A ! Z) Non-standard [A] 0 - 0.8 to 0 - 1.2 or 0 - 4 to 0 - 6				Z				
4. Output signal								
0 - 20 mA						1		
4 - 20 mA						2		
4 - 20 mA, 2 – wire – connection/supply						3		
9) _____ mA ! 9) Non-standard [mA] 0 - 2.5 to 0 - < 20 1 - 5 to < (4 - 20)						9		
0 - 10 V						A		
Z) _____ V ! Z) Non-standard (V) 0 - 5.0 to 0 - < 10 1 - 5 to 2 - 10						Z		
5. Auxiliary energy								
Auxiliary voltage U_h: 24 V AC							1	
Auxiliary voltage U_h: 110 V AC							2	
Auxiliary voltage U_h: 115 V AC							3	
Auxiliary voltage U_h: 120 V AC							4	
Auxiliary voltage U_h: 230 V AC							5	
Auxiliary voltage U_h: 400 V AC, ! max. 300 V to earth!							6	
Auxiliary voltage U_h: 24 V DC							A	
Auxiliary voltage U_h: 24 V DC via output circuit							B	
Auxiliary voltage U_h: 85 - 230 V AC/DC							C	
Auxiliary voltage U_h: 24 - 60 V AC/DC							D	
U_h...rated voltage Permissible tolerances for AC –15 - +33% Permissible tolerances for DC –15 - +15% Permissible tolerances for DC via output circuit –50 - +33% ! 1) to A) not combinable with output signal, order no.: 3) ! B) not combinable with output signal Order no.: 1), 2), 9), A), Z)								
6. Test protocols								
Without test protocol								0
With test protocol (German)								D
With test protocol (English)								E

EMBSIN 201 IE

Measuring transducer for alternating current



Characteristics / benefits

- Auxiliary power supply via integrated AC/DC wide range power supply
- True/effective value measurement, logarithmic measuring method
- With two measuring ranges selectable via input terminals: 0 - 1/5 A or 0 - 1.2/6
- Measured variable: Sinusoidal or distorted alternating currents
- Measurement output: Unipolar and live-zero output variables
- Assembly enclosure for 35 mm DIN top-hat rail

Application:

Measuring transducer for converting sinusoidal or distorted alternating current. A load-independent direct current signal or impressed direct voltage signal with action proportional to the RMS value of the input variable is available as output signal. The measuring transducer satisfies all requirements and regulations with respect to electromagnetic compatibility (EMC) and safety (IEC 1010 or EN 61010). The measuring transducers are solely intended for use indoors.

Technical parameters:

Measurement input		**Accuracy**	
Rated frequency f_N	50/60 Hz	Crest factor	√2
Input rated current I_N	1/5 A or 1.2/6 A (switchable)	Warm-up time	≤ 5 min
Internal consumption	≤ 1 VA	Operating temperature range	-10 °C to +55 °C
Overload capacity	1.2 · I_N, continuous	Storage temperature range	-40 °C to +70 °C
	20 · I_N, 1 sec.	**Auxiliary energy**	
Measurement output		All-current power supply unit	DC or AC (40 - 400 Hz)
Load-independent direct current	0 - 1 mA to 0 - 20 mA	AC/DC ranges	24 - 60 V or 85 - 230 V
	or live-zero	AC power supply unit	45 - 65 Hz
	0.2 - 1 mA to 4 - 20 mA	Power consumption	≤ 1.5 W (3 VA)
Max. load voltage	≤ 15 V	**Safety**	
Max. load resistance	R_{EXT} [kΩ] ≤ 15 V/I_{AN} [mA]	Protection class	II (protective insulation, DIN EN 61010)
Current limitation upon overload	approx. 1.5 x I_{AN}	Contact protection	IP 40, housing (test wire, EN 60529)
Impressed direct voltage	0 - 1 V to 0 - 10 V		IP 20, connection terminals (test finger, EN 60529)
	or live-zero	Degree of pollution	2
	0.2 - 1 V to 2 - 10 V	Overvoltage category	III
Load capacity	max. 2 mA	Rated insulation voltage (to earth)	300 V, input
Min. load resistance	R_{EXT} [kΩ] ≥ U_{AN} [V]/2 mA		230 V, auxiliary energy
Voltage limitation at $R_{EXT} = \infty$	≤ 25 V		40 V, measurement output
Current limitation upon overload	≤ 10 mA	Test voltage	50 Hz, 1 min., EN 61010-1
Ripple voltage of output current	≤ 0.5 % p.p. (300 ms)		3.7 kV, measurement input against all other circuits and outer surface
	≤ 2% p.p. (50 ms)		
Setting time	50 ms or 300 ms		3.7 kV, auxiliary energy against output and outer surface
Accuracy			490 V, measurement output against outer surface
Reference value	Output full scale	Weight	250 g
Basic accuracy	Class 0.5		

EMBSIN 201 IE – measuring transducer for alternating current, effective value measurement

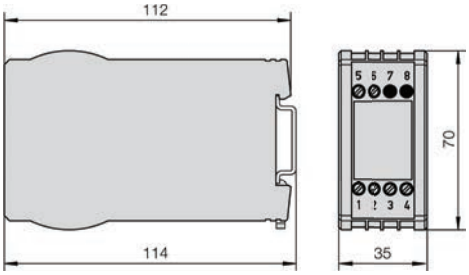
Feature	Order number									
EMBSIN 201 IE, alternating current measuring transducer Effective value order no.: 201 IE - Mxx xx x	201 IE –	M	X	X		X	X		X	X
1. Design Assembly enclosure, SP2, for DIN top-hat rail mounting		M								
2. Frequency of input voltage of input current										
Rated frequency 50/60 Hz			1							
Rated frequency 400 Hz			2							
3. Measurement ranges										
0 - 1.0/5.0 A				1						
0 - 1.2/6.0 A				2						
9) _____ A Lower higher measuring range depending on connection ! Z) Non-standard [A] 0 - 0.1/0.5 to 0 - < 1.2/6 Measuring range full scale ratio 1 : 5				9						
4. Output signal										
0 - 20 mA						1				
4 - 20 mA						2				
9) _____ mA ! 9) Non-standard [mA]: 0 - 1.00 to 0 - < 20 0.2 - 1 to < (4 - 20)						9				
A) 0 - 10 V						A				
Z) _____ V ! Z) Non-standard (V): 0 - 1.00 to 0 - < 10 0.2 - 1 to 2 - 10						Z				
5. Auxiliary voltage										
Auxiliary voltage U_h: 85 - 230 V AC/DC 1							1	1		
Auxiliary voltage U_h: 24 - 60 V AC/DC 2							2	2		
Auxiliary voltage from measurement input (≥ 24 - 60 V AC)								3		
Auxiliary voltage from measurement input (≥ 85 - 230 V AC)								4		
Auxiliary voltage U_h: 24 V AC/24 - 60 V DC from low voltage side							5	5		
U_h...rated voltage tolerances: DC –15 - +33% AC –15 - +15% ! 3) Not combinable with measuring range order no.: C) - L) ! 4) Not combinable with measuring range order no.: A, B, L										
6. Setting time										
300 ms (standard)									1	
50 ms									2	
7. Test protocols										
Without test protocol										0
With test protocol (German)										D
With test protocol (English)										E

EMBSIN 120 U

Measuring transducer for alternating voltage

Characteristics / benefits

- Without auxiliary power supply
- Assembly enclosure for 35 mm DIN top-hat rail
- Measurement input: Sinusoidal alternating voltage (0 - 20 to 0 - 500 V), arithmetic average measurement, effective value calibrated
- Measurement output: Unipolar output variables
- Measurement principle: Rectified method
- Low wiring outlay



Application:

Measuring transducer for converting sinusoidal alternating voltage. A load-independent direct current signal proportional to the rectified average of the input variable is available as output signal for displaying, registering, monitoring and/or controlling purposes. The measuring transducer satisfies all requirements and regulations with respect to electromagnetic compatibility (EMC) and safety (IEC 1010 or EN 61010). The measuring transducers are solely intended for use indoors.

Technical parameters:

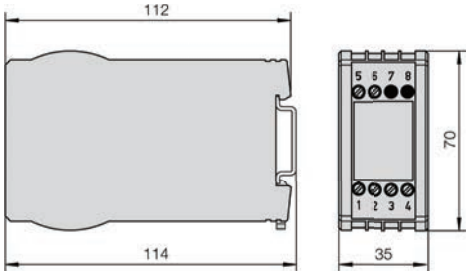
Measurement input		Accuracy	
Rated frequency f_N	50/60 Hz	Reference value	Output rated value
Input rated voltage U_N	0 - 20 V to 0 - 500 V	Basic accuracy	Class 0.5
	(Maximum wire value - wire voltage!)	Measuring range	20 - 100% U_N
	Max. input voltage to earth 300 V	Temperature influence (-10 - +55 °C	0.2% / 10 K
Internal consumption	≤ 2 VA	Operating temperature range	-10 °C to +55 °C
Overload capacity	1.2 · U_N, continuous	Storage temperature range	-40 °C to +70 °C
	2 · U_N, 1 sec.	**Safety**	
Measurement output		Protection class	II (protective insulation, DIN EN 61010)
Load-independent direct current	0 - 5 mA, 0 - 10 mA	Contact protection	IP 40, housing (test wire, EN 60529)
	or 0 - 20 mA		IP 20, connection terminals (test finger, EN 60529)
Max. load voltage	≤ 15 V	Degree of pollution	2
Max. load resistance	R_{EXT} [kΩ] ≤ 15 V/I_{AN} [mA]	Rated insulation voltage	300 V, rms,
Voltage limitation at $R_{EXT} = \infty$	≤ 54 V		Connection category III
Current limitation upon overload	≤ 1.7 · I_N		500 V, rms,
Ripple voltage of output current	≤ 1% p.p.		Connection category II
Setting time	< 300 ms	Weight	180 g

EMBSIN 120 U – measuring transducer for alternating voltage, without auxiliary voltage

Features	Order number					
EMBSIN 120 U, measuring transducer for alternating voltage Order no.: 120 U – Mxxxx	120 U –	M	X	X	X	X
1. Design Assembly enclosure, SP1, for 35 mm DIN top-hat rail		M				
2. Measuring range						
0 - 100/$\sqrt{3}$ V			A			
0 - 110/$\sqrt{3}$ V			B			
0 - 120/$\sqrt{3}$ V			C			
0 - 100 V			D			
0 - 110 V			E			
0 - 116.66 V			F			
0 - 120 V			G			
0 - 125 V			H			
0 - 133.33 V			J			
0 - 150 V			K			
0 - 250 V			L			
0 - 400 V			M			
0 - 500 V !			N			
Z) _____ V ! Z) Non-standard (V): 0 - 20 V to 0 - 500 V Max. 250 V rated voltage to earth (Rated voltages according to EN 61010)			Z			
3. Output signal						
0 - 5 mA, $R_a \leq 3$ kΩ				1		
0 - 10 mA, R_a % ≤ 1.5 kΩ				2		
0 - 20 mA, $R_a \leq 750$ Ω				3		
4. Measuring range adjustable						
Measuring range fixed					0	
Measuring range – full scale adjustable approx. ±10%					1	
5. Test protocols						
Without test protocol						0
With test protocol (German)						D
With test protocol (English)						E

EMBSIN 121 U

Measuring transducer for alternating voltage



Characteristics / benefits

- With auxiliary power supply
- Optionally with measurement output 4 - 320 mA and/or 2-wire technology
- Assembly enclosure for 35 mm DIN top-hat rail
- Measurement input: Sinusoidal alternating voltage, arithmetic average measurement, effective value calibrated
- Measurement output: Unipolar and live-zero output variables
- Measurement principle: Rectified method
- AC or DC auxiliary energy

Application:

Measuring transducer for converting sinusoidal alternating voltage. A load-independent direct current signal or impressed direct voltage signal with action proportional to the measured value of the input variable is available as output signal. The measuring transducer satisfies all requirements and regulations with respect to electromagnetic compatibility (EMC) and safety (IEC 1010 or EN 61010). The measuring transducers are solely intended for use indoors.

Technical parameters:

Measurement input	
Rated frequency f_N	50/60 Hz
Input rated voltage U_N	0 - 50 V to 0 - 600 V
	(Wire - wire voltage)
	UN to earth max. 300 V (operating voltage according to EN 61010)
Internal consumption	≤ U · 50 µA (U_N ≤ 150 V)
	≤ U · 20 µA (150 < U_N ≤ 400 V)
	≤ U · 5 µA (400 < U_N ≤ 600 V)
Overload capacity	1.2 · U_N, continuous
	2 · U_N, 1 sec.
Measurement output	
Load-independent direct current	0 - 5 mA to 0 - 20 mA or live-zero
	1 - 5 mA to 4 - 20 mA
Max. load voltage	≤ 15 V
Max. load resistance	R_{EXT} [kΩ] ≤ 15 V/I_{AN} [mA]
For 2-wire connection	Standard range 4 - 20 mA External resistance R_{EXT} dependent on auxiliary energy H (12 - 32 V DC) R_{EXT} [kΩ] ≤ (H-12)V/20 mA
Current limitation upon overload	< 30 mA
Voltage limitation at R_{EXT} = ∞	≤ 40 V
Ripple voltage of output current	≤ 1% p.p.
Impressed direct voltage	0 - 5 V to 0 - 10 V or live-zero
	1 - 5 V to 2 - 10 V
Min. load resistance	R_{EXT} [kΩ] ≤ U_{AN} [V] / 10 mA
Residual ripple voltage of output voltage	≤ 1% p.p.
Setting time	< 300 ms
Accuracy	
Reference value	Output rated value
Operating temperature range	-10 °C to +55 °C

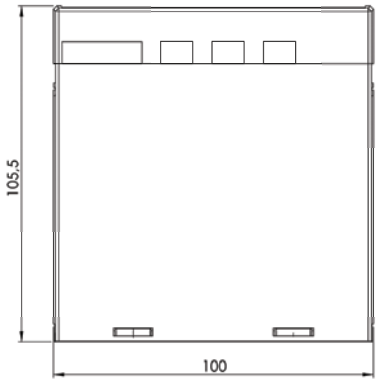
Accuracy	
Basic accuracy	Class 0.5 (U_N ≤ 500 V)
	Class 1 (U_N > 500 V)
Auxiliary energy	
Alternating voltage	24 - 400 V (±15%, 50/60 Hz)
	Power consumption P ≤ 3 VA
Direct voltage	24 V (-15 / +33%)
	24 V, (-50 / +33%) for 2-wire
	Supply and measurement output 4 - 20 mA
	Power consumption P ≤ 1.5 W
Wide range supply	24 - 60 V AC/DC
	DC -15 / + 33%
	Power consumption P ≤ 1.5 W
	AC ±15%
	Power consumption P ≤ 3 VA
Safety	
Protection class	II (protective insulation, DIN EN 61010)
Contact protection	IP 40, housing (Test wire, EN 60529)
	IP 20, connection terminals (Test finger, EN 60529)
Degree of pollution	2
Overvoltage category	III
Rated insulation voltage (to earth)	300 V, input
	300 V, auxiliary energy AC
	50 V, auxiliary energy 24 V DC
	50 V, output
Weight	195 g

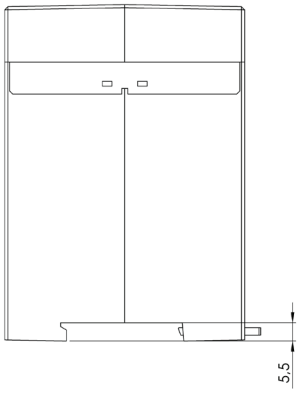
EMBSIN 121 U – measuring transducer for alternating voltage

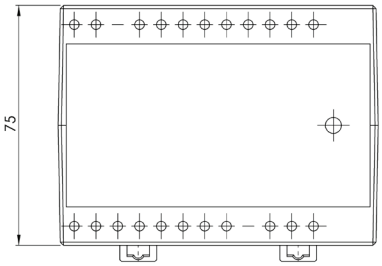
Features	Order number							
EMBSIN 121 U, measuring transducer for alternating voltage Order no. 121 U – Mx xxx	121 U –	M	X		X	X	X	
1. Design Assembly enclosure, SP1, for 35 mm DIN top-hat rail mounting		M						
2. Frequency of input voltage of input current								
Rated frequency 50/60 Hz			1					
3. Measuring range								
0 - 100 V					A			
0 - 250 V					B			
0 - 500 V					C			
Z) _____ V ! Z) Non-standard (V) 0 - 50 to 0 - 500 Max. 300 V rated voltage of grid to earth (rated voltages according to EN 61010)					Z			
4. Output signal								
0 - 20 mA						1		
4 - 20 mA						2		
4 - 20 mA, 2 – wire – connection/supply						3		
9) _____ mA ! 9) Non-standard [mA] 0 - 2.5 to 0 - < 20 1 - 5 to < (4 - 20)						9		
0 - 10 V						A		
Z) _____ V ! Z) Non-standard (V) 0 - 5.0 to 0 - < 10 1 - 5 to 2 - 10						Z		
5. Auxiliary energy								
Auxiliary voltage U_h: 24 V AC							1	
Auxiliary voltage U_h: 110 V AC							2	
Auxiliary voltage U_h: 115 V AC							3	
Auxiliary voltage U_h: 120 V AC							4	
Auxiliary voltage U_h: 230 V AC							5	
Auxiliary voltage U_h: 400 V AC, ! max. 300 V to earth!							6	
Auxiliary voltage U_h: 24 V DC							A	
Auxiliary voltage U_h: 24 V DC via output circuit							B	
Auxiliary voltage U_h: 85 - 230 V AC/DC							C	
Auxiliary voltage U_h: 24 - 60 V AC/DC							D	
U_h...rated voltage Permissible tolerances for AC –15 - +33% Permissible tolerances for DC –15 - +15% Permissible tolerances for DC via output circuit –50 - +33% ! 1) to A) not combinable with output signal, order no.: 3) ! B) not combinable with output signal Order no.: 1), 2), 9), A), Z)								
6. Test protocols								
Without test protocol								0
With test protocol (German)								D
With test protocol (English)								E

MT 440

Programmable measuring transducer for all electrical variables







Characteristics / benefits

- With wide range auxiliary power supply
- Assembly enclosure for 35 mm DIN top-hat rail
- Recording of up to 50 different measured variables (V, A, kW, kVA, etc.)
- Multifunctional measuring transducer with 4 freely parameterisable measurement outputs
- Measurement outputs parameterisable as analogue output, pulse output, relay output or control output
- As standard with USB 2.0 port (not galvanically isolated)
- Serial interface RS232 or RS485 as additional option
- MODBUS RTU communication protocol
- Automatic measuring range selection of current and voltage inputs
- Simple parameterisation using parameterisation software included in scope of delivery
- Rated frequency of input variables 50/60 Hz or 400 Hz

Application:

The programmable measuring transducer MT 440 facilitates the recording of up to 50 different electrical parameters of the connected grid. Large nominal ranges of input variables permit the recording of virtually all electrical performance parameters in standardised grids.
Four similarly freely parameterisable measurement outputs integrated in the device permit simultaneous use of the respectively assigned measured variable for control and regulatory purposes.

