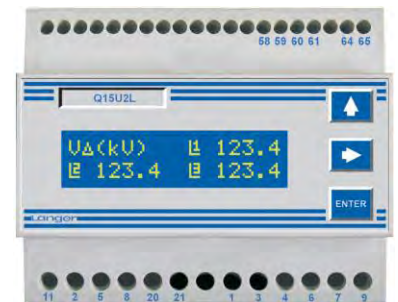
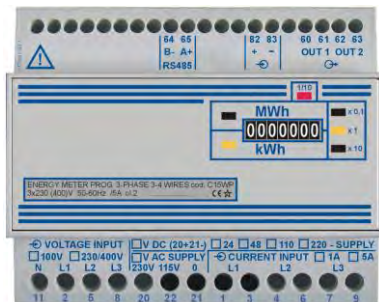
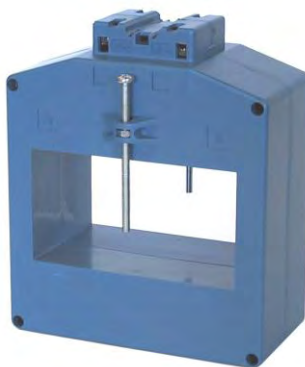
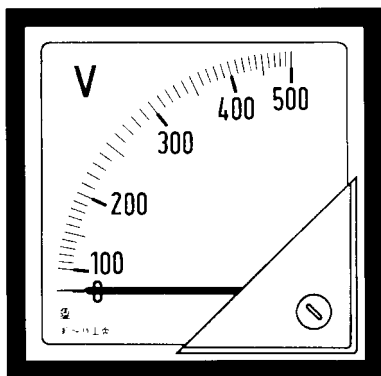


Catalog

2012



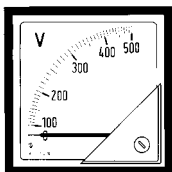


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Static Energy Meter

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AREA 4
Shunts
Current Transformer
Voltage Transformer

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AREA 5
Digital Panel Meter

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AREA 6
Transducer

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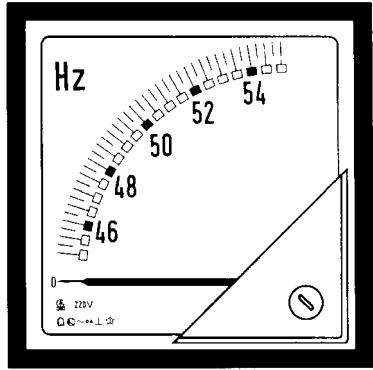
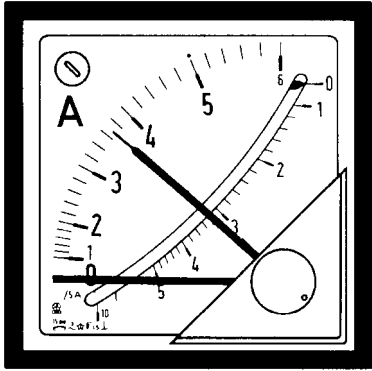
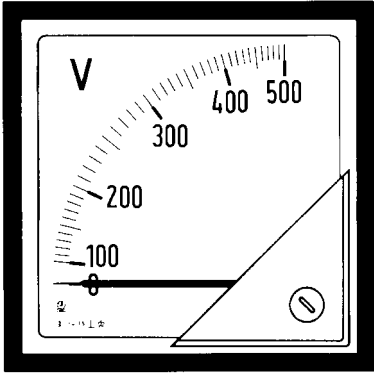


AREA 7
Low Tension Insulators
Modular Busbar System

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AREA 1

Analog Panel Meter



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AREA 1

Analog Panel Meter

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General Information

Engineer standards:

Our measuring instruments and equipment usually correspond to:

general:	IEC 60051	housing:	DIN 43700; DIN 43880
safety:	IEC 61010; VDE 0410	environmental conditions:	IEC 60068; IEC 60654; IEC 60721
protection:	IEC 60529	measurement ranges:	DIN 43701

Housing and panel:

The housing dimensions of the square DIN switchboard instruments are manufactured according to **DIN 43 700**.

The front frames and the housing of the square DIN switchboard instruments are made of ABS-synthetic material, self-extinguishing.

The front frames are also available similar RAL 7037.

Pointer and front glass:

We are using a beam-shaped pointer with a knife end. Square DIN switchboard instruments are available with a red tolerance pointer.

The front glass of the square DIN switchboard instruments is available as low-reflecting glass.

Protection:

Front IP52, for an additional price IP54, IP55; IP65 – if possible.

Back IP00. Terminal cover included.

Temperature conditions:

Standard configuration climatic class 2:

The reference temperature for class accuracy is +20°C.

Operating temperature : -25°C to +50°C

Transport and storage temperature: -40°C to +80°C

Climatic change: relative humidity max. 85% (temperature max. 35°C) only for 60 days a year; Average annual humidity 65%.

Special realization climatic class 3 according to VDE 3540 "tropicalized":

The reference temperature for class accuracy is +20°C.

Operating temperature : -25°C to +60°C

Climatic change: relative humidity max. 95% (temperature max. 35°C) only for 30 days a year; Average annual humidity 75%.

Test voltage:

Test voltage is 2kV/50Hz for 1 minute. This allows a max. operating voltage of 660 V.

Mark of conformity: ☆

Overload:

Ammeters continuously 1,2-times and instantaneous 10-times for 5 sec.

Voltmeters continuously 1,2-times and instantaneous 2-times for 5 sec.

Measuring ranges:

The measuring ranges refer to the standardized numbers according to DIN 43 701

(1 - 1,2 - 1,5 - 2 - 3 - 4 - 5 - 6 - 8 and their decimal multiple).

Accuracy and operating positions:

The accuracy refers class 1,5 according to DIN 43 780. Raising to accuracy class 1% is possible for some types. The class accuracy is only applicable for the operating position shown by relevant sign on the instrument. The class accuracy is printed on the scale.

The normal operating position of the panel instruments is vertical.



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General Information

Panel Meter with Moving Iron

Moving iron instruments are usually used for alternating current and voltage with frequencies from 40-60 Hz special realizations 400Hz.

The measuring of direct current and voltage affects an additional error of 1% .

Moving iron instruments indicate TRMS values.

The measuring range starts at 20% of the full scale value.

Measuring range:

The measuring ranges refer to the standardized number according to DIN 43 701:

1 - 1,5 - 2 - 2,5 - 4 - 6 und their decimal multiple.

For connection on current transformer the measuring ranges are:

1 - 1,2 - 1,5 - 2 - 2,5 - 3 - 4 - 5 - 6 - 7,5 - 8 and their decimal multiple.

Accuracy:

The accuracy refers class 1,5 according to DIN 43 780.

Rising to accuracy class 1% is possible for some types.

Panel Meter with Moving Coil

Moving coil instruments are usually used for direct current and voltage.

Moving coil instruments with rectifier indicate the arithmetic mean of the current. The calibration is based on TRMS-values with sinusoidal alternating current.

Measuring range:

The measuring ranges refer to the standardized number according to DIN 43 701:

1 - 1,5 - 2 - 2,5 - 4 - 6 and their decimal multiple.

For connection on shunts the measuring ranges are:

1 - 1,2 - 1,5 - 2 - 2,5 - 3 - 4 - 5 - 6 - 7,5 - 8 and their decimal multiple.

Accuracy:

The accuracy refers class 1,5 according to DIN 43 780.

Rising to accuracy class 1% is possible for some types.

Wattmeter and Varmeter

The measuring ranges should be chosen between the 0,6- and 1,2-times value of the calculated apparent power.

$N = \sqrt{3} \times U \times I \times (0,6-1,2)$.

W (Watt), kW (kilowatt) or MW (Megawatt) for active power.

var (var), kvar (kilovar) or Mvar (Megavar) for reactive power.

Zero point in the center of the scale is available.

Rising to accuracy class 1% is possible for some types.

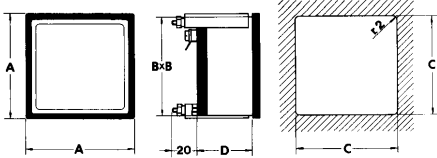
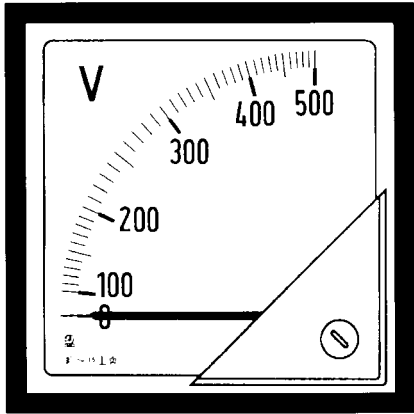
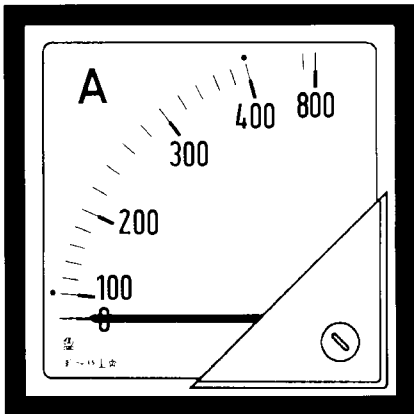
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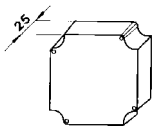
Analog Panel Meter 90° with Moving Iron for Alternating Current and Voltage



dimensions and weight

	48E	72E	96E	144E
A/mm	48	72	96	144
B/mm	44	67	91	137
C/mm	45	68	92	138
D/mm	46	46	46	50
kg	0,150	0,200	0,250	0,500

terminal cover



TECHNICAL DATA

Square panel meter with moving iron;
90° indicator deflection; according to DIN 43 780

accuracy (class)	±1,5% (DIN 43 780)
self-consumption: <i>ammeters</i>	approx. 1VA (5A)
<i>voltmeters</i>	approx. 1VA (100V)
operating voltage	660V
operating frequency	45...65Hz (special 400Hz)
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-40...80°C
manufactured according to	DIN, VDE, IEC, CEI

Input	Scale	Order Code			
		48E	72E	96E	144E
1A	1/2A				
1,5A	1,5/3A				
2,5A	2,5/5A				
4A	4/8A				
6A	6/12A				
10A	10/20A				
15A	15/30A				
25A	25/50A				
40A	40/80A				
60A	60/120A				
<i>transformer</i>	<i>standard scale *)</i>				
sec. 1A	10/20A - 8/16kA				
sec. 5A	10/20A - 8/16kA				
40V	40V				
60V	60V				
100V	100V				
150V	150V				
250V	250V				
400V	400V				
500V	500V				
600V	600V				
<i>transformer</i>	<i>standard scale *)</i>				
100/110V					

*) *standard scale* 10A 15A 20A 25A 30A 40A 50A 60A 80A 100A
and their decimal multiple
1kV 1,5kV 2kV 2,5kV 3kV 4kV 5kV 6kV 8kV 10kV
Overload scale for moving iron instruments are 100%:
20A 30A 40A 50A 60A 80A 100A 120A 160A 200A

Ordering Information

- Order Code
- Measurement Range and Standard Scale
- Special scale realizations are possible;
please inform us about the labeling

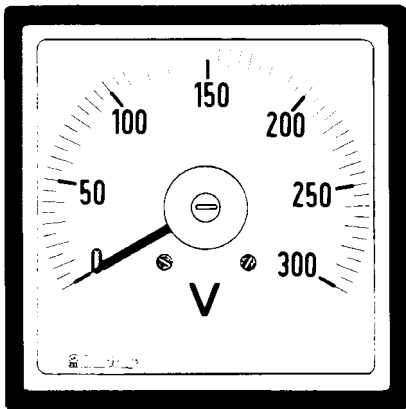
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Analog Panel Meter 240° with Moving Coil and Rectifier for Alternating Current and Voltage



TECHNICAL DATA

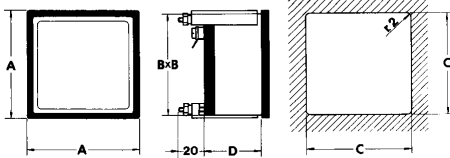
Square panel meter with moving coil and rectifier;
240° indicator deflection; according to DIN 43 780

accuracy (class)	±1,5% DIN 43 780
self-consumption: <i>ammeters</i>	approx. 1,5VA (5A)
<i>voltmeters</i>	approx. 1VA (100V)
operating voltage	660V
operating frequency	45...65Hz (special 400Hz)
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-40...80°C
manufactured according to	DIN, VDE, IEC, CEI

Input	Scale	Order Code			
		A48E	A72E	A96E	A144E
1A	1/2A				
1,5A	1,5/3A				
2,5A	2,5/5A				
4A	4/8A				
6A	6/12A				
<i>transformer</i>	<i>standard scale *)</i>				
sec. 1A	10/20A - 8/16kA				
sec. 5A	10/20A - 8/16kA				

40V	40V
60V	60V
100V	100V
150V	150V
250V	250V
400V	400V
500V	500V
600V	600V
<i>transformer</i>	<i>Standard scale *)</i>
100/110V	

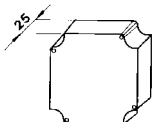
*) <i>standard scale</i>	10A	15A	20A	25A	30A	40A	50A	60A	80A	100A
	1kV	1,5kV	2kV	2,5kV	3kV	4kV	5kV	6kV	8kV	10kV
	and their decimal multiple									
	Overload scale for moving coil and rectifier are 100%:									
	20A	30A	40A	50A	60A	80A	100A	120A	160A	200A



dimensions and weight

	A48E	A72E	A96E	A144E
<i>A/mm</i>	48	72	96	144
<i>B/mm</i>	44	67	91	137
<i>C/mm</i>	45	68	92	138
<i>D/mm</i>	46	46	46	50
<i>kg</i>	0,200	0,250	0,300	0,550

terminal cover



Ordering Information

- Order Code
- Measurement Range and Standard Scale
- Special scale realizations are possible;
please inform us about the labeling

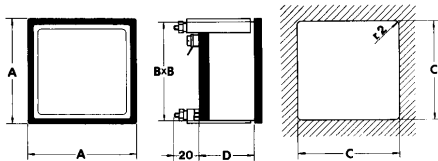
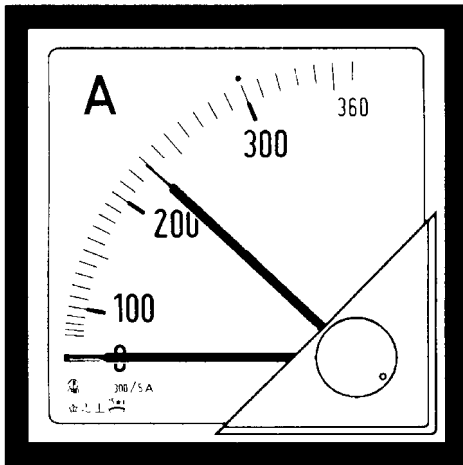
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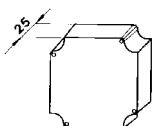
Analog Bimetallic Panel Meter 90° for Alternating Current



dimensions and weight

	72T	96T	144T
<i>A/mm</i>	72	96	144
<i>B/mm</i>	67	91	137
<i>C/mm</i>	68	92	138
<i>D/mm</i>	46	46	50
kg	0,200	0,250	0,450

terminal cover



TECHNICAL DATA

**Square bimetallic panel meter;
90° indicator deflection; according to DIN 43 780**

accuracy (class)	±3%
self-consumption	approx. 2,0VA (5A)
operating voltage	660V
delay time	8 or 15 min.
operating frequency	45...65Hz
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-40...80°C
manufactured according to	DIN, VDE, IEC, CEI

Input	Scale	Order Code		
<i>transformer</i>				
sec. 1A	<i>standard scales</i>	72T	96T	144T
sec. 5A	<i>standard scales</i>	72T	96T	144T

The following standard scales are available without an additional price:

primary

current: 10A 12A 15A 20A 25A 30A 40A 50A 60A 80A 100A
and their decimal multiple

Overload scales for bimetallic instruments are 20%:

12A 14,4A 18A 24A 30A 36A 48A 60A 72A 96A 120A

Ordering Information

- Order Code
- Delay Time 8 or 15 Minutes
- Current Transformer sec. 1A or 5A
- Standard Scale
- Special scale realizations are possible;
please inform us about the labeling

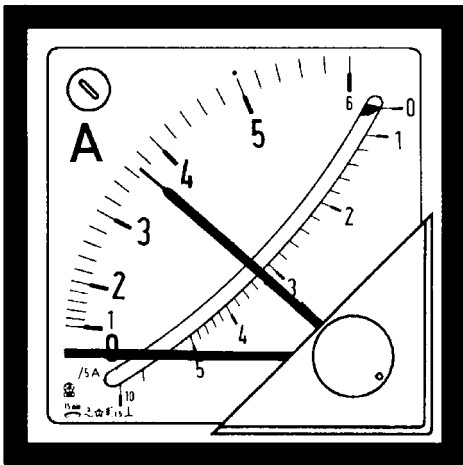
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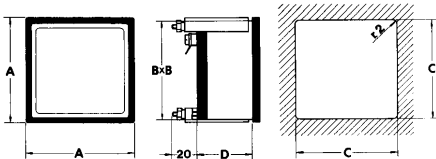
Analog Bimetallic Panel Meter 90° combined with Moving Iron for Alternating Current



TECHNICAL DATA

Square bimetallic panel meter combined with moving iron;
90° indicator deflection; according to DIN 43 780

accuracy (class)	±3% (bimetallic) ±1,5% (moving iron)
self-consumption	approx. 2,5VA (5A)
operating voltage	660V
delay time	8 or 15 min.
operating frequency	45...65Hz
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-40...80°C
manufactured according to	DIN, VDE, IEC, CEI



dimensions and weight

	72TE	96TE	144TE
A/mm	72	96	144
B/mm	67	91	137
C/mm	68	92	138
D/mm	46	46	50
kg	0,250	0,300	0,500

Input	Scale	Order Code		
<i>transformer</i>				
sec. 1A	<i>standard scales</i>	72TE	96TE	144TE
sec. 5A	<i>standard scales</i>	72TE	96TE	144TE

The following standard scales are available without an additional price:

Bimetallic scale:

primary

current: 10A 12A 15A 20A 25A 30A 40A 50A 60A 80A 100A
and their decimal multiple

Overload scales for bimetallic instruments are 20%:

12A 14,4A 18A 24A 30A 36A 48A 60A 72A 96A 120A

Moving iron scale:

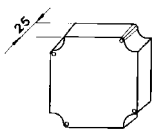
primary

current: 10A 15A 20A 25A 30A 40A 50A 60A 80A 100A
and their decimal multiple

Overload scale for moving iron instruments are 100%:

20A 30A 40A 50A 60A 80A 100A 120A 160A 200A

terminal cover



Ordering Information

- Order Code
- Delay Time 8 or 15 Minutes
- Current Transformer sec. 1A or 5A
- Standard Scale
- Special scale realizations are possible;
please inform us about the labeling

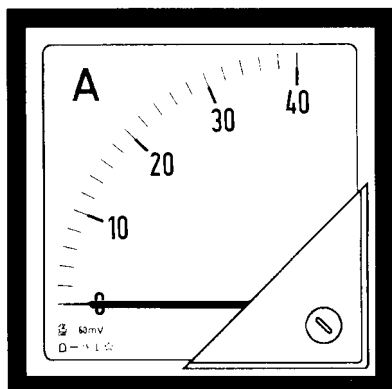
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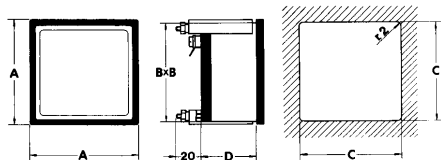
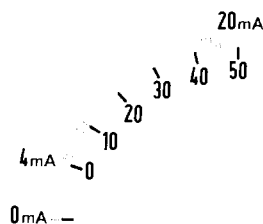
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Analog Panel Meter 90° with Moving Coil for Direct Current and Direct Voltage



1) Scale marked from 4..20mA and blank from 0..4mA:



dimensions and weight

	48M	72M	96M	144M
A/mm	48	72	96	144
B/mm	44	67	91	137
C/mm	45	68	92	138
D/mm	46	46	46	50
kg	0,150	0,180	0,200	0,450

TECHNICAL DATA

Square panel meter with moving coil;
90° indicator deflection, according to DIN 43 780

accuracy (class)	±1,5% (DIN 43 780)
self-consumption: <i>ammeters</i>	approx. 60mV (10mA...60A)
<i>voltmeters</i>	approx. 1mA (1000Ω/V)
operating voltage	660V
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-40...80°C
manufactured according to	DIN, VDE, IEC, CEI

Input	Scale	Order Code			
		48M	72M	96M	144M
100-150μA	100-150μA				
250-400-600μA	250-400-600μA				
1-1,5-2,5-4-6mA	1-1,5-2,5-4-6mA				
10-15-20-25-40	10-15-20-25-40				
60-100-150-250	60-100-150-250				
400-600mA	400-600mA				
0..4..20mA ¹⁾	<i>standard scales *)</i>				
1-1,5-2,5-4-6A	1-1,5-2,5-4-6A				
10-15-25A	10-15-25A				
40-60A	40-60A				
<i>shunt</i>					
60mV	<i>standard scales **)</i>				
150mV	<i>standard scales **)</i>				
300mV	<i>standard scales **)</i>				
400-600mV	400-600mV				
1-1,5-2,5V	1-1,5-2,5V				
4-6-10V	4-6-10V				
15-25-40-60V	15-25-40-60V				
100-150-250V	100-150-250V				
400-500-600V	400-500-600V				

*) *standard scales* 1 1,5 2 2,5 3 4 5 6 8 10
 **) *standard scales* 10A 15A 20A 25A 30A 40A 50A 60A 80A 100A
 and their decimal multiple

Ordering Information

- Order Code
- Measurement Range and Standard Scale
- Special scale realizations are possible;
please inform us about the labeling

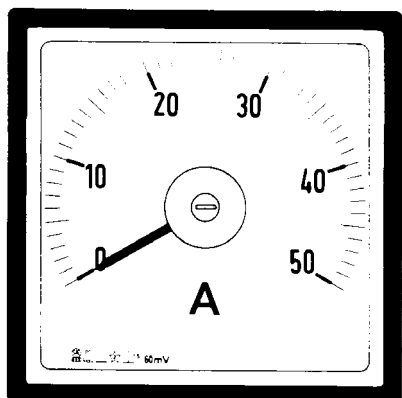
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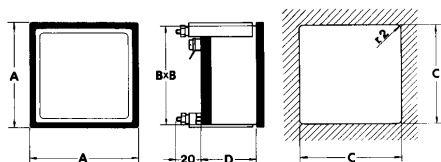
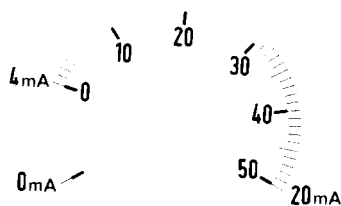
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Analog Panel Meter 240° with Moving Coil for Direct Current and Direct Voltage



1) Scale marked from 4..20mA and blank from 0..4mA:



dimensions and weight

	A48M	A72M	A96M	A144M
A/mm	48	72	96	144
B/mm	44	67	91	137
C/mm	45	68	92	138
D/mm	46	46	46	50
kg	0,200	0,250	0,300	0,550

TECHNICAL DATA

Square panel meter with moving coil;
240° indicator deflection; according to DIN 43 780

accuracy (class)	±1,5% (DIN 43 780)
self-consumption: <i>ammeters</i>	approx. 60mV (10mA...60A)
<i>voltmeters</i>	approx. 1mA (1000Ω/V)
operating voltage	660V
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-40...80°C
manufactured according to	DIN, VDE, IEC, CEI

Input	Scale	Order Code
<i>A48M A72M A96M A144M</i>		
250-400-600μA	250-400-600μA	
1-1,5-2,5-4-6mA	1-1,5-2,5-4-6mA	
10-15-20-25-40	10-15-20-25-40	
60-100-150-250	60-100-150-250	
400-600mA	400-600mA	
0..4..20mA ¹⁾	<i>standard scales *)</i>	
1-1,5-2,5-4-6A	1-1,5-2,5-4-6A	
<i>shunt</i>		
60mV	<i>standard scales **)</i>	
150mV	<i>standard scales **)</i>	
300mV	<i>standard scales **)</i>	
400-600mV	400-600mV	
1-1,5-2,5V	1-1,5-2,5V	
4-6-10V	4-6-10V	
15-25-40-60V	15-25-40-60V	
100-150-250V	100-150-250V	
400-500-600V	400-500-600V	
<i>*) standard scales</i>	1 1,5 2 2,5 3 4 5 6 8 10	
<i>**) standard scales</i>	10A 15A 20A 25A 30A 40A 50A 60A 80A 100A	
	and their decimal multiple	

Ordering Information

- Order Code
- Measurement Range and Standard Scale
- Special scale realizations are possible;
please inform us about the labeling

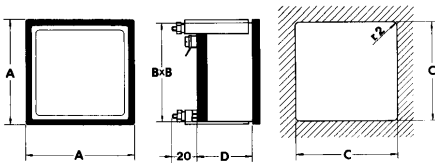
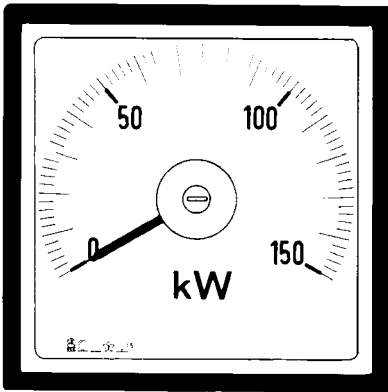
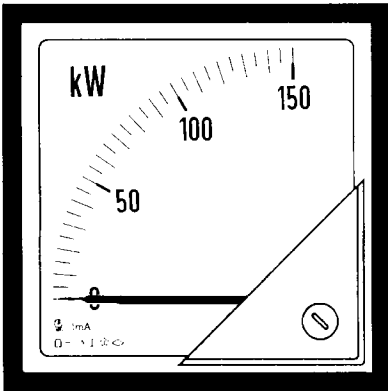
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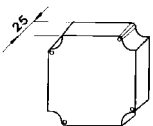
Panel Wattmeter and Varmeter 90°/240° with External Transducer



dimensions and weight

	(A)48W	(A)72W	(A)96W	(A)144W
A/mm	48	72	96	144
B/mm	44	67	91	137
C/mm	45	68	92	138
D/mm	46	46	46	50
kg	0,150	0,180	0,200	0,450

terminal cover



TECHNICAL DATA

Square panel wattmeter and varmeter with external transducer, 90° and 240° indicator deflection; according to DIN 43 780

accuracy (class)	±1,5% (DIN 43 780)
self-consumption: <i>current</i>	approx. 0,5VA (5A)
<i>voltage</i>	approx. 3VA (100V)
operating frequency	45...65Hz
operating voltage	660V
test voltage	2kV-50Hz-60s
load impedance	max. 100Ω
operating temperature	-25...50°C
storage temperature	-40...80°C
manufactured according to	DIN, VDE, IEC, CEI

Input Current:	1A or 5A (current transformer)
Input Voltage:	100/110V, 230V, 400V or 440V

Active power meter for single-phase:

90° indicator deflection:	48WSM	72WSM	96WSM	144WSM
240° indicator deflection:	A48WSM	A72WSM	A96WSM	A144WSM

Active power meter three-phase three-wires circuits with balanced load:

90° indicator deflection:	48WY	72WY	96WY	144WY
240° indicator deflection:	A48WY	A72WY	A96WY	A144WY

Active power meter three-phase four-wires circuits with balanced load:

90° indicator deflection:	48WST	72WST	96WST	144WST
240° indicator deflection:	A48WST	A72WST	A96WST	A144WST

Active power meter three-phase three wires circuits with unbalanced load:

90° indicator deflection:	48WD	72WD	96WD	144WD
240° indicator deflection:	A48WD	A72WD	A96WD	A144WD

Active power meter three phase four wires circuits with unbalanced load:

90° indicator deflection:	48WDT	72WDT	96WDT	144WDT
240° indicator deflection:	A48WDT	A72WDT	A96WDT	A144WDT

For varmeter please replace letter „W“ with letter „R“ when ordering!

Ordering Information

- Order Code
- Current Transformer, Input Voltage
- Scale

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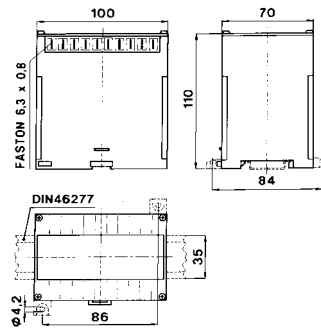
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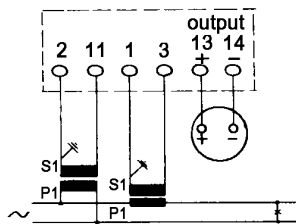
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Wiring Diagrams for Wattmeter and Varmeter

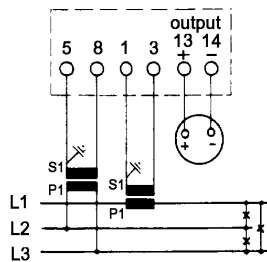
dimension of transducer:



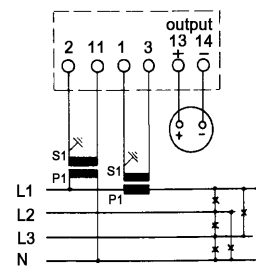
wattmeter and varmeter for single phase



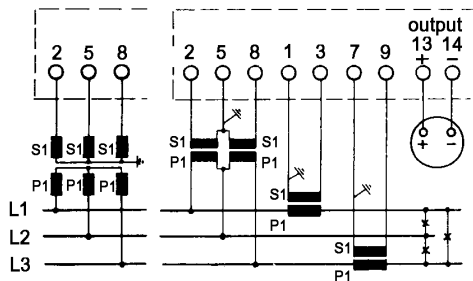
wattmeter and varmeter for
three-phase three-wires balanced load



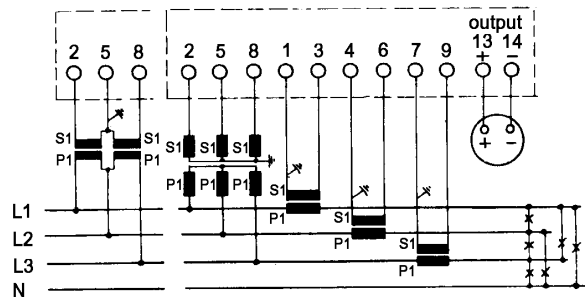
wattmeter and varmeter for
three-phase four wires balanced load



wattmeter and varmeter for
three-phase three-wires unbalanced load



wattmeter and varmeter for
three-phase four-wires unbalanced load



UP TO 440V THERE IS NO VOLTAGE TRANSFORMER NECESSARY!

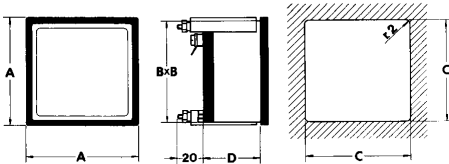
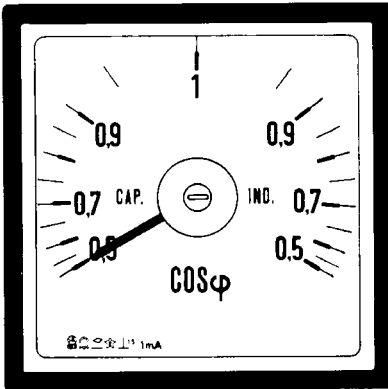
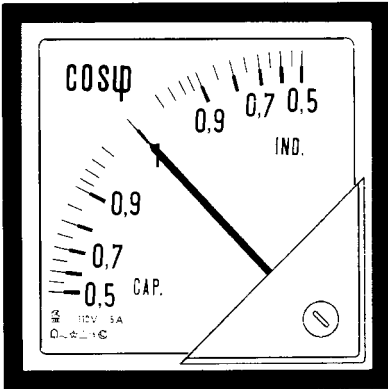
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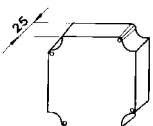
Panel Power Factor Meter 90°/240° with External Transducer



dimensions and weight

	(A)48P.	(A)72P.	(A)96P.	(A)144P
A/mm	48	72	96	144
B/mm	44	67	91	137
C/mm	45	68	92	138
D/mm	46	46	46	50
kg	0,150	0,180	0,200	0,450

terminal cover



TECHNICAL DATA

Square panel power factor meter with external transducer, 90° and 240° indicator deflection; according to DIN 43 780

accuracy (class)	±1,5% (DIN 43 780)
self-consumption: <i>current</i>	approx. 0,5VA (5A)
<i>voltage</i>	approx. 3VA (100V)
operating frequency	45...65Hz
voltage tolerance	±20% Un
current tolerance	5...120% In
operating voltage	660V
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-40...80°C
manufactured according to	DIN, VDE, IEC, CEI

Power factor meter are used to show the proportion between active and reactive power in three-phase systems or similar systems.

Input Current: 1A or 5A (current transformer)
Input Voltage: 100/110V, 230V, 400V or 440V

Power factor meter for single-phase:

90° indicator deflection: 48PS * 72PS 96PS 144PS

240° indicator deflection: A48PS * A72PS A96PS A144PS

Power factor meter for three-phase three-wires balanced load:

90° indicator deflection: 48PY * 72PY 96PY 144PY

240° indicator deflection: A48PY * A72PY A96PY A144PY

*) types with external transducer

Standard realization of cosφ-meter scale: CAP. 0,5...1...0,5 IND.
 Special realization (on request): CAP. 0,8...1...0,2 IND.

Ordering Information

- Order Code
- Current Transformer, Input Voltage and Scale
- Special scale realizations are possible; please inform us about the labeling

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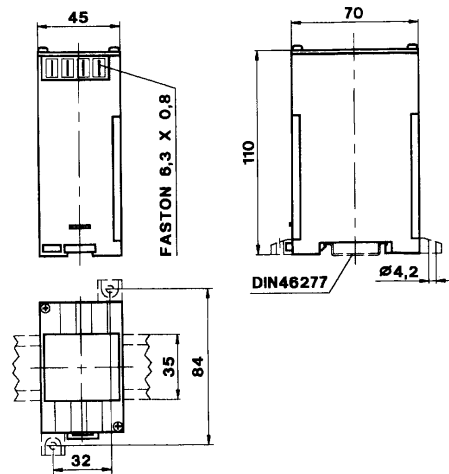
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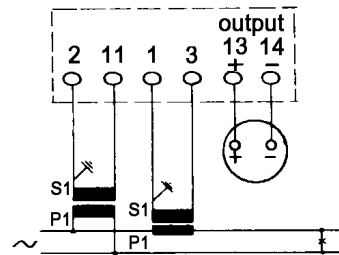
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Wiring Diagrams for Power Factor Meter

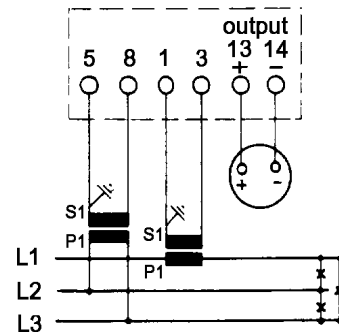
dimension of transducer
48PS – A48PS – 48PY – A48PY:



power factor meter for single phase:



power factor meter for
three-phase three-wires balanced load



UP TO 440V THERE IS NO VOLTAGE TRANSFORMER NECESSARY!

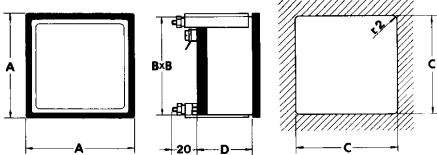
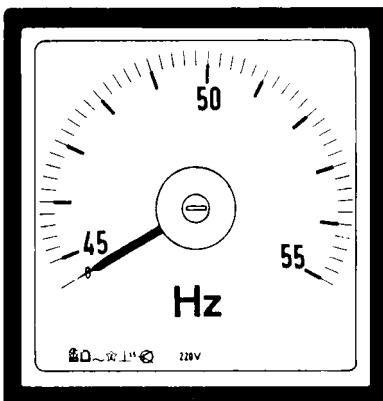
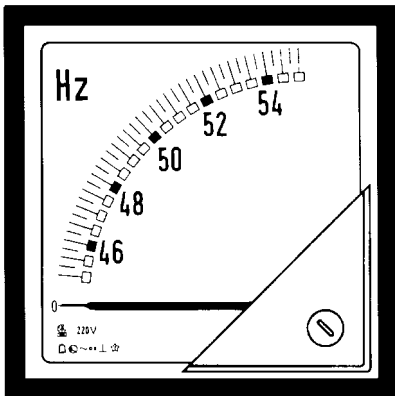
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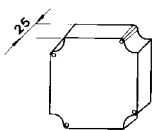
Panel Pointer Frequency Meter 90°/240°



dimensions and weight

	(A)48FI	(A)72FI	(A)96FI	(A)144FI
A/mm	48	72	96	144
B/mm	44	67	91	137
C/mm	45	68	92	138
D/mm	46	46	46	50
kg	0,150	0,180	0,200	0,450

terminal cover



TECHNICAL DATA

Square panel pointer frequency meter,
90° and 240° indicator deflection; according to DIN 43 780

accuracy (class)	±1,5% (DIN 43 780)
self-consumption	5VA (400V)
voltage tolerance	±10%
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-40...80°C
manufactured according to	DIN, VDE, IEC, CEI

Pointer frequency meter have a build-in moving coil instrument and a build-in transducer.

Pointer frequency meter with 90° indicator deflection

Input Voltage: 100/110V, 230V, 400V or 440V

Frequency	Scale	Order Code			
		48FI*)	72FI	96FI	144FI
50Hz	45-55Hz				
60Hz	55-65Hz				
50-60Hz	45-65Hz				
100Hz	90-110Hz				
200Hz	180-220Hz				
400Hz	360-440Hz				

Pointer frequency meter with 240° indicator deflection

Input Voltage: 100/110V, 230V, 400V or 440V

Frequency	Scale	Order Code			
		A48FI*)	A72FI	A96FI	A144FI
50Hz	45-55Hz				
60Hz	55-65Hz				
50-60Hz	45-65Hz				
100Hz	90-110Hz				
200Hz	180-220Hz				
400Hz	360-440Hz				

*) types with external transducer

Ordering Information

- Order Code
- Frequency Range and Input Voltage

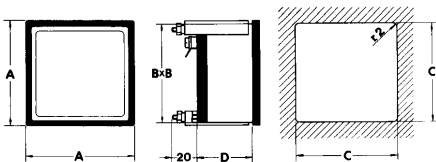
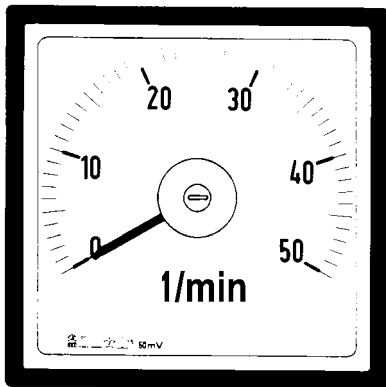
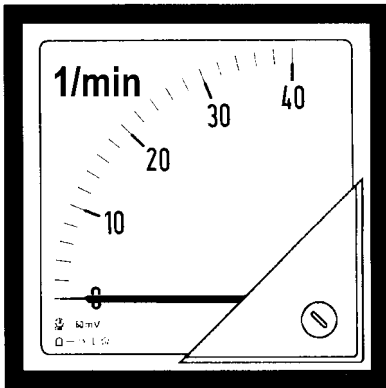
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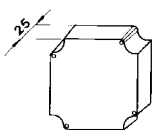
Panel Tachometer 90°/240° with Potentiometer



dimensions and weight

	(A)48D	(A)72D	(A)96D	(A)144D
A/mm	48	72	96	144
B/mm	44	67	91	137
C/mm	45	68	92	138
D/mm	46	46	46	50
kg	0,150	0,180	0,200	0,450

terminal cover



TECHNICAL DATA

Square panel tachometer with moving coil,
90° and 240° indicator deflection; according to DIN 43 780

accuracy (class)	±1,5%
self-consumption	approx. 1mA
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-40...80°C
manufactured according to	DIN, VDE, IEC, CEI

All instruments are provided with build-in potentiometers to adjust for approximately ±10% of the end scale value. The potentiometer is on the back side of the housing.

Instruments with potentiometer for direct voltage

90° indicator deflection				240° indicator deflection			
48D	72D	96D	144D	A48D	A72D	A96D	A144D

Instruments for direct voltage with zero in the center are available.

Instruments with potentiometer and build-in rectifier for alternating voltage

90° indicator deflection				240° indicator deflection			
48DW	72DW	96DW	144DW	A48DW	A72DW	A96DW	A144DW

Calibration in external measurement according curve or table is possible.

The following standard scales are available without an additional price:

Full Scale:

1 1,2 1,5 2 2,5 3 4 5 6 8
and their decimal multiple

Ordering Information

- Order Code
- Max. Voltage Value and Standard Scale
- Special scale realization are possible; please inform us about labeling

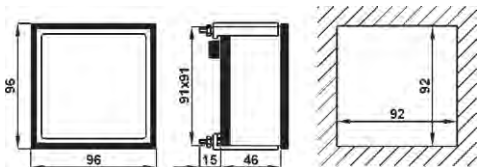
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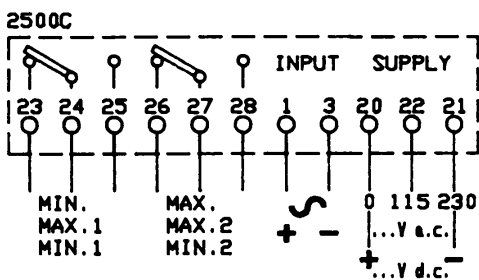
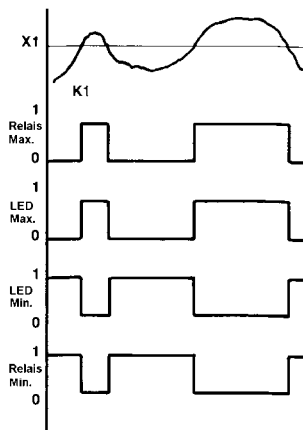
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Panel Meter 90° with Min.-/ Max.-Contact



operating diagram



TECHNICAL DATA

Square panel meter with moving coil, adjustable contacts and 90° indicator deflection

accuracy (class)	1,5%
self-consumption	5VA
alarm indication by	LED
alarm set-point indication by	LED
adjustable delay	0,1...20s
max. relay switch capacity	5A / 230V
continuously overload	2In - 1,2Un
instantaneous overload	10In - 2Un
test voltage	2kV-50Hz-60s
operating temperature	-10...50°C
storage temperature	-30...70°C
manufactured according to	DIN, VDE, IEC, CEI
power supply	115+230V ±10% 50Hz

General information

This type of contact meter is recommended whenever measure and alarm set points have to be read on the same dial.

It is an analog indicator with a 30-led scale running along the normal 90° pointer scale; one or two lighting led stay for set-points indication of one or two alarms.

Input	Order Code	
	1 max.	1 min.
<i>Direct current and voltage</i>		
0-60mV	X96MMV-X	X96MMV-N
0-1V ... 0-600V	X96MV-X	X96MV-N
0-20mA; 4-20mA	X96MMA-X	X96MMA-N
0-1mA ... 0-999mA	X96MMA-X	X96MMA-N
0-1mA ... 0-10A	X96MMA-X	X96MMA-N

<i>Alternating current and voltage</i>		
0-1V ... 0-600V	X96EV-X	X96EV-N
0-1A ... 0-10A	X96EA-X	X96EA-N

Input	Order Code		
	2 max.	1 min. 1 max.	1 max. - 1 max.+
<i>Direct current and voltage</i>			
0-60mV	X96MMV-M	X96MMV-H	X96MMV-E
0-1V ... 0-600V	X96MV-M	X96MMV-H	X96MMV-E
0-20mA; 4-20mA	X96MMA-M	X96MMA-H	X96MMA-E
0-1mA ... 0-999mA	X96MMA-M	X96MMA-H	X96MMA-E
0-1A ... 0-10A	X96MA-M	X96MA-H	X96MA-E

<i>Alternating current and voltage</i>		
0-1V ... 0-600V	X96EV-M	X96EV-H
0-1A ... 0-10A	X96EA-M	X96EA-H

The following standard scales are available without an additional price:

<i>Full Scale:</i>	1	1,2	1,5	2	2,5	3	4	5	6	8
--------------------	---	-----	-----	---	-----	---	---	---	---	---

and their decimal multiple

Ordering Information

- Order Code, Measurement Range and Scale
- DC-Power Supply on Request
- Special scale realizations are possible; please inform us about the labeling

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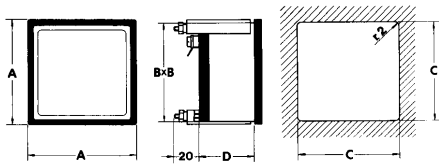
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Hour-Meter with Synchronous Motor

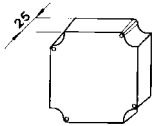
Voltmeter/Ammeter Change-Over Switch



dimensions and weight

	48H	72H	96H
<i>A/mm</i>	48	72	96
<i>B/mm</i>	44	67	91
<i>C/mm</i>	45	68	92
<i>D/mm</i>	46	46	46
<i>kg</i>	0,100	0,180	0,200

terminal cover for 72H and 96H



dimensions: 48x48mm



TECHNICAL DATA

Square panel hour-meter according to DIN 43 780

accuracy (class)	±1,5% (DIN 43 780)
indicator	7-digits (max. 99999,99)
self-consumption	approx. 1VA
operating voltage	660V
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-40...80°C
manufactured according to	DIN, VDE, IEC, CEI

Input	Order Code		
	48H	72H	96H
100/110V 50Hz			
230V 50Hz			
400V 50Hz			
100/110V 60Hz			
230V 60Hz			
400V 60Hz			

Special voltages on request

Ordering Information

- Order Code
- Measurement Range

Voltmeter Change-Over Switch

This voltmeter change-over switch allows indicating different measurements with only one voltmeter. The following measurements are possible:

L3-L1 L2-L3 L1-L2 0 L1-N L2-N L3-N

Order Code:

SPU1

Ammeter Change-Over Switch

This ammeter change-over switch allows indicating different measurements with only one ammeter. The following measurements are possible:

L1 L2 L3 0

Order Code:

AU1

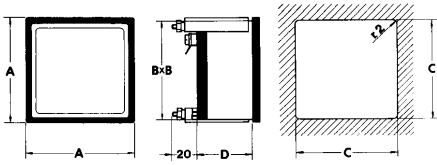
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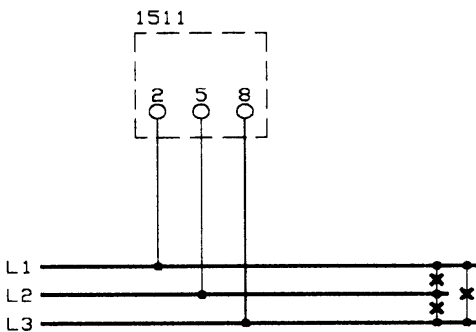
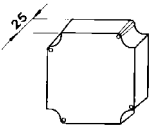
Phase Sequence Meter



dimensions and weight

	72SE	96SE	144SE
A/mm	72	96	144
B/mm	67	91	137
C/mm	68	92	138
D/mm	46	46	46
kg	0,100	0,190	0,280

terminal cover



TECHNICAL DATA

Square phase sequence meter according to DIN 43 780

accuracy (class)	±1,5% (DIN 43 780)
display	light symbols
self-consumption	approx. 1VA
operating voltage	660V
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-40...80°C
manufactured according to	DIN, VDE, IEC, CEI

Description

Correct phase sequence of a three-phase line when the clockwise arrow symbol is lighten; incorrect phase sequence when the counter clockwise arrow symbol is lighten.

The symbols L1, L2 and L3 show the presence of the corresponding line voltage when turned on. Voltage failure on a line is shown by the corresponding symbol turned off and by the two arrow symbols both turned on.

Input

Order Code

72SE

96SE

144SE

100/110V AC

230V AC

400/440V AC

Special voltage realizations on request

Ordering Information

- Order Code
- Measurement Range

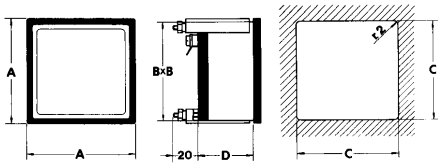
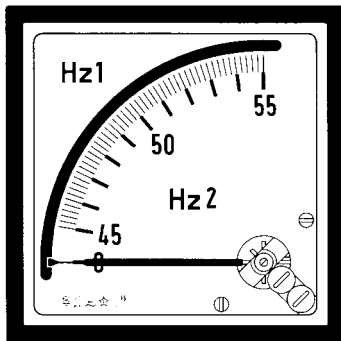
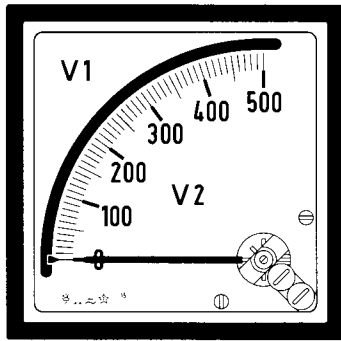
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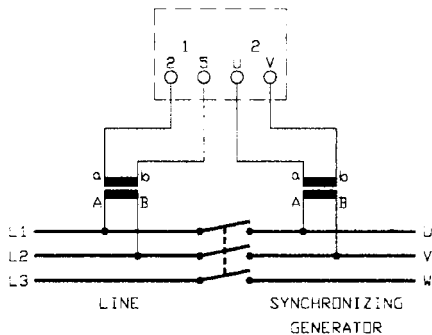
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Panel Double Voltmeter 90° Panel Double Frequency Meter 90°



dimensions und weight					
Type	A/mm	B/mm	C/mm	D/mm	kg
96V2	96	91	92	70	0,45
144V2	144	137	138	70	0,80
96F2	96	91	92	70	0,50
144F2	144	137	138	70	0,80

**Wiring diagram for
double voltmeter and
double frequency meter:**



TECHNICAL DATA

**Square panel double voltmeter and frequency meter.
90° indicator deflection.**

self-consumption (double voltmeter)	1,5VA
self-consumption (frequency meter)	1,5VA
operating frequency	45...65Hz (special 400Hz)
accuracy (double voltmeter)	1,5%
accuracy (frequency meter)	0,5%
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-40...80°C
protection for housing	IP52
protection for terminals	IP00
manufactured according to	DIN, VDE, IEC, CEI

Double Voltmeter

Order Code

Input	Scale	96V2	144V2
100V AC	transformer		
115V AC	transformer		
230V AC	300V		
380V AC	500V		
440V AC	600V		

Double Frequency Meter

Order Code

Input	Scale	96F2	144F2
100V AC	45...55Hz		
115V AC	or		
230V AC	55...65Hz		
380V AC	or		
440V AC	360...440Hz		

Ordering Information

- Order Code
- Input Voltage
- Frequency Range
- Special scale realizations are possible;
please inform us about the labeling

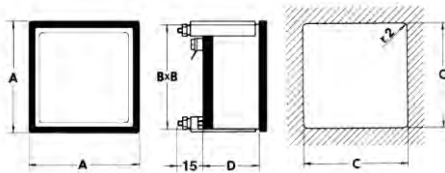
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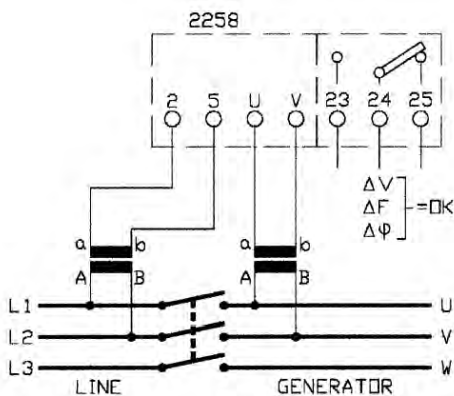
Panel LED-Synchronoskope with Control and Impulse Contact



dimensions and weight

Type	A/mm	B/mm	C/mm	D/mm	kg
96YX	96	91	92	70	0,40
144YX	144	137	138	70	0,50

wiring diagram:



TECHNICAL DATA

synchronoscope indication	28 LEDs
phase delay accuracy (synchronoscope)	0,1rad
self-consumption (synchronoscope)	approx. 3VA
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-30...70°C
protection for housing	IP52
protection for terminals	IP20
manufactured according to	DIN, VDE, IEC, CEI

back side potentiometer:	
- voltage difference	±2,5 ... 20% Un
- phase difference	±5 ... ±25°
- frequency difference	0,1 ... 1Hz

Order Code

Input	96YX	144YX
100-110V AC		
230V		
400V		
440V		

LEDs flashes sequentially in clockwise direction when generator speed is too high in relation to the line, and vice versa.