Supported measured variables:

Basic measuring ranges	
Phase	Voltage U1, U2, U3 and U~
	Current I1, I2, I3, In, It and
	Active power P1, P2, P3 and Pt
	Reactive power Q1, Q2, Q3 and Qt
	Apparent power S1, S2, S3 and St
	Power factor PF1, PF2, PF3 and PF~
	Phase angle φ1, φ2, φ3, and φ~
	THD of phase voltage Uf1, Uf2 and Uf3
	THD of phase angle I1, I2 and I3
Wire-wire	Wire-wire voltage U12, U23, U31
	Average wire-wire voltage U_{ff}
	Phase angle (wire-wire) φ12, φ23, φ31
	THD of wire-wire voltage
Energy	Counter 1
	Counter 2
	Counter 3
	Counter 4
	Active tariff
	Additional measuring ranges
	Wire-current I1, I2, I3
	Active power P (positive)
	Active power P (negative)
	Reactive power Q – L
	Reactive power Q – C
	Apparent power S
	Frequency
	Internal temperature

Technical parameters:

Measurement input	
Input rated voltage U_N	500 V (phase against neutral conductor)
	Automatic measuring range selection
Voltage measuring ranges	62.5 V, 125 V, 250 V, 500 V
Input rated current I_N	5 A
Current measuring ranges	1 A, 5 A, 10 A
Overload capacity	
Current input	15 A continuous
(according to IEC 60688)	20 x I_N, 5 x 1 sec.
Voltage input	600 V continuous,
(according to IEC 60688)	2 x UN, 10 sec.
Measurement output	
DC current outputs	
4 output ranges,	-100% - 0 - 100%
Parameterisable	-(1 - 20) mA - 0 - (1 - 20) mA
Control range	± 120% I_{AN}
Max. load voltage	≤ 10 V
Max. output current upon overload	35 mA
Max. output voltage	35 V
With open current output	
Max. load resistance	R_{max} [kΩ] = 10 V / I_{AN} [mA]
Setting time	≤ 50 ms (analogue FAST)
Ripple voltage of output current	≤ 1% p.p.
DC voltage outputs	
2 output ranges,	-100% - 0 - 100%
Parameterisable	-(1 - 10) V - 0 - (1 - 10) V
Control range	±120%
Max. output voltage upon	120% nominal
Overload	
Max. output current	20 mA
Min. load resistance	R_{BMIN} [kΩ] ≥ UAN / 20 mA
Setting time	≤ 50 ms (analogue FAST)
Ripple voltage of output voltage	≤ 1% p.p.
Accuracy	
IEC 60688	Class 0.5
Auxiliary energy	
All-current power supply unit	AC 40 - 276 V, (45 - 65 Hz)
	DC 24 - 300 V
Power consumption	≤ 8 VA

Reference conditions	
Ambient temperature	15 - 30 °C
Input variable	0 - 100% I_N
Frequency	45 - 65 Hz
Electrical connections	
Screw terminals	2.5 mm², wire with conductor end sleeve
	4.0 mm², solid conductor
Parameterisation software	MiQen
	Software for communication and
	parameterisation of measuring transducer
Interfaces (optional)	RS232 or RS485
Usage conditions	
Ambient temperature	-10 - 0 - 45 - 55 °C
Operating temperature	-30 - + 70 °C
Storage temperature	-40 - + 70 °C
Average humidity	≤ 93%
Application height	≤ 2000 m
Safety	
Protection class	IP 40
	(IP 20 for connection terminals)
Degree of pollution	2
Measurement category	CAT III; 600 V, measurement inputs
(EN 61010-1)	CAT III; 300 V, auxiliary power input
Test voltages	3320 V AC_{RMS}, auxiliary voltage against input/output
(DIN 57411)	Interface
	3320 V AC_{RMS}, auxiliary voltage against current input/
	Voltage input
	3320 V AC_{RMS}, current input against voltage input
Housing material	PC / ABS / UL 94 V-0
Standards	EN 61010-1; 2001
	EN 60688; 1995 / A2; 2001
	EN 61326-1; 2006
	EN 60529; 1997 / A1; 2000
	EN 60068-2-1/ -2/ -6/ -27/ -30
Dimensions (W x H x D)	100 x 105 x 75 mm
Weight	370 g

MT 440

Programmable measuring transducer for all electrical variables

Connection diagram

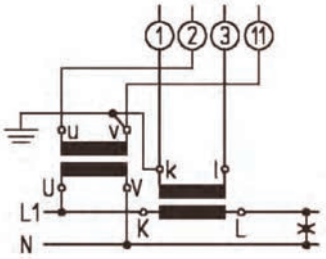
The voltage inputs of the measuring transducer can be connected directly to a low-voltage grid or, using a high-voltage transformer, to a high-voltage grid.

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

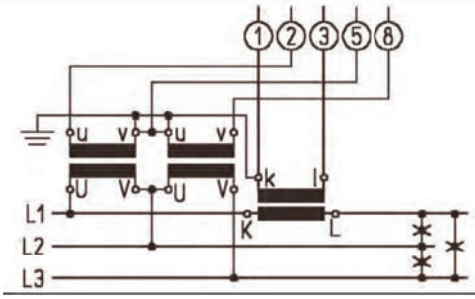
Function			Connection
Measurement input	AC current	I_{L1}	1/3
		I_{L2}	4/6
		I_{L3}	7/9
	AC voltage	U_{L1}	2
		U_{L2}	5
		U_{L3}	8
		N	11
Input/output	Output 1	ω +	15
		ω ϑ	16
	Output 2	ω +	17
		ω ϑ	18
	Output 3	ω +	19
		ω ϑ	20
	Output 4	ω +	21
		ω ϑ	22
Auxiliary power supply		+ / AC (L)	13
		- / AC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

1 Connections: -NC- do not assign

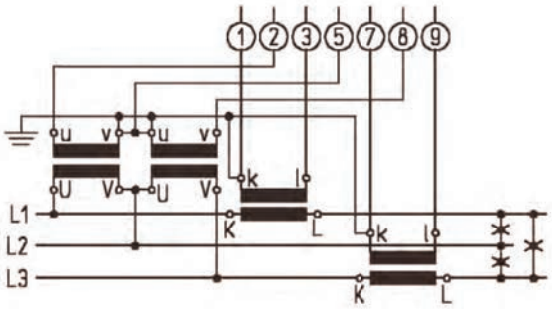
Single-phase current – 1b



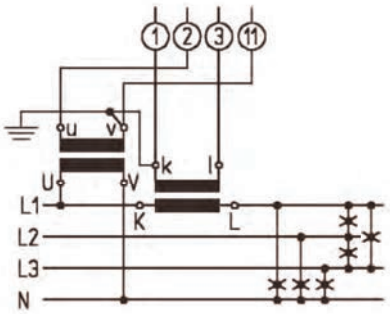
3-wire three-phase current - 3b, balanced load



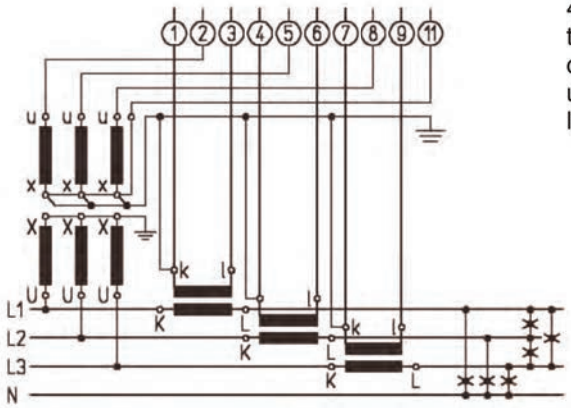
3-wire three-phase current - 3u, unbalanced load



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



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



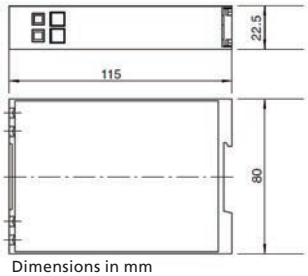
MT 440 – Programmable measuring transducer for all electrical performance variables

Features	Order number							
MT 440, Programmable measuring transducer for all electrical performance variables Order no.: 440 – xxxxxxx	440 –	X	X	X	X	X	X	X
1. Auxiliary power supply								
Universal power supply unit (40 - 276 V AC, 45 - 65 Hz; 24 - 300 V DC), 8 VA		1						
2. Input rated frequency								
Rated frequency 50/60 Hz			1					
Rated frequency 400 Hz			2					
3. Type of serial interface								
without				0				
RS232				1				
RS485				2				
4. Output 1								
without					0			
Analogue (< 100 ms)					1			
Fast analogue (< 50 ms)					2			
Semiconductor relay					3			
Electromagnetic relay					4			
5. Output 2								
without						0		
Analogue (< 100 ms)						1		
Fast analogue (< 50 ms)						2		
Semiconductor relay						3		
Electromagnetic relay						4		
6. Output 3								
without							0	
Analogue (< 100 ms)							1	
Fast analogue (< 50 ms)							2	
Semiconductor relay							3	
Electromagnetic relay							4	
7. Output 4								
without								0
Analogue (< 100 ms)								1
Fast analogue (< 50 ms)								2
Semiconductor relay								3
Electromagnetic relay								4

MA-1.1s

Measuring transducer for alternating current (sinusoidal)

Side view



Dimensions in mm

Characteristics / benefits

- Measurement output 0(4) - 20 mA, 0(2) - 10 V
- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: Sinusoidal alternating current
- Measurement output: Unipolar and live-zero output variables
- With auxiliary power supply

Application:

The measuring transducers convert currents correctly signed into a load-independent direct current or impressed direct voltage. These can then be displayed, registered and/or used for controlling purposes at the measurement location or in measuring stations located further away.

Functional principle:

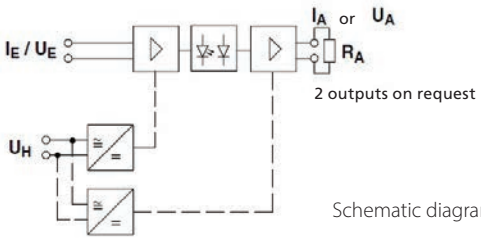
The current measurement occurs internally via a shunt resistor. The signal is subsequently galvanically isolated from the input via an optical line and converted into a proportional impressed direct voltage or proportional load-independent direct current.

Technical parameters:

Measurement input		Nominal conditions	
Rated frequency f_N	48 - 62 Hz	Auxiliary voltage	U_{HN} ± 5% (50 Hz with AC)
Input rated current I_N	200 µA – 5 A	Load	0.5 R_A max. ± 1% with current output R_A min. ± 1% with voltage output
Internal consumption	I_E · 0.1 V		
Overload capacity	1.2 · I_{EN}, continuous 10 · I_{EN}, max. 1 sec.	Frequency	50 - 60 Hz
		Waveform	Sine, distortion factor ≤ 0.1%
Operating voltage	max. 519 V AC, max. 300 V phase zero	Ambient temperature	23 °C ±1 K
		Warm-up time	≥ 5 min
Measurement output		**Auxiliary energy**	
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA	Alternating voltage	230 V~ (-15% +10%); < 6 VA 115 V~ (-15% +10%); < 3.5 VA
Load range R_A	0 - 12 V / I_{AN}		
Current limitation	to 120 - 150% of full scale	Direct voltage	24 V = (20 - 72 V); < 3 VA
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V	Wide range	20 - 100 V = or 15 - 70 V~; < 3 VA
Load R_A	≥ 4 kΩ	AC / DC	90 - 357 V = or 65 - 253 V~; < 3 - 6 VA
Load error	≤ 0.1% upon 50% load change	**General technical data**	
Ripple voltage	≤ 1% eff	Test voltage	2210 V all circuits against housing 3536 V all circuits to each other
Setting time	approx. 500 ms, 250 ms, 100 ms		
Open-circuit voltage	≤ 15 V	Operating voltage	300 V (rated grid voltage, phase zero)
Accuracy		Protection class	IP 40 housing, IP 20 terminals
Basic accuracy	±0.5% of full scale	Protection class	II
Temperature drift	≤ 0.01%/K	Measurement category	CAT III
		Degree of pollution	2
		Weight	Approx. 120 g

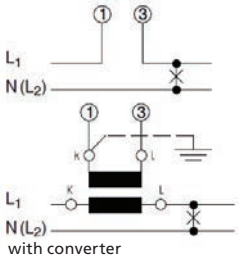
MA-1.1s – Measuring transducer for alternating current (sinusoidal)

Features	Order number								
MA-1.1s, measuring transducer for sinusoidal alternating current Order no. IMU02 – xxxxxx	IMU	02 –	X	X	X	X	X	X	X
1. Input rated current									
0 - 200 µA			1						
0 - 20 mA			2						
0 - 0.5 A			3						
0 - 1 A			4						
0 - 2 A			5						
0 - 5 A			6						
Special range up to 5 A			9						
2. Input frequency range									
15 - 18 Hz (16 ⅔ Hz)				1					
48 - 62 Hz (50/60 Hz)				2					
98 - 102 Hz (100 Hz)				3					
380 - 420 Hz (400 Hz)				4					
Special frequency				9					
3. Output									
0 - 20 mA					1				
4 - 20 mA					2				
0 - 10 V					3				
2 - 10 V					4				
0 - 20 mA and 0 - 10 V					5				
4 - 20 mA and 2 - 10 V					6				
Special ranges					9				
0 - 10 mA					A				
0 - 5 mA					B				
-20 - 0 - 20 mA					C				
-10 - 0 - 10 V					D				
-20 - 0 - 20 mA and -10 - 0 - 10 V					E				
according to specification					Z				
4. Accuracy									
±0.5% of full scale						1			
5. Setting time									
500 ms							1		
250 ms							2		
100 ms							3		
6. Auxiliary energy									
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 protocols									
Without test protocol									0
With test protocol German_English									1

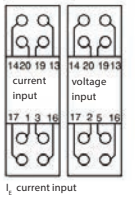


2 outputs on request

Schematic diagram



Connection diagram



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

I_E current input
U_E voltage input
U_H auxilliary voltage input
The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

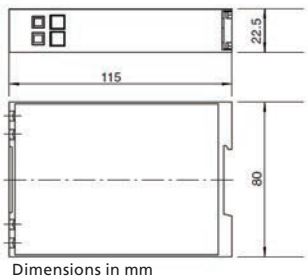
I_A current output
U_A voltage output

Terminal assignment

MA-1.1s (eff)

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

Side view



Dimensions in mm

Characteristics / benefits

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

Application:

The measuring transducers convert currents correctly signed into a load-independent direct current or impressed direct voltage. These can then be displayed, registered and/or used for controlling purposes at the measurement location or in measuring stations located further away.

Functional principle:

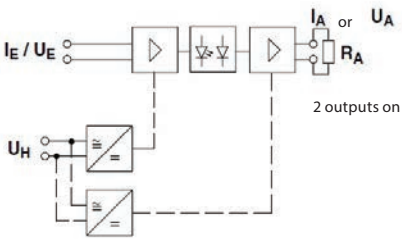
The current measurement occurs internally via a shunt resistor. The signal is subsequently galvanically isolated from the input via an optical line and converted into a proportional impressed direct voltage or proportional load-independent direct current.