One single bright LED in random position shows line voltage only. All black LEDs show generator voltage only.

Optimal conditions for synchronizing are (phase and frequency matching) when the central green LED is flashing;

a pulse contact with a length of approx. 100ms will be closed.

Following parameters will be checked:

ΔV:	voltage difference between line and generator
ΔF:	frequency difference between line and generator
ΔΦ:	phase difference between line and generator

The parameters thresholds can be set within the specified limits at the back side of the instrument.

One deviation only results in separation of the synchronization.

Please note:

With all the parameters thresholds set to minimum values, reaching the correct paralleling condition can require long time.

Ordering Information

- Order Code
- Input Voltage
- Operating Frequency

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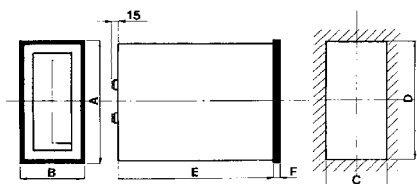
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Panel Profile Indicator for AC and DC



1) scale marked from 4..20mA
and blank from 0..4mA
(price incl. special scale acc. to DIN)



dimensions in mm

Type	A	B	C	D	E	F
PR4824	48	24	21	45,5		
PR7224	72	24	21	69	88	2
PR9624	96	24	22,5	92	95	5
PR9648	96	48	44	93	120	6
PR14472	144	72	68	139	168	5

TECHNICAL DATA

Rectangular panel profile indicator

accuracy (class)	±1,5% (DIN 43 780)
self-consumption: ammeter AC	approx. 1VA (5A)
voltmeter AC	approx. 1VA (100V)
ammeter DC	500mV...60mV
voltmeter DC	approx. 1mA (1000Ω/V)
operating voltage	600V
operating frequency	40...60Hz
test voltage	2kV-50Hz-60s
operating temperature	-10...50°C
storage temperature	-30...70°C
manufactured according to	DIN, VDE, IEC, CEI

Input	Order Code				
	PR4824E	PR7224E	PR9624E	PR9648E	PR14472E
1-1,5-2,5A AC					
4-5-6-10A AC					
current transformer ..1A AC (incl. scale)					
current transformer ..15A AC (incl. scale)					
25-40-60-100V AC					
150-250-300V AC					
400-500-600V AC					
	PR4824M	PR7224M	PR9624M	PR9648M	PR14472M
100-150µA DC					
250-400-600µA DC					
1-1,5-2,5-5-10mA DC					
15-20-25-40mA DC					
0..4..20mA ¹⁾ DC					
60-100-150mA DC					
250-400-600mA DC					
1-1,5-2,5-4-6A DC					
60mV - 150mV DC for shunt (incl. scale)					
400-600mV DC					
1-1,5-2,5-4-6-10V DC					
25-40-60-100-150V DC					
250-400-500-600V DC					

Ordering Information

- Order Code
- Measurement Range
- Vertical or Horizontal Scale
- Special scale realizations are possible;
please inform us about the labeling

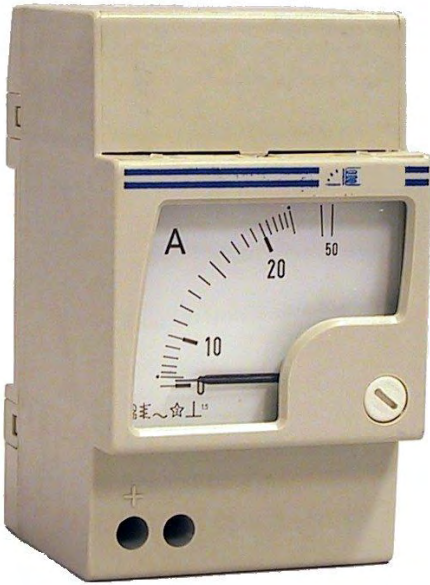
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DIN rail meter with moving iron for Alternating Current and Voltage

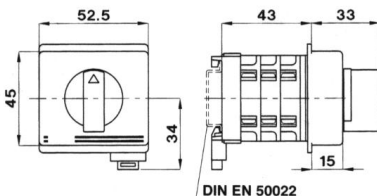
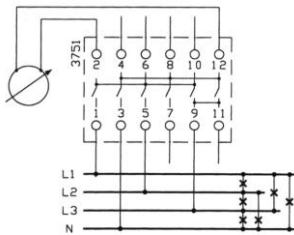
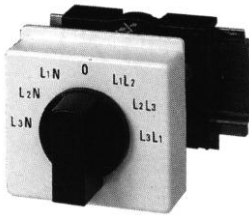


TECHNICAL DATA

DIN rail meter with moving coil (35mm)

accuracy (class)	±1,5% (DIN 43 780)
self-consumption: <i>ammeters</i>	approx. 1VA (5A)
<i>voltmeters</i>	approx. 1,5VA (100V)
operating voltage	600V
operating frequency	45...65Hz
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-40...80°C
protection frontal	IP50
protection circuit points	IP20
weight	approx. 0,15kg
manufactured according to	DIN, VDE, IEC, CEI

Voltmeter change-over switch
Type SPU-3M



Input	Scale	52E
0,5A	0,5/1A	
1A	1/2A	
5A	5/10A	
10A	10/20A	
15A	15/30A	
20A	20/40A	
25A	25/50A	
current transformer ../1A	standard scales 10/20A - 8/16kA	
current transformer ../5A	standard scales 10/20A - 8/16kA	
40V	40V	
60V	60V	
100V	100V	
150V	150V	
250V	250V	
400V	400V	
500V	500V	
600V	600V	
voltage transformer 100/110V	standard scales (please inform us about the measurement range)	

Ordering Information

- Order Code (52E)
- Measurement Range and Standard Scale
- Special scale realizations are possible;
please inform us about the labeling

Voltmeter Change-Over Switch (35mm)

This voltmeter change-over switch allows indicating different measurements with only one voltmeter. The following measurements are possible:

L1-N L2-N L3-N 0 L1-L2 L2-L3 L3-L1

Order Code:

SPU-3M

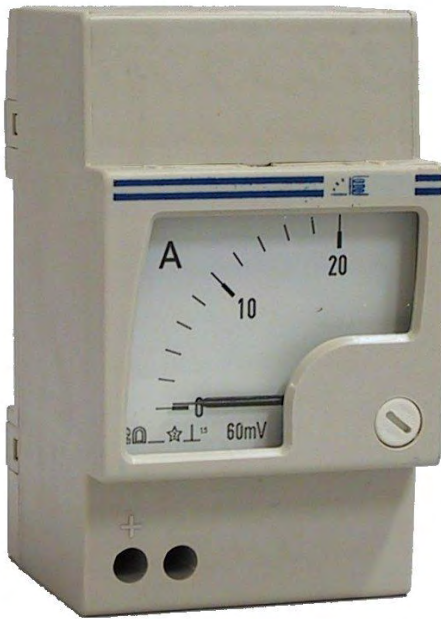
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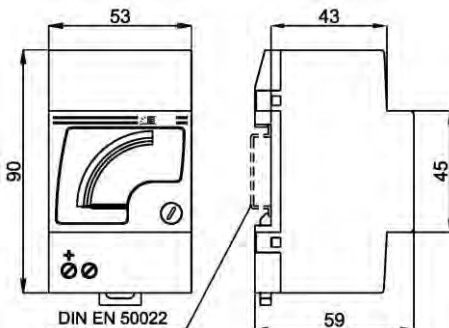
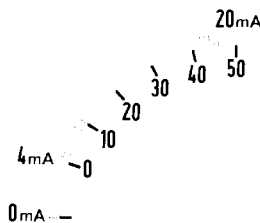
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DIN rail meter with moving coil for Direct Current and Voltage



¹⁾ scale marked from 4..20mA and blank from 0..4mA



TECHNICAL DATA

DIN rail meter with moving coil (35mm)

accuracy (class)	±1,5% (DIN 43 780)
self-consumption: <i>ammeters</i>	approx. 60mV (10mA..60A)
<i>voltmeters</i>	approx. 1mA (1000Ω/V)
operating voltage	600V
test voltage	2kV-50Hz-60s
operating temperature	-25...50°C
storage temperature	-40...80°C
protection frontal	IP50
protection circuit points	IP20
weight	approx. 0,15kg
manufactured according to	DIN, VDE, IEC, CEI

Input	Scale	52M
100-150μA 250-400-600μA	100-150μA 250-400-600μA	
1-1,5-2,5-4-5-6mA 10-15-20-25-40mA 60-100-150-250mA 400-600mA	1-1,5-2,5-4-6mA 10-15-20-25-40mA 60-100-150-250mA 400-600mA	
0..4..20mA ¹⁾	<i>standard scales *)</i>	
1-1,5-2,5-4-6A 10-15-25A	1-1,5-2,5-4-6A 10-15-25A	
shunt 60mV	<i>standard scales **)</i>	
400-600mV	400-600mV	
1-1,5-2,5V 4-6-10V	1-1,5-2,5V 4-6-10V	
15-25-40-60V 100-150-250V 400-500-600V	15-25-40-60V 100-150-250V 400-500-600V	

*) *standard-scales* 10 1,5 2 2,5 3 4 5 6 8 10
 **) *standard scales* 10A 15A 20A 25A 30A 40A 50A 60A 80A 100A
 and their decimal multiple

Ordering Information

- Order Code (52M)
- Measurement Range and Standard Scale
- Special scale realizations are possible;
please inform us about the labeling

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Special Versions - Accessories

Housing:

replacement housing (incl. glass) for meters 48x48, 72x72, 96x96 and 144x144
front frame grey similar to RAL 7037
non reflective glass
front frames with glass and fastening 72x72 or 96x96
front frames with glass and fastening 144x144
plastic panel top for DIN hole 48x48, 72x72 or 96x96
terminal cover VGB4
reference red pointer, externally adjustable (as far as possible)
background lighting (as far as possible)

Protection:

tropicalized according to VDE 3540 Bl.2, class 3
protection IP 54
protection IP 55 (not for every type possible)
protection IP 65 (only for instruments 96x96 and 72x72 with separate housing possible)

Special scales:

moving iron or bimetallic instruments scale according to DIN
special scale for moving coil instruments according to DIN
(1 - 1,2 - 1,5 - 2 - 2,5 - 3 - 4 - 5 - 6 - 7,5 - 8 and their decimal multiple)
special scale for moving coil instruments 4-20mA according to DIN
(1 - 1,2 - 1,5 - 2 - 2,5 - 3 - 4 - 5 - 6 - 7,5 - 8 and their decimal multiple)
special scale for moving coil instruments not according to DIN
special scale for moving coil instruments 4-20mA not according to DIN
red mark at any position of the scale
colored field in any sector of the scale
second division (linear)
second division (not linear)
black scale,
pointer, graduation and numbering yellow or white color

Moving iron instruments for alternating current:

special measurement range not according to DIN
second range with three terminals (as far as possible)
ammeter without overload scale
ammeter with 5-times overload scale
calibration for 400 Hz
shielding up to 4 mT

Moving coil instruments for direct current:

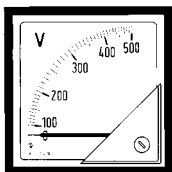
second range with three terminals (as far as possible)
second numbering
zero point mid-scale or eccentric within the scale
increase of input impedance approx. 2 kOhm/V
increase of input impedance approx. 5 kOhm/V
increase of input impedance approx. 10 kOhm/V
calibration of supply impedance by connecting a shunt

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AREA 1
Analog Panel Meter

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AREA 2
Multifunction Meter

page 30 - 40



AREA 3
Static Energy Meter

page 42 - 54



AREA 4
Shunts
Current Transformer
Voltage Transformer

page 56 - 90



AREA 5
Digital Panel Meter

page 92 - 109



AREA 6
Transducer

page 112 - 130



AREA 7
Low Tension Insulators
Modular Busbar System

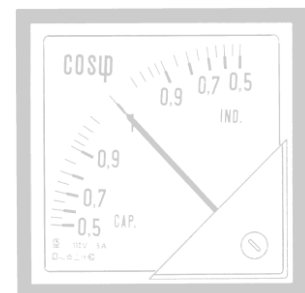
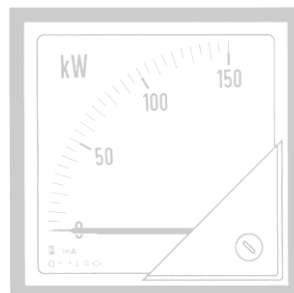
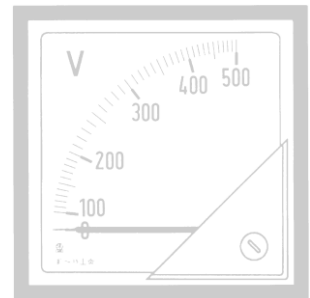
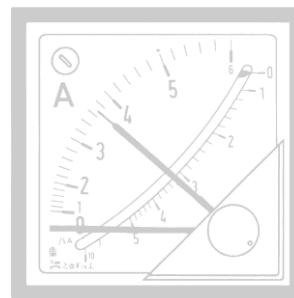
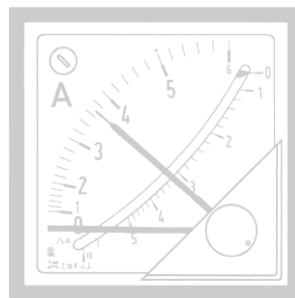
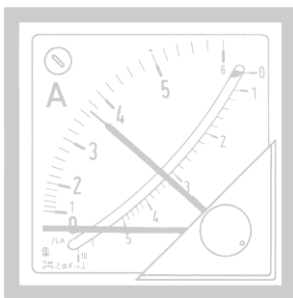
page 132 - 143

Multifunction Meter

**Modern measuring with multifunction meters
in low-voltage switchboards -
one instrument for all measurements !**



**The conventional measuring with a lot of analog instruments
in low-voltage switchboards -
installation and wiring
with an extensive extra work !**



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Multifunction Meter

The range of instruments with a lot of possibilities!
For each case of operation the optimal multifunction meter!

							
Order-Code	Q15UCL Q96UCL	Q96D4	Q96B4W	Q15U2L	Q96U2L	Q96U4L	Q96U4H
Page	32/33	34/35	34/35	36/37	36/37	38/39	38/39
Display	LED	LED	LED	LCD	LCD	LCD	LCD
DC measuring (V, A, W, Ah, kWh)	✓						
Voltage phase-phase		✓	✓	✓	✓	✓	✓
Voltage phase-N		✓	✓	✓	✓	✓	✓
Current		✓	✓	✓	✓	✓	✓
Average current				✓	✓	✓	✓
Maximum current		✓	✓	✓	✓	✓	✓
Active Power L1, L2, L3		✓	✓			✓	✓
Active power total		✓	✓	✓	✓	✓	✓
Average active power total				✓	✓	✓	✓
Max. average active power total		✓	✓	✓	✓	✓	✓
Reactive power L1, L2, L3		✓	✓			✓	✓
Reactive power total		✓	✓	✓	✓	✓	✓
Apparent power L1, L2, L3		✓	✓			✓	✓
Apparent power total		✓	✓			✓	✓
Power factor L1, L2, L3		✓	✓	✓	✓	✓	✓
Power factor total		✓	✓	✓	✓	✓	✓
Active energy counter			✓	✓	✓	✓	✓
Reactive energy counter			✓	✓	✓	✓	✓
Frequency		✓	✓	✓	✓	✓	✓
Transformer ratio programming		✓	✓	✓	✓	✓	✓
Alarm contacts			✓	✓	✓	✓	✓
Pulse output			✓	✓	✓	✓	✓
Energy value memory			✓	✓	✓	✓	✓
ModBus	✓		✓	✓	✓	✓	✓
ProfiBus	✓		✓	✓	✓	✓	✓
TCP/Webserver	✓		✓	✓	✓	✓	✓
Programmable output for contact and pulse (external extra module)						✓	✓
Harmonic analysis							✓

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DC-Multifunction Meter Q15UCL & Q96UCL



TECHNICAL DATA:

accuracy (class)	0,2
display	LCD backlighted 16 characters per line
number of display lines	2 lines
standard resolution	4 digits (9999) with floating point
resolution for energy data	8 digits
memory	kWh- and Ah-data, user settings
input voltage	max. 600V DC
input current	max. 10A DC
adjustment range voltage divider	1...10000 (input: 100V)
adjustment range shunt	1...10000A/..mV (max. 300mV)
measurement range	5..120% x Un; 5..120% x In
continuous overload	2In; 1,2Un
short-term overload (1sec.)	20In; 1,2Un
self-consumption: voltage	<0,5VA
current	<0,5VA
test voltage	2kV-50Hz-60s
surge test	5kV; 1,2/50µs
protection (Q15UCL)	IP40
protection (Q96UCL)	IP50 front; IP20 back
operating temperature	-10...50°C
storage temperature	-30...70°C
weight	0,5 Kg
alarm output / pulse output	max. 100mA / 250V (Photo-MOS)
complete galvanic separation	

Auxiliary voltage

standard auxiliary voltage	230V ±10% 50/60Hz (6VA)
on demand auxiliary voltage AC	24V, 48V or 400V
on demand auxiliary voltage DC	24V, 48V, 110V or 220V

ModBus RTU

interface	RS485 (ModBus RTU)
speed (bps)	9600/19200 bps
communication parameters	1,8,N,2/1,8,E,1/1,8,O,1
addressing range	1..247 (adjustable)

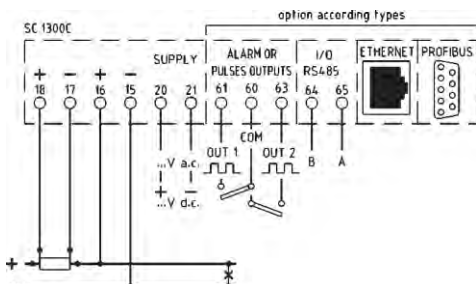
ModBus TCP / Webservice

ethernet interface	IEEE 802.3(u) 10 Base T / 100 Base TX
speed	10/100 Mbit/s (auto-negotiation)
duplex	half/full (auto-negotiation)

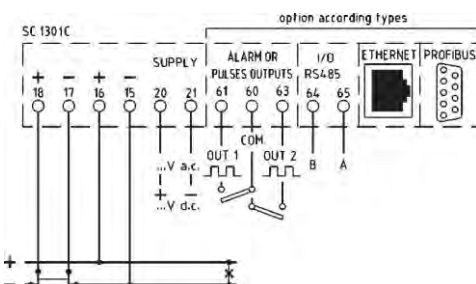
Profibus DP V0

network	NRZ asynchronous
baud rate	9,6kbit/s...12Mbit/s
addressing range	1...99 (adjustable)
manufactured according to	EN 50170

shunt in plus-line



shunt in minus-line



input voltage	600V D.C. directly
or	voltage divider 100V D.C
input current	10A D.C. directly
or	shunt 60mV; 100mV; 150mV; 300mV

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DC-Multifunction Meter Q15UCL & Q96UCL

Display:

U(U)	123.4	voltage
I(A)	12.34	current
P(kW)	-123.4	active power
Pavg	123.4kW	average active power
Pmax	123.4kW	max. active power
kWh+	1234567.8	active energy counter (consumption)
kWh-	1234567.8	active energy counter (recovery)
Ah+	1234567.8	ampere-hour (consumption)
Ah-	1234567.8	ampere-hour (recovery)
UR123456U/1234 U		setting voltage divider
CR 12345/123mV		setting shunt

Alarm and pulse output

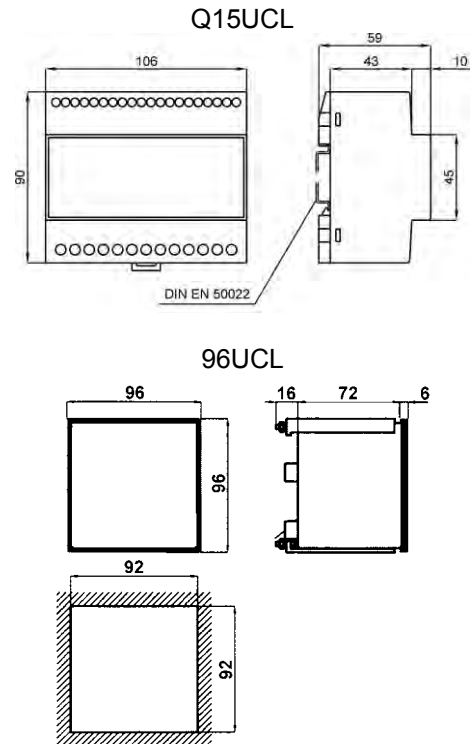
Each unit is equipped with two adjustable alarm or pulse outputs. Pulse values are directly proportional with active energy and programmable. Alarm signal is available for pre-defined minimum or maximum values. A switching delay between 0 and 99 seconds may be adjusted.

Order Code:

Q15UCL
Q96UCL

Ordering Information

- Order Code
- Input Voltage (nominal voltage or voltage divider ratio)
- Input Current (nominal current or shunt ratio)
- Shunt Position (plus-line or minus-line)
- Auxiliary Voltage (on demand)
- ModBus TCP or ProfiBus (on demand)



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Multifunction Meter Q96D4 & Q96B4W

Q96D4



Q96B4W



TECHNICAL DATA:

accuracy (class)	1,0 ±1 digit current and voltage 2,0 ±1 digit rating and cosφ
measuring type	TRMS
display	4 x LED per 3-digits (999)
frequency	45...65Hz
input voltage	100...400V
input current	1...5A
input range	10..120% x Un; 5..120% x In
continuous overload	2In; 1,2Un
short-term overload (1sec.)	20In; 2Un
self-consumption: voltage	<0,5VA
current	<0,5VA
test voltage	2kV-50Hz-60s
surge test	5kV; 1,2/50µs
protection	IP50 front; IP20 back
operating temperature	-10...50°C
storage temperature	-30...70°C
weight	0,5 Kg

complete galvanic separation

Auxiliary voltage

standard auxiliary voltage	115 and 230V ±10% 50/60Hz (6VA)
on demand auxiliary voltage AC	24V, 48V or 400V
on demand auxiliary voltage DC	24V, 48V, 110V or 220V

Q96B4W (additional):

alarm output / pulse output	max. 100mA / 250V DC (Photo-MOS)
-----------------------------	----------------------------------

ModBus RTU

interface	RS485 (ModBus RTU)
speed (bps)	9600/19200 bps
communication parameters	1,8,N,2/1,8,E,1/1,8,O,1
addressing range	1..247 (adjustable)

ModBus TCP / Webservice

ethernet interface	IEEE 802.3(u) 10 Base T / 100 Base TX
speed	10/100 Mbit/s (auto-negotiation)
duplex	half/full (auto-negotiation)

Profibus DP V0

network	NRZ asynchronous
baud rate	9,6kbit/s...12Mbit/s
addressing range	1...99 (adjustable)
manufactured according to	EN 50170

Q96B4W:

Alarm output / pulse output

Each unit is equipped with two adjustable alarm or pulse outputs. Pulse values are directly proportional with active energy and programmable. Alarm signal is available for pre-defined minimum or maximum values. A switching delay between 0 and 99 seconds may be adjusted.

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Multifunction Meter Q96D4 & Q96B4W

features	Q96D4	Q96B4W
voltage phase-phase	✓	✓
voltage phase-N	✓	✓
current L1, L2, L3	✓	✓
max. average current L1, L2, L3 (15 minutes delay "bimetallic-function")	✓	✓
active power L1, L2 and L3	✓	✓
active power total	✓	✓
max. average active power total	✓	✓
reactive power L1, L2 and L3	✓	✓
reactive power total (ind.)	✓	✓
apparent power L1, L2 and L3	✓	✓
apparent power total	✓	✓
power factor L1, L2 and L3	✓	✓
power factor total	✓	✓
frequency	✓	✓
hour of operation counter		✓
countdown timer		✓
active energy (kWh+ / kWh-)		✓
reactive energy (kvarh+ / kvarh-)		✓
programming of transformer ratios	✓	✓
ModBus RTU		✓
ModBus TCP		optional
Profibus DP V0		optional

Please note (type Q96D4 only):

- ⇒ this type is designed for current transformer measurement only (sec. 1A or 5A)
- ⇒ connection of the secondary winding to ground is not allowed!
- ⇒ direct current connection is not possible!
- ⇒ it is not allowed to connect further equipment in series to the transformer circuit

Transformer connection

Both types are designed for current transformer measurement (sec. 1A or 5A).
The voltage input connection up to 400V is direct.
For higher voltages it is necessary to use a voltage transformer.

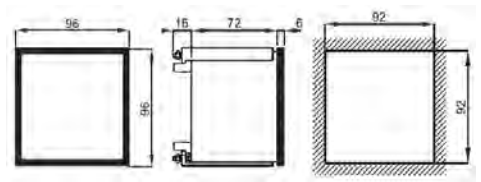
Order Code:

Q96D4

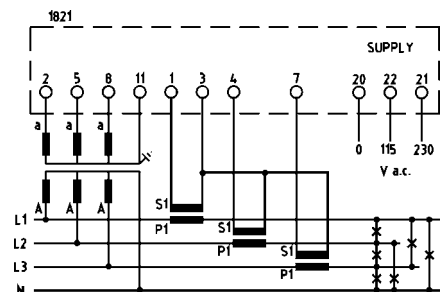
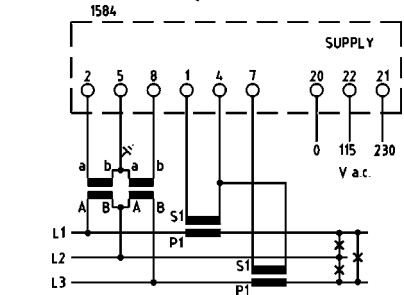
Q96B4W

Ordering Information

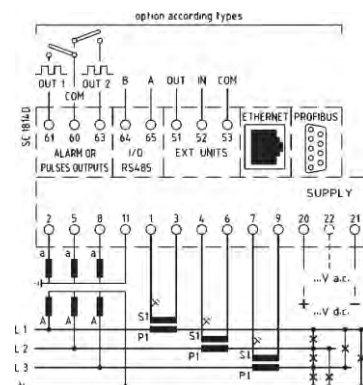
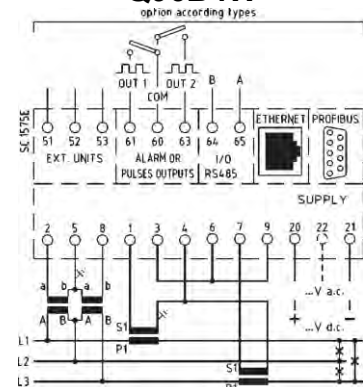
- Order Code
- Auxiliary Voltage (on demand)
- ModBus TCP or Profibus (on demand)



Q96D4



Q96B4W



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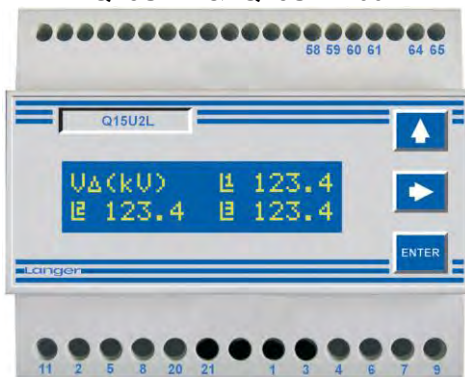
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Multifunction Meter Q15U2L & Q96U2L

Q15U2L & Q15U2X100



Q96U2L



TECHNICAL DATA:

accuracy (class)	0,5
	2,0 (kWh)
	3,0 (kvarh)
display	LCD backlighted 16 characters per line
number of display lines	2 lines
standard resolution	4 digits (9999) with floating point
resolution for energy data	8 digits
bidirectional	yes
memory	kWh- and kvarh-data, user settings
frequency	50...60Hz
input voltage	100...400V
input current	1...5A or 100A (Q15U2X100)
input range	5..120% x Un; 5..120% x In
continuous overload	2In; 1,2Un
short-term overload (1sec)	20In; 1,5Un
self-consumption: voltage	<0,5VA
current	<0,5VA
test voltage	2kV-50Hz-60s
surge test	5kV; 1,2/50μs
protection (Q15U2L)	IP40
protection (Q96U2L)	IP50 front; IP20 back
operating temperature	-10...50°C
storage temperature	-30...70°C
weight	0,5 kg
complete galvanic separation	
alarm output / pulse output	max. 100mA / 250V (Photo-MOS)

Auxiliary voltage

standard auxiliary voltage	115 and 230V ±10% 50/60Hz (6VA)
on demand auxiliary voltage AC	24V, 48V or 400V
on demand auxiliary voltage DC	24V, 48V, 110V or 220V

SERIAL INTERFACE (Q96U2L485 & Q15U2L485 only):

port	RS485
interface	ModBus RTU
baud rate	9600/19200bps
communication parameters	1,8,N,2/1,8,E,1/1,8,O,1
addressing range	1...247

Alarm output / pulse output

Each unit is equipped with two adjustable alarm or pulse outputs. Pulse values are directly proportional with active energy and programmable. Alarm signal is available for pre-defined minimum or maximum values. A switching delay between 0 and 99 seconds may be adjusted.

Transformer connection

Type Q15U2L and Q96U2L are designed for current transformer measurement (sec. 1A or 5A).

The voltage input connection up to 400V is direct. For higher voltages it is necessary to use a voltage transformer.

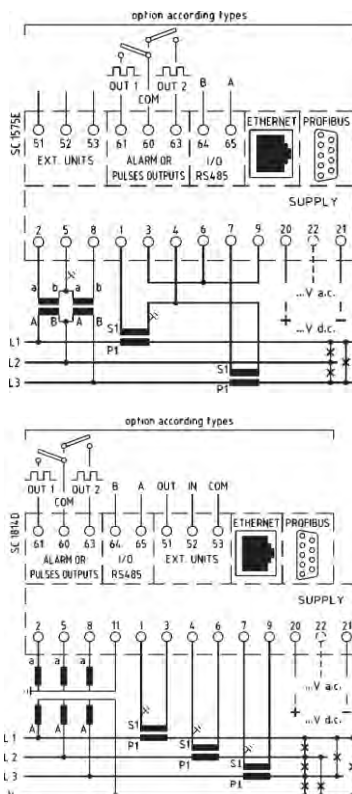
Direct measurements

Type Q15U2X100 is designed for direct current measurements up to 3x100A. This type uses built-in current transformer.

The three phases are mounted top down through the unit.

Cable sleeve diameter is approx. 13mm.

The voltage input connection up to 400V is direct.



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Multifunction Meter Q15U2L & Q96U2L

Display:

$U_{\Delta}(kV)$ 123.4 123.4	voltage phase-phase
$U_{\lambda}(kV)$ 123.4 123.4	voltage phase-N
$I_L(kA)$ 123.4 123.4	current L1, L2 and L3
P. F. -0.99L -0.99L	power factor L1, L2, L3
$I_{avg}(kA)$ 123.4 123.4	average current L1, L2, L3
$I_{max}(kA)$ 123.4 123.4	max. average current L1, L2, L3
kW +12.345 kvar -12.345	active power total reactive power total (ind.)
P. F. Σ -0.12L F(Hz) 12.34	power factor total (ind.) frequency phase L1
kWh+ 123456.78 kvarh+ 123456.78	active energy counter (consumption) reactive energy counter (consumption)
kWh- 123456.78 kvarh- 123456.78	active energy counter (recovery) reactive energy counter (recovery)
Pavg15 12.345kW Pmax15 12.345kW	average active power total max. average power total

Code:

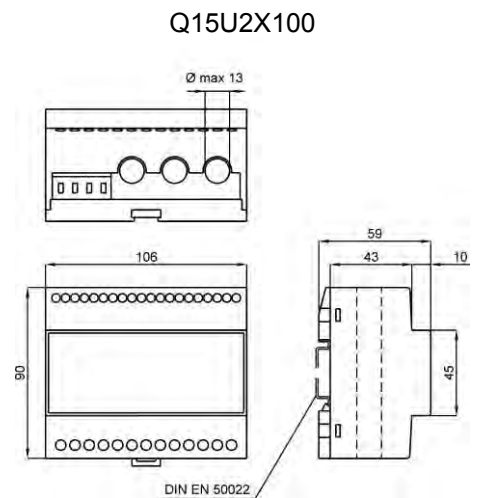
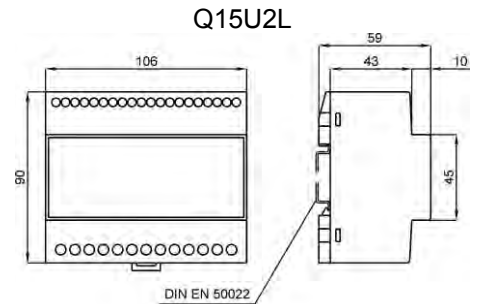
Features

Q15U2L	incl. alarm output / pulse output
Q15U2X100	incl. alarm output / pulse output
Q96U2L *)	incl. alarm output / pulse output
Q15U2L-485	incl. alarm output / pulse output / RS485 interface
Q15U2X100-485	incl. alarm output / pulse output / RS485 interface
Q96U2L-485	incl. alarm output / pulse output / RS485 interface

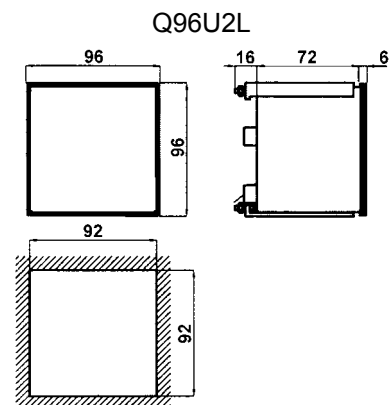
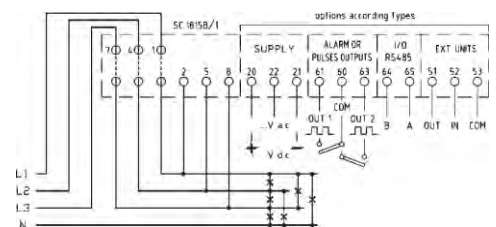
*) available from stock

Ordering Information

- Order Code
- Auxiliary Voltage (on demand)



electrical connection (Q15U2X100 only)



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Multifunction Meter Q96U4



TECHNICAL DATA:

accuracy (class)	0,2; 2,0 (kWh); 3,0 (kvarh)
measuring type	TRMS
display	LCD backlighted 16 characters per line
number of display lines	4 lines
standard resolution	4 digits (9999) with floating point
resolution for energy data	8 digits (max. 99999999 GWh/Gvarh)
bidirectional	active power and reactive power
memory	kWh- and kvarh-data, user settings
frequency	45...65Hz
input voltage	100...400V
input current	1...5A
input range	5...120% Un, 5...120% In
continuous overload	2In; 1,2Un
short-term overload (1sec.)	20In; 2Un
self-consumption: voltage	< 0,5VA
current	< 0,5VA
test voltage	2kV-50Hz-60s
surge test	5kV; 1,2/50µs
protection	IP50 front; IP20 back
operating temperature	-10...50°C
storage temperature	-30...70°C
weight	0,5 kg
complete galvanic separation	

alarm output / pulse output max. 100mA / 250V DC (Photo-MOS)

Auxiliary voltage

standard auxiliary voltage	115 and 230V ±10% 50/60Hz (6VA)
on demand auxiliary voltage AC	24V, 48V or 400V
on demand auxiliary voltage DC	24V, 48V, 110V or 220V

ModBus RTU

interface	RS485 (ModBus RTU)
speed (bps)	9600/19200 bps
communication parameters	1,8,N,2/1,8,E,1/1,8,O,1
addressing range	1..247 (adjustable)

ModBus TCP / Webservice

ethernet interface	IEEE 802.3(u) 10 Base T / 100 Base TX
speed	10/100 Mbit/s (auto-negotiation)
duplex	half/full (auto-negotiation)

Profibus DP V0

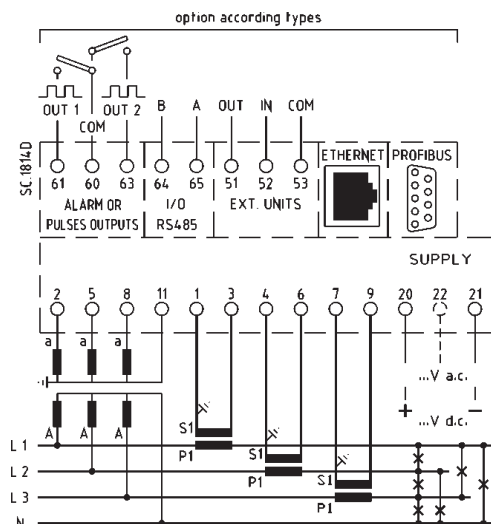
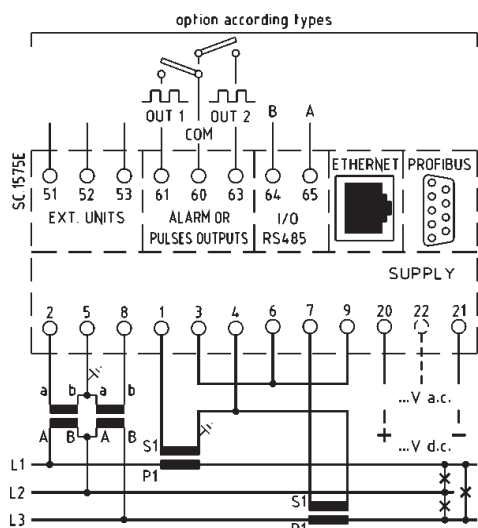
network	NRZ asynchronous
baud rate	9,6kbit/s...12Mbit/s
addressing range	1...99 (adjustable)
manufactured according to	EN 50170

Alarm and pulse output

Each unit is equipped with four zero potential alarm or pulse outputs. All four outputs may be programmed as alarm output. Alarm signal is available for pre-defined minimum or maximum values. A switching delay between 0 and 99 seconds may be adjusted. Alternatively two outputs may be programmed as pulse output. Pulse values are proportional with active energy and adjustable. (e.g.: 1 Imp./1kWh)

Harmonic analysis (Q96U4H only)

Measurement of the main variables (current and voltage) is performed as TRMS. The instrument performs a harmonic analysis on each phase for voltage and current, providing the entire THD-value (total harmonic distortion) and the single harmonic. Values may also be displayed as percentage of the TRMS value.



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Multifunction Meter Q96U4

Add-on modules

With external modules the functional range of this unit is expandable with additional contact respectively analog outputs.

Each module has two additional alarm outputs and either two or four analog outputs.

Up to 3 modules at the same time may be contacted to one multifunction meter, which provides 6 alarm and 12 analog outputs in total.

(detailed information see page 40)

```

U1E 998A 396.0V
U2E 997A 396.7V
U3E 1011A 395.0V
Σ 547kW 0.80L
    
```

```

UN 1002A 227.6V
EN 998A 229.2V
LN 1011A 229.1V
QΣ 414kr 50.0Hz
    
```

```

P1E 189.8 kW
P2E 172.7 kW
P3E 187.1 kW
PΣ 548.5 kW
    
```

```

Q1E 123.0 kvar L
Q2E 150.5 kvar L
Q3E 135.0 kvar L
QΣ 413.5 kvar L
    
```

```

S1E 227.8 kVA
S2E 228.5 kVA
S3E 230.8 kVA
SΣ 687.1 kVA
    
```

```

P.F.1E 0.83 L
P.F.2E 0.75 L
P.F.3E 0.80 L
P.F.Σ 0.80 L
    
```

```

kWh+ 00005918
kWh- 00000145
kvarh+ 00001932
kvarh- 00001675
    
```

```

Iavg1 999 A
Iavg2 995 A
Iavg3 1008 A
PavgΣ 545.0 kW
    
```

```

Imax1 1000 A
Imax2 998 A
Imax3 1011 A
PmaxΣ 552.4 kW
    
```

```

Σ 1004A 396.0V
PΣ 549kW 0.80L
H 18.3 49.9Hz
kWh+ 00005944
    
```

Features	Q96U4L	Q96U4H
voltage phase-phase	✓	✓
voltage phase-N	✓	✓
current	✓	✓
max. average current	✓	✓
average current	✓	✓
("bimetallic-function" – delay adjustable: 1..60min)		
active power L1, L2 and L3	✓	✓
active power total	✓	✓
max. average active power total	✓	✓
reactive power L1, L2 and L3	✓	✓
reactive power total (ind.)	✓	✓
apparent power L1, L2 and L3	✓	✓
apparent power total	✓	✓
power factor L1, L2 and L3	✓	✓
power factor total (ind.)	✓	✓
frequency	✓	✓
active energy counter (kWh+ / kWh-)	✓	✓
reactive energy counter (kvarh+ / kvarh-)	✓	✓
hour-meter	✓	✓
ModBus RTU	✓	✓
ModBus TCP	optional	optional
Profibus DP V0	optional	optional
neutral wire current		✓
difference voltage (ULLmax.-ULLmin.)		✓
cosφ (actual difference of phase)		✓
THDV (% of U nominal)		✓
THDI (% of I nominal)		✓
THDV (% of U rms)		✓
THDI (% of I rms)		✓

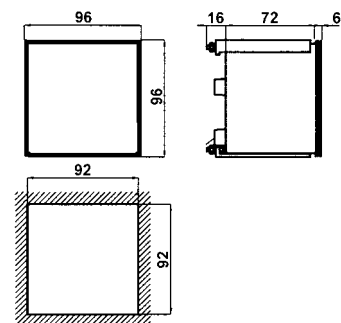
Order code:

Features

Q96U4L	standard configuration
Q96U4H	additional with harmonic analysis

Ordering Information

- Order Code
- Auxiliary Voltage (on demand)
- ModBus TCP or Profibus (on demand)



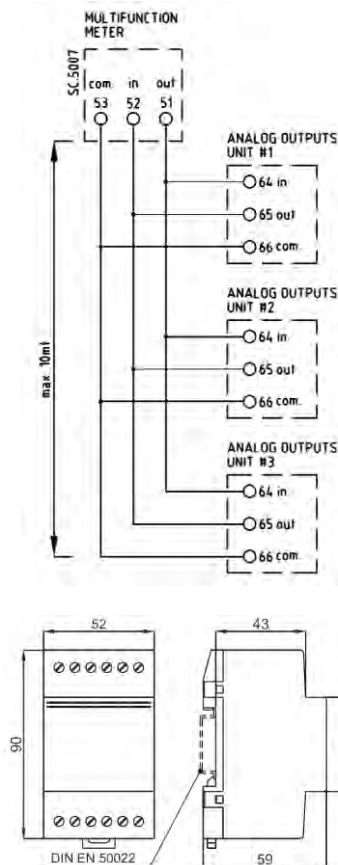
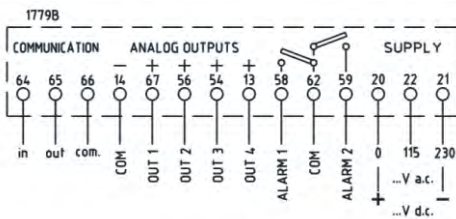
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Add-on Modules for Multifunction Meter Q96U4



TECHNICAL DATA:

accuracy (class)	0,5
number of analog outputs	2 or 4
outputs	programmable
response time	100ms
number of alarm outputs	2
alarm output	Photo-MOS, max. 100V, 100mA
operating temperature	-10...50°C
storage temperature	-30...70°C
weight	0,4 kg
standard auxiliary voltage	115 and 230V ±10% 50/60Hz (10VA)
galvanic separation of auxiliary voltage	

The add-on modules type **M52U** are used for the expansion of multifunction meters **Q96U4**.

The functional range of the main unit is extended by analog outputs and additional alarm outputs.

Up to 3 modules at the same time may be connected to one multifunction meter, which provides up to 6 alarm and 12 analog outputs in total.

Adjustment of analog outputs is made with DIP-switches. Each single output may be configured individually:

Output:	±1mA	±5mA	±10mA	±20mA	±10V	
Burden:	15kΩ	3kΩ	1,5kΩ	750Ω	>2kΩ	
Output:	0-1mA	0-5mA	0-10mA	0-20mA	4-20mA	0-10V
Burden:	15kΩ	3kΩ	1,5kΩ	750Ω	750Ω	>2kΩ

All other settings get adjusted directly on the front panel of the multifunction meter.

Each single output can be individually assigned to a measuring value of the multifunction display unit.

e.g.	0..250V	=	0..20mA	or
	-25..0..100kW	=	4..20mA	or
	45..50..55Hz	=	-10..0..+10V	etc.

The alarm outputs can be programmed as min. or max. contact.

Number of Outputs	Order Code
2 analog and 2 alarm	M52U02
4 analog and 2 alarm	M52U04

Ordering Information

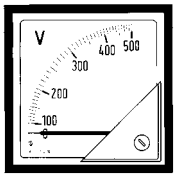
- Order Code
- DC-Auxiliary Voltage (on demand)

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AREA 1
Analog Panel Meter

page 4 - 28



AREA 2
Multifunction Meter

page 30 - 40



AREA 3
Static Energy Meter

page 42 - 54



AREA 4
Shunts
Current Transformer
Voltage Transformer

page 56 - 90



AREA 5
Digital Panel Meter

page 92 - 109



AREA 6
Transducer

page 112 - 130



AREA 7
Low Tension Insulators
Modular Busbar System

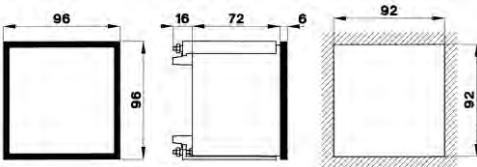
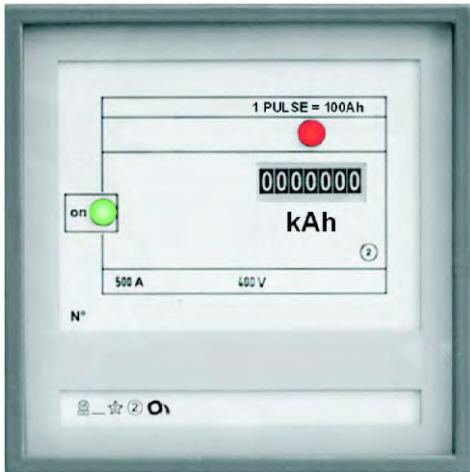
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AREA 3

Static Energy Meter

Type	Circuit	Measurement	Page:
C96AC	d.c. current circuit	kAh	43
C96WS	a.c. single phase	kWh	44/45
C96WY	3-phase and 3-wires balanced load	kWh	44/45
C96WN	3-phase and 4-wires balanced load	kWh	44/45
C96WD	3-phase and 3-wires unbalanced load	kWh	44/45
C96WT	3-phase and 4-wires unbalanced load	kWh	44/45
C96RS	a.c. single phase	kvarh	44/45
C96RY	3-phase and 3-wires balanced load	kvarh	44/45
C96RN	3-phase and 4-wires balanced load	kvarh	44/45
C96RD	3-phase and 3-wires unbalanced load	kvarh	44/45
C96RT	3-phase and 4-wires unbalanced load	kvarh	44/45
C96QS	a.c. single phase	kvarh & kWh	44/45
C96QY	3-phase and 3-wires balanced load	kvarh & kWh	44/45
C96QN	3-phase and 4-wires balanced load	kvarh & kWh	44/45
C96QD	3-phase and 3-wires unbalanced load	kvarh & kWh	44/45
C96QT	3-phase and 4-wires unbalanced load	kvarh & kWh	44/45
C15WS	a.c. single phase	kWh	46/47
C15WY	3-phase and 3-wires balanced load	kWh	46/47
C15WN	3-phase and 4-wires balanced load	kWh	46/47
C15WD	3-phase and 3-wires unbalanced load	kWh	46/47
C15WP	3-phase and 4-wires unbalanced load	kWh	46/47
C15RS	a.c. single phase	kvarh	46/47
C15RY	3-phase and 3-wires balanced load	kvarh	46/47
C15RN	3-phase and 4-wires balanced load	kvarh	46/47
C15RD	3-phase and 3-wires unbalanced load	kvarh	46/47
C15RT	3-phase and 4-wires unbalanced load	kvarh	46/47
C15QS	a.c. single phase	kvarh & kWh	46/47
C15QY	3-phase and 3-wires balanced load	kvarh & kWh	46/47
C15QN	3-phase and 4-wires balanced load	kvarh & kWh	46/47
C15QD	3-phase and 3-wires unbalanced load	kvarh & kWh	46/47
C15QT	3-phase and 4-wires unbalanced load	kvarh & kWh	46/47
C15WTX100	3-phase and 4-wires unbalanced load	kWh	48/49
C15RTX100	3-phase and 4-wires unbalanced load	kvarh	48/49
C15QTX100	3-phase and 4-wires unbalanced load	kvarh & kWh	48/49
C15WTX100-DTF	3-phase and 4-wires unbalanced load	dual rate kWh	48/49
C15WY-DTF	3-phase and 3-wires balanced load	dual rate kWh	50
C15WN-DTF	3-phase and 4-wires balanced load	dual rate kWh	50
C15WP-DTF	3-phase and 4-wires unbalanced load	dual rate kWh	50
C48WS	a.c. single phase	kWh	51
C18WS	a.c. single phase	kWh	52
C52WSX100	a.c. single phase	kWh	53
C52RSX100	a.c. single phase	kvarh	53
MCO6	pulse concentrator RS485 ModBus		54

Electronic Ampere-Hour Meter for Direct Current



TECHNICAL DATA

Square panel meter with build-in counter for ampere-hour

accuracy (class)	±2%
display (mech. counter)	7-digit
digit height	4mm
pulse indication by LED	
internal resistance: <i>current</i>	>1KΩ (mV); <0,12Ω (A)
continuous overload	1,2In
short-term overload	20In (0,5s)
test voltage	2kV-50Hz-60s
operating temperature	-10...45°C
storage temperature	-25...70°C
galvanic separation between input, output and power supply	
unidirectional measurement	

Input Current	0,5A; 1A; 5A; 10A <i>d.c. direct connection</i>
Input Current / Shunt	60mV; 100mV; 150mV; 300mV with <i>shunt</i>

Pulse output with reed-relay:

Max. 5 pulse per sec.

Max. burden: 100mA (100V)

Output pulse ratio can be specified as equal to, or 10, or 100 times faster than the counter resolution.

Please designate on order.

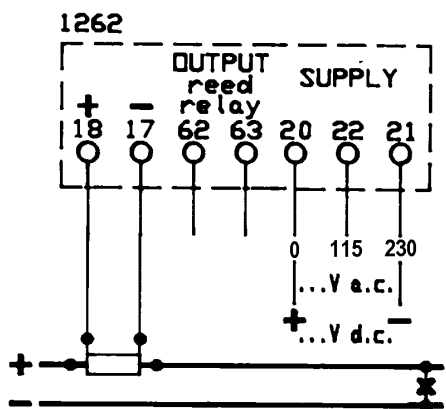
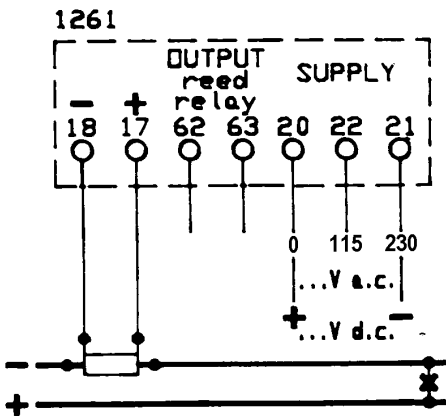
Ah-counter type C96AC:

Our Ah-counter is designed for direct and accurate measurements of the current flow against the time elapsed, even if instantaneous current has heavy fluctuation.