Technical parameters:

Measurement input		Nominal conditions	
Rated frequency f_N	48 - 62 Hz	Auxiliary voltage	U_{HN} ± 5% (50 Hz with AC)
Input rated current I_N	I_{EN} = 200 µA - 5 A	Load	0.5 R_A max. ± 1% with current output R_A min. ± 1% with voltage output
Internal consumption	I_E · 0.1 V		
Overload capacity	1.2 · I_{EN}, continuous 10 · I_{EN}, max. 1 sec.	Frequency	50 - 60 Hz
		Waveform	Non-sinusoidal, crest factor ≤ 4
Operating voltage	max. 519 V AC, max. 300 V phase zero	Ambient temperature	23 °C ± 1 K
		Warm-up time	≥ 5 min
Measurement output		**Auxiliary energy**	
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA	Alternating voltage	230 V~ (-15% +10%); < 6 VA 115 V~ (-15% +10%); < 3.5 VA
Load range R_A	0 - 12 V / I_{AN}		
Current limitation	to 120 - 150% of full scale	Direct voltage	24 V= (20 - 72 V); < 3 VA
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V	Wide range	20 - 100 V = or 15 - 70 V~; < 3 VA
Load R_A	≥ 4 kΩ	AC / DC	90 - 357 V = or 65 - 253 V~; < 3 - 6 VA
Load error	≤ 0.1% upon 50% load change	**General technical data**	
Ripple voltage	≤ 1% eff	Test voltage	2210 V all circuits against housing 3536 V all circuits to each other
Setting time	approx. 500 ms		
Open-circuit voltage	≤ 15 V	Operating voltage	300 V (rated grid voltage, phase zero)
Accuracy		Protection class	IP 40 housing, IP 20 terminals
Basic accuracy	±0.5% of full scale	Protection class	II
Temperature drift	≤ 0.01%/K	Measurement category	CAT III
		Degree of pollution	2
		Weight	Approx. 120 g

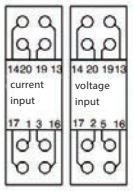
MA-1.1s (eff) – Measuring transducer for non-sinusoidal alternating current (true/effective value)

Features	Order number								
MA-1.1s (eff), measuring transducer for non-sinusoidal alternating current Order no. IMU04 – xxxxxx	IMU	04 –	X	X	X	X	X	X	X
1. Input rated current									
0 - 200 µA			1						
0 - 20 mA			2						
0 - 0.5 A			3						
0 - 1 A			4						
0 - 2 A			5						
0 - 5 A			6						
Special range up to 5 A			9						
2. Input frequency range									
15 - 18 Hz (16 ⅔ Hz)				1					
48 - 62 Hz (50/60 Hz)				2					
98 - 102 Hz (100 Hz)				3					
380 - 420 Hz (400 Hz)				4					
Special frequency				5					
3. Output									
0 - 20 mA					1				
4 - 20 mA					2				
0 - 10 V					3				
2 - 10 V					4				
0 - 20 mA and 0 - 10 V					5				
4 - 20 mA and 2 - 10 V					6				
Special ranges					9				
0 - 10 mA					A				
0 - 5 mA					B				
-20 - 0 - 20 mA					C				
-10 - 0 - 10 V					D				
-20 - 0 - 20 mA and -10 - 0 - 10 V					E				
according to specification					Z				
4. Accuracy									
±0.5% of full scale						1			
5. Setting time									
500 ms							1		
6. Auxiliary energy									
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 protocols									
Without test protocol									0
With test protocol German_English									1



2 outputs on request

Block circuit diagram

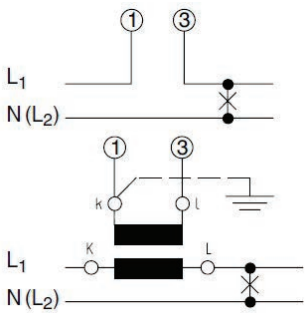


T. Function		T. Function	
1	I_E (+)	19	U_A, I_A (+)
3	I_E (–)	20	U_A, I_A (–)
2	U_E (+)		
5	U_E (–)		
16	U_H L1(+)	13	U_A (+)
17	U_H N (–)	14	U_A (–)
		19	I_A (+)
		20	I_A (–)

I_A current output
U_A voltage output

I_E current input
U_E voltage input
U_H auxilliary voltage input
The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

Terminal assignment



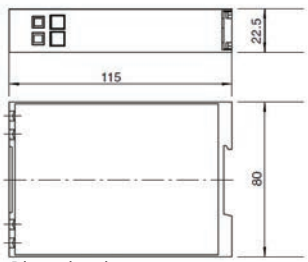
with transformer

Connection diagram

MV-1.1s

Measuring transducer for alternating voltage (sinusoidal)

Side view



Dimensions in mm

Characteristics / benefits

- Measurement output 0(4) - 20 mA, 0(2) - 10 V
- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: Sinusoidal alternating voltage
- Measurement output: Unipolar and live-zero output variables
- AC or DC auxiliary energy

Application:

The measuring transducers convert voltages correctly signed into a load-independent direct current or impressed direct voltage. These can then be displayed, registered and/or used for controlling purposes at the measurement location or in measuring stations located further away.

Functional principle:

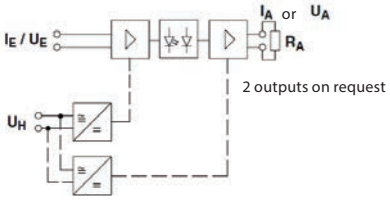
The voltage measurement occurs internally via a voltage divider. The signal is subsequently galvanically isolated from the input via an optical line and converted into a proportional impressed direct voltage or proportional load-independent direct current.

Technical parameters:

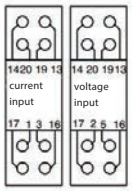
Measurement input		Nominal conditions	
Rated frequency f_N	48 - 62 Hz	Auxiliary voltage	U_{HN} ± 5% (50 Hz with AC)
Input rated voltage U_{EN}	U_{EN} = 60 mV - 519 V	Load	0.5 R_A max. ± 1% with current output R_A min. ± 1% with voltage output
Internal consumption	I_E · 0.1 V		
Overload capacity	1.2 ·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

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

Features	Order number								
MV-1.1s, measuring transducer for sinusoidal alternating voltage Order no. UMU05 – xxxxxx	UMU	05 –	X	X	X	X	X	X	X
1. Input voltage									
0 - 60 mV			1						
0 - 1 V			2						
0 - 10 V			3						
0 - 115 V			4						
0 - 230 V			5						
0 - 400 V			6						
Special range up to 519 V AC, up to 300 V DC			9						
2. Input frequency range									
15 - 18 Hz (16 ⅔ Hz)				1					
48 - 62 Hz (50/60 Hz)				2					
98 - 102 Hz (100 Hz)				3					
380 - 420 Hz (400 Hz)				4					
Special frequency				5					
3. Output									
0 - 20 mA					1				
4 - 20 mA					2				
0 - 10 V					3				
2 - 10 V					4				
0 - 20 mA and 0 - 10 V					5				
4 - 20 mA and 2 - 10 V					6				
Special ranges					9				
0 - 10 mA					A				
0 - 5 mA					B				
-20 - 0 - 20 mA					C				
-10 - 0 - 10 V					D				
-20 - 0 - 20 mA and -10 - 0 - 10 V					E				
according to specification					Z				
4. Accuracy									
±0.5% of full scale						1			
5. Setting time									
500 ms							1		
250 ms							2		
100 ms							3		
6. Auxiliary energy									
AC 230 V (195 - 253 V), (48 - 62 Hz)								1	
AC 115 V (98 - 126 V), (48 - 62 Hz)								2	
DC 24 V (20 - 72 V)								3	
DC 20 - 100 V / AC 15 - 70 V								4	
DC 90 - 357 V / AC 65 - 253 V								5	
7. Without auxiliary energy									
0 - 57.7 V with output 0 - 20 mA								A	
0 - 63.5 V with output 0 - 20 mA								B	
0 - 100 V with output 0 - 20 mA								C	
0 - 110 V with output 0 - 20 mA								D	
0 - 150 V with output 0 - 20 mA								E	
0 - 250 V with output 0 - 20 mA								F	
0 - 400 V with output 0 - 20 mA								G	
0 - 500 V with output 0 - 20 mA								H	
7. Test protocols									
Without test protocol									0
With test protocol German_English									1



Schematic diagram

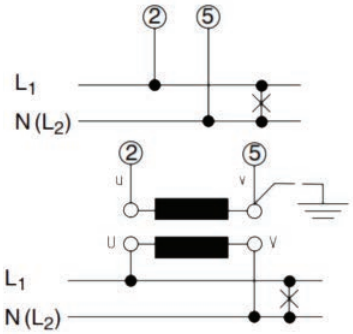


T.	Function
1	I_E (+)
3	I_E (–)
2	U_E (+)
5	U_E (–)
16	U_H L1(+)
17	U_H N (–)

T.	Function
19	U_A, I_A (+)
20	U_A, I_A (–)
13	U_A (+)
14	U_A (–)
19	I_A (+)
20	I_A (–)

I_E current input
U_E voltage input
U_H auxilliary voltage input
The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).
I_A current output
U_A voltage output

Terminal assignment

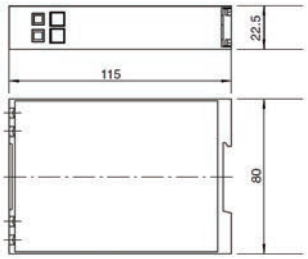


Connection diagram

MV-1.1s (eff)

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

Side view



Front view

Dimensions in mm

Characteristics / benefits

- Measurement output 0(4) - 20 mA, 0(2) - 10 V
- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: non-sinusoidal alternating voltage
- Measurement output: Unipolar and live-zero output variables

Application:

The measuring transducers convert voltages correctly signed into a load-independent direct current or impressed direct voltage. These can then be displayed, registered and/or used for controlling purposes at the measurement location or in measuring stations located further away.

Functional principle:

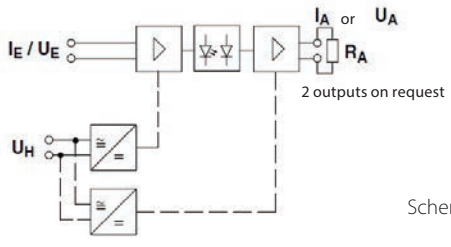
The voltage measurement occurs internally via a voltage divider. The signal is subsequently galvanically isolated from the input via an optical line and converted into a proportional impressed direct voltage or proportional load-independent direct current.

Technical parameters:

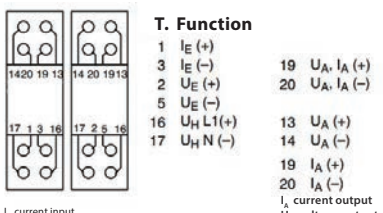
Measurement input		Nominal conditions	
Rated frequency f_N	48 - 62 Hz	Auxiliary voltage	U_{HN} ± 5% (50 Hz with AC)
Input voltage U_{EN}	U_{EN} = 60 mV - 519 V	Load	0.5 R_A max. ± 1% with current output R_A min. ± 1% with voltage output
Internal consumption	I_E · 0.1 V		
Overload capacity	1.2 · U_{EN}, continuous 2 · U_{EN}, max. 1 sec.	Frequency	50 - 60 Hz
		Waveform	Non-sinusoidal, crest factor ≤ 4
Operating voltage	max. 519 V AC, max. 300 V phase zero	Ambient temperature	23 °C ± 1 K
		Warm-up time	≥ 5 min
Measurement output		**Auxiliary energy**	
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA	Alternating voltage	230 V~ (-15% +10%); < 6 VA 115 V~ (-15% +10%); < 3.5 VA
Load range R_A	0 - 12 V / I_{AN}		
Current limitation	to 120 - 150% of full scale	Direct voltage	24 V= (20 - 72 V); < 3 VA
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V	Wide range	20 - 100 V = or 15 - 70 V~; < 3 VA
Load R_A	≥ 4 kΩ	AC / DC	90 - 357 V = or 65 - 253 V~; < 3 - 6 VA
Load error	≤ 0.1% upon 50% load change	**General technical data**	
Ripple voltage	≤ 1% eff	Test voltage	2210 V all circuits against housing 3536 V all circuits to each other
Setting time	approx. 500 ms		
Open-circuit voltage	≤ 15 V	Operating voltage	300 V (rated grid voltage, phase zero)
Accuracy		Protection class	IP 40 housing, IP 20 terminals
Basic accuracy	±0.5% of full scale	Protection class	II
Temperature drift	≤ 0.01%/K	Measurement category	CAT III
		Degree of pollution	2
		Weight	Approx. 120 g

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

Features	Order number								
MV-1.1s (eff), measuring transducer for non-sinusoidal alternating voltage Order no. UMU07 – xxxxxx	UMU	07 –	X	X	X	X	X	X	X
1. Input voltage									
0 - 60 mV			1						
0 - 1 V			2						
0 - 10 V			3						
0 - 115 V			4						
0 - 230 V			5						
0 - 400 V			6						
Special range up to 519 V AC, up to 300 V DC			9						
2. Input frequency range									
15 - 18 Hz (16 ⅔ Hz)				1					
48 - 62 Hz (50/60 Hz)				2					
98 - 102 Hz (100 Hz)				3					
380 - 420 Hz (400 Hz)				4					
Special frequency				5					
3. Output									
0 - 20 mA					1				
4 - 20 mA					2				
0 - 10 V					3				
2 - 10 V					4				
0 - 20 mA and 0 - 10 V					5				
4 - 20 mA and 2 - 10 V					6				
Special ranges					9				
0 - 10 mA					A				
0 - 5 mA					B				
-20 - 0 - 20 mA					C				
-10 - 0 - 10 V					D				
-20 - 0 - 20 mA and -10 - 0 - 10 V					E				
according to specification					Z				
4. Accuracy									
±0.5% of full scale						1			
5. Setting time									
500 ms							1		
6. Auxiliary energy									
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	
6. Test protocols									
Without test protocol									0
With test protocol German_English									1



Schematic diagram



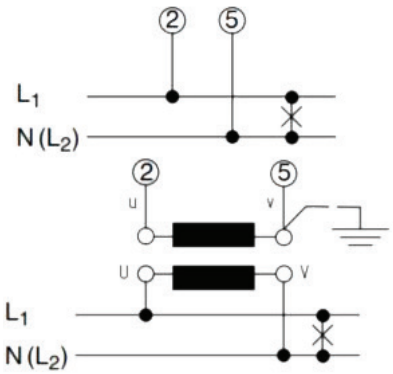
T. Function

1	I_E (+)	19	U_A, I_A (+)
3	I_E (–)	20	U_A, I_A (–)
2	U_E (+)		
5	U_E (–)		
16	U_H L1(+)	13	U_A (+)
17	U_H N (–)	14	U_A (–)
		19	I_A (+)
		20	I_A (–)

I_A current output
U_A voltage output

I_E current input
U_E voltage input
U_H auxilliary voltage input
The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

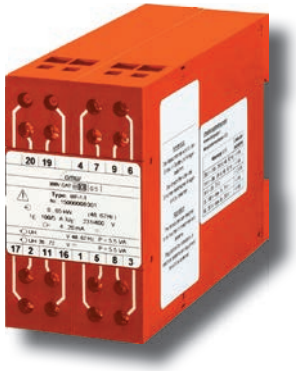
Terminal assignment



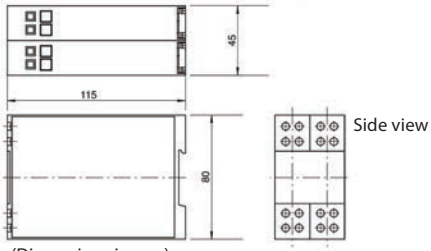
Connection diagram

MF-1.1

Measuring transducer for frequency



Front view



(Dimensions in mm)

Characteristics / benefits

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

Application:

Measuring transducers MF-1.1 in microprocessor technology record the frequency of the input signal and subsequently convert this into load-independent direct current and direct voltage signals. These can then be displayed, registered and/or used for controlling purposes at the measurement location or in measuring stations located further away.

Functional principle:

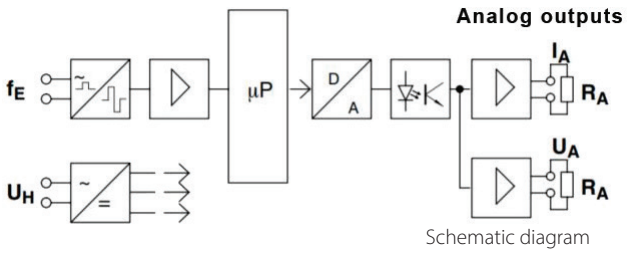
The input alternating voltage is converted into a square-wave signal and subsequently supplied to a microprocessor, which analyses it. Via a D/A converter and optical coupler for galvanic isolation, the signal arrives at the output circuits, which supply a load-independent direct current and a synchronous impressed direct voltage proportional to the frequency present at the input.

Technical parameters:

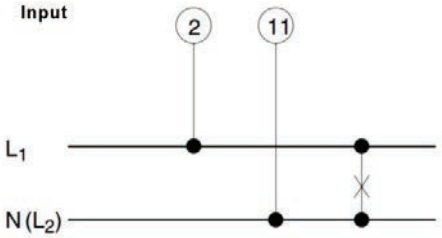
Measurement input		Nominal conditions	
Rated frequency f_E	f_{Emin} ≥ 14 Hz f_{Emax} ≤ 500 Hz	Auxiliary voltage	U_{HN} ± 1%, 48 - 62 Hz
Input voltage U_{EN}	U_{EN} = 100 V - 519 V	Voltage	U_{EN} ± 1%
		Frequency	f_N
Internal consumption	3 - 7 VA	Waveform	Sine, distortion factor ≤ 0.1%
Overload capacity	1.2 · U_{EN}, continuous 2 · U_{EN}, max. 1 sec.	Ambient temperature	23 °C ±1 K
Operating voltage	max. 519 V AC max. 300 V phase zero	Warm-up time	≥ 5 min
		Auxiliary energy	
Measurement output		Alternating voltage	230 V~ (-15% +10%); < 7 VA
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA		115 V~ (-15% +10%); < 4 VA
Load range R_A	0 - 10 V / I_{AN}	Direct voltage	24 V = (20 - 72 V); < 4 VA
Current limitation	to 120 - 150% of full scale	Wide range	20 - 100 V = or 15 - 70 V~; < 3 VA
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V	AC / DC	90 - 357 V = or 65 - 253 V~; < 4 - 7 VA
Load R_A	≥ 4 kΩ	**General technical data**	
Load error	≤ 0.1% upon 50% load change	Test voltage	2210 V all circuits against housing
Ripple voltage	≤ 1% eff		3536 V measuring current circuit and auxiliary voltage against output
Setting time	approx. 500 ms		1330 V currents against each other and against voltages
		Operating voltage	300 V (rated grid voltage, phase zero)
Open-circuit voltage	≤ 15 V	Protection class	IP 40 housing, IP 20 terminals
Accuracy		Protection class	II
Basic accuracy	±0.5% of full scale	Measurement category	CAT III
Temperature drift	≤ 0.02%/K	Degree of pollution	2
		Weight	Approx. 230 g

MF-1.1 – measuring transducer for frequency

Feature	Order number						
MF-1.1, frequency measuring transducer Order no.: FMU08 – xxxxxx	FMU	08 –	X	X	X	X	X
1. Input frequency range							
45 - 50 - 55 Hz			1				
48 - 50 - 52 Hz			2				
55 - 60 - 65 Hz			3				
58 - 60 - 65 Hz			4				
360 - 400 - 440 Hz			5				
380 - 400 - 420 Hz			6				
Special measuring range			9				
2. Input rated voltage							
100 V				A			
110 V				B			
115 V				C			
120 V				D			
230 V				E			
240 V				F			
380 V				G			
400 V				H			
415 V				I			
440 V				K			
Special rated voltage				Z			
3. Output							
0 - 20 mA and 0 - 10 V					1		
0 - 10 mA and 0 - 10 V					2		
0 - 5 mA and 0 - 10 V					3		
4 - 20 mA and 2 - 10 V					4		
- 20 - 0 - 20 mA and - 10 - 0 - 10 V					5		
Special output					9		
4. Auxiliary energy							
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 protocols							
Without test protocol							0
With test protocol German_English							1



Schematic diagram



Connection diagram

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

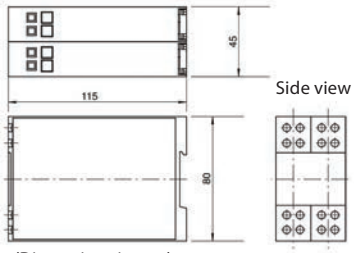
Terminal assignment

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

MPLz.1

Measuring transducer for phase angle or power factor

Front view



(Dimensions in mm)

Characteristics / benefits

- Measurement output 0(4) - 20 mA, 0(2) - 10 V
- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: Sinusoidal voltages and currents in alternating three-phase grids under equal load
- Measurement output: Unipolar and live-zero output variables

Application:

Measuring transducer for recording phase angle between current and voltage in equally loaded alternating and three-phase grid. A load-independent direct current signal and impressed direct voltage signal with action proportional to the phase angle or power factor between the measured variables current and voltage are available as output signal.