A galvanic separated pulse output allows an easy data-processing.

Typical applications:

- Cathode protection systems;
- Electrolysis and galvanic processes;
- Charge and discharge cycles of batteries



Order Code:

C96AC

Ordering Information

- Order Code
- Current Input or Shunt Connection
- Shunt Position (minus-line or plus-line)
- Pulse Rate
- Measurement Range
- Auxiliary Voltage

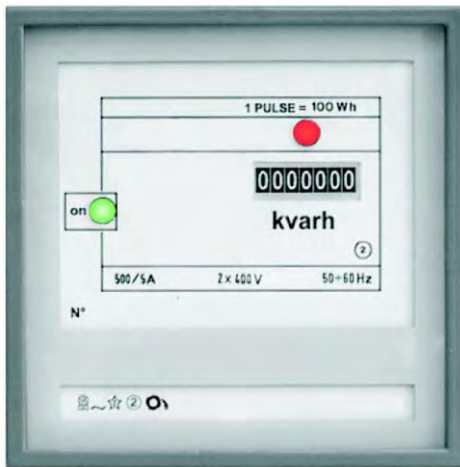
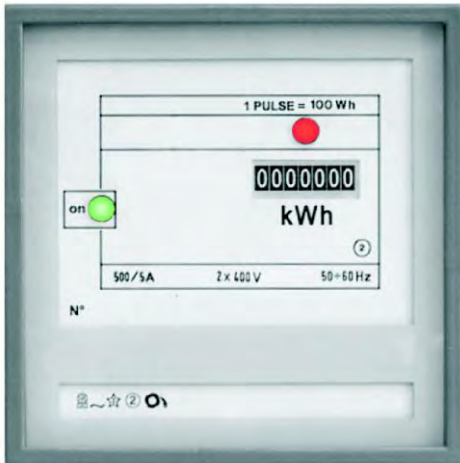
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Static Panel Energy Meter for Active Energy and/or Reactive Energy



TECHNICAL DATA

Square panel meter with build-in counter for active energy and/or reactive energy

accuracy class active energy	2%
accuracy class reactive energy	3%
display (mech. counter)	7-digit
digit height	4mm
pulse indication by LED	
self-consumption: <i>current</i>	0,5VA
<i>voltage</i>	3VA
continuous overload	1,2In; 1,1Un
short-term overload	20In; 1,15Un (0,5s)
test voltage	2kV-50Hz-60s
operating temperature	-20...55°C
storage temperature	-25...70°C
pulse output	DIN S0
manufactured according to	EN62052-11; EN62053-21

These counters (depending on the type) are suitable for single phase or 3-phase circuits with balanced or unbalanced loads.
The counters are designed self-supplied, no auxiliary voltage is needed.
This unit is designed for switchboard use.
The insulated pulse output allows the external processing of the energy values.

Custom pulse rates are:

nominal current			
10...99A	1Imp./100Wh (varh)	1Imp./10Wh (varh)	1Imp./Wh (varh)
100...999A	1Imp./kWh (kvarh)	1Imp./100Wh (varh)	1Imp./10Wh (varh)
1000...5000A	1Imp./10kWh (kvarh)	1Imp./kWh (kvarh)	1Imp./100Wh (varh)

Code:

C96WS active energy counter for a.c. single phase
C96WY active energy counter for 3-phase and 3-wires balanced load
C96WN active energy counter for 3-phase and 4-wires balanced load
C96WD active energy counter for 3-phase and 3-wires unbalanced load
C96WT active energy counter for 3-phase and 4-wires unbalanced load

C96RS reactive energy counter for a.c. single phase
C96RY reactive energy counter for 3-phase and 3-wires balanced load
C96RN reactive energy counter for 3-phase and 4-wires balanced load
C96RD reactive energy counter for 3-phase and 3-wires unbalanced load
C96RT reactive energy counter for 3-phase and 4-wires unbalanced load

C96QS active energy counter and reactive energy counter for a.c. single phase

C96QY active energy counter and reactive energy counter for 3-phase and 3-wires balanced load

C96QN active energy counter and reactive energy counter for 3-phase and 4-wires balanced load

C96QD active energy counter and reactive energy counter for 3-phase and 3-wires unbalanced load

C96QT active energy counter and reactive energy counter for 3-phase and 4-wires unbalanced load

Ordering Information

- Order Code
- Current Transformer Ratio: xxx/1A or xxx/5A
- Input Voltage: 400V direct or Voltage Transformer: xxx/100V
- Custom Pulse Rate (if an extra pulse output is requested)

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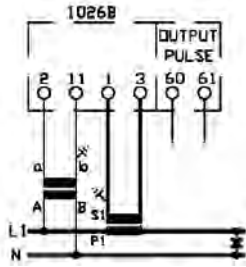
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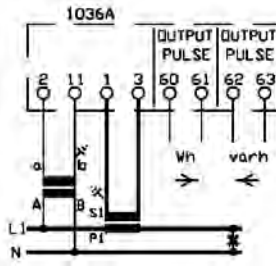
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Static Panel Energy Meter for Active Energy and/or Reactive Energy

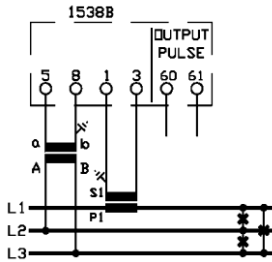
C96WS - C96RS



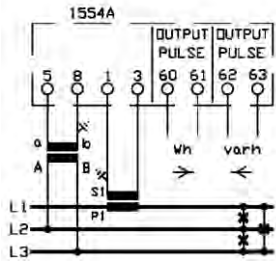
C96QS



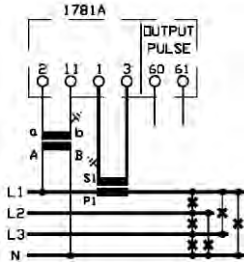
C96WY - C96RY



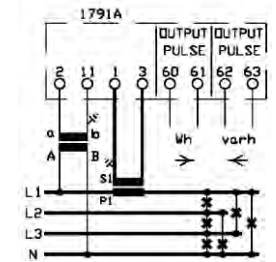
C96QY



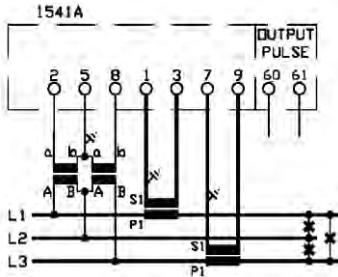
C96WN - C96RN



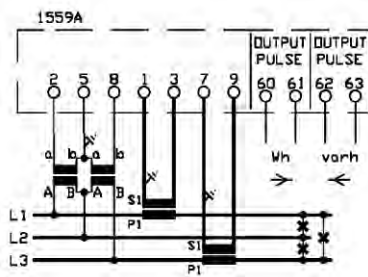
C96QN



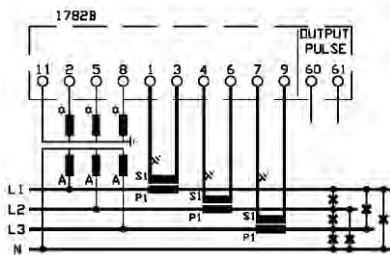
C96WD - C96RD



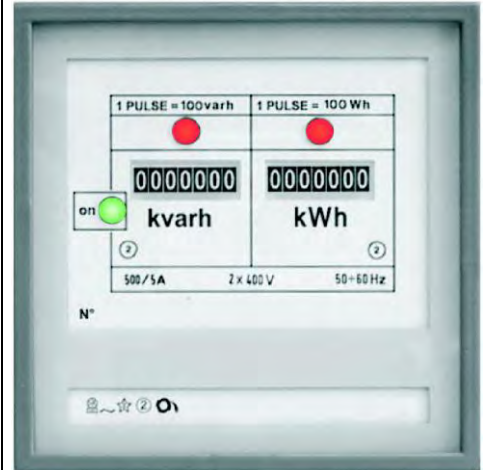
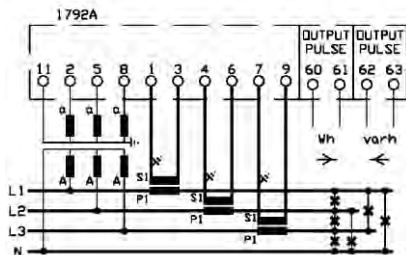
C96QD



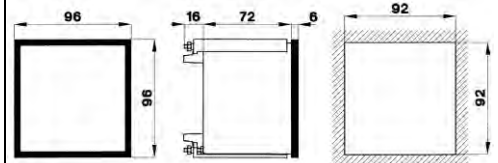
C96WT - C96RT



C96QT



Please note:
up to 440V there is no
voltage transformer necessary



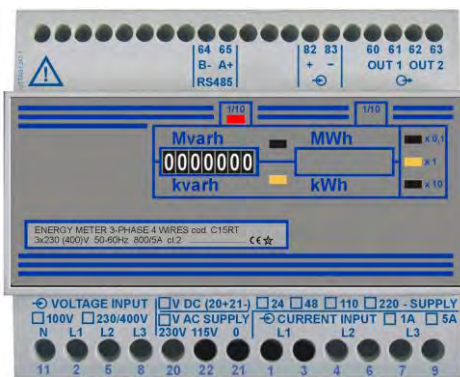
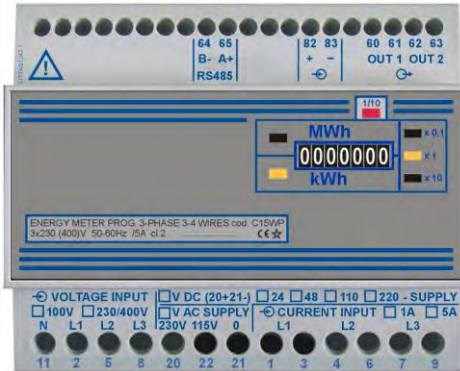
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DIN Rail Static Energy Meter for Active Energy and/or Reactive Energy



Please note:

In case of using voltage transformers it is not possible to adjust the transformer ratios via the DIP-switches.

If so, specify ratios of voltage and current transformers on order, please.

Ordering Information

- Order Code
- Accuracy (class 1 on demand)
- Voltage Input
- Current Transformer: .../1A or .../5A
e.g. C15WP 400V & .. /5A or
C15WP 10KV/100V & 1250/1A

TECHNICAL DATA

DIN-rail-instruments (35mm) with build-in counter for active energy and/or reactive energy.

accuracy class active energy	2%
accuracy class reactive energy	3%
display (mech. counter)	7-digit
digit height	4mm
pulse indication by LED	
self-consumption: <i>current</i>	0,5VA
<i>voltage</i>	3VA
continuous overload	1,2In; 1,1Un
short-term overload	20In; 1,15Un (0,5s)
test voltage	2kV-50Hz-60s
operating temperature	-20...55°C
storage temperature	-25...70°C
pulse output	DIN S0; adjustable
manufactured according to:	EN62052-11; EN62053-21

These counters (depending on the type) are suitable for single phase or 3-phase circuits with balanced or unbalanced loads.

The counters are designed for 35mm-DIN-rail.

Energy values are displayed on the build in mechanical counter.

By using DIP-switches a plenty of current transformer ratios and pulse rates are adjustable.

The following primary currents are adjustable via DIP-switches:

5A	10A	15A	20A	25A	30A	40A	50A	60A	75A
80A	100A	120A	125A	150A	160A	200A	250A	300A	400A
500A	600A	750A	800A	1000A	1200A	1250A	1500A	1600A	2000A
2500A	3000A	4000A	5000A	6000A	8000A	10000A	12000A	12500A	15000A

The insulated pulse output allows the external processing of the energy values.

The following pulse rates are adjustable via DIP-switches:

nominal current:				
5...250A	1Imp./10Wh	1Imp./100Wh	1Imp./kWh	
300...2500A		1Imp./100Wh	1Imp./kWh	1Imp./10kWh
3000...15000A			1Imp./kWh	1Imp./10kWh

Code:

C15WS active energy counter for a.c. single phase
C15WY active energy counter for 3-phase and 3-wires balanced load
C15WN active energy counter for 3-phase and 4-wires balanced load
C15WD active energy counter for 3-phase and 3-wires unbalanced load
C15WP *) **active energy counter for 3-phase and 4-wires unbalanced load**

C15RS reactive energy counter for a.c. single phase
C15RY reactive energy counter for 3-phase and 3-wires balanced load
C15RN reactive energy counter for 3-phase and 4-wires balanced load
C15RD reactive energy counter for 3-phase and 3-wires unbalanced load
C15RT reactive energy counter for 3-phase and 4-wires unbalanced load

C15QS active energy and reactive energy counter for a.c. single phase
C15QY active energy and reactive energy counter for 3-phase and 3-wires balanced load
C15QN active energy and reactive energy counter for 3-phase and 4-wires balanced load
C15QD active energy and reactive energy counter for 3-phase and 3-wires unbalanced load
C15QT active energy and reactive energy counter for 3-phase and 4-wires unbalanced load

*) available from stock



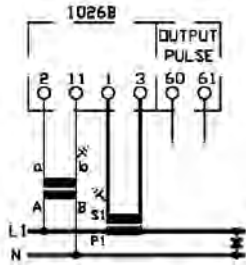
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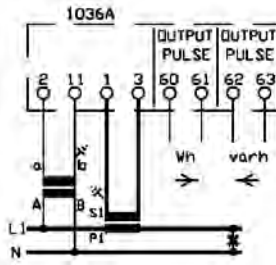
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DIN Rail Static Energy Meter for Active Energy and/or Reactive Energy

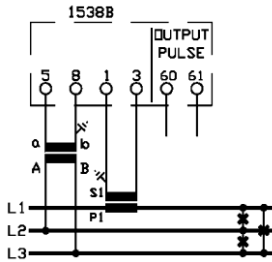
C15WS - C15RS



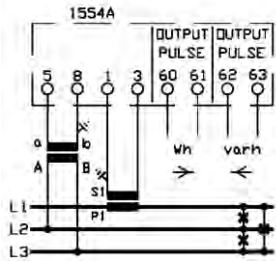
C15QS



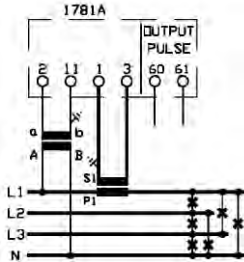
C15WY - C15RY



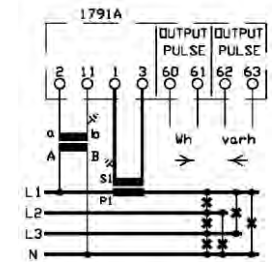
C15QY



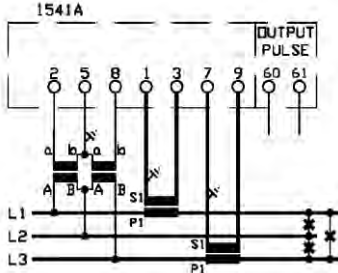
C15WN - C15RN



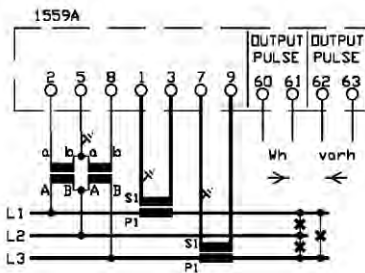
C15QN



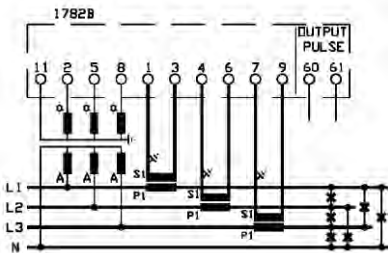
C15WD - C15RD



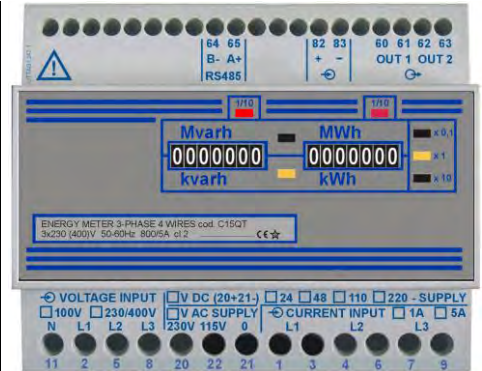
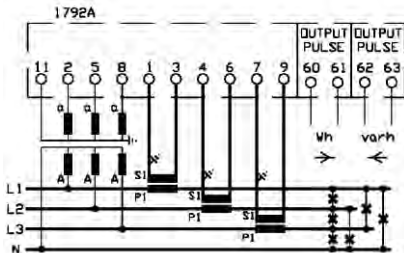
C15QD



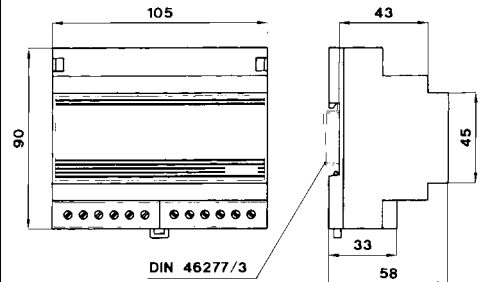
C15WP - C15RT



C15QT



Please note:
up to 440V there is no
voltage transformer necessary



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DIN Rail Static Energy Meter for Active Energy and/or Reactive Energy

TECHNICAL DATA

DIN-rail-instrument (35mm) with build-in counter for direct reading up to 100A

accuracy class active energy
accuracy class reactive energy
display (mech. counter)
nominal voltage U_n
nominal current I_n
tariff switching input
accuracy range

2%
3%
7-digit
3 x 230(400)V
3 x 100(120)A
12...24V DC
5...120% I_n ;
80...115% U_n
front side LED
0,5VA
3VA
1,2 I_n ; 1,1 U_n
20 I_n ; 1,15 U_n (0,5s)
4kV-50Hz-60s
-20...55°C
-25...70°C
DIN S0; adjustable
max. 100mA / 100V
EN62052-11, EN62053-21

operation indicator
self-consumption: *current*
voltage

continuous overload
short-term overload
test voltage
operating temperature
storage temperature
pulse output

manufactured according to



C15WTX100: is designed to read the active energy in 3-phase and 4-wires circuits with unbalanced load.
Direct current input up to 3 x 100A.

C15RTX100: is designed to read the reactive energy in 3-phase and 4-wires circuits with unbalanced load.
Direct current input up to 3 x 100A.

C15QTX100: is designed to read the active and reactive energy in 3-phase and 4-wires circuits with unbalanced load.
Direct current input up to 3 x 100A.

C15WXT100-DTF: direct connection 3 x 100A double rate static active energy meter, suitable for 3-phase and 4-wires systems with unbalanced load.
Tariff switch gets released by an external voltage signal.

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DIN Rail Static Energy Meter for Active Energy and/or Reactive Energy

This applies to all static energy meters:

Measurement of current uses build-in current transformer.
The three phases are mounted top down through the unit.
Cable sleeve diameter is approx. 13mm.

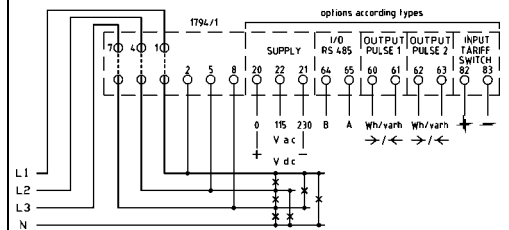
Direct voltage input up to 440V.

This type of energy meters are designed for 35mm-DIN-rail.

The energy values are shown on the mechanical display. The pulse output allows the external processing of the energy values.

The following pulse rates are adjustable via DIP-switches:

1Imp./KWh (kvarh)	1Imp./100Wh (varh)	1Imp./10Wh (varh)
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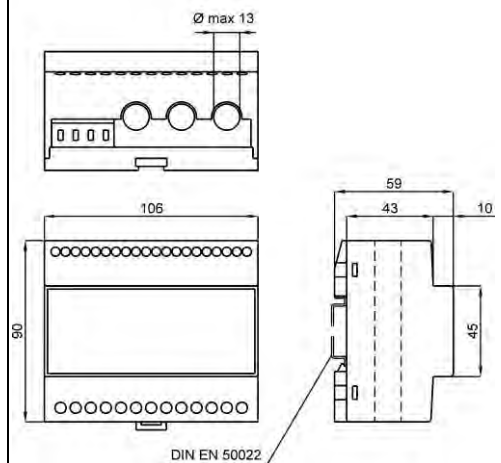
Code:

C15WTX100 *)	active energy counter for 3-phase and 4-wires unbalanced load
C15RTX100	reactive energy counter for 3-phase and 4-wires unbalanced load
C15QTX100	active energy and reactive energy counter for 3-phase and 4-wires unbalanced load
C15WTX100-DTF	double rate active energy counter for 3-phase and 4-wires unbalanced load

*) available from stock

Ordering Information

- Order Code
- Higher Accuracy Class (on demand)

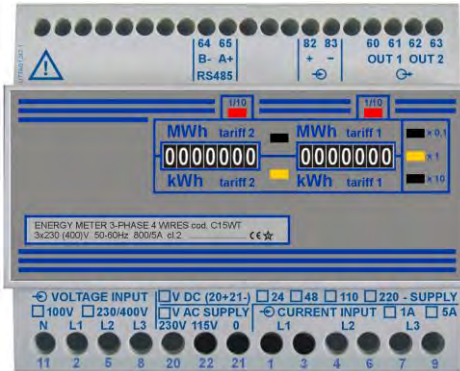


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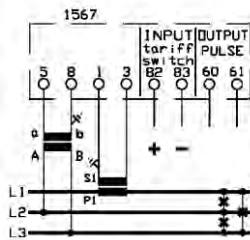
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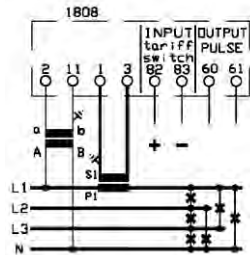
DIN Rail Static Energy Meter for Active Energy Dual Rate



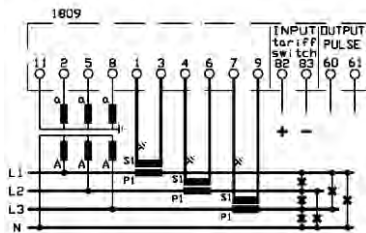
C15WY-DTF



C15WN-DTF



C15WP-DTF



Please note:

Up to 440V there is no voltage transformer necessary.

In case of using voltage transformer it is not possible to adjust the transformer ratios via the DIP-switches.

If so, specify ratios of voltage and current transformers on order, please.

TECHNICAL DATA

DIN-rail-instruments (35mm) with build-in counter for active energy dual rate

accuracy class	2%
display (2 mech. counter)	7-digit
digit height	4mm
pulse indication by LED	
tariff switching input	24V DC
self-consumption: <i>current</i>	0,5VA
<i>voltage</i>	3VA
continuous overload	1,2In; 1,1Un
short-term overload	20In; 1,15Un (0,5s)
test voltage	2kV-50Hz-60s
operating temperature	-20...55°C
storage temperature	-25...70°C
pulse output	DIN S0; adjustable
manufactured according to	EN62052-11; EN62053-21

These counters are suitable for 3-phase circuits with balanced or unbalanced loads. Dual rate measurement is possible. The tariff transfer is happen by an external voltage signal.

The counters are designed for 35mm-DIN-rail. Energy values are shown on the build-in mechanical counter.

By using DIP-switches a plenty of current transformer ratios and pulse rates are adjustable.

The following primary currents are adjustable via DIP-switches:

5A	10A	15A	20A	25A	30A	40A	50A	60A	75A
80A	100A	120A	125A	150A	160A	200A	250A	300A	400A
500A	600A	750A	800A	1000A	1200A	1250A	1500A	1600A	2000A
2500A	3000A	4000A	5000A	6000A	8000A	10000A	12000A	12500A	15000A

The insulated pulse output allows the external processing of the energy values.

The following pulse rates are adjustable:

nominal current:				
5...250A	1Imp./10Wh	1Imp./100Wh	1Imp./kWh	
300...2500A		1Imp./100Wh	1Imp./kWh	1Imp./10kWh
3000...15000A			1Imp./kWh	1Imp./10kWh

Code:

- C15WY2** dual rate active energy counter for 3-phase and 3-wires balanced load
- C15WN2** dual rate active energy counter for 3-phase and 4-wires balanced load
- C15WP2** dual rate active energy counter for 3-phase and 4-wires unbalanced load

Ordering Information

- Order Code
 - Voltage Input
 - Current Transformer .../1A or .../5A
- e.g. C15WP-DTF 400V & ../5A or
C15WP-DTF 10KV/100V & 1250/1A



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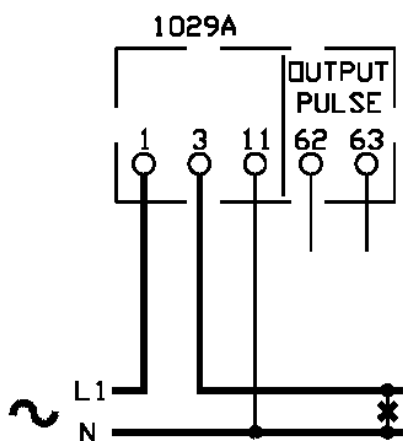
Static Panel Energy Meter for AC Single Phase



TECHNICAL DATA

Square panel meter with build-in counter for direct current input up to 16A

accuracy (class)	2% (kWh)
display (mech. counter)	7-digit (max. 999999,9)
operation indicator	LED
input voltage	230V
input current	16A
self-consumption	3VA
continuous overload	25A; 1,15Un
short-term overload	30In; 2Un (10ms)
test voltage	2kV-50Hz-60s
operating temperature	-20...55°C
storage temperature	-25...70°C
pulse output (on demand)	DIN S0
manufactured according to	EN62052-11; EN62053-21



Counter type **C48WS** is suitable for single phase circuits.

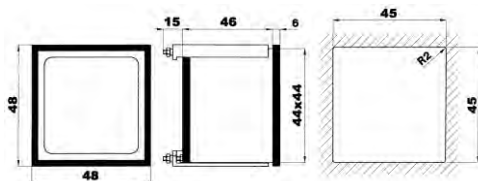
This counter is designed for switchboard installation. Energy values are displayed on the build-in mechanical counter.