Functional principle:

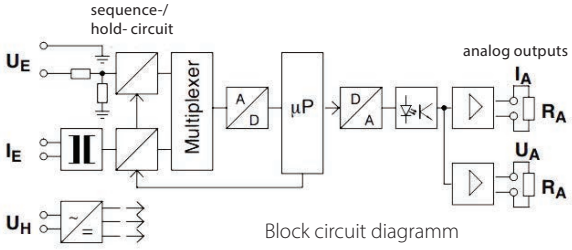
A converter in the current path and a divider in the voltage path adapt the input signals and relay them via a multiplexer to an A/D converter. A microprocessor processes the digitalised signals in real-time. Via a D/A converter and optical coupler for galvanic isolation, the signal arrives at the output circuits.

Technical parameters:

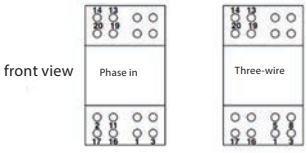
Measurement input		Nominal conditions	
Measurement ranges	Cap 0.8 - 1 - 0.8 ind, Cap 0.5 - 1 - 0.5 ind	Auxiliary voltage	U_{HN} ± 1%, 48 - 62 Hz
Rated frequency f_N	48 - 62 Hz	Voltage	U_{EN} ± 0.5%
		Power factor	cos φ = 1
Input rated voltage U_{EN}	65, 100, 110, 240, 400, 415, 440, 500 V	Frequency	50 - 60 HZ
Internal consumption	approx. 0.25 mA per voltage path I2 · 0.01 Ω per current path	Waveform	Sine, distortion factor ≤ 0.1%
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, continuous	Ambient temperature	23 °C ±1 K
	2 · U_{EN}, 10 I_{EN} max. 1 sec.		
Operating voltage	max. 519 V AC	Warm-up time	≥ 5 min
Measurement output		**Auxiliary energy**	
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA	Alternating voltage	230 V~ (-15% +10%); < 7 VA
Load range R_A	0 - 10 V / I_{AN}		115 V~ (-15% +10%); < 4 VA
Current limitation	to 120 - 150% of full scale	Direct voltage	24 V = (20 - 72 V); < 3 VA
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V	Wide range	20 - 100 V = or 15 - 70 V~; < 3 VA
Load R_A	≥ 4 kΩ	AC / DC	90 - 357 V = or 65 - 253 V~; < 4 - 7 VA
Load error	≤ 0.1% upon 50% load change	**General technical data**	
Ripple voltage	≤ 1% eff	Test voltage	2210 V all circuits against housing
Setting time	approx. 500 ms <		3536 V measuring current circuit and auxiliary voltage against output
			1330 V currents against each other and against voltages
Open-circuit voltage	≤ 15 V	Operating voltage	300 V (rated grid voltage, phase zero)
Accuracy		Protection class	IP 40 housing, IP 20 terminals
Basic accuracy	±0.5% of full scale	Protection class	II
Temperature drift	≤ 0.01%/K	Measurement category	CAT III
		Degree of pollution	2
		Weight	Approx. 270 g

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

Feature	Order number									
MPlz.1, measuring transducer for phase angle/power factor Order no.: GMU09 – xxxxxxxxx	GMU	09 –	X	X	X	X	X	X	X	X
1. Application										
Single-phase alternating current grid			1							
Three-wire three-phase grid under equal load			2							
2. Current input										
1 A				1						
5 A				5						
Special current input				9						
3. Voltage input										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V					5					
415 V					6					
440 V					7					
500 V					8					
Special voltage input					9					
4. Measuring range										
-37° - 0 - 37° Corresponds to cos φ: cap 0.8 - 1 - 0.8 ind						A				
-60° - 0 - 60° Corresponds to cos φ: cap 0.5 - 1 - 0.5 ind						B				
As specified in range of -180° - 0 - 180° Corresponds to cos φ (output): ind. -1 - 1 - -1 cap. Distinct measuring range - 175° to + 175°						C				
5. Input frequency range										
48 - 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 - 20 mA and 0 - 10 V								1		
0 - 10 mA and 0 - 10 V								2		
0 - 5 mA and 0 - 10 V								3		
4 - 20 mA and 2 - 10 V								4		
- 20 - 0 - 20 mA and - 10 - 0 - 10 V								5		
Special output								9		
7. Auxiliary energy										
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 protocols										
Without test protocol										0
With test protocol German_English										1



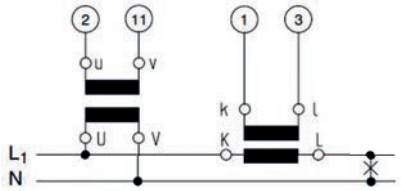
Block circuit diagramm

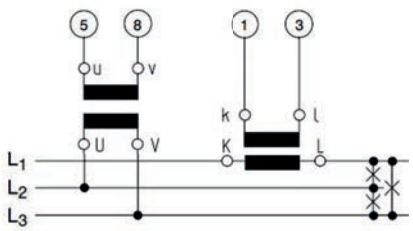


Klemme	Einphasen	Dreileiter
1	I_E L_1	I_E L_1
2	U_E L_1	–
3	I_E L_1	I_E L_1
5	–	U_E L_2
8	–	U_E L_3
11	U_E N	–
13	U_A (+)	U_A (+)
14	U_A (–)	U_A (–)
16	U_H L_1 (+)	U_H L_2 (+)
17	U_H N (–)	U_H N (–)
19	I_A (+)	I_A (+)
20	I_A (–)	I_A (–)

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

Terminal assignment



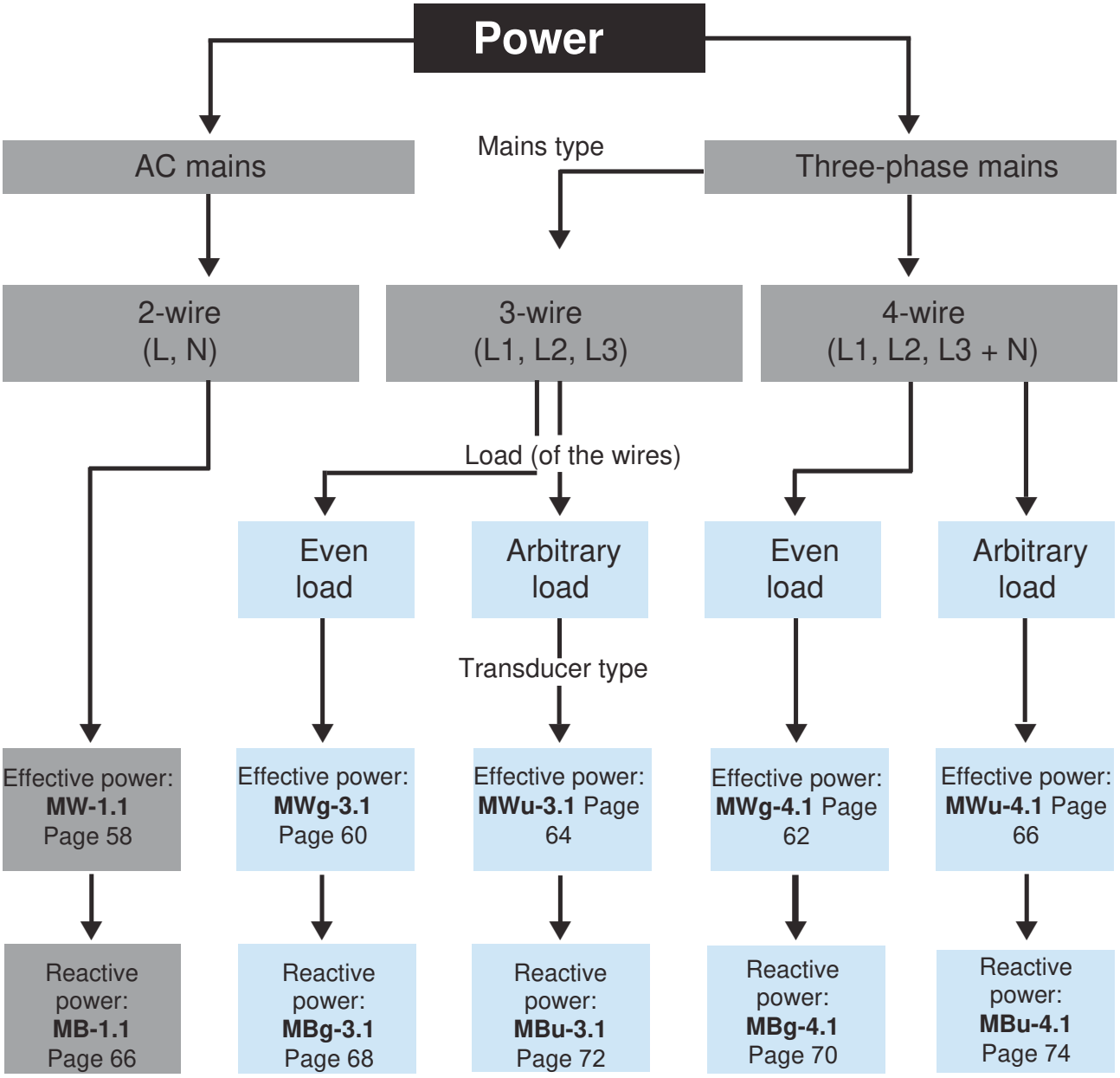


Connection diagram

Notes:

Measuring transducer for power

Type finding for power measuring transducers



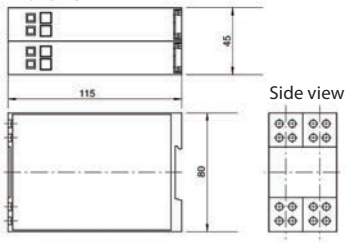
Explanation of abbreviations

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

MW-1.1

Measuring transducer for active power (also suitable for frequency converters)

Front view



(Dimensions in mm)

Characteristics / benefits

- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: Sinusoidal voltages and non-sinusoidal voltages and currents in alternating current grids of any waveform
- Measurement output: Unipolar, live-zero and bipolar output variables and output with zero elevation

Application:

Measuring transducer for recording the active power of an alternating current grid. A load-independent direct current signal or impressed direct voltage signal with action directly proportional to the active power of the primary grid is available as output signal.

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 isolate the high-voltage current circuits from the electronics and adapt the input current and input voltage to the multiplier, which multiplies the measured values by analogue multiplication and integrates them with a low-pass filter.

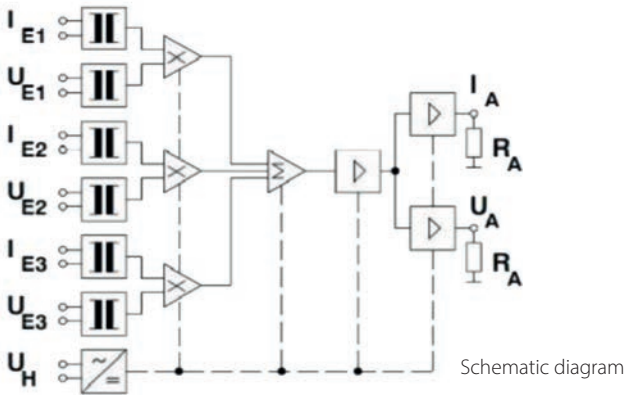
Technical parameters:

Measurement input		Nominal conditions	
Rated frequency	50 or 60 Hz Harmonic factor ≤ 0.2	Auxiliary voltage	U_{HN} ± 2%, 50 - 60 Hz
Input rated current I_{EN}	0 - 0.5 - 5 A	Input voltage	U_{EN} ± 0.5%
		Power factor	sin φ = 1.0 - 0.8
Input rated voltage U_{EN}	0 - 50 - 519 V	Frequency	50 / 60 HZ
Internal consumption	approx. 1 mA per voltage path < 0.1 VA per current path with 1A input < 0.4 VA per current path with 5A input	Waveform	Sine, distortion factor ≤ 0.1%
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, continuous 2 · U_{EN}, 20 I_{EN} max. 1 sec.	Ambient temperature	23 °C ±1 K
Operating voltage	max. 519 V AC	Warm-up time	≥ 5 min
Measurement output		**Auxiliary energy**	
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA	Alternating voltage	230 V~ (-15% +10%); < 7 VA
Load range R_A	0 - 10 V / I_{AN}		115 V~ (-15% +10%); < 4 VA
Current limitation	to approx. 37 mA	Direct voltage	24 V = (20 - 72 V); < 3 VA
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V	Wide range	20 - 100 V = or 15 - 70 V~; < 3 VA
Load R_A	≥ 4 kΩ	AC / DC	90 - 357 V = or 65 - 253 V~; < 4 - 7 VA
Load error	≤ 0.1% upon 50% load change	**General technical data**	
Ripple voltage	≤ 1% eff	Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
Setting time	approx. 500 ms		Measuring current circuit and auxiliary voltage against output: 3510 V_{eff} 5 sec.
			Currents against each other and against voltage: 3510 V_{eff} 5 sec.
Open-circuit voltage	≤ 15 V	Operating voltage	300 V (rated grid voltage, phase zero)
Accuracy		Protection class	IP 40 housing, IP 20 terminals
Basic accuracy	±0.5% of full scale	Protection class	II
Temperature drift	≤ 0.02 %/K	Measurement category	CAT III
		Degree of pollution	2
		Weight	Approx. 270 g

MW-1.1 – Measuring transducer for active power (also suitable for frequency converters)

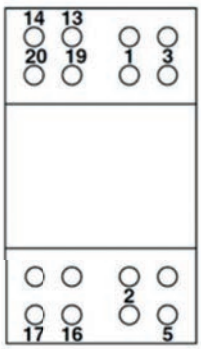
Feature	Order number									
MW-1.1, measuring transducer for active power Order no.: PMU10 – xxxxxxxxx	PMU	10 -	X	X	X	X	X	X	X	X
1. Application										
Single-phase alternating current			1							
2. Current input										
1 A primary current, please specify				1						
5 A primary current, please specify				5						
Special current input				9						
3. Voltage input **Input voltages Um (AC)** **Please specify transformation ratio _____**										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
300 V					5					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify _____W						1				
5. Frequency range										
48 - 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 - 20 mA and 0 - 10 V								1		
0 - 10 mA and 0 - 10 V								2		
0 - 5 mA and 0 - 10 V								3		
4 - 20 mA and 2 - 10 V								4		
- 20 - 0 - 20 mA and - 10 - 0 - 10 V								5		
7. Auxiliary energy										
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 protocols										
Without test protocol										0
With test protocol German_English										1

Four-wire three-phase network of any load

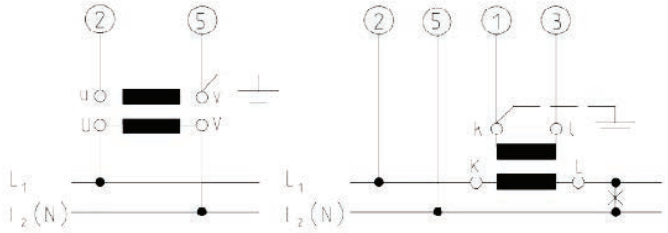


Schematic diagram

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



Terminal assignment

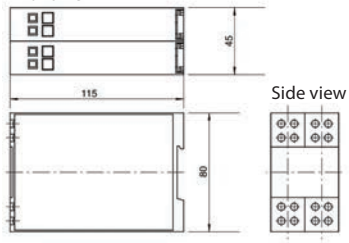


Connection diagram

MWg-3.1

Measuring transducer for active power (also suitable for frequency converters)

Front view



(Dimensions in mm)

Characteristics / benefits

- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: Sinusoidal and non-sinusoidal voltages and currents in three-phase grids of any waveform
- Measurement output: Unipolar, live-zero and bipolar output variables and output with zero elevation

Application:

Measuring transducer for recording the active power of a 3-wire three-phase grid of identical phase load. A load-independent direct current signal or impressed direct voltage signal with action directly proportional to the active power of the primary grid is available as output signal.

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 isolate the high-voltage current circuits from the electronics and adapt the input current and input voltage to the multiplier, which multiplies the measured values by analogue multiplication and integrates them with a low-pass filter.

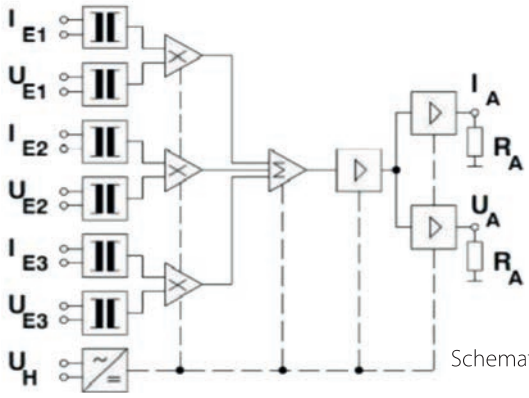
Technical parameters:

Measurement input		Nominal conditions	
Rated frequency	50 or 60 Hz Harmonic factor ≤ 0.2	Auxiliary voltage	U_{HN} ± 2%, 50 - 60 Hz
Input rated current I_{EN}	0 - 0.5 - 5 A	Input voltage	U_{EN} ± 0.5%
		Power factor	sin φ = 1.0 - 0.8
Input rated voltage U_{EN}	0 - 50-519 V	Frequency	50 / 60 Hz
Internal consumption	approx. 1 mA per voltage path	Waveform	Sine, distortion factor ≤ 0.1%
	< 0.1 VA per current path with 1 A		
	< 0.4 VA per current path with 5 A		
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, continuous 2 · U_{EN}, 20 I_{EN} max. 1 sec.	Ambient temperature	23 °C ±1 K
		Warm-up time	≥ 5 min
Operating voltage	max. 519 V		
Measurement output		**Auxiliary energy**	
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA	Alternating voltage	230 V~ (-15% +10%); < 7 VA
Load range R_A	0 - 10 V / I_{AN}		115 V~ (-15% +10%); < 4 VA
Current limitation	to approx. 37 mA	Direct voltage	24 V = (20 - 72 V); < 3 VA
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V	Wide range	20 - 100 V = or 15 - 70 V~; < 3 VA
Load R_A	≥ 4 kΩ	AC / DC	90 - 357 V = or 65 - 253 V~; < 4 - 7 VA
Load error	≤ 0.1% upon 50% load change	**General technical data**	
Ripple voltage	≤ 1% eff	Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
Setting time	approx. 500 ms		Measuring current circuit and auxiliary voltage against output: 3510 V_{eff} 5 sec.
			Currents against each other and against voltage: 3510 V_{eff} 5 sec.
Open-circuit voltage	≤ 15 V	Operating voltage	300 V (rated grid voltage, phase zero)
Accuracy		Protection class	IP 40 housing, IP 20 terminals
Basic accuracy	±0.5% of full scale	Protection class	II
Temperature drift	≤ 0.02%/K	Measurement category	CAT III
		Degree of pollution	2
		Weight	Approx. 270 g

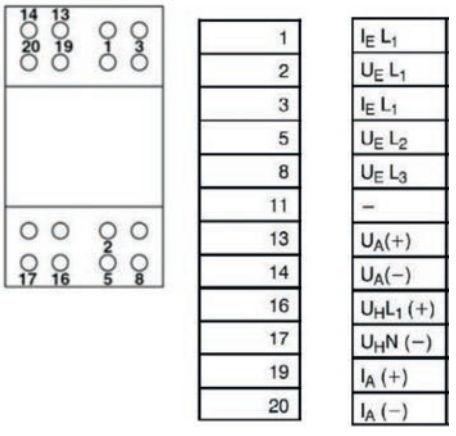
MWg-3.1 – Measuring transducer for active power (also suitable for frequency converters)

	Order number									
MWg-3.1, measuring transducer for active power Order no.: PMU11 – xxxxxxxxx	PMU	11 -	X	X	X	X	X	X	X	X
1. Application										
3-wire three-phase current, identical 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 transformation ratio _____**										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (max. 300 V rated grid voltage, phase zero)					5					
415 V (max. 300 V rated grid voltage, phase zero)					6					
440 V (max. 300 V rated grid voltage, phase zero)					7					
500 V (max. 300 V rated grid voltage, phase zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify _____W						1				
5. Frequency range										
48 - 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 - 20 mA and 0 - 10 V								1		
0 - 10 mA and 0 - 10 V								2		
0 - 5 mA and 0 - 10 V								3		
4 - 20 mA and 2 - 10 V								4		
- 20 - 0 - 20 mA and - 10 - 0 - 10 V								5		
7. Auxiliary energy										
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 protocols										
Without test protocol										0
With test protocol German_English										1

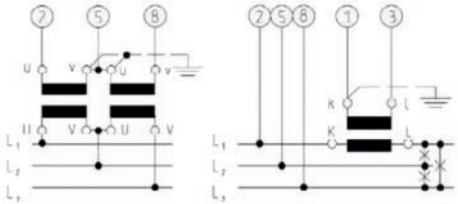
Four-wire three-phase network of any load



Schematic diagram



Terminal assignment

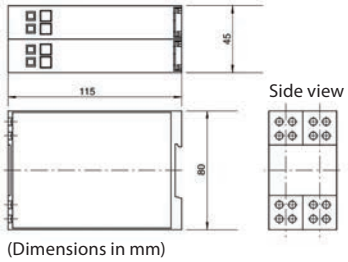


Connection diagram

MWg-4.1

Measuring transducer for active power (also suitable for frequency converters)

Front view



(Dimensions in mm)

Characteristics / benefits

- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: Sinusoidal and non-sinusoidal voltages and currents in three-phase grids of any waveform
- Measurement output: Unipolar, live-zero and bipolar output variables and output with zero elevation

Application:

Measuring transducer for recording the active power of a 4-wire three-phase grid of identical phase load. A load-independent direct current signal or impressed direct voltage signal with action directly proportional to the active power of the primary grid is available as output signal.

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 isolate the high-voltage current circuits from the electronics and adapt the input current and input voltage to the multiplier, which multiplies the measured values by analogue multiplication and integrates them with a low-pass filter.

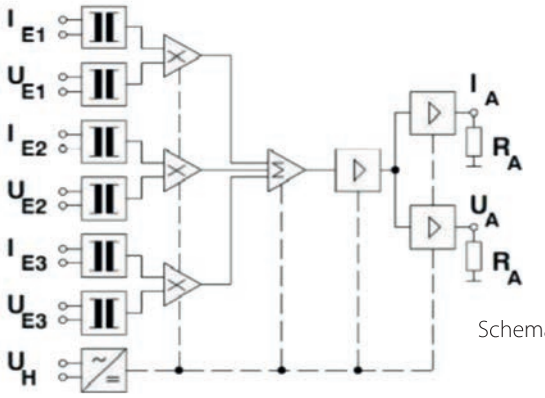
Technical parameters:

Measurement input		Nominal conditions	
Rated frequency	50 or 60 Hz Harmonic factor ≤ 0.2	Auxiliary voltage	U_{HN} ± 2%, 50 - 60 Hz
Input rated current I_{EN}	0 - 0.5 - 5 A	Input voltage	U_{EN} ± 0.5%
		Power factor	sin φ = 1.0 - 0.8
Input rated voltage U_{EN}	0 - 50-519 V	Frequency	50 / 60 Hz
Internal consumption	approx. 1 mA per voltage path	Waveform	Sine, distortion factor ≤ 0.1%
	< 0.1 VA per current path with 1 A	Ambient temperature	23 °C ±1 K
	< 0.4 VA per current path with 5 A	Warm-up time	≥ 5 min
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, continuous 2 · U_{EN}, 20 I_{EN} max. 1 sec.	**Auxiliary energy**	
		Alternating voltage	230 V~ (-15% +10%); < 7 VA
Operating voltage	max. 519 V		115 V~ (-15% +10%); < 4 VA
Measurement output		Direct voltage	24 V = (20 - 72 V); < 3 VA
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA	Wide range	20 - 100 V = or 15 - 70 V~; < 3 VA
Load range R_A	0 - 10 V / I_{AN}	AC / DC	90 - 357 V = or 65 - 253 V~; < 4 - 7 VA
Current limitation	to approx. 37 mA	**General technical data**	
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V	Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
Load R_A	≥ 4 kΩ		Measuring current circuit and auxiliary voltage against output: 3510 V_{eff} 5 sec.
Load error	≤ 0.1% upon 50% load change		Currents against each other and against voltage: 3510 V_{eff} 5 sec.
Ripple voltage	≤ 1% eff	Operating voltage	300 V (rated grid voltage, phase zero)
Setting time	approx. 500 ms	Protection class	IP 40 housing, IP 20 terminals
		Protection class	II
Open-circuit voltage	≤ 15 V	Measurement category	CAT III
Accuracy		Degree of pollution	2
Basic accuracy	±0.5% of full scale	Weight	Approx. 270 g
Temperature drift	≤ 0.02%/K		

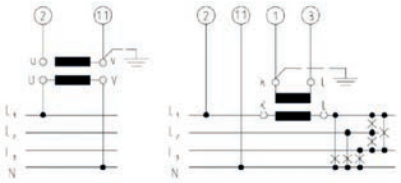
MWg-4.1 – Measuring transducer for active power (also suitable for frequency converters)

	Order number									
MWg-3.1, measuring transducer for active power Order no.: PMU11 – xxxxxxxxx	PMU	11 -	X	X	X	X	X	X	X	X
1. Application										
3-wire three-phase current, identical 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 transformation ratio _____**										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (max. 300 V rated grid voltage, phase zero)					5					
415 V (max. 300 V rated grid voltage, phase zero)					6					
440 V (max. 300 V rated grid voltage, phase zero)					7					
500 V (max. 300 V rated grid voltage, phase zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify _____W						1				
5. Frequency range										
48 - 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 - 20 mA and 0 - 10 V								1		
0 - 10 mA and 0 - 10 V								2		
0 - 5 mA and 0 - 10 V								3		
4 - 20 mA and 2 - 10 V								4		
- 20 - 0 - 20 mA and - 10 - 0 - 10 V								5		
7. Auxiliary energy										
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 protocols										
Without test protocol										0
With test protocol German_English										1

Four-wire three-phase network of any load

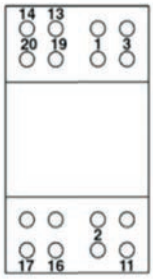


Schematic diagram



Connection diagram

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

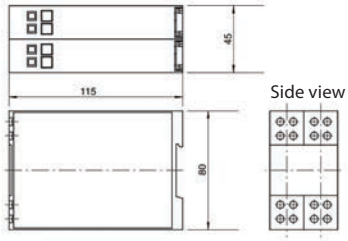


Terminal assignment

MWu-3.1

Measuring transducer for active power (also suitable for frequency converters)

Front view



(Dimensions in mm)

Characteristics / benefits

- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: Sinusoidal voltages and non-sinusoidal voltages and currents in three-phase grids of any waveform
- Measurement output: Unipolar, live-zero and bipolar output variables and output with zero elevation

Application:

Measuring transducer for recording the active power in a 3-wire three-phase grid of identical or arbitrary phase load. A load-independent direct current signal or impressed direct voltage signal with action directly proportional to the active power of the primary grid is available as output signal.

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 isolate the high-voltage current circuits from the electronics and adapt the input current and input voltage to the multiplier, which multiplies the measured values by analogue multiplication and integrates them with a low-pass filter.

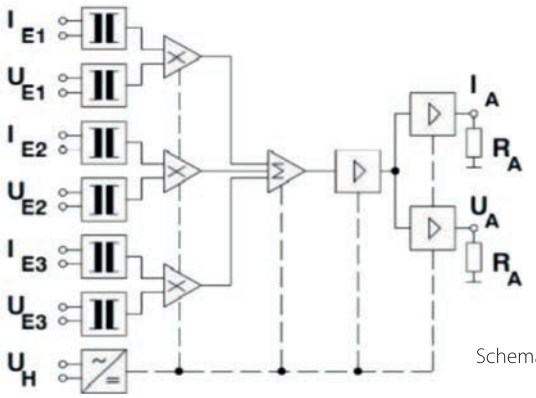
Technical parameters:

Measurement input		Nominal conditions	
Rated frequency	50 or 60 Hz Harmonic factor ≤ 0.2	Auxiliary voltage	U_{HN} ± 2%, 50 - 60 Hz
Input rated current I_{EN}	0 - 0.5 - 5 A	Input voltage	U_{EN} ± 0.5%
		Power factor	sin φ = 1.0 - 0.8
Input rated voltage U_{EN}	0 - 50 - 519 V	Frequency	50 / 60 HZ
Internal consumption	approx. 1 mA per voltage path	Waveform	Sine, distortion factor ≤ 0.1%
	< 0.1 VA per current path with 1 A	Ambient temperature	23 °C ±1 K
	< 0.4 VA per current path with 5 A	Warm-up time	≥ 5 min
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, continuous	**Auxiliary energy**	
	2 · U_{EN}, 20 I_{EN} max. 1 sec.	Alternating voltage	230 V~ (-15% +10%); < 7 VA
Operating voltage	max. 519 V		115 V~ (-15% +10%); < 4 VA
Measurement output		Direct voltage	24 V = (20 - 72 V); < 3 VA
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA	Wide range	20 - 100 V = or 15 - 70 V~; < 3 V A
Load range R_A	0 - 10 V / I_{AN}	AC / DC	90 - 357 V = or 65 - 253 V~; < 4 - 7 VA
Current limitation	to approx. 37 mA	**General technical data**	
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V	Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
Load R_A	≥ 4 kΩ		Measuring current circuit and auxiliary voltage against output: 3510 V_{eff} 5 sec.
Load error	≤ 0.1% upon 50% load change		Currents against each other and against voltage: 3510 V_{eff} 5 sec.
Ripple voltage	≤ 1% eff	Operating voltage	300 V (rated grid voltage, phase zero)
Setting time	approx. 500 ms <	Protection class	IP 40 housing, IP 20 terminals
		Protection class	II
Open-circuit voltage	≤ 15 V	Measurement category	CAT III
Accuracy		Degree of pollution	2
Basic accuracy	±0.5% of full scale	Weight	Approx. 290 g
Temperature drift	≤ 0.02%/K		

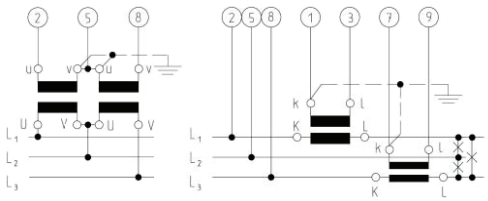
MWu-3.1 – Measuring transducer for active power (also suitable for frequency converters)

	Order number									
MWu-3.1, measuring transducer for active power Order no.: PMU12 – xxxxxxxxx	PMU	12 -	X	X	X	X	X	X	X	X
1. Application										
3-wire three-phase current, any 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 transformation ratio _____**										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (max. 300 V rated grid voltage, phase zero)					5					
415 V (max. 300 V rated grid voltage, phase zero)					6					
440 V (max. 300 V rated grid voltage, phase zero)					7					
500 V (max. 300 V rated grid voltage, phase zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify _____W						1				
5. Frequency range										
48 - 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 - 20 mA and 0 - 10 V								1		
0 - 10 mA and 0 - 10 V								2		
0 - 5 mA and 0 - 10 V								3		
4 - 20 mA and 2 - 10 V								4		
- 20 - 0 - 20 mA and - 10 - 0 - 10 V								5		
7. Auxiliary energy										
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 protocols										
Without test protocol										0
With test protocol German_English										1

Four-wire three-phase network of any load

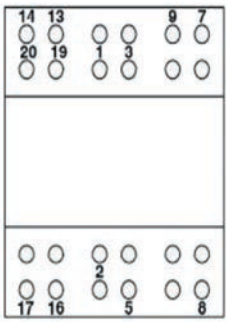


Schematic diagram



Connection diagram

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

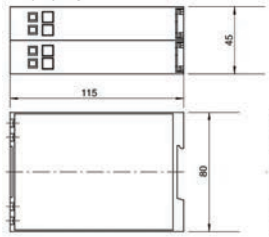


Terminal assignment

MWu-4.1

Measuring transducer for active power (also suitable for frequency converters)

Front view



Side view

(Dimensions in mm)

Characteristics / benefits

- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: Sinusoidal and non-sinusoidal voltages and currents in three-phase grids of any waveform
- Measurement output: Unipolar, live-zero and bipolar output variables and output with zero elevation

Application:

Measuring transducer for recording the active power of a 4-wire three-phase grid of identical or arbitrary phase load. A load-independent direct current signal or impressed direct voltage signal with action directly proportional to the active power of the primary grid is available as output signal.

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 isolate the high-voltage current circuits from the electronics and adapt the input current and input voltage to the multiplier, which multiplies the measured values by analogue multiplication and integrates them with a low-pass filter.