This counter is designed for direct reading up to 16A only. They are not for use in connection with transformers.

The insulated pulse output allows the external processing of the energy values.

Code:

C48WS active energy counter for a.c. single phase 230V / 16(25)A



Ordering Information

- Order Code

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Static Panel Energy Meter for AC Single Phase

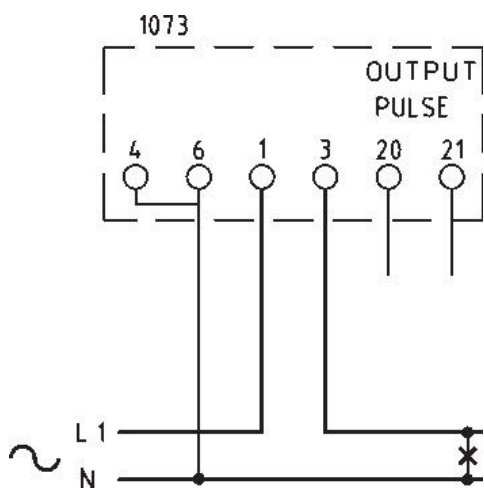


NEW

TECHNICAL DATA

Single-phase active energy meter for direct current input up to 32A

accuracy (class)	1%
LCD display resolution	7-digit (max. 99999,99)
operation indicator	front side LED
input voltage	230V ±20%
input current	5(32)A
self-consumption	current: <1VA voltage: < 8VA
continuous overload	32A
short-term overload	30In (10ms)
test voltage	2kV-50Hz-60s
operating temperature	-20...55°C
storage temperature	-25...70°C
pulse output	DIN S0; 1 pulse / Wh max. 60V DC, 30mA
manufactured according to	EN62052-11; EN62053-21



Counter type **C18WS** is suitable for single phase circuits.

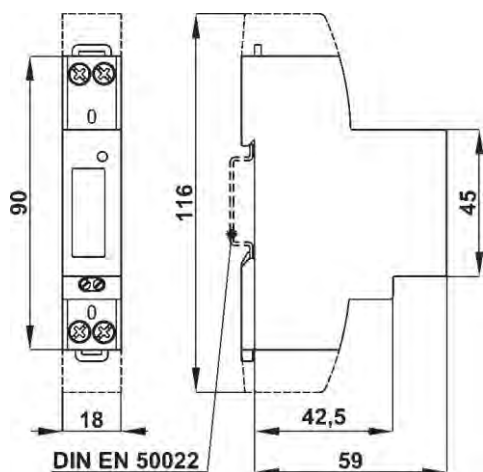
This counter is designed for switchboard installation. Energy values are displayed on the build-in LCD display.

This counter is designed for direct reading up to 32A only.

The insulated pulse output allows the external processing of the energy values.

Code:

C18WS active energy counter for a.c. single phase 230V / 5(32)A



Ordering Information

- Order Code

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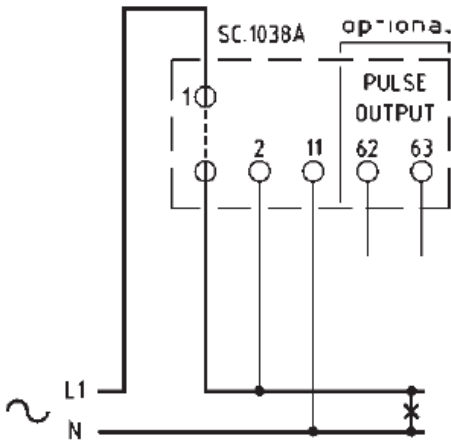
Static Energy Meter for AC Single Phase



TECHNICAL DATA

Energy counter for a.c. single phase up to 100A

accuracy (class)	2% (kWh); 3% (kvarh)
mech. counter	7-digit (max. 999999,9)
operation indicator	front side LED
input voltage	230V
input current	100A
self-consumption	8VA
continuous overload	1,2In; 1,15Un
short-term overload	30In; 2Un (10ms)
test voltage	2kV-50Hz-60s
operating temperature	-20...55°C
storage temperature	-25...70°C
pulse output	DIN S0; adjustable
manufactured according to	EN62052-11; EN62053-21



Counter type **C52WSX100** or **C52RSX100** is suitable for measurements of active or reactive energy in single phase circuits. These counters are designed for switchboard installation. Energy values are displayed on the build-in mechanical counter.

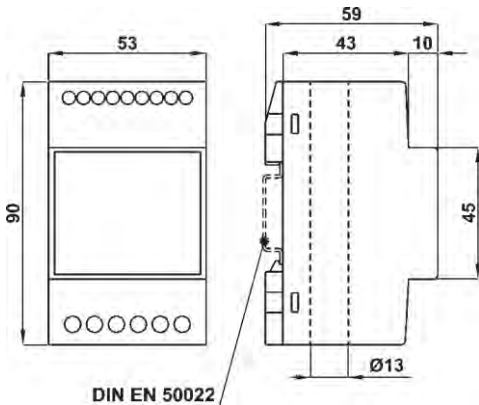
Measurement of current uses build-in current transformer. The conducting cable is mounted top down through the unit. Cable sleeve diameter is approx. 13mm.

This counter is designed for direct reading only.

The insulated pulse output allows the external processing of the energy values.

The following pulse rates are adjustable via jumper setting:

1Imp./100Wh or 1Imp./100varh	1Imp./10Wh or 1Imp./10varh
------------------------------	----------------------------



Code:

C52WSX100	active energy counter for a.c. single phase 230V / 100(120)A
C52RSX100	reactive energy counter for a.c. single phase 230V / 100(120)A

Ordering Information

- Order Code

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Pulse Concentrator MCO6



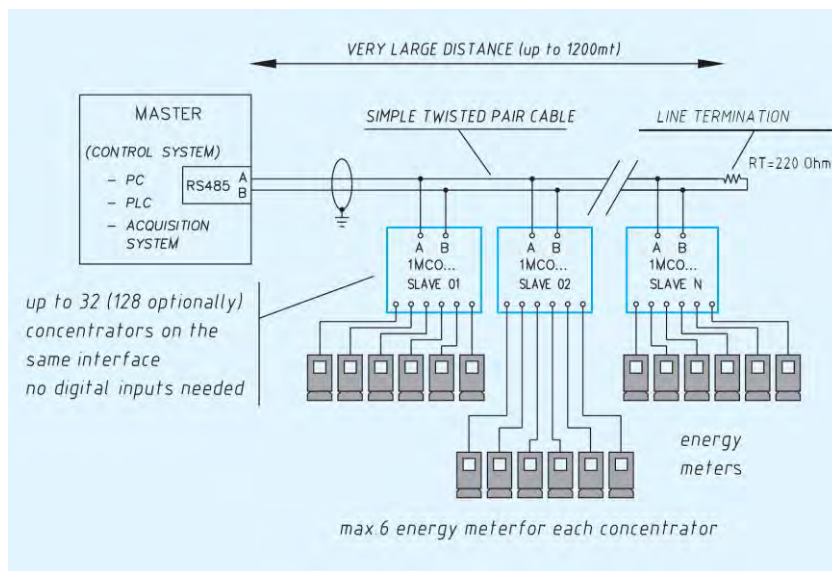
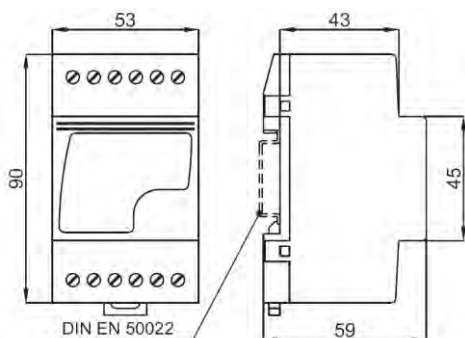
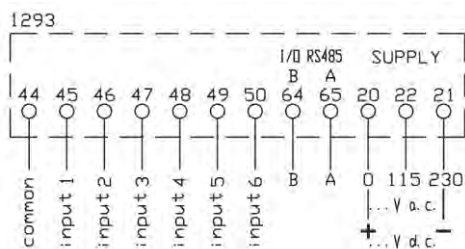
TECHNICAL DATA:

number of inputs	max. 6
input type (common gnd)	potential free contact
minimum pulse length	80ms
maximum pulse frequency	5 /s
serial interface	RS485
communication protocol	ModBus RTU
communication parameters	9600, 1, 8, N, 1
addressing range	1...247 programmable
protection	IP40 front; IP20 back
operating temperature	-10...50°C
storage temperature	-30...70°C
test voltage	2kV-50Hz-60s
power supply	115 and 230V ±10% 45-65Hz (2VA)
auxiliary voltage (on demand)	24, 48, 110, 220V DC +20 -15% (2W)
galvanic separation	input, output and power supply

Description

These concentrators are used to interface energy counters provided with pulses output, with PC's, PLC's and acquisition systems using a serial RS485 interface and ModBus protocol. It is therefore possible to set-up a telemetering system composed of up to 32 concentrators, each one of them able to receive the counting pulses of up to 6 energy counters.

To keep the transmitted values equal to those actually displayed on the counters, or to perform partial energy counting, the concentrators counting registers can be preset to a desired value or reset to zero. In addition, the registers are saved approx. every 8 minutes in a non-volatile memory, in order to prevent data losses in case of power supply failure.



Order Code:

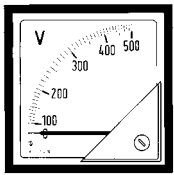
MCO6

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AREA 1
Analog Panel Meter

page 4 - 28



AREA 2
Multifunction Meter

page 30 - 40



AREA 3
Static Energy Meter

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AREA 4
Shunts
Current Transformer
Voltage Transformer

page 56 - 90



AREA 5
Digital Panel Meter

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AREA 6
Transducer

page 112 - 130



AREA 7
Low Tension Insulators
Modular Busbar System

page 132 - 143

AREA 4

Shunts, Current Transformer, Voltage Transformer



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AREA 4

Shunts, Current Transformer, Voltage Transformer

page:

SHUNTS

Shunts according to DIN 43 703 class 0,5.....	58/59
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CURRENT TRANSFORMER

General information.....	60/61
Table of low voltage current transformer / type and burden (VA).....	62/63
TAT22 for primary current from 60 to 600A.....	64
TAC17 for primary current from 30 to 200A.....	65
TAC22 for primary current from 40 to 250A.....	66
TAC32 for primary current from 100 to 600A.....	67
TAC33 for primary current from 60 to 600A.....	68
TAC40 for primary current from 100 to 1.000A.....	69
TAC53 for primary current from 250 to 1.500A.....	70
TAT61 for primary current from 300 to 2.000A.....	71
TAT81 for primary current from 400 to 2.500A.....	72
TAT84 for primary current from 200 to 2.500A.....	73
TAT101 for primary current from 400 to 2.500A.....	74
TAT126 for primary current from 400 to 4.000A.....	75
TAT127 for primary current from 800 to 4.000A.....	76
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TAC5 wound primary current transformer for 1 to 100A.....	81
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VOLTAGE TRANSFORMER

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TTV10 low voltage transformers up to 500V.....	87
TTV20 low voltage transformers up to 1000V.....	88
TTV50 low voltage transformers up to 1000V.....	89
TTV100 low voltage transformers up to 1000V.....	90

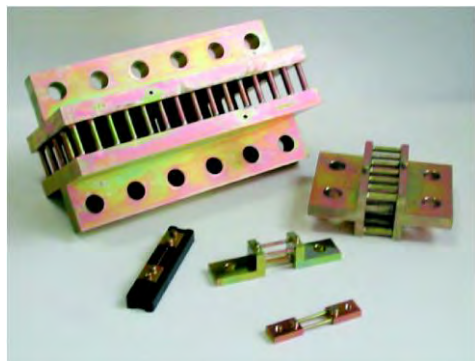


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Shunts



TECHNICAL DATA

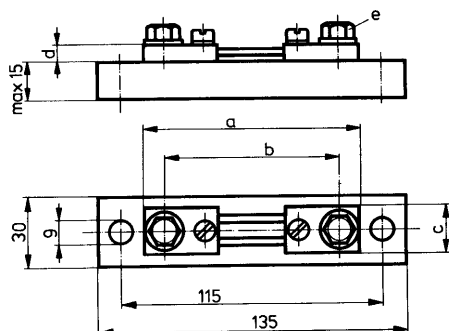
accuracy (class)	0,5%
resistance material	Manganin
continuous overload	1,2In
storage temperature	-40...+80°C
operating temperature	-25...+50°C
manufactured according to	DIN 43703 IEC/EN 60051 DIN 43780

nominal current Ampere	voltage drop		
	60mV	150mV	300mV
1	x	x	x
1,5	x	x	x
2	x	x	x
2,5	x	x	x
3	x	x	x
4	x	x	x
5	x	x	x
6	x	x	x
8	x	x	x
10	x	x	x
12	x	x	x
15	x	x	x
20	x	x	x
25	x	x	x
30	x	x	x
40	x	x	x
50	x	x	x
60	x	x	x
80	x	x	x
100	x	x	x
150	x	x	x
200	x	x	x
250	x	x	x
300	x	x	x
400	x	x	x
500	x	x	x
600	x	x	x
800	x	x	x
1000	x	x	x
1200	x	x	x
1500	x	x	x
2000	x	x	x
2500	x	x	x
3000	on demand	on demand	on demand
4000	on demand	on demand	on demand
5000	on demand	on demand	on demand
6000	on demand	on demand	on demand
8000	on demand	not available	
10000	on demand	not available	

x = common type

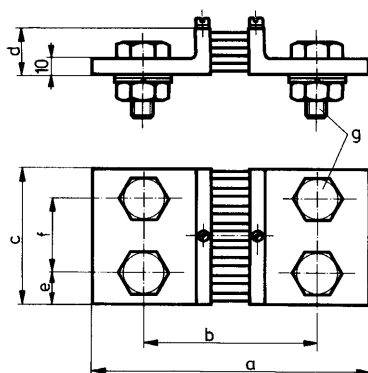
Shunts

design A

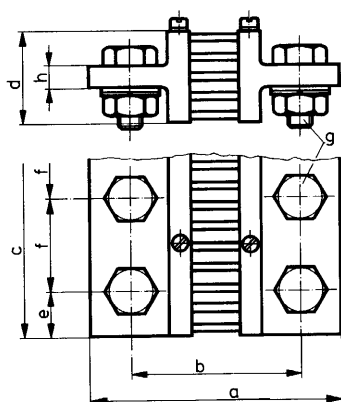


Insulation socket for design A up to 25A only!

design B



design C



dimension in mm

nominal current / voltage drop	a	b	c	d	e	f	g	h	weight ca. kg
--------------------------------	---	---	---	---	---	---	---	---	---------------

design A

1-25A/60mV	90	78	20	8	M5				0,12
1-25A/150mV	90	78	20	8	M5				0,13
1-25A/300mV	90	78	20	8	M5				0,14
40-150A/60mV	100	80	20	8	M8				0,12
40-150A/150mV	225	205	25	8	M8				0,14
40-150A/300mV	384	364	25	8	M8				0,15

design B

200A/60mV	145	105	30	30	15		M12		0,13
200A/150mV	270	230	30	50	15		M12		0,26
200A/300mV	429	389	30	50	15		M12		0,40
250A/60mV	145	105	30	30	15		M12		0,61
250A/150mV	270	230	30	50	15		M12		0,68
250A/300mV	429	389	30	50	15		M12		0,80
400-800A/60mV	145	105	40	30	20		M16		0,83
400-800A/150mV	270	230	40	50	20		M16		1,15
400-800A/300mV	429	389	40	50	20		M16		1,40
1000A/60mV	165	115	60	30	30		M20		1,45
1000A/150mV	290	240	70	60	35		M20		2,15
1000A/300mV	449	399	70	60	35		M20		2,80
1200A/60mV	165	115	90	30	21	48	M16		1,45
1500A/60mV	165	115	90	30	21	48	M16		1,96
2000A/60mV	165	115	90	30	21	48	M16		2,30
2500A/60mV	165	115	120	30	30	60	M20		2,90
3000A/60mV	165	115	120	30	30	60	M20		3,00

design C

1200A/150mV	290	240	90	60	21	48	M16	15	2,25
1200A/300mV	449	399	90	60	21	48	M16	15	3,10
1500A/150mV	290	240	90	60	21	48	M16	15	3,10
1500A/300mV	449	399	90	60	21	48	M16	15	3,70
2500A/150mV	290	240	120	60	30	60	M20	15	5,20
2500A/300mV	449	399	120	60	30	60	M20	15	6,00
3000A/150mV	290	240	120	60	30	60	M20	15	7,00
3000A/300mV	449	399	120	60	30	60	M20	15	6,90
4000A/60mV	165	115	120	60	30	60	M20	15	4,25
4000A/150mV	300	250	120	130	30	60	M20	25	8,30
4000A/300mV	459	409	120	130	30	60	M20	25	13,10
5000A/60mV	165	115	120	60	30	60	M20	15	4,30
5000A/150mV	300	250	120	130	30	60	M20	25	10,60
5000A/300mV	459	409	120	130	30	60	M20	25	13,90
6000A/60mV	175	125	154	130	25	52	M20	25	10,50
6000A/150mV	300	250	154	130	25	52	M20	25	15,00
6000A/300mV	459	409	154	130	25	52	M20	25	17,70
8000A/60mV	175	125	154	130	25	52	M20	25	12,00
10000A/60mV	185	135	206	170	25	52	M20	30	21,00

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General Information

Current Transformer

General:

Current transformers are used for measurement setups of high currents. A high primary current gets transformed to a standardized secondary low current within a given error. The display scales are calibrated according to the primary current of the transformer.

Manufactured according to:

VDE 0414/1-3
IEC 185
IEC/EN 60044/1
VDE, BS, UTE

Nominal current:

Specific nominal primary current (input) and nominal secondary current (output) is printed on the transformer label. Standardized primary current values according DIN 42 600 are 1 - 1,2 - 2 - 2,5 - 3 - 4 - 5 - 6 - 7,5 - 8 – and their decimal multiple.

Standardized secondary current values are either 5 A or 1 A.

Frequency: 50 - 60 Hz, insulation class E

Current limiting factor: FS5. Voltage in series: $0,5 \times \text{series} = \text{max. } 800\text{V}$

Thermal short-term current:

I_{th} is the effective primary current, which the secondary winding can withstand for 1 second.

Dynamic short-term current:

Our current transformers meet the standard $I_{dyn} = 2,5 \times I_{th}$

Continuous overload current: $1,2 I_n$

Operating voltage:

Maximum approved operating voltage $U_m = 800 \text{ V}$

Test voltage: 3 kV, 1min

Accuracy (class):

Current transformers are classified according their precision. Accuracy classes are 0,5 - 1 - 3, which is dependent on the burden in use. Detailed class data information is printed on the transformer label.

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General Information Current Transformer

Power requirement:

The self-consumption of cable is calculated by following formula:

$$P = \frac{\rho \times \ell \times I^2}{A}$$

P rating in W
ρ resistivity
 (ρ_{Cu} = 0,0175 Ωmm²/m; ρ_{Al} = 0,0278 Ωmm²/m)
ℓ cable length in m
I current in A
A cable cross-section in mm²

Self-consumption of copper cable:

Cable cross-section in mm ²	Self-consumption in W per m cable length (please note: forward and return line!)	
	current transformer sec. 5A	current transformer sec. 1A
0,75	0,5833	0,0233
1	0,4375	0,0175
1,5	0,2917	0,0117
2,5	0,1750	0,0070
4	0,1094	0,0044
6	0,0729	0,0029

Protection current transformers:

For a save function of the protection device it is necessary that the measuring error stays low even at the end of the over current input range. The nominal excess current factor is placed after the protection rating labeling.

For example 5P10.

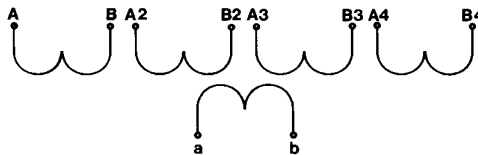
Summation current transformers:

Summation current transformers enable the summation of several synchronous alternating currents with same phase position but different phase shifts.

In connection with main transformers of different ratio all single ratios have to be stated on order.

In connection with main transformers of same ratio it is not necessary to state the ratio on order.

All unused primary circuits of a summation current transformer have to be open. Do not short-circuit!



The connections of all primary coils are marked by the capital letters "A" (P1) and "B" (P2).

The connections of all secondary coils are marked by the same small letters "a" (S1) and "b" (S2).

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Table of Low Voltage Current Transformer Type and Burden (VA)

Type	TAC5		TAC10		TAT22			TAC17			TAC22			
<i>cable size:</i>	(wound CT)		(wound CT)		Ø 22,5mm			Ø 17mm			Ø 22mm			
<i>busbar size:</i>					1x20x10mm			1x15x10mm			1x20x10mm			
<i>catalog page:</i>	81		82		64			65			66			
class	0,5	1	0,5	1	0,5	1	3	0,5	1	3	0,5	1	3	
primary current (A)	burden in VA		burden in VA		burden in VA			burden in VA			burden in VA			
5	5	7	10	20										
10	5	7	10	20										
15	5	7	10	20										
20	5	7	10	20										
25	5	7	10	20										
30	5	7	10	20						1,5				
40	5	7	10	20						3			1,5	
50	5	7	10	20					1	4			2	
60	5	7	10	20			1,5		1,25	5		1	2,5	
80	5	7	10	20			2,5	1	2,5	6		2	4	
100	5	7	10	20			1,5	3	1,5	4	8	1	3	5
150			10	20			2	5	4	8	15	3	5	8
200			10	20				2	7	15	20	5	10	12
250			10	20			1,5	3				8	10	15
300			10	20			2	4						
400			10	20	1,5	3	5							
500			10	20	2	4	6							
600			10	20	2,5	5	7							

Type	TAC32			TAC33			TAC40			TAC53			TAT61		
<i>cable size:</i>	Ø 24mm			Ø 24mm			Ø 32mm								
<i>busbar size:</i>	1x30x10mm			1x30x10mm			1x40x10mm			2x50x10mm			2x60x10mm		
<i>catalog page:</i>	67			68			69			70			71		
class	0,5	1	3	0,5	1	5P10	0,5	1	3	0,5	1	3	0,5	1	3
primary current (A)	burden in VA			burden in VA			burden in VA			burden in VA			burden in VA		
60				1	1,5										
80				2	3										
100	1	2	3	3	4				4						
150	2,5	3	5	5	7,5	1	1,5	3	5						
200	3	5	8	7,5	10	1	2	4	6	2	4	10			
250	4	7	10	10	12	1,5	3	6	9	4	8	12			
300	6	10	12	10	15	2	5	8	12	5	10	15		3	6
400	10	12	12	12	20	2,5	10	15	20	6	12	20	2	4	10
500	12	15	15	15	25	3	12	20	25	10	20	25	4	10	12
600	12	15	15	20	30	4	15	20	25	15	25	30	6	15	18
800							18	25	30	20	30	40	8	15	20
1000							20	25	30	30	40	50	10	20	30
1200										30	40	50	12	25	30
1500										30	40	50	20	30	40
2000										30	40	50	25	40	50



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Table of Low Voltage Current Transformer Type and Burden (VA)

Type	TAT81			TAT82			TAT84			TAT101			TAT126		
<i>busbar size</i>	2x80x10mm			2x80x10mm			2x80x10mm			3x100x10mm			2x120x10mm		
<i>catalog page</i>	72			72			73			74			75		
class	0,5	1	5P10	5P10			0,5	1	3	0,5	1	5P10	0,5	1	3
primary current (A)	burden in VA			burden in VA			burden in VA			burden in VA			burden in VA		
200							2	4	8						
250							3	6	10						
300							4	8	15						
400	5	10		5			5	10	20	3	5		3	5	10
500	5	10		6			6	15	30	5	8	2	4	8	15
600	8	15		7			8	20	40	8	12	4	6	12	20
800	10	20		8			10	20	40	10	18	6	8	15	20
1000	15	30		12			15	25	50	15	25	7	12	20	30
1200	20	40		13			20	40	60	20	30	8	15	30	50
1500	20	40		15			25	50	80	30	40	8	20	40	60
2000	30	50		15			30	60	80	30	40	10	30	60	80
2500	40	60		15			40	80	100	35	40	12	40	80	100
3000										35	40	15	50	80	120
4000										35	40	15	60	100	150

Type	TAT127			TAT128			TAT129			TAT165			TAT225		
<i>busbar size</i>	3x120x10mm			4x120x10mm			5x120x10mm			6x160x10mm			6x220x10mm		
<i>catalog page</i>	76			77			78			79			80		
class	0,5	1	5P10	0,5	1	5P10	0,5	1	5P10	0,5	1	5P10	0,5	1	5P10
primary current (A)	burden in VA			burden in VA			burden in VA			burden in VA			burden in VA		
800	20	40	8												
1000	20	40	10	25	50	10	25	50	10	25	50	10	25	50	10
1200	25	50	12	30	60	12	30	60	12	30	60	12	30	60	12
1500	40	80	15	35	70	15	35	70	15	35	70	15	35	70	15
2000	50	100	15	40	80	20	40	80	20	40	80	20	40	80	20
2500	60	120	20	50	100	20	50	100	20	50	100	20	50	100	20
3000	80	160	25	70	120	25	70	120	25	70	120	25	70	120	25
4000	100	200	30	80	150	30	80	150	30	80	150	30	80	150	30
5000	120	240	-	100	180	20	100	180	15	100	180	15	100	180	15
6000							100	180	15	100	180	15	100	180	15
8000										100	180	15	100	180	15
10000													100	180	15

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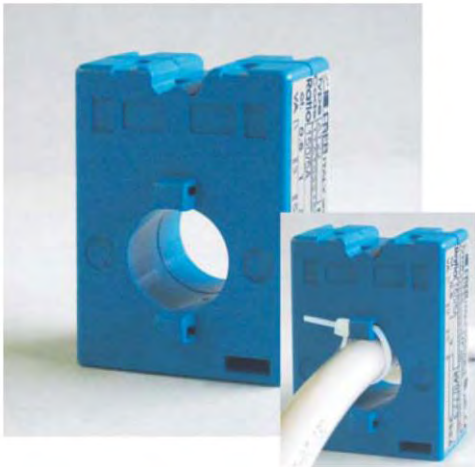
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TAT22

Current Transformer 48mm Width suitable for HRC-Fuse-Load-Switches Size 00 (160A) to Size 3 (630A)

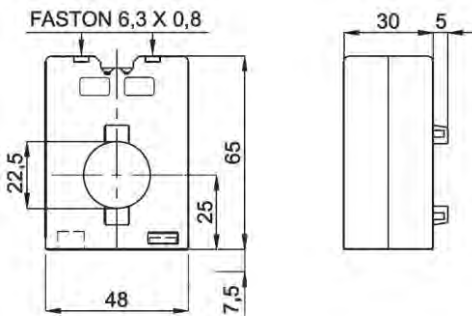
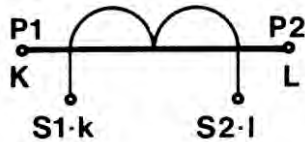


TECHNICAL DATA

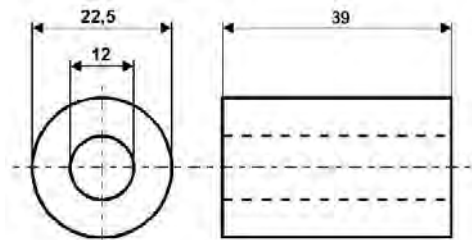
break-proof plastic housing with
integrated terminal cover
self-extinguishing
secondary connection

insulation
protection
frequency
current limiting factor
thermal short-term current
dynamic short-term current
storage temperature
operating temperature
weight

UL94-V0
flat plug socket
6,3x0,8mm (top side)
class E
IP 20
50...60Hz
FS 5
 $I_{th}=40I_n$
 $I_{dyn}=2,5 \times I_{th}$
-40...+80°C
-25...+50°C
0,15...0,20kg



copper bushing



Order Code	sec. 5A primary	burden class 0,5	burden class 1,0	burden class 3,0
TAT022060-05	60A			1,5VA
TAT022080-05	80A			2,5VA
TAT022100-05	100A		1,5VA	3,0VA
TAT022150-05	150A		3,0VA	5,0VA
TAT022200-05	200A			2,0VA
TAT022250-05	250A		1,5VA	3,0VA
TAT022300-05	300A		2,0VA	4,0VA
TAT022400-05	400A	1,5VA	3,0VA	5,0VA
TAT022500-05	500A	2,0VA	4,0VA	6,0VA
TAT022600-05	600A	2,5VA	5,0VA	7,0VA

Order Code	sec. 1A primary	burden class 0,5	burden class 1,0	burden class 3,0
TAT022060-01	60A			1,5VA
TAT022080-01	80A			2,5VA
TAT022100-01	100A		1,5VA	3,0VA
TAT022150-01	150A		3,0VA	5,0VA
TAT022200-01	200A			2,0VA
TAT022250-01	250A		1,5VA	3,0VA
TAT022300-01	300A		2,0VA	4,0VA
TAT022400-01	400A	1,5VA	3,0VA	5,0VA
TAT022500-01	500A	2,0VA	4,0VA	6,0VA
TAT022600-01	600A	2,5VA	5,0VA	7,0VA

Please note:

Additional copper bushings are necessary for mounting current transformers type TAT22 behind HRC-fuse-load-switches.