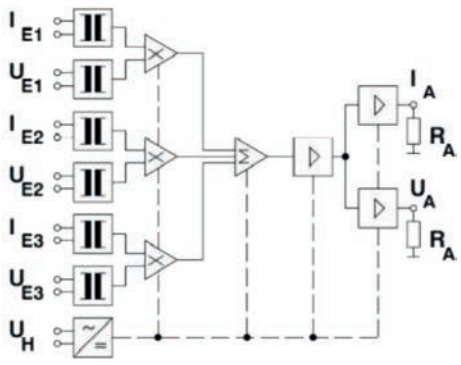
Technical parameters:

Measurement input		Nominal conditions	
Rated frequency	50 or 60 Hz Harmonic factor ≤ 0.2	Auxiliary voltage	U_{HN} ± 2%, 50 - 60 Hz
Input rated current I_{EN}	0 - 0.5 - 5 A	Input voltage	U_{EN} ± 0.5%
		Power factor	sin φ = 1.0 - 0.8
Input rated voltage U_{EN}	0 - 50-519 V	Frequency	50 / 60 Hz
Internal consumption	approx. 0.25 mA per voltage path	Waveform	Sine, distortion factor ≤ 0.1%
	I^2 · 0.01 Ω per current path	Ambient temperature	23 °C ±1 K
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, continuous 2 · U_{EN}, 20 I_{EN} max. 1 sec.	Warm-up time	≥ 5 min
		Auxiliary energy	
Operating voltage	max. 519 V	Alternating voltage	230 V~ (-15% +10%); < 7 VA
Measurement output			115 V~ (-15% +10%); < 4 VA
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA	Direct voltage	24 V = (20 - 72 V); < 3 VA
Load range R_A	0 - 10 V / I_{AN}	Wide range	20 - 100 V = or 15 - 70 V~; < 3 VA
Current limitation	to approx. 37 mA	AC / DC	90 - 357 V = or 65 - 253 V~; < 4 - 7 VA
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V	**General technical data**	
Load R_A	≥ 4 kΩ	Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
Load error	≤ 0.1% upon 50% load change		Measuring current circuit and auxiliary voltage against output: 3510 V_{eff} 5 sec.
Ripple voltage	≤ 1% eff		Currents against each other and against voltage: 3510 V_{eff} 5 sec.
Setting time	approx. 500 ms	Operating voltage	300 V (rated grid voltage, phase zero)
		Protection class	IP 40 housing, IP 20 terminals
Open-circuit voltage	≤ 15 V	Protection class	II
Accuracy		Measurement category	CAT III
Basic accuracy	±0.5% of full scale	Degree of pollution	2
Temperature drift	≤ 0.02%/K	Weight	Approx. 310 g

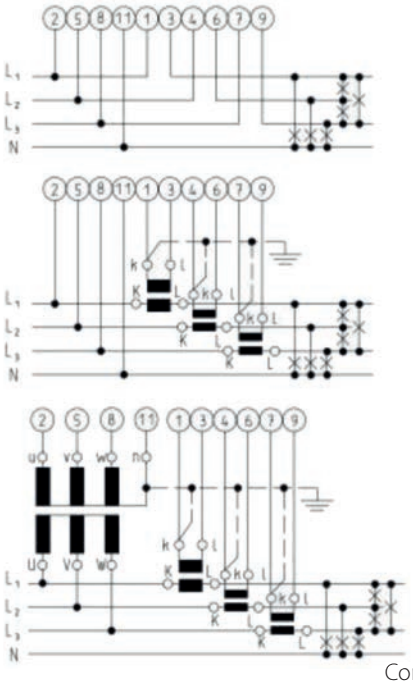
MWu-4.1 – Measuring transducer for active power (also suitable for frequency converters)

	Order number									
MWu-4.1, measuring transducer for active power Order no.: PMU14 – xxxxxxxxx	PMU	14 -	X	X	X	X	X	X	X	X
1. Application										
4-wire three-phase current, any 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 transformation ratio _____**										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (max. 300 V rated grid voltage, phase zero)					5					
415 V (max. 300 V rated grid voltage, phase zero)					6					
440 V (max. 300 V rated grid voltage, phase zero)					7					
500 V (max. 300 V rated grid voltage, phase zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify _____W						1				
5. Frequency range										
48 - 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 - 20 mA and 0 - 10 V								1		
0 - 10 mA and 0 - 10 V								2		
0 - 5 mA and 0 - 10 V								3		
4 - 20 mA and 2 - 10 V								4		
- 20 - 0 - 20 mA and - 10 - 0 - 10 V								5		
7. Auxiliary energy										
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 protocols										
Without test protocol										0
With test protocol German_English										1

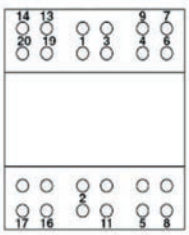
Four-wire three-phase network of any load



Schematic diagram



Connection diagram



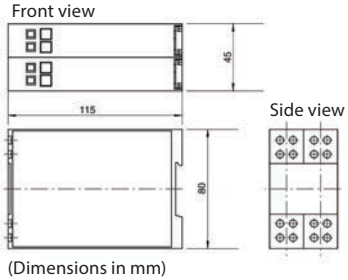
Klemme	
1	$I_E L_1$
2	$U_E L_1$
3	$I_E L_1$
4	$I_E L_2$
5	$U_E L_2$
6	$I_E L_2$
7	$I_E L_3$
8	$U_E L_3$
9	$I_E L_3$
11	$U_E N$
13	$U_A (+)$
14	$U_A (-)$
16	$U_H L_1 (+)$
17	$U_H N (-)$
19	$I_A (+)$
20	$I_A (-)$

Terminal assignment

MBg-3.1

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

Front view



(Dimensions in mm)

Characteristics / benefits

- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: Sinusoidal and non-sinusoidal voltages and currents in three-phase grids of any waveform
- Measurement output: Unipolar, live-zero and bipolar output variables and output with zero elevation

Application:

Measuring transducer for recording the reactive power of a 3-wire three-phase grid of identical phase load. A load-independent direct current signal or impressed direct voltage signal with action directly proportional to the active power of the primary grid is available as output signal.

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 isolate the high-voltage current circuits from the electronics and adapt the input current and input voltage to the multiplier, which multiplies the measured values by analogue multiplication and integrates them with a low-pass filter.

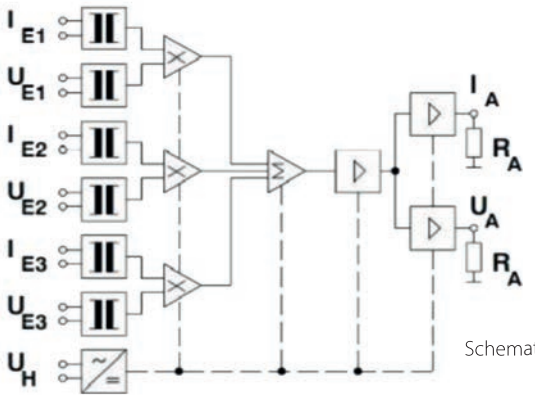
Technical parameters:

Measurement input		Nominal conditions	
Rated frequency	50 or 60 Hz	Auxiliary voltage	U_{HN} ± 2%, 50 - 60 Hz
Input rated current I_{EN}	0 - 0.5 - 5 A	Input voltage	U_{EN} ± 0.5%
Input rated voltage U_{EN}	0 - 50-519 V	Power factor	sin φ = 1.0 - 0.8
Internal consumption	approx. 1 mA per voltage path	Frequency	50 / 60 Hz
	< 0.1 VA per current path with 1 A	Waveform	Sine, distortion factor ≤ 0.1%
	< 0.4 VA per current path with 5 A	Ambient temperature	23 °C ±1 K
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, continuous 2 · U_{EN}, 20 I_{EN} max. 1 sec.	Warm-up time	≥ 5 min
Operating voltage	max. 519 V	**Auxiliary energy**	
Measurement output		Alternating voltage	230 V~ (-15% +10%); < 7 VA
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA		115 V~ (-15% +10%); < 4 VA
Current limitation	to approx. 37 mA	Direct voltage	24 V = (20 - 72 V); < 3 VA
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V		24 V = (20 - 72 V); < 3 VA
Load R_A	≥ 4 kΩ		90 - 357 V = or 65 - 253 V~; < 4 - 7 VA
Load error	≤ 0.1% upon 50% load change	**General technical data**	
Ripple voltage	≤ 1% eff	Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
Setting time	approx. 500 ms		Measuring current circuit and auxiliary voltage against output: 3510 V_{eff} 5 sec.
Open-circuit voltage	≤ 15 V		Currents against each other and against voltage: 10 V_{eff} 5 sec.
Accuracy		Operating voltage	300 V (rated grid voltage, phase zero)
Basic accuracy	±0.5% of full scale	Protection class	IP 40 housing, IP 20 terminals
Temperature drift	≤ 0.02%/K	Protection class	II
		Measurement category	CAT III
		Degree of pollution	2
		Weight	Approx. 270 g

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

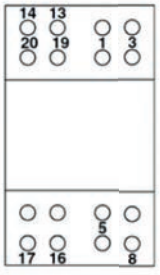
	Order number									
MBg-3.1, measuring transducer for reactive power: Order no.: PMU15 – xxxxxxxxx	PMU	15 -	X	X	X	X	X	X	X	X
1. Application										
3-wire three-phase current, identical load			1							
2. Current input										
1 A primary current, please specify				1						
5 A primary current, please specify				5						
Special current input				9						
3. Voltage input **Input voltages Um (AC)** **Please specify transformation ratio _____**										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (max. 300 V rated grid voltage, phase zero)					5					
415 V (max. 300 V rated grid voltage, phase zero)					6					
440 V (max. 300 V rated grid voltage, phase zero)					7					
500 V (max. 300 V rated grid voltage, phase zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify _____W						1				
5. Frequency range										
48 - 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 - 20 mA and 0 - 10 V								1		
0 - 10 mA and 0 - 10 V								2		
0 - 5 mA and 0 - 10 V								3		
4 - 20 mA and 2 - 10 V								4		
- 20 - 0 - 20 mA and - 10 - 0 - 10 V								5		
7. Auxiliary energy										
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 protocols										
Without test protocol										0
With test protocol German_English										1

Four-wire three-phase network of any load

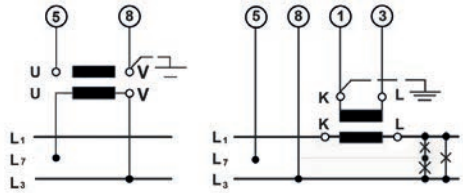


Schematic diagram

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



Terminal assignment

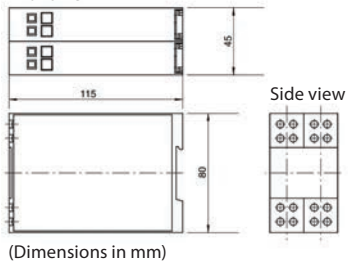


Connection diagram

MBg-4.1

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

Front view



(Dimensions in mm)

Characteristics / benefits

- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: Sinusoidal and non-sinusoidal voltages and currents in three-phase grids of any waveform
- Measurement output: Unipolar, live-zero and bipolar output variables and output with zero elevation

Application:

Measuring transducer for recording the reactive power of a 4-wire three-phase grid of identical phase load. A load-independent direct current signal or impressed direct voltage signal with action directly proportional to the active power of the primary grid is available as output signal.

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 isolate the high-voltage current circuits from the electronics and adapt the input current and input voltage to the multiplier, which multiplies the measured values by analogue multiplication and integrates them with a low-pass filter.

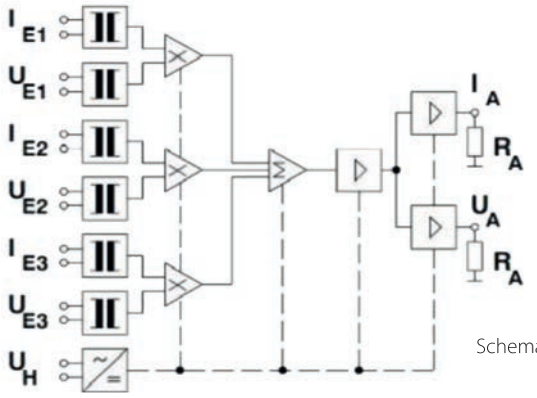
Technical parameters:

Measurement input		Nominal conditions	
Rated frequency	50 or 60 Hz	Auxiliary voltage	U_{HN} ± 2%, 50 - 60 Hz
Input rated current I_{EN}	0 - 0.5 - 5 A	Input voltage	U_{EN} ± 0.5%
Input rated voltage U_{EN}	0 - 50-519 V	Power factor	sin φ = 1.0 - 0.8
Internal consumption	approx. 1 mA per voltage path	Frequency	50 / 60 Hz
	< 0.1 VA per current path with 1 A	Waveform	Sine, distortion factor ≤ 0.1%
	< 0.4 VA per current path with 5 A	Ambient temperature	23 °C ±1 K
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, continuous 2 · U_{EN}, 20 I_{EN} max. 1 sec.	Warm-up time	≥ 5 min
Operating voltage	max. 519 V	**Auxiliary energy**	
Measurement output		Alternating voltage	230 V~ (-15% +10%); < 7 VA
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA		115 V~ (-15% +10%); < 4 VA
Current limitation	to approx. 37 mA	Direct voltage	24 V = (20 - 72 V); < 3 VA
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V		24 V = (20 - 72 V); < 3 VA
Load R_A	≥ 4 kΩ		90 - 357 V = or 65 - 253 V~; < 4 - 7 VA
Load error	≤ 0.1% upon 50% load change	**General technical data**	
Ripple voltage	≤ 1% eff	Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
Setting time	approx. 500 ms		Measuring current circuit and auxiliary voltage against output: 3510 V_{eff} 5 sec.
Open-circuit voltage	≤ 15 V		Currents against each other and against voltage: 10 V_{eff} 5 sec.
Accuracy		Operating voltage	300 V (rated grid voltage, phase zero)
Basic accuracy	±0.5% of full scale	Protection class	IP 40 housing, IP 20 terminals
Temperature drift	≤ 0.02%/K	Protection class	II
		Measurement category	CAT III
		Degree of pollution	2
		Weight	Approx. 270 g

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

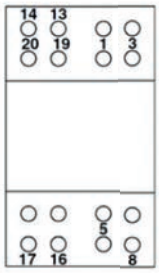
	Order number									
MBg-4.1, measuring transducer for reactive power: Order no.: PMU17 – xxxxxxxxx	PMU	17 -	X	X	X	X	X	X	X	X
1. Application										
3-wire three-phase current, identical load			1							
2. Current input										
1 A primary current, please specify				1						
5 A primary current, please specify				5						
Special current input				9						
3. Voltage input **Input voltages Um (AC)** **Please specify transformation ratio _____**										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (max. 300 V rated grid voltage, phase zero)					5					
415 V (max. 300 V rated grid voltage, phase zero)					6					
440 V (max. 300 V rated grid voltage, phase zero)					7					
500 V (max. 300 V rated grid voltage, phase zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify _____W						1				
5. Frequency range										
48 - 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 - 20 mA and 0 - 10 V								1		
0 - 10 mA and 0 - 10 V								2		
0 - 5 mA and 0 - 10 V								3		
4 - 20 mA and 2 - 10 V								4		
- 20 - 0 - 20 mA and - 10 - 0 - 10 V								5		
7. Auxiliary energy										
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 protocols										
Without test protocol										0
With test protocol German_English										1

Four-wire three-phase network of any load

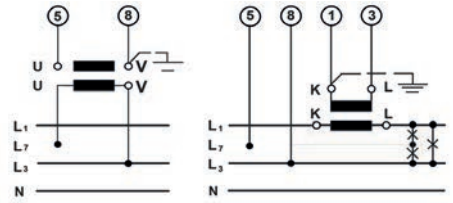


Schematic diagram

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



Terminal assignment

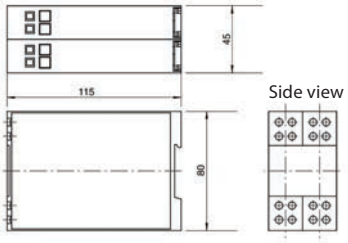


Connection diagram

MBu-3.1

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

Front view



(Dimensions in mm)

Characteristics / benefits

- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: Sinusoidal voltages and non-sinusoidal voltages and currents in three-phase grids of any waveform
- Measurement output: Unipolar, live-zero and bipolar output variables and output with zero elevation

Application:

Measuring transducer for recording the reactive power in a 3-wire three-phase grid of identical or arbitrary phase load. A load-independent direct current signal or impressed direct voltage signal with action directly proportional to the active power of the primary grid is available as output signal.

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 isolate the high-voltage current circuits from the electronics and adapt the input current and input voltage to the multiplier, which multiplies the measured values by analogue multiplication and integrates them with a low-pass filter.

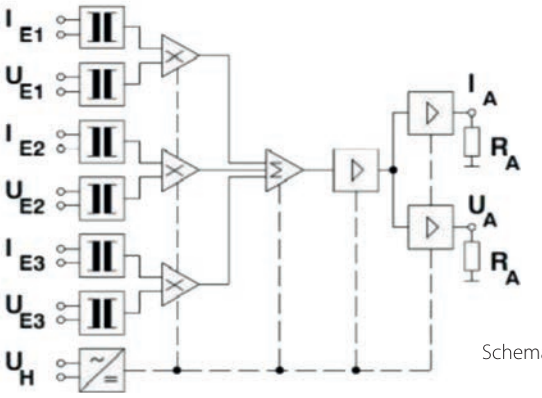
Technical parameters:

Measurement input		Nominal conditions	
Rated frequency	50 or 60 Hz Harmonic factor ≤ 0.2	Auxiliary voltage	U_{HN} ± 2%, 50 - 60 Hz
Input rated current I_{EN}	0 - 0.5 - 5 A	Voltage	U_{EN} ± 0.5%
Input rated voltage U_{EN}	0 - 50 - 519 V	Power factor	sin φ = 1.0 - 0.8
Internal consumption	approx. 1 mA per voltage path	Frequency	50 / 60 HZ
	< 0.1 VA per current path with 1 A	Waveform	Sine, distortion factor ≤ 0.1%
	< 0.4 VA per current path with 5 A	Ambient temperature	23 °C ±1 K
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, continuous	Warm-up time	≥ 5 min
	2 · U_{EN}, 20 I_{EN} max. 1 sec.	**Auxiliary energy**	
Operating voltage	max. 519 V AC	Alternating voltage	230 V~ (-15% +10%); < 7 VA
Measurement output			115 V~ (-15% +10%); < 4 VA
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA	Direct voltage	24 V = (20 - 72 V); < 3 VA
Load range R_A	0 - 10 V / I_{AN}	Wide range	20 - 100 V = or 15 - 70 V~; < 3 VA
Current limitation	to approx. 37 mA	AC / DC	90 - 357 V = or 65 - 253 V~; < 4 - 7 VA
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V	**General technical data**	
Load R_A	≥ 4 kΩ	Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
Load error	≤ 0.1% upon 50% load change		Measuring current circuit and auxiliary voltage against output: 3510 V_{eff} 5 sec.
Ripple voltage	≤ 1% eff		Currents against each other and against voltage: 3510 V_{eff} 5 sec.
Setting time	approx. 500 ms <	Operating voltage	300 V (rated grid voltage, phase zero)
		Protection class	IP 40 housing, IP 20 terminals
Open-circuit voltage	≤ 15 V	Protection class	II
Accuracy		Measurement category	CAT III
Basic accuracy	±0.5% of full scale	Degree of pollution	2
Temperature drift	≤ 0.02%/K	Weight	Approx. 290 g

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

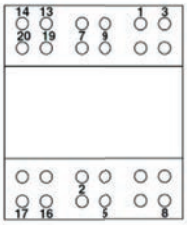
	Order number									
MBu-3.1, measuring transducer for reactive power: Order no.: PMU16 – xxxxxxxxx	PMU	16	X	X	X	X	X	X	X	X
1. Application										
3-wire three-phase current, any load			1							
2. Current input										
1 A primary current, please specify				1						
5 A primary current, please specify				5						
Special current input				9						
3. Voltage input **Input voltages Um (AC)** **Please specify transformation ratio _____**										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (max. 300 V rated grid voltage, phase zero)					5					
415 V (max. 300 V rated grid voltage, phase zero)					6					
440 V (max. 300 V rated grid voltage, phase zero)					7					
500 V (max. 300 V rated grid voltage, phase zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify _____W						1				
5. Frequency range										
48 - 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 - 20 mA and 0 - 10 V								1		
0 - 10 mA and 0 - 10 V								2		
0 - 5 mA and 0 - 10 V								3		
4 - 20 mA and 2 - 10 V								4		
- 20 - 0 - 20 mA and - 10 - 0 - 10 V								5		
7. Auxiliary energy										
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 protocols										
Without test protocol										0
With test protocol German_English										1

Four-wire three-phase network of any load

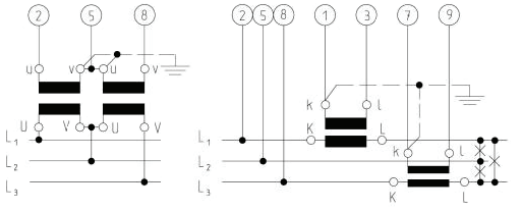


Schematic diagram

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



Terminal assignment

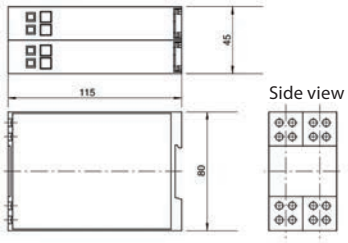


Connection diagram

MBu-4.1

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

Front view



(Dimensions in mm)

Characteristics / benefits

- Sinusoidal and non-sinusoidal voltages and currents in three-phase grids of any waveform
- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement output: Unipolar, live-zero and bipolar output variables and output with zero elevation

Application:

Measuring transducer for recording the reactive power of a 4-wire three-phase grid of identical phase load. A load-independent direct current signal or impressed direct voltage signal with action directly proportional to the active power of the primary grid is available as output signal

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 isolate the high-voltage current circuits from the electronics and adapt the input current and input voltage to the multiplier, which multiplies the measured values by analogue multiplication and integrates them with a low-pass filter.

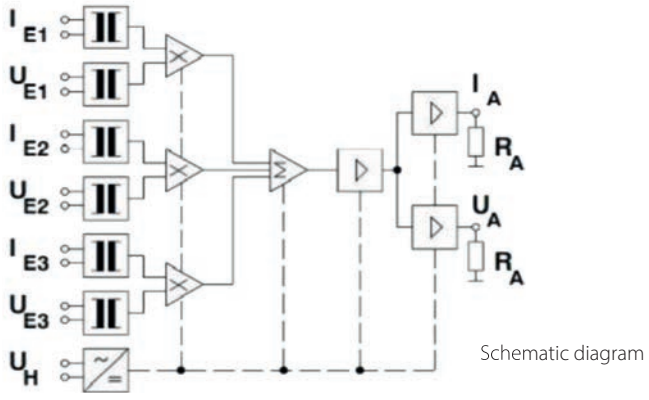
Technical parameters:

Measurement input		Nominal conditions	
Rated frequency	50 or 60 Hz Harmonic factor ≤ 0.2	Auxiliary voltage	U_{HN} ± 2%, 50 - 60 Hz
Input rated current I_{EN}	0 - 0.5 - 5 A	Voltage	U_{EN} ± 0.5%
Input rated voltage U_{EN}	0 - 50 - 519 V	Power factor	sin φ = 1.0 - 0.8
Internal consumption	approx. 1 mA per voltage path	Frequency	50 / 60 HZ
	< 0.1 VA per current path with 1A	Waveform	Sine, distortion factor ≤ 0.1%
	< 0.4 VA per current path with 5 A	Ambient temperature	23 °C ±1 K
Overload capacity	1.2 · U_{EN} or 1.2 I_{EN}, continuous	Warm-up time	≥ 5 min
	2 · U_{EN}, 20 I_{EN} max. 1 sec.	**Auxiliary energy**	
Operating voltage	max. 519 V AC	Alternating voltage	230 V~ (-15% +10%); < 7 VA
Measurement output			115 V~ (-15% +10%); < 4 VA
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA	Direct voltage	24 V = (20 - 72 V); < 3 VA
Load range R_A	0 - 10 V / I_{AN}	Wide range	20 - 100 V = or 15 - 70 V~; < 3 VA
Current limitation	to approx. 37 mA	AC / DC	90 - 357 V = or 65 - 253 V~; < 4 - 7 VA
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V	**General technical data**	
Load R_A	≥ 4 kΩ	Test voltage	All circuits against housing: 3510 V_{eff} 5 sec.
Load error	≤ 0.1% upon 50% load change		Measuring current circuit and auxiliary voltage against output: 3510 V_{eff} 5 sec.
Ripple voltage	≤ 1% eff		Currents against each other and against voltage: 3510 V_{eff} 5 sec.
Setting time	approx. 500 ms <	Operating voltage	300 V (rated grid voltage, phase zero)
		Protection class	IP 40 housing, IP 20 terminals
Open-circuit voltage	≤ 15 V	Protection class	II
Accuracy		Measurement category	CAT III
Basic accuracy	±0.5% of full scale	Degree of pollution	2
Temperature drift	≤ 0.02%/K	Weight	Approx. 310 g

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

	Order number									
MBu-4.1, measuring transducer for reactive power: Order no.: PMU18 – xxxxxxxxx	PMU	18 -	X	X	X	X	X	X	X	X
1. Application										
4-wire three-phase current, any 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 transformation ratio _____**										
65 V					1					
100 V					2					
110 V					3					
240 V					4					
400 V (max. 300 V rated grid voltage, phase zero)					5					
415 V (max. 300 V rated grid voltage, phase zero)					6					
440 V (max. 300 V rated grid voltage, phase zero)					7					
500 V (max. 300 V rated grid voltage, phase zero)					8					
Special voltage input					9					
4. Measuring range										
Measuring range: please specify _____W						1				
5. Frequency range										
48 - 62 Hz (50/60 Hz)							1			
Special frequency							9			
6. Output										
0 - 20 mA and 0 - 10 V								1		
0 - 10 mA and 0 - 10 V								2		
0 - 5 mA and 0 - 10 V								3		
4 - 20 mA and 2 - 10 V								4		
- 20 - 0 - 20 mA and - 10 - 0 - 10 V								5		
7. Auxiliary energy										
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 protocols										
Without test protocol										0
With test protocol German_English										1

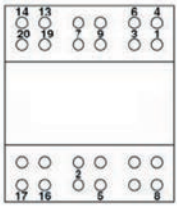
Four-wire three-phase network of any load

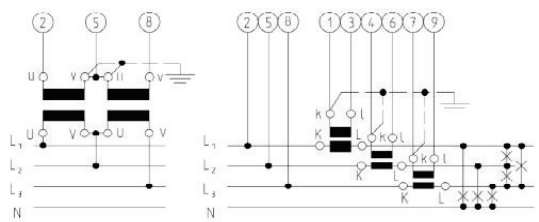


Schematic diagram

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

Terminal assignment



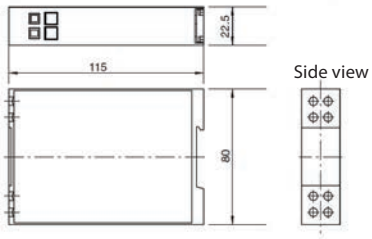


Connection diagram

MA-G.1

Measuring transducer for direct current

Front view



(Dimensions in mm)

Characteristics / benefits

- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: Direct current
- Measurement output: Unipolar, live-zero and bipolar output variables and output with zero elevation

Application:

The measuring transducers convert currents correctly signed into a load-independent direct current or impressed direct voltage. These can then be displayed, registered and/or used for controlling purposes at the measurement location or in measuring stations located further away.

Functional principle:

The current measurement occurs internally via a shunt resistor. The signal is subsequently galvanically isolated from the input via an optical line and converted into a proportional impressed direct voltage or proportional load-independent direct current.

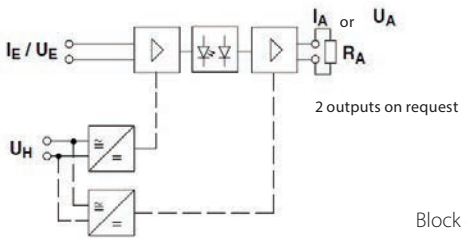
Technical parameters:

Measurement input	
Input rated current I_N	200 µA – 5 A
Internal consumption	$I_E \cdot 0.1$ V
Overload capacity	$1.2 \cdot I_{EN}$, continuous
	$10 \cdot I_{EN}$, max. 1 sec.
Operating voltage	max. 519 V AC,
	max. 300 V phase zero
Measurement output	
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA
Load range R_A	0 - 12 V / I_{AN}
Current limitation	to 120 - 150% of full scale
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V
Load R_A	≥ 4 kΩ
Load error	≤ 0.1% upon 50% load change
Ripple voltage	≤ 1% eff
Setting time	approx. 500 ms, 250 ms, 100ms
Open-circuit voltage	≤ 15 V
Accuracy	
Basic accuracy	±0.5% of full scale
Temperature drift	≤ 0.02%/K

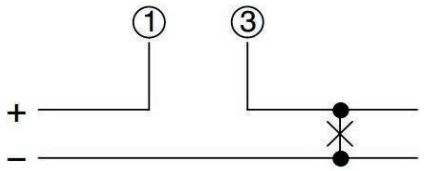
Nominal conditions	
Auxiliary voltage	U_{HN} ± 5%, 50 Hz with AC
Load	0.5 R_A max. ± 1% with current output
	R_A min. ± 1% with voltage output
Ambient temperature	23 °C ±1 K
Warm-up time	≥ 5 min
Auxiliary energy	
Alternating voltage	230 V~ (-15% +10%); < 6 VA
	115 V~ (-15% +10%); < 3.5 VA
Direct voltage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

MA-G.1 – Measuring transducer for direct current

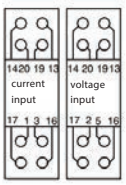
Features	Order number								
MA-G.1, Measuring transducer for direct current Order no. IMU28 – xxxxxx	IMU	28 –	X	X	X	X	X	X	X
1. Input rated current									
0 - 200 µA			1						
0 - 20 mA			2						
0 - 0.5 A			3						
0 - 1 A			4						
0 - 2 A			5						
-5 - 0 - +5 A			6						
Special range up to ± 5 A			9						
2. Input frequency range									
DC				0					
3. Output									
0 - 20 mA					1				
4 - 20 mA					2				
0 - 10 V					3				
2 - 10 V					4				
0 - 20 mA and 0 - 10 V					5				
4 - 20 mA and 2 - 10 V					6				
Special ranges					9				
0 - 10 mA					A				
0 - 5 A					B				
-20 - 0 - 20 mA					C				
-10 - 0 - 10 V					D				
-20 - 0 - 20 mA and -10 - 0 - 10 V					E				
according to specification					Z				
4. Accuracy									
±0.5% of full scale						1			
±0.2% of full scale						2			
5. Setting time									
500 ms							1		
250 ms							2		
100 ms							3		
6. Auxiliary energy									
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 protocols									
Without test protocol									0
With test protocol German_English									1



Block circuit diagram



Connection diagram



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

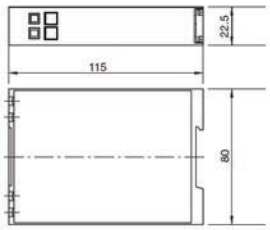
I_E current input
U_E voltage input
U_H auxilliary voltage input
I_A current output
U_A voltage output
The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

Terminal assignment

MV-G.1

Measuring transducer for direct voltage

Front view



Side view

(Dimensions in mm)

Characteristics / benefits

- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: Direct voltage
- Measurement output: Unipolar, live-zero and bipolar output variables and output with zero elevation

Application:

The measuring transducers convert voltages correctly signed into a load-independent direct current or impressed direct voltage. These can then be displayed, registered and/or used for controlling purposes at the measurement location or in measuring stations located further away.

Functional principle:

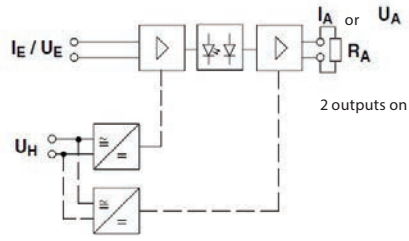
The voltage measurement occurs internally via a voltage divider. The signal is subsequently galvanically isolated from the input via an optical line and converted into a proportional impressed direct voltage or proportional load-independent direct current.

Technical parameters:

Measurement input		Nominal conditions	
Rated frequency f_N	48 - 62 Hz	Auxiliary voltage	U_{HN} ± 5%, 50 Hz with AC
Input rated voltage U_{EN}	U_{EN} = 60 mV - 300 V	Load	0.5 R_A max. ± 1% with current output
Internal consumption	U_E^2 / R_E		R_A min. ± 1% with voltage output
Overload capacity	1.2 · U_{EN}, continuous	Ambient temperature	23 °C ±1 K
	2 · U_{EN}, max. 1 sec.	Warm-up time	≥ 5 min
Operating voltage	max. 300 V	**Auxiliary energy**	
Measurement output		Alternating voltage	230 V~ (-15% +10%); < 6 VA
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA		115 V~ (-15% +10%); < 3.5 VA
Load range R_A	0 - 12 V / I_{AN}	Direct voltage	24 V = (20 - 72 V); < 3 VA
Current limitation	to 120 - 150% of full scale	Wide range	20 - 100 V = or 15 - 70 V~; < 3 VA
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V	AC / DC	90 - 357 V = or 65 - 253 V~; < 3 - 6 VA
Load R_A	≥ 4 kΩ	**General technical data**	
Load error	≤ 0.1% upon 50% load change	Test voltage	2210 V all circuits against housing
Ripple voltage	≤ 1% eff		3536 V all circuits to each other
Setting time	approx. 500 ms	Operating voltage	300 V (rated grid voltage, phase zero)
Open-circuit voltage	≤ 15 V	Protection class	IP 40 housing, IP 20 terminals
Accuracy		Protection class	II
Basic accuracy	±0.5% of full scale	Measurement category	CAT III
Temperature drift	≤ 0.02%/K	Degree of pollution	2
		Weight	Approx. 120 g

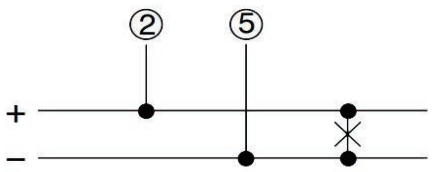
MV-G.1 – Measuring transducer for direct voltage

Features	Order number								
MV-G.1, Measuring transducer for direct voltage Order no. UMU30 – xxxxxx	UMU	30 –	X	X	X		X	X	X
1. Input rated 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. Input frequency range									
DC				0					
3. Output									
0 - 20 mA					1				
4 - 20 mA					2				
0 - 10 V					3				
2 - 10 V					4				
0 - 20 mA and 0 - 10 V					5				
4 - 20 mA and 2 - 10 V					6				
Special ranges					9				
0 - 10 mA					A				
0 - 5 A					B				
-20 - 0 - 20 mA					C				
-10 - 0 - 10 V					D				
-20 - 0 - 20 mA and -10 - 0 - 10 V					E				
according to specification					Z				
4. Accuracy									
±0.5% of full scale						1			
±0.2% of full scale						2			
5. Setting time									
500 ms							1		
250 ms							2		
100 ms							3		
6. Auxiliary energy									
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 protocols									
Without test protocol									0
With test protocol German_English									1

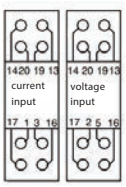


2 outputs on request

Block circuit diagram



Connection diagram



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

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

I_E current input
U_E voltage input
U_H auxilliary voltage input
The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

I_A current output
U_A voltage output

Terminal assignment

NT-G.1

Measuring transducer for DC standard signals

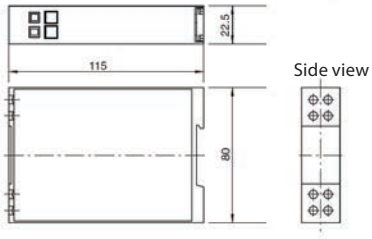
Characteristics / benefits

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

Application:

The isolating amplifier records a standard signal (direct current 0/4 - 20 mA or direct voltage 0/2 - 10 V), amplifies it under galvanic isolation and converts it to a load-independent direct current signal or impressed direct voltage signal.

Front view



(Dimensions in mm)

Functional principle:

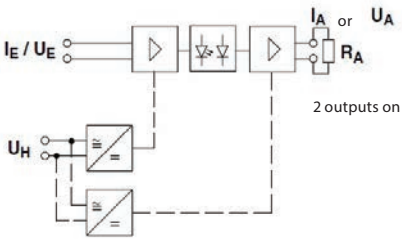
The current measurement occurs internally via a shunt resistor, the voltage measurement via a voltage divider. The signal is subsequently galvanically isolated from the input via an optical line and converted into a proportional impressed direct voltage or proportional load-independent direct current.