Order Code	
CU3912	copper bushing



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TAC17

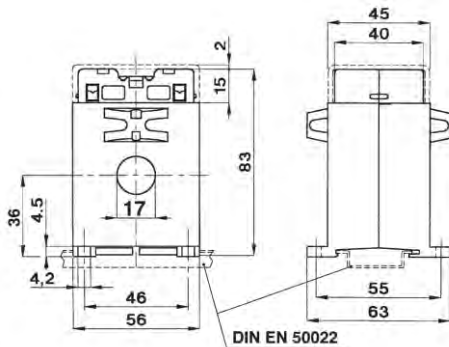
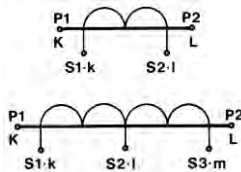
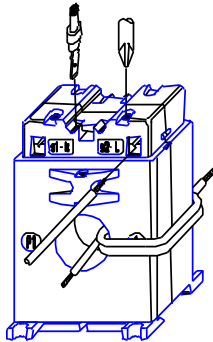
Current Transformer 56mm Width suitable for 35mm DIN Rail for Cable \varnothing max. 17mm



TECHNICAL DATA

break-proof plastic housing with
integrated terminal cover
self-extinguishing
insulation
protection
frequency
current limiting factor
thermal short-term current
dynamic short-term current
storage temperature
operating temperature
weight

UL94-V0
class E
IP 20
50...60Hz
FS 5
 $I_{th}=40I_n$
 $I_{dyn}=2,5 \times I_{th}$
-40...+80°C
-25...+50°C
0,25...0,30kg



Order Code	sec. 5A primary	burden class 0,5	burden class 1,0	burden class 3,0
TAC017030-05	30A			1,5VA
TAC017040-05	40A			3VA
TAC017050-05	50A		1VA	4VA
TAC017060-05	60A		1,25VA	5VA
TAC017080-05	80A	1VA	2,5VA	6VA
TAC017100-05	100A	1,5VA	4VA	8VA
TAC017150-05	150A	4VA	8VA	15VA
TAC017200-05	200A	7VA	15VA	20VA

Order Code	sec. 1A primary	burden class 0,5	burden class 1,0	burden class 3,0
TAC017030-01	30A			1,5VA
TAC017040-01	40A			3VA
TAC017050-01	50A		1VA	4VA
TAC017060-01	60A		1,25VA	5VA
TAC017080-01	80A	1VA	2,5VA	6VA
TAC017100-01	100A	1,5VA	4VA	8VA
TAC017150-01	150A	4VA	8VA	15VA
TAC017200-01	200A	7VA	15VA	20VA

Special Options

- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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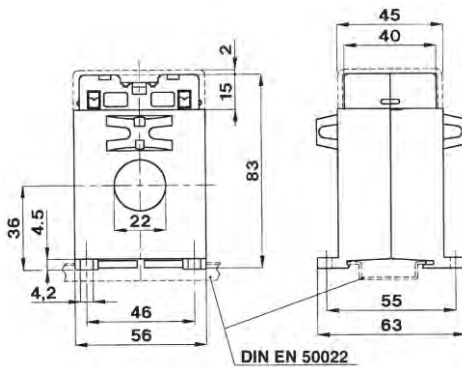
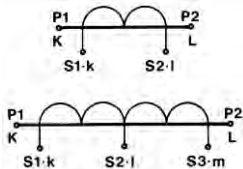
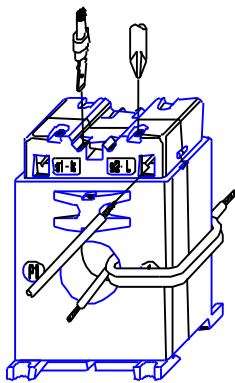
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TAC22

Current Transformer 56mm Width suitable for 35mm DIN Rail for Cable \varnothing max. 22mm



TECHNICAL DATA

break-proof plastic housing with
integrated terminal cover
self-extinguishing
insulation
protection
frequency
current limiting factor
thermal short-term current
dynamic short-term current
storage temperature
operating temperature
weight

UL94-V0
class E
IP 20
50...60Hz
FS 5
 $I_{th}=40I_n$
 $I_{dyn}=2,5 \times I_{th}$
-40...+80°C
-25...+50°C
0,25...0,30kg

Order Code	sec. 5A primary	burden class 0,5	burden class 1,0	burden class 3,0
TAC022040-05	40A			1,5VA
TAC022050-05	50A			2VA
TAC022060-05	60A		1VA	2,5VA
TAC022080-05	80A		2VA	4VA
TAC022100-05	100A	1VA	3VA	5VA
TAC022150-05	150A	3VA	5VA	8VA
TAC022200-05	200A	5VA	10VA	12VA
TAC022250-05	250A	8VA	10VA	15VA

Order Code	sec. 1A primary	burden class 0,5	burden class 1,0	burden class 3,0
TAC022040-01	40A			1,5VA
TAC022050-01	50A			2VA
TAC022060-01	60A		1VA	2,5VA
TAC022080-01	80A		2VA	4VA
TAC022100-01	100A	1VA	3VA	5VA
TAC022150-01	150A	3VA	5VA	8VA
TAC022200-01	200A	5VA	10VA	12VA
TAC022250-01	250A	8VA	10VA	15VA

Special Options

- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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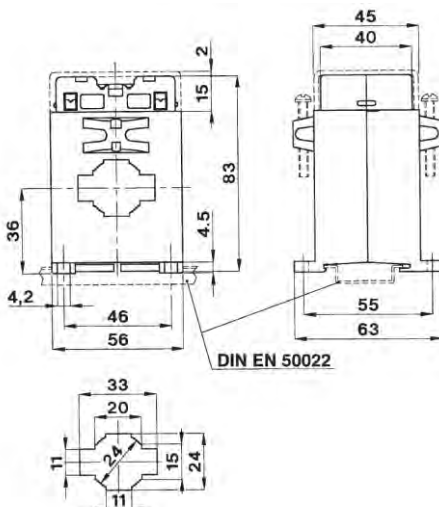
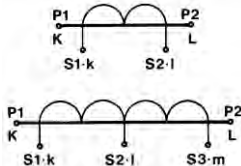
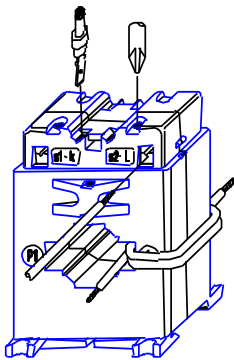
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TAC32

Current Transformer 56mm Width suitable for 35mm DIN Rail designed for Busbar 30x10mm



TECHNICAL DATA

break-proof plastic housing with
integrated terminal cover
self-extinguishing
insulation
protection
frequency
current limiting factor
thermal short-term current
dynamic short-term current
storage temperature
operating temperature
weight

UL94-V0
class E
IP 20
50...60Hz
FS 5
 $I_{th}=40I_n$
 $I_{dyn}=2,5 \times I_{th}$
-40...+80°C
-25...+50°C
0,25...0,30kg

Order Code	sec. 5A	burden	burden	burden
	primary	class	class	class
		0,5	1,0	3,0
TAC032100-05	100A	1VA	2VA	3VA
TAC032150-05	150A	2,5VA	3VA	5VA
TAC032200-05	200A	3VA	5VA	8VA
TAC032250-05	250A	4VA	7VA	10VA
TAC032300-05	300A	6VA	10VA	12VA
TAC032400-05	400A	10VA	12VA	12VA
TAC032500-05	500A	12VA	15VA	15VA
TAC032600-05	600A	12VA	15VA	15VA

Order Code	sec. 1A	burden	burden	burden
	primary	class	class	class
		0,5	1,0	3,0
TAC032100-01	100A	1VA	2VA	3VA
TAC032150-01	150A	2,5VA	3VA	5VA
TAC032200-01	200A	3VA	5VA	8VA
TAC032250-01	250A	4VA	7VA	10VA
TAC032300-01	300A	6VA	10VA	12VA
TAC032400-01	400A	10VA	12VA	12VA
TAC032500-01	500A	12VA	15VA	15VA
TAC032600-01	600A	12VA	15VA	15VA

Special Options

- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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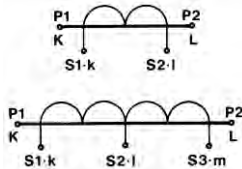
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TAC33

Current Transformer 70mm Width suitable for 35mm DIN Rail designed for Busbar 30x10mm



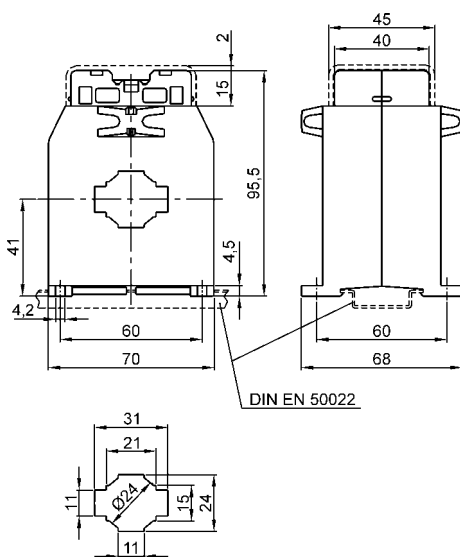
TECHNICAL DATA

break-proof plastic housing with
integrated terminal cover
self-extinguishing
insulation
protection
frequency
current limiting factor
thermal short-term current
dynamic short-term current
storage temperature
operating temperature
weight

UL94-V0
class E
IP 20
50...60Hz
FS 5
 $I_{th}=40I_n$
 $I_{dyn}=2,5 \times I_{th}$
-40...+80°C
-25...+50°C
0,55...0,75kg

Order Code	sec. 5A primary	burden class 0,5	burden class 1,0	burden class 5P5 *)	burden class 5P10 *)
TAC033060-05	60A	1VA	1,5VA	1VA	-
TAC033080-05	80A	2VA	3VA	1,5VA	-
TAC033100-05	100A	3VA	4VA	2VA	-
TAC033150-05	150A	5VA	7,5VA	3VA	1VA
TAC033200-05	200A	7,5VA	10VA	4VA	1VA
TAC033250-05	250A	10VA	12VA	5VA	1,5VA
TAC033300-05	300A	10VA	15VA	6VA	2VA
TAC033400-05	400A	12VA	20VA	8VA	2,5VA
TAC033500-05	500A	15VA	25VA	10VA	3VA
TAC033600-05	600A	20VA	30VA	12VA	4VA

Order Code	sec. 1A primary	burden class 0,5	burden class 1,0	burden class 5P5 *)	burden class 5P10 *)
TAC033060-01	60A	1VA	1,5VA	1VA	-
TAC033080-01	80A	2VA	3VA	1,5VA	-
TAC033100-01	100A	3VA	4VA	2VA	-
TAC033150-01	150A	5VA	7,5VA	3VA	1VA
TAC033200-01	200A	7,5VA	10VA	4VA	1VA
TAC033250-01	250A	10VA	12VA	5VA	1,5VA
TAC033300-01	300A	10VA	15VA	6VA	2VA
TAC033400-01	400A	12VA	20VA	8VA	2,5VA
TAC033500-01	500A	15VA	25VA	10VA	3VA
TAC033600-01	600A	20VA	30VA	12VA	4VA



Special Options

- *) Protection Transformer
- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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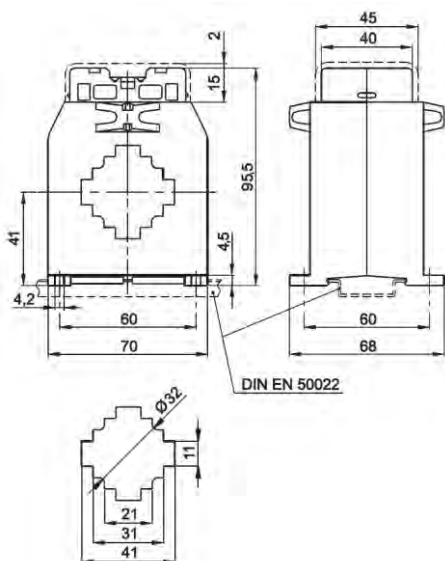
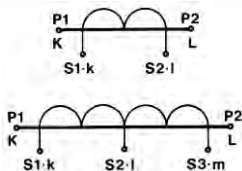
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TAC40

Current Transformer 70mm Width suitable for 35mm DIN Rail designed for Busbar 40x10mm or 2x30x10mm



TECHNICAL DATA

break-proof plastic housing with
integrated terminal cover
self-extinguishing
insulation
protection
frequency
current limiting factor
thermal short-term current
dynamic short-term current
storage temperature
operating temperature
weight

UL94-V0
class E
IP 20
50...60Hz
FS 5
 $I_{th}=60I_n$
 $I_{dyn}=2,5 \times I_{th}$
-40...+80°C
-25...+50°C
0,35...0,50kg

Order Code	sec. 5A	burden	burden	burden
	primary	class	class	class
		0,5	1,0	3,0
TAC040100-05	100A			4VA
TAC040150-05	150A	1,5VA	3VA	5VA
TAC040200-05	200A	2VA	4VA	6VA
TAC040250-05	250A	3VA	6VA	9VA
TAC040300-05	300A	5VA	8VA	12VA
TAC040400-05	400A	10VA	15VA	20VA
TAC040500-05	500A	12VA	20VA	25VA
TAC040600-05	600A	15VA	20VA	25VA
TAC040750-05	750A	15VA	20VA	25VA
TAC040800-05	800A	18VA	25VA	30VA
TAC0401K0-05	1000A	20VA	25VA	30VA

Order Code	sec. 1A	burden	burden	burden
	primary	class	class	class
		0,5	1,0	3,0
TAC040100-01	100A			4VA
TAC040150-01	150A	1,5VA	3VA	5VA
TAC040200-01	200A	2VA	4VA	6VA
TAC040250-01	250A	3VA	6VA	9VA
TAC040300-01	300A	5VA	8VA	12VA
TAC040400-01	400A	10VA	15VA	20VA
TAC040500-01	500A	12VA	20VA	25VA
TAC040600-01	600A	15VA	20VA	25VA
TAC040750-01	750A	15VA	20VA	25VA
TAC040800-01	800A	18VA	25VA	30VA
TAC0401K0-01	1000A	20VA	25VA	30VA

Special Options

- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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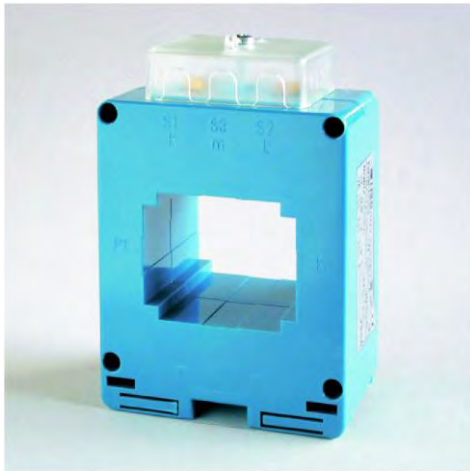
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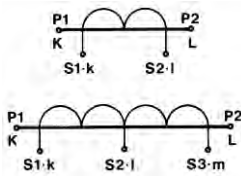
TAC53

Current Transformer 85mm Width suitable for 35mm DIN Rail designed for Busbar 2x50x10mm or 40x40mm



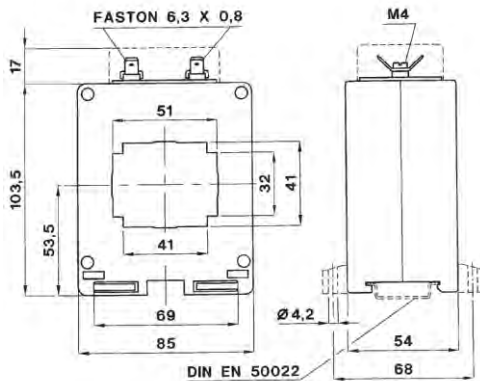
TECHNICAL DATA

break-proof plastic housing	UL94-V0
self-extinguishing	class E
insulation	IP 30
protection	50...60Hz
frequency	FS 5
current limiting factor	$I_{th}=60I_n$
thermal short-term current	$I_{dyn}=2,5 \times I_{th}$
dynamic short-term current	-40...+80°C
storage temperature	-25...+50°C
operating temperature	0,50...0,70kg
weight	



Order Code	sec. 5A	burden	burden	burden
	primary	class 0,5	class 1,0	class 3,0
TAC053200-05	200A	2VA	4VA	10VA
TAC053250-05	250A	4VA	8VA	12VA
TAC053300-05	300A	5VA	10VA	15VA
TAC053400-05	400A	6VA	12VA	20VA
TAC053500-05	500A	10VA	20VA	25VA
TAC053600-05	600A	15VA	25VA	30VA
TAC053750-05	750A	15VA	25VA	30VA
TAC053800-05	800A	20VA	30VA	40VA
TAC0531K0-05	1000A	30VA	40VA	50VA
TAC0531K2-05	1200A	30VA	40VA	50VA
TAC0531K5-05	1500A	30VA	40VA	50VA
TAC0532K0-05	2000A	30VA	40VA	50VA

Order Code	sec. 1A	burden	burden	burden
	primary	class 0,5	class 1,0	class 3,0
TAC053200-01	200A	2VA	4VA	10VA
TAC053250-01	250A	4VA	8VA	12VA
TAC053300-01	300A	5VA	10VA	15VA
TAC053400-01	400A	6VA	12VA	20VA
TAC053500-01	500A	10VA	20VA	25VA
TAC053600-01	600A	15VA	25VA	30VA
TAC053750-01	750A	15VA	25VA	30VA
TAC053800-01	800A	20VA	30VA	40VA
TAC0531K0-01	1000A	30VA	40VA	50VA
TAC0531K2-01	1200A	30VA	40VA	50VA
TAC0531K5-01	1500A	30VA	40VA	50VA
TAC0532K0-01	2000A	30VA	40VA	50VA



Special Options

- Tropical design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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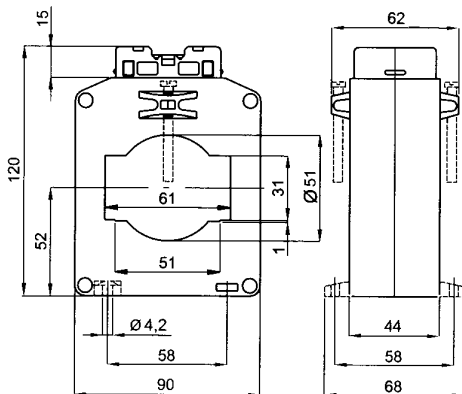
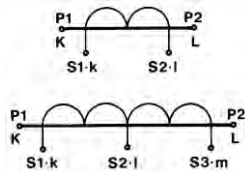
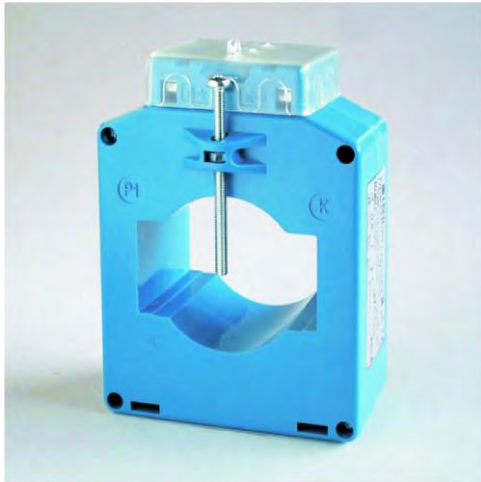
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TAT61

Current Transformer 90mm Width designed for Busbar 2x60x10mm



TECHNICAL DATA

break-proof plastic housing with integrated terminal cover	UL94-V0
self-extinguishing insulation	class E
protection	IP 20
frequency	50...60Hz
current limiting factor	FS 5
thermal short-term current	$I_{th}=60I_n$
dynamic short-term current	$I_{dyn}=2,5 \times I_{th}$
storage temperature	-40...+80°C
operating temperature	-25...+50°C
weight	0,50...1,00kg

Order Code	sec. 5A	burden class	burden class	burden class
	primary	0,5	1,0	<u>5P5 *)</u>
TAT061300-05	300A		4VA	
TAT061400-05	400A	2VA	6VA	
TAT061500-05	500A	4VA	10VA	
TAT061600-05	600A	6VA	15VA	2VA
TAT061750-05	750A	6VA	15VA	2VA
TAT061800-05	800A	8VA	15VA	3VA
TAT0611K0-05	1000A	10VA	20VA	4VA
TAT0611K2-05	1200A	12VA	25VA	5VA
TAT0611K5-05	1500A	20VA	30VA	6VA
TAT0612K0-05	2000A	25VA	40VA	8VA

Order Code	sec. 1A	burden class	burden class	burden class
	primary	0,5	1,0	<u>5P5 *)</u>
TAT061300-01	300A		4VA	
TAT061400-01	400A	2VA	6VA	
TAT061500-01	500A	4VA	10VA	
TAT061600-01	600A	6VA	15VA	2VA
TAT061750-01	750A	6VA	15VA	2VA
TAT061800-01	800A	8VA	15VA	3VA
TAT0611K0-01	1000A	10VA	20VA	4VA
TAT0611K2-01	1200A	12VA	25VA	5VA
TAT0611K5-01	1500A	20VA	30VA	6VA
TAT0612K0-01	2000A	25VA	40VA	8VA

Special Options

- *) Protection Transformer
- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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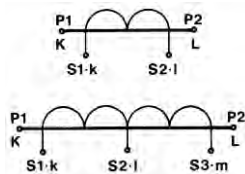
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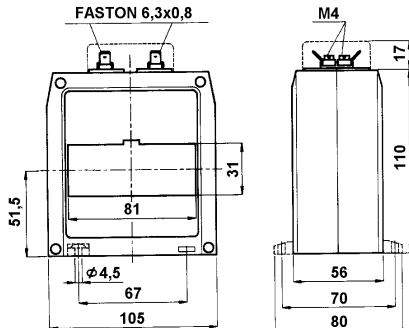
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TAT81 / TAT82

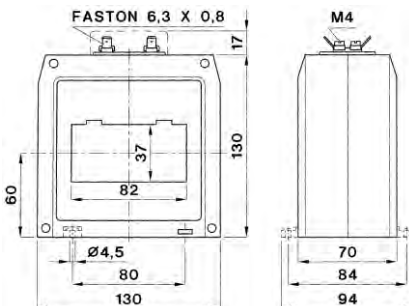
Current Transformer 105mm Width designed for Busbar 2x80x10mm



TAT81



TAT82 *)



TECHNICAL DATA

break-proof plastic housing	UL94-V0
self-extinguishing	class E
insulation	IP 30
protection	50...60Hz
frequency	FS 5
current limiting factor	$I_{th}=60I_n$
thermal short-term current	$I_{dyn}=2,5 \times I_{th}$
dynamic short-term current	-40...+80°C
storage temperature	-25...+50°C
operating temperature	0,55...0,75kg
weight	