Technical parameters:

Measurement input		**Nominal conditions**	
Input variable	I_{EN} = 0 - 20 mA, 4 - 20 mA	Auxiliary voltage	U_{HN} ± 5%, 50 Hz with AC
	U_{EN} = 0 - 10 V, 2 - 10 V	Load	0.5 R_A max. ± 1% with current output
Internal consumption	I_E · 0.1 V		R_A min. ± 1% with voltage output
Overload capacity	1.2 · I_{EN}, continuous	Ambient temperature	23 °C ±1 K
	2 · I_{EN}, max. 1 sec.	Warm-up time	≥ 5 min
Operating voltage	max. 300 V	**Auxiliary energy**	
Measurement output		Alternating voltage	230 V~ (-15% +10%); < 6 VA
Rated current I_{AN}	0 - 20 mA or 4 - 20 mA		115 V~ (-15% +10%); < 3.5 VA
Load range R_A	0 - 12 V / I_{AN}	Direct voltage	24 V = (20 - 72 V); < 3 VA
Current limitation	to 120 - 150% of full scale	Wide range	20 - 100 V = or 15 - 70 V~; < 3 VA
Rated voltage U_{AN}	0 - 10 V or 2 - 10 V	AC / DC	90 - 357 V = or 65 - 253 V~; < 3 - 6 VA
Load R_A	≥ 4 kΩ	**General technical data**	
Load error	≤ 0.1% upon 50% load change	Test voltage	2210 V all circuits against housing
Ripple voltage	≤ 1% eff		3536 V all circuits to each other
Setting time	approx. 500 ms, 250 ms, 100 ms	Operating voltage	300 V (rated grid voltage, phase zero)
Open-circuit voltage	≤ 15 V	Protection class	IP 40 housing, IP 20 terminals
Accuracy		Protection class	II
Basic accuracy	±0.5% of full scale	Measurement category	CAT III
Temperature drift	≤ 0.02%/K	Degree of pollution	2
		Weight	Approx. 120 g

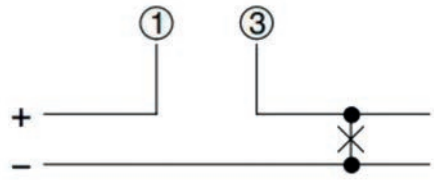
NT-G.1 – Measuring transducer for DC standard signals

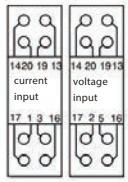
Features	Order number								
NT-G.1, Measuring transducer for DC standard signals Order no. NMU31 – xxxxxx	NMU	31 –	X	X	X		X	X	X
1. Input rated current									
0 - 20 mA			1						
0 - 10 V			2						
4 - 20 mA			3						
2 - 10 V			4						
0 - 60 mV			5						
2. Input frequency range									
DC				0					
3. Output									
0 - 20 mA					1				
4 - 20 mA					2				
0 - 10 V					3				
2 - 10 V					4				
0 - 20 mA and 0 - 10 V					5				
4 - 20 mA and 2 - 10 V					6				
Special ranges					9				
0 - 10 mA					A				
0 - 5 mA					B				
-20 - 0 - 20 mA					C				
-10 - 0 - 10 V					D				
-20 - 0 - 20 mA and -10 - 0 - 10 V					E				
according to specification					Z				
4. Accuracy									
±0.5% of full scale						1			
±0.2% of full scale						2			
5. Setting time									
500 ms							1		
250 ms							2		
100 ms							3		
6. Auxiliary energy									
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 protocols									
Without test protocol									0
With test protocol German_English									1



2 outputs on request

Block circuit diagram





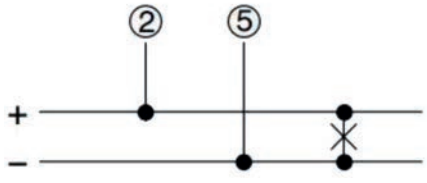
T. Function
1 I_E (+)
3 I_E (–)
2 U_E (+)
5 U_E (–)
16 U_H L1(+)
17 U_H N (–)

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

I_E current input
U_E voltage input
U_H auxilliary voltage input
The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

I_A current output
U_A voltage output

Terminal assignment

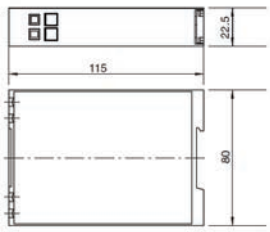


Connection diagram

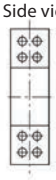
Mt-G.oH

Isolating transducer for standard signals without auxiliary energy

Front view



Side view



(Dimensions in mm)

Characteristics / benefits

- Without auxiliary power supply
- Assembly enclosure for top-hat rail TH 35 according to DIN EN 60 715
- Measurement input: Direct current
- Measurement output: Unipolar, live-zero and bipolar output variables and output with direct current

Application:

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

Functional principle:

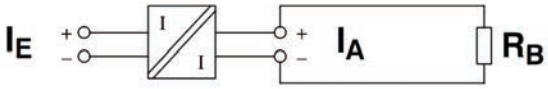
Input and output current are galvanically isolated from one another without additional auxiliary energy. The energy required for this is drawn from the input signal. The input resistance is therefore dependent on the input current and the connected load resistance R_B.

Technical parameters:

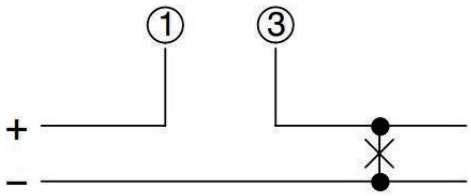
Measurement input		Nominal conditions	
Input variable I_{EN}	I_{EN} = 20 mA	Load	250 Ω ±1%
Internal consumption	2.4 V at 20 mA	Ambient temperature	23 °C ±1 K
Overload capacity	Max. 2 I_{EN} continuous	Warm-up time	≥ 5 min
Measurement output		Test voltage	2210 V all circuits against housing
Rated current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

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

Features	Order number					
Mt-G.oH, Measuring transducer for standard signals without auxiliary energy Order no. NMU32 – xxxxxx	NMU	32 –	X	X	X	X
1. Application						
0 - 20 mA for 1 standard signal			1			
2. Input measuring range						
0 - 20 mA				A		
3. Output						
0 - 20 mA					1	
4. Test protocols						
Without test protocol						0
With test protocol German_English						1



Schematic diagram



Connection diagram

front view

Clamp		TUP 2.0
		1 - Kanal
A	1	I_E (+)
B	3	I_E (–)
C		I_A (+)
D		I_A (–)
E		–
F		–
G		–
H		–

Terminal assignment

I_E Power input
I_A Current output

NEW

MTI

Measuring transducer for sinusoidal and non-sinusoidal alternating current with digital measurement output via Modbus-RTU / RS 485

Characteristics / benefits

- Measurement output as double output, switchable: 0(4) - 20 mA and 0(2) - 10 V
- With auxiliary power supply
- Assembly enclosure for top-hat rail 35 mm according to DIN EN 60 715
- Measurement output: Unipolar and live-zero output variables
- AC or DC auxiliary energy
- Measuring range and outputs easily switchable via DIP switch

Application:

Measuring transducer for converting sinusoidal and non-sinusoidal (distorted) alternating current. A load-independent direct current signal and an impressed direct voltage signal with action proportional to the measured value of the input variable are available as output signal. Both outputs are switchable between 0 - 20 mA and 4 - 20 mA or 0 - 10 V and 2 - 10 V.

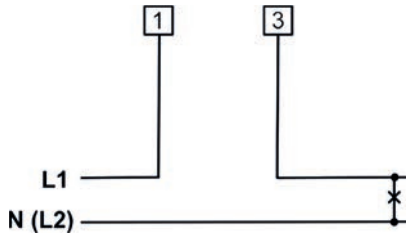
Technical parameters:

Measurement input		**Accuracy**	
Rated frequency f_N	50 Hz or 60 Hz	Basic accuracy	± 0.5% at 0 - 120% of nominal value I_N
Input rated current I_N	0 - 1 A or 0 - 5 A switchable Higher currents on request	Temperature range	-20 °C to +70 °C
		Temperature influence	< 0.05% at 10 K
Measuring range	0 - 1.2 A or 0 - 6 A	Humidity	10 - 70% rel. humidity, non-condensing
Load	0.01 Ω	**Auxiliary energy**	
Overload capacity	2 · I_N, continuous 20 · I_N, 1 sec.	Alternating voltage	100 - 277 V AC, 47 - 63 Hz Condensing
Measurement output 0(4) - 20 mA		Direct voltage	24 V DC, ± 15%
Load-independent direct current (0 - 1.2 A or 0 - 6 A)	0 - 24 mA / 750 Ω load or live-zero 4 - 23.2 mA / 750 Ω load	Auxiliary voltage influence	No
		Internal consumption	< 1.4 W @ 24 V DC < 2 VA @ 230 V AC
Load-independent direct current at I_N max.	20 mA / 750 Ω load	Waveform	Non-sinusoidal, crest factor < 4
Open-circuit voltage	max. 22 V	**Safety**	
Current limitation	max. 25 mA upon overload	Test voltage	4 kV between input, output, Auxiliary voltage 230 V AC or 1 kV with auxiliary voltage 24 V DC
Measurement output 0(2) - 10 V		Weight	Approx. 110 g
Impressed direct voltage (0 - 1.2 A or 0 - 6 A)	0 - 12 V / ≥ 10 kΩ load or live-zero 2 - 11.6 V / ≥ 10 kΩ load	**General technical data**	
		Protection class	2
Impressed direct current at I_N max.	10 V / ≥ 10 kΩ load	Protection class	IP 20
Voltage limitation	12.5 V upon overload	Measurement category	CAT III
Ripple voltage	< 10 mVpp	**Switching via DIP switch**	
Setting time	< 200 ms	1: DIP active / inactive	OFF = setting according to Modbus
Frequency influence	< 0.05% at 10 Hz Frequency change		ON = setting according to DIP 2, 3, 4
		2: Measuring range	OFF = 1 A
External field influence	No (400 A/m)		ON = 5 A
		3: Measurement output voltage	OFF = 0 - 10 V
Digital interface			ON = 2 - 10 V
Log	Modbus RTU	4: Measurement output current	OFF = 0 - 20 mA
Electric	RS 485		ON = 4 - 20 mA
Cable length	max. 30 m, shielded from 3 m (not cross-building)		

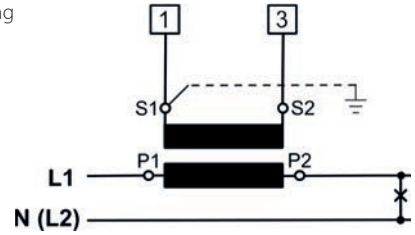
MTI – Measuring transducer for sinusoidal and non-sinusoidal alternating current with digital measurement output via Modbus-RTU / RS 485

Features	Measurement outputs / preconfigured					
	Primary current (A)	0 - 10 V and 0 - 20 mA	0 - 10 V and 4 - 20 mA	2 - 10 V and 0 - 20 mA	2 - 10 V and 4 - 20 mA	Setting via 4-pin DIP switch
1. Auxiliary voltage U_H						
230 V	1 A	100225101	100225102	100225103	100225104	100225100
230 V	5 A	100225105	100225106	100225107	100225108	
24 V	1 A	100225201	100225202	100225203	100225204	100225200
24 V	5 A	100225205	100225206	100225207	100225208	

Direct switching



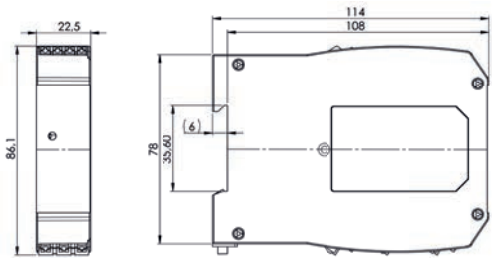
Converter switching



Terminal assignment

Clamp	
1	I_E
3	I_E
7	UH L1 (+)
9	UH N (-)
18	U_A (+)
19	U_A (-)
20	I_A (+)
21	I_A (-)
Modbus RTU	
14	D+
15	D-
16	GND

Dimensioned drawing



DIP switch connection
Rear side

DIP switch

NEW

MTU

Measuring transducer for sinusoidal and non-sinusoidal alternating voltage with digital measurement output via Modbus-RTU / RS 485

Characteristics / benefits

- Measurement output as double output, switchable: 0(4) - 20 mA and 0(2) - 10 V
- With auxiliary power supply
- Assembly enclosure for top-hat rail 35 mm according to DIN EN 60 715
- Measurement output: Unipolar and live-zero output variables
- AC or DC auxiliary energy
- Measuring range and outputs easily switchable via DIP switch

Application:

Measuring transducer for converting sinusoidal and non-sinusoidal (distorted) alternating voltage. A load-independent direct current signal and an impressed direct voltage signal with action proportional to the measured value of the input variable are available as output signal. Both outputs are switchable between 0 - 20 mA and 4 - 20 mA or 0 - 10 V and 2 - 10 V.

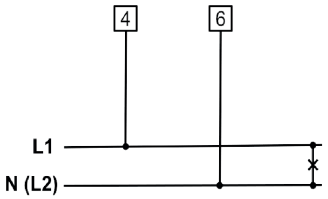
Technical parameters:

Measurement input		**Accuracy**	
Rated frequency f_N	50 Hz or 60 Hz	Basic accuracy	± 0.5% at 0 - 120% of nominal value U_N
Input rated voltage U_N	0 - 250 V or 0 - 500 V switchable	Temperature range	-20 °C to +70 °C
		Temperature influence	< 0.05% at 10 K
Measuring range	0 - 300 V or 0 - 600 V	Humidity	10 - 70% rel. humidity, non-condensing
Overload capacity	4 · U_N, continuous	**Auxiliary energy**	
Internal resistance	4 MΩ	Alternating voltage	100 - 277 V AC, 47 - 63 Hz Condensing
Measurement output 0(4) - 20 mA		Direct voltage	24 V DC, ± 15%
Load-independent direct current (0 - 300 V or 0 - 600 V)	0 - 24 mA / 750 Ω load or live-zero 4 - 23.2 mA / 750 Ω load	Auxiliary voltage influence	No
		Internal consumption	< 1.4 W @ 24 V DC < 2 VA @ 230 V AC
Load-independent direct current at U_N max.	20 mA / 750 Ω load	Waveform	Non-sinusoidal, crest factor < 4
Open-circuit voltage	max. 22 V	**Safety**	
Current limitation	max. 25 mA upon overload	Test voltage	4 kV between input, output, Auxiliary voltage 230 V AC or 1 kV with auxiliary voltage 24 V DC
Measurement output 0(2) - 10 V		Weight	Approx. 115 g
Impressed direct voltage (0 - 300 V or 0 - 600 V)	0 - 12 V / ≥ 10 kΩ load or live-zero 2 - 11.6 V / ≥ 10 kΩ load	**General technical data**	
Impressed direct voltage at U_N max.	10 V / ≥ 10 kΩ load	Degree of pollution	2
Voltage limitation	12.5 V upon overload	Protection class	2
Ripple voltage	< 10 mVpp	Protection class	IP 20
Setting time	< 200 ms	Measurement category	CAT III
Frequency influence	< 0.05% at 10 Hz Frequency change	**Switching via DIP switch**	
		1: DIP active / inactive	OFF = setting according to Modbus
External field influence	No (400 A/m)		ON = setting according to DIP 2, 3, 4
Digital interface		2: Measuring range	OFF = 250 V
Log	Modbus RTU		ON = 500 V
Electric	RS 485	3: Measurement output voltage	OFF = 0 - 10 V
Cable length	max. 30 m, shielded from 3 m (not cross-building)		ON = 2 - 10 V
		4: Measurement output current	OFF = 0 - 20 mA
			ON = 4 - 20 mA

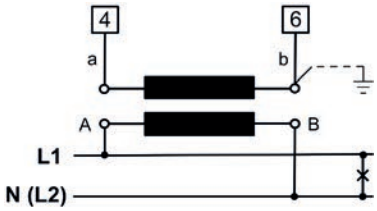
MTU – Measuring transducer for sinusoidal and non-sinusoidal alternating voltage with digital measurement output via Modbus-RTU / RS 485

Features	Measurement outputs / preconfigured					
	Input rated voltage (V)	0 - 10 V and 0 - 20 mA	0 - 10 V and 4 - 20 mA	2 - 10 V and 0 - 20 mA	2 - 10 V and 4 - 20 mA	Setting via 4-pin DIP switches
1. Auxiliary voltage U_H						
230 V	250 V	100225301	100225302	100225303	100225304	100225300
230 V	500 V	100225305	100225306	100225307	100225308	
24 V	250 V	100225401	100225402	100225403	100225404	100225400
24 V	500 V	100225405	100225406	100225407	100225408	

Direct switching



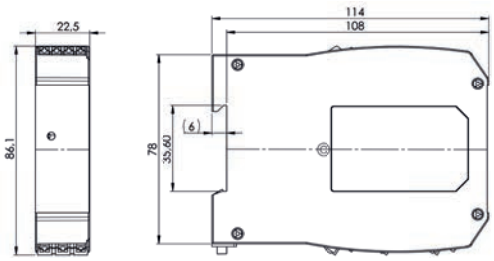
Converter switching



Terminal assignment

Clamp	
4	U_E
6	U_E
7	UH L1 (+)
9	UH N (-)
18	U_A (+)
19	U_A (-)
20	I_A (+)
21	I_A (-)
Modbus RTU	
14	D+
15	D-
16	GND

Dimensioned drawing



DIP switch connection
Rear side

DIP switch

Gilgen, Müller & Weigert (GMW) GmbH & Co. KG

Am Farrnbach 4A
90556 Cadolzburg, Germany

Tel.: 0049 9103 7129 0,
Fax: 0049 9103 7129 207
info@g-mw.de

Managing Director: Prof. Dr. h.c. Wolfgang Gilgen
VAT identification number: DE 815 535 316

For additional information and the most up-to-date catalogue, please visit our website.

Version dated: 2025-01 | Subject to technical modifications without notice | 27867 00562