Order Code	sec. 5A primary	burden class 0,5	burden class 1,0	burden class 5P10 *)
TAT081400-05	400A	5VA	10VA	5VA
TAT081500-05	500A	5VA	10VA	6VA
TAT081600-05	600A	8VA	15VA	7VA
TAT081750-05	750A	8VA	15VA	7VA
TAT081800-05	800A	10VA	20VA	8VA
TAT0811K0-05	1000A	15VA	30VA	12VA
TAT0811K2-05	1200A	20VA	40VA	13VA
TAT0811K5-05	1500A	20VA	40VA	15VA
TAT0812K0-05	2000A	30VA	50VA	15VA
TAT0812K5-05	2500A	40VA	60VA	15VA

Order Code	sec. 1A primary	burden class 0,5	burden class 1,0	burden class 5P10 *)
TAT081400-01	400A	5VA	10VA	5VA
TAT081500-01	500A	5VA	10VA	6VA
TAT081600-01	600A	8VA	15VA	7VA
TAT081750-01	750A	8VA	15VA	7VA
TAT081800-01	800A	10VA	20VA	8VA
TAT0811K0-01	1000A	15VA	30VA	12VA
TAT0811K2-01	1200A	20VA	40VA	13VA
TAT0811K5-01	1500A	20VA	40VA	15VA
TAT0812K0-01	2000A	30VA	50VA	15VA
TAT0812K5-01	2500A	40VA	60VA	15VA

*) Special option protection transformer with TAT82 only;
Width TAT82 = 130mm

Special Options

- *) Protection Transformer
- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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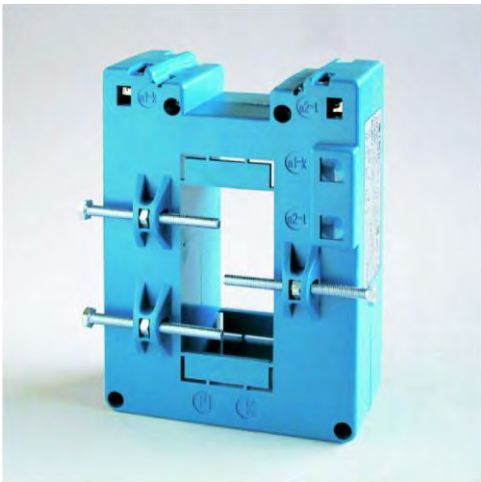
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TAT84

Current Transformer

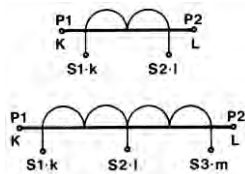
designed for Busbar 2x80x10mm



TECHNICAL DATA

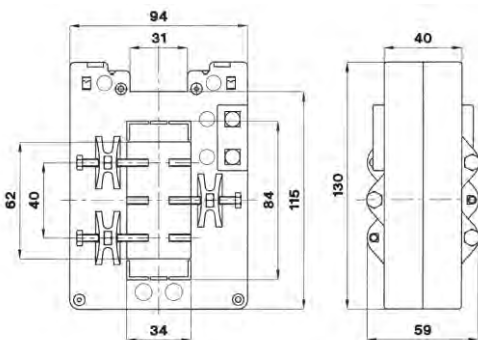
break-proof plastic housing with
integrated terminal cover
self-extinguishing
insulation
protection
frequency
current limiting factor
thermal short-term current
dynamic short-term current
storage temperature
operating temperature
weight

UL94-V0
class E
IP 20
50...60Hz
FS 5
 $I_{th}=80I_n$
 $I_{dyn}=2,5 \times I_{th}$
-40...+80°C
-25...+50°C
0,75...1,5kg



Order Code	sec. 5A	burden	burden	burden
	primary	class 0,5	class 1,0	class 3,0
TAT084200-05	200A	2VA	4VA	8VA
TAT084250-05	250A	3VA	6VA	10VA
TAT084300-05	300A	4VA	8VA	15VA
TAT084400-05	400A	5VA	10VA	20VA
TAT084500-05	500A	6VA	15VA	30VA
TAT084600-05	600A	8VA	20VA	40VA
TAT084750-05	750A	8VA	20VA	40VA
TAT084800-05	800A	10VA	20VA	40VA
TAT0841K0-05	1000A	15VA	25VA	50VA
TAT0841K2-05	1200A	20VA	40VA	60VA
TAT0841K5-05	1500A	25VA	50VA	80VA
TAT0842K0-05	2000A	30VA	60VA	80VA
TAT0842K5-05	2500A	40VA	80VA	100VA

Order Code	sec. 1A	burden	burden	burden
	primary	class 0,5	class 1,0	class 3,0
TAT084200-01	200A	2VA	4VA	8VA
TAT084250-01	250A	3VA	6VA	10VA
TAT084300-01	300A	4VA	8VA	15VA
TAT084400-01	400A	5VA	10VA	20VA
TAT084500-01	500A	6VA	15VA	30VA
TAT084600-01	600A	8VA	20VA	40VA
TAT084750-01	750A	8VA	20VA	40VA
TAT084800-01	800A	10VA	20VA	40VA
TAT0841K0-01	1000A	15VA	25VA	50VA
TAT0841K2-01	1200A	20VA	40VA	60VA
TAT0841K5-01	1500A	25VA	50VA	80VA
TAT0842K0-01	2000A	30VA	60VA	80VA
TAT0842K5-01	2500A	40VA	80VA	100VA



Special Options

- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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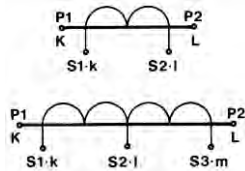
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TAT101

Current Transformer 129mm Width designed for Busbar 3x100x10mm

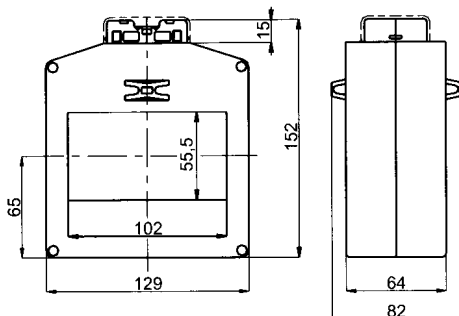


TECHNICAL DATA

break-proof plastic housing with integrated terminal cover	UL94-V0
self-extinguishing insulation	class E
protection	IP 20
frequency	50...60Hz
current limiting factor	FS 5
thermal short-term current	$I_{th}=80I_n$
dynamic short-term current	$I_{dyn}=2,5 \times I_{th}$
storage temperature	-40...+80°C
operating temperature	-25...+50°C
weight	1,2...3,0kg

Order Code	sec. 5A primary	burden class 0,5	burden class 1,0	burden class 5P10 *)
TAT101400-05	400A	3VA	5VA	-
TAT101500-05	500A	5VA	8VA	2VA
TAT101600-05	600A	8VA	12VA	4VA
TAT101750-05	750A	8VA	12VA	4VA
TAT101800-05	800A	10VA	18VA	6VA
TAT1011K0-05	1000A	15VA	25VA	7VA
TAT1011K2-05	1200A	20VA	30VA	8VA
TAT1011K5-05	1500A	30VA	40VA	8VA
TAT1012K0-05	2000A	40VA	45VA	10VA
TAT1012K5-05	2500A	40VA	45VA	12VA
TAT1013K0-05	3000A	40VA	45VA	15VA
TAT1014K0-05	4000A	40VA	45VA	20VA

Order Code	sec. 1A primary	burden class 0,5	burden class 1,0	burden class 5P10 *)
TAT101400-01	400A	3VA	5VA	-
TAT101500-01	500A	5VA	8VA	2VA
TAT101600-01	600A	8VA	12VA	4VA
TAT101750-01	750A	8VA	12VA	4VA
TAT101800-01	800A	10VA	18VA	6VA
TAT1011K0-01	1000A	15VA	25VA	7VA
TAT1011K2-01	1200A	20VA	30VA	8VA
TAT1011K5-01	1500A	30VA	40VA	8VA
TAT1012K0-01	2000A	40VA	45VA	10VA
TAT1012K5-01	2500A	40VA	45VA	12VA
TAT1013K0-01	3000A	40VA	45VA	15VA
TAT1014K0-01	4000A	40VA	45VA	20VA



Special Options

- *) Protection Transformer
- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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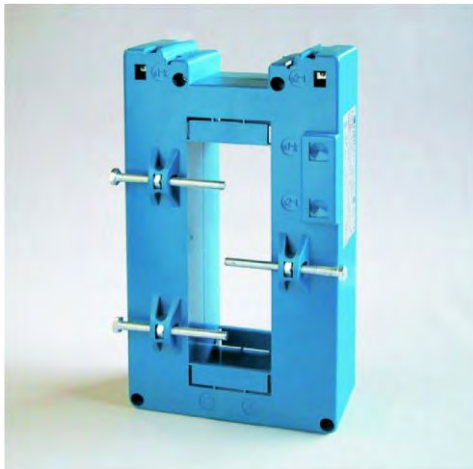
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TAT126

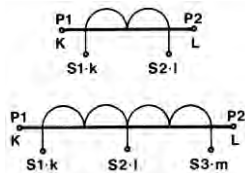
Current Transformer

designed for Busbar 2x120x10mm



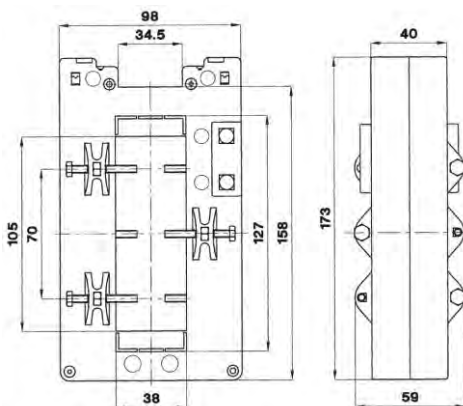
TECHNICAL DATA

break-proof plastic housing with integrated terminal cover	UL94-V0
self-extinguishing insulation	class E
protection	IP 20
frequency	50...60Hz
current limiting factor	FS 5
thermal short-term current	$I_{th}=80I_n$
dynamic short-term current	$I_{dyn}=2,5 \times I_{th}$
storage temperature	-40...+80°C
operating temperature	-25...+50°C
weight	1,2...3,0kg



Order Code	sec. 5A	burden	burden	burden
	primary	class 0,5	class 1,0	class 3,0
TAT126400-05	400A	3VA	5VA	10VA
TAT126500-05	500A	4VA	8VA	15VA
TAT126600-05	600A	6VA	12VA	20VA
TAT126750-05	750A	6VA	12VA	20VA
TAT126800-05	800A	8VA	15VA	20VA
TAT1261K0-05	1000A	12VA	20VA	30VA
TAT1261K2-05	1200A	15VA	30VA	50VA
TAT1261K5-05	1500A	20VA	40VA	60VA
TAT1262K0-05	2000A	30VA	60VA	80VA
TAT1262K5-05	2500A	40VA	80VA	100VA
TAT1263K0-05	3000A	50VA	80VA	120VA
TAT1264K0-05	4000A	60VA	100VA	150VA

Order Code	sec. 1A	burden	burden	burden
	primary	class 0,5	class 1,0	class 3,0
TAT126400-01	400A	3VA	5VA	10VA
TAT126500-01	500A	4VA	8VA	15VA
TAT126600-01	600A	6VA	12VA	20VA
TAT126750-01	750A	6VA	12VA	20VA
TAT126800-01	800A	8VA	15VA	20VA
TAT1261K0-01	1000A	12VA	20VA	30VA
TAT1261K2-01	1200A	15VA	30VA	50VA
TAT1261K5-01	1500A	20VA	40VA	60VA
TAT1262K0-01	2000A	30VA	60VA	80VA
TAT1262K5-01	2500A	40VA	80VA	100VA
TAT1263K0-01	3000A	50VA	80VA	120VA
TAT1264K0-01	4000A	60VA	100VA	150VA



Special Options

- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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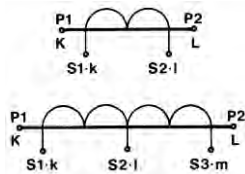
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TAT127

Current Transformer 185mm Width designed for Busbar 3x120x10mm

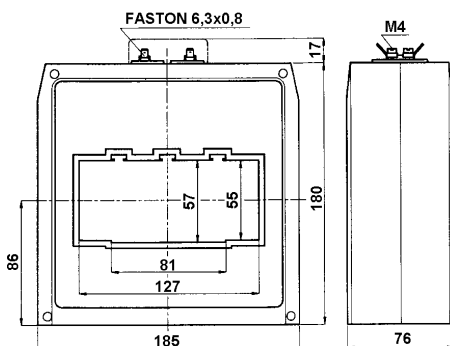


TECHNICAL DATA

break-proof plastic housing	UL94-V0
self-extinguishing	class E
insulation	IP 30
protection	50...60Hz
frequency	FS 5
current limiting factor	$I_{th}=80I_n$
thermal short-term current	$I_{dyn}=2,5 \times I_{th}$
dynamic short-term current	-40...+80°C
storage temperature	-25...+50°C
operating temperature	2,5...3,3kg
weight	

Order Code	sec. 5A	burden	burden	burden
	primary	class	class	class
		0,5	1,0	<u>5P10 *)</u>
TAT127800-05	800A	20VA	40VA	8VA
TAT1271K0-05	1000A	20VA	40VA	10VA
TAT1271K2-05	1200A	25VA	50VA	12VA
TAT1271K5-05	1500A	40VA	80VA	15VA
TAT1272K0-05	2000A	50VA	100VA	15VA
TAT1272K5-05	2500A	60VA	120VA	20VA
TAT1273K0-05	3000A	80VA	160VA	25VA
TAT1274K0-05	4000A	100VA	200VA	30VA
TAT1275K0-05	5000A	120VA	240VA	-

Order Code	sec. 1A	burden	burden	burden
	primary	class	class	class
		0,5	1,0	<u>5P10 *)</u>
TAT127800-01	800A	20VA	40VA	8VA
TAT1271K0-01	1000A	20VA	40VA	10VA
TAT1271K2-01	1200A	25VA	50VA	12VA
TAT1271K5-01	1500A	40VA	80VA	15VA
TAT1272K0-01	2000A	50VA	100VA	15VA
TAT1272K5-01	2500A	60VA	120VA	20VA
TAT1273K0-01	3000A	80VA	160VA	25VA
TAT1274K0-01	4000A	100VA	200VA	30VA
TAT1275K0-01	5000A	120VA	240VA	-



Special Options

- *) Protection Transformer
- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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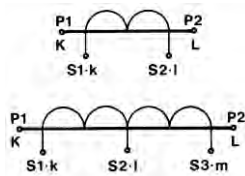
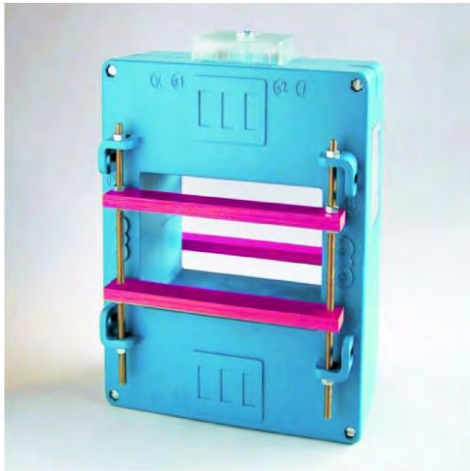
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TAT128

Current Transformer 185mm Width designed for Busbar 4x120x10mm

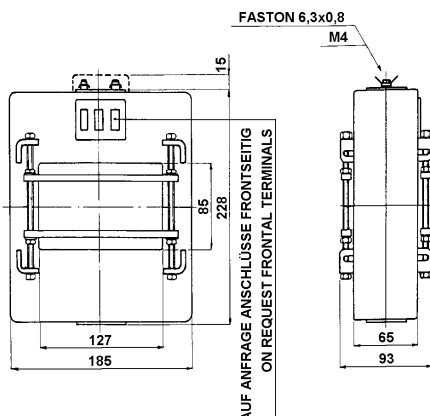


TECHNICAL DATA

break-proof plastic housing	UL94-V0
self-extinguishing	class E
insulation	IP 30
protection	50...60Hz
frequency	FS 5
current limiting factor	$I_{th}=80I_n$
thermal short-term current	$I_{dyn}=2,5 \times I_{th}$
dynamic short-term current	-40...+80°C
storage temperature	-25...+50°C
operating temperature	2,3...3,5kg
weight	

Order Code	sec. 5A primary	burden class 0,5	burden class 1,0	burden class 5P10 *)
TAT1281K0-05	1000A	25VA	50VA	10VA
TAT1281K2-05	1200A	30VA	60VA	12VA
TAT1281K5-05	1500A	35VA	70VA	15VA
TAT1282K0-05	2000A	40VA	80VA	20VA
TAT1282K5-05	2500A	50VA	100VA	20VA
TAT1283K0-05	3000A	70VA	120VA	25VA
TAT1284K0-05	4000A	80VA	150VA	30VA
TAT1285K0-05	5000A	100VA	180VA	30VA

Order Code	sec. 1A primary	burden class 0,5	burden class 1,0	burden class 5P10 *)
TAT1281K0-01	1000A	25VA	50VA	10VA
TAT1281K2-01	1200A	30VA	60VA	12VA
TAT1281K5-01	1500A	35VA	70VA	15VA
TAT1282K0-01	2000A	40VA	80VA	20VA
TAT1282K5-01	2500A	50VA	100VA	20VA
TAT1283K0-01	3000A	70VA	120VA	25VA
TAT1284K0-01	4000A	80VA	150VA	30VA
TAT1285K0-01	5000A	100VA	180VA	30VA



Special Options

- *) Protection Transformer
- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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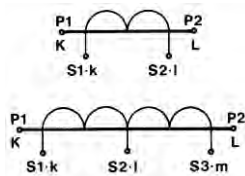
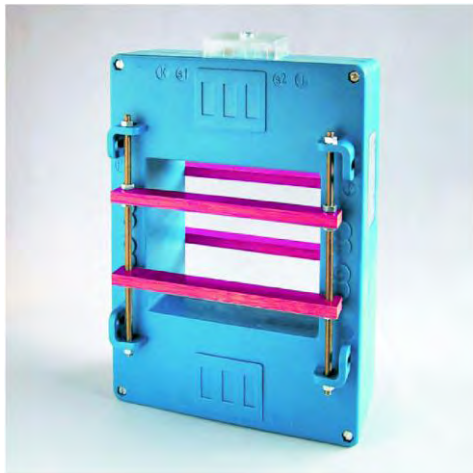
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TAT129

Current Transformer 185mm Width designed for Busbar 5x120x10mm

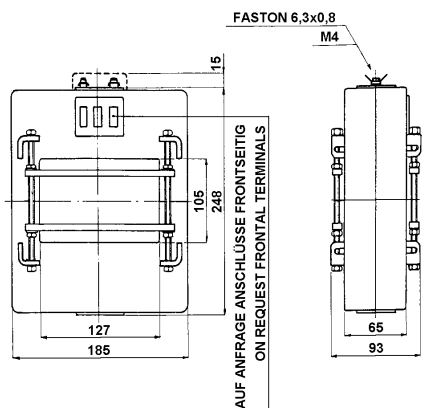


TECHNICAL DATA

break-proof plastic housing	UL94-V0
self-extinguishing	class E
insulation	IP 30
protection	50...60Hz
frequency	FS 5
current limiting factor	$I_{th}=80I_n$
thermal short-term current	$I_{dyn}=2,5 \times I_{th}$
dynamic short-term current	-40...+80°C
storage temperature	-25...+50°C
operating temperature	2,5...3,7kg
weight	

Order Code	sec. 5A	burden	burden	burden
	primary	class	class	class
		0,5	1,0	<u>5P10 *</u>
TAT1291K0-05	1000A	25VA	50VA	10VA
TAT1291K2-05	1200A	30VA	60VA	12VA
TAT1291K5-05	1500A	35VA	70VA	15VA
TAT1292K0-05	2000A	40VA	80VA	20VA
TAT1292K5-05	2500A	50VA	100VA	20VA
TAT1293K0-05	3000A	70VA	120VA	25VA
TAT1294K0-05	4000A	80VA	150VA	30VA
TAT1295K0-05	5000A	100VA	180VA	15VA
TAT1296K0-05	6000A	100VA	180VA	15VA

Order Code	sec. 1A	burden	burden	burden
	primary	class	class	class
		0,5	1,0	<u>5P10 *</u>
TAT1291K0-01	1000A	25VA	50VA	10VA
TAT1291K2-01	1200A	30VA	60VA	12VA
TAT1291K5-01	1500A	35VA	70VA	15VA
TAT1292K0-01	2000A	40VA	80VA	20VA
TAT1292K5-01	2500A	50VA	100VA	20VA
TAT1293K0-01	3000A	70VA	120VA	25VA
TAT1294K0-01	4000A	80VA	150VA	30VA
TAT1295K0-01	5000A	100VA	180VA	15VA
TAT1296K0-01	6000A	100VA	180VA	15VA



Special Options

- *) Protection Transformer
- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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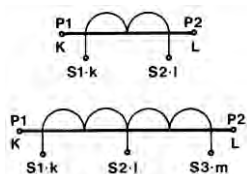
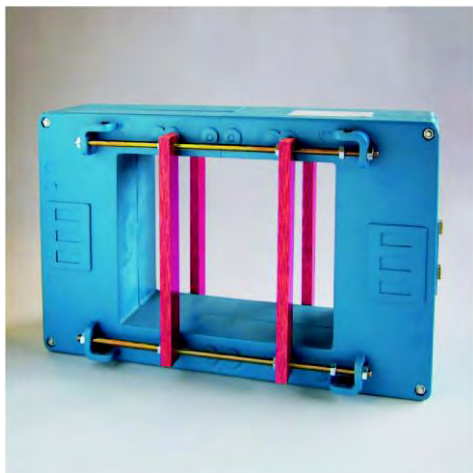
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TAT165

Current Transformer 308mm Width

designed for Busbar 6x160x10mm

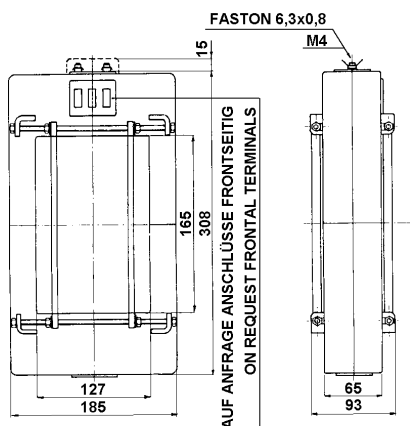


TECHNICAL DATA

break-proof plastic housing	UL94-V0
self-extinguishing	class E
insulation	IP 30
protection	50...60Hz
frequency	FS 5
current limiting factor	$I_{th}=80I_n$
thermal short-term current	$I_{dyn}=2,5 \times I_{th}$
dynamic short-term current	-40...+80°C
storage temperature	-25...+50°C
operating temperature	2,8...4,0kg
weight	

Order Code	sec. 5A	burden	burden	burden
	primary	class	class	class
		0,5	1,0	<u>5P10 *)</u>
TAT1651K0-05	1000A	25VA	50VA	10VA
TAT1651K2-05	1200A	30VA	60VA	12VA
TAT1651K5-05	1500A	35VA	70VA	15VA
TAT1652K0-05	2000A	40VA	80VA	20VA
TAT1652K5-05	2500A	50VA	100VA	20VA
TAT1653K0-05	3000A	70VA	120VA	25VA
TAT1654K0-05	4000A	80VA	150VA	30VA
TAT1655K0-05	5000A	100VA	180VA	15VA
TAT1656K0-05	6000A	100VA	180VA	15VA
TAT1658K0-05	8000A	100VA	180VA	15VA

Order Code	sec. 1A	burden	burden	burden
	primary	class	class	class
		0,5	1,0	<u>5P10 *)</u>
TAT1651K0-01	1000A	25VA	50VA	10VA
TAT1651K2-01	1200A	30VA	60VA	12VA
TAT1651K5-01	1500A	35VA	70VA	15VA
TAT1652K0-01	2000A	40VA	80VA	20VA
TAT1652K5-01	2500A	50VA	100VA	20VA
TAT1653K0-01	3000A	70VA	120VA	25VA
TAT1654K0-01	4000A	80VA	150VA	30VA
TAT1655K0-01	5000A	100VA	180VA	15VA
TAT1656K0-01	6000A	100VA	180VA	15VA
TAT1658K0-01	8000A	100VA	180VA	15VA



Special Options

- *) Protection Transformer
- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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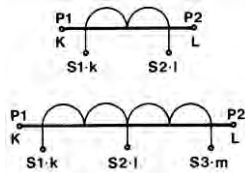
TAT225

Current Transformer 368mm Width designed for Busbar 6x220x10mm



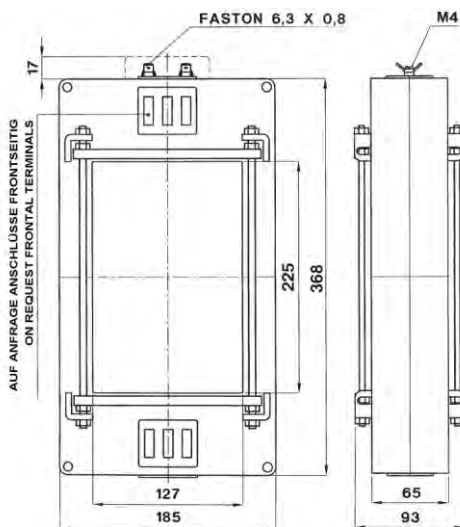
TECHNICAL DATA

break-proof plastic housing	UL94-V0
self-extinguishing	class E
insulation	IP 30
protection	40...60Hz
frequency	FS 5
current limiting factor	$I_{th}=80I_n$
thermal short-term current	$I_{dyn}=2,5 \times I_{th}$
dynamic short-term current	-40...+80°C
storage temperature	-25...+50°C
operating temperature	3,0...5,0kg
weight	



Order Code	sec. 5A primary	burden class 0,5	burden class 1,0	burden class 5P10 *)
TAT2251K0-05	1000A	25VA	50VA	10VA
TAT2251K2-05	1200A	30VA	60VA	12VA
TAT2251K5-05	1500A	35VA	70VA	15VA
TAT2252K0-05	2000A	40VA	80VA	20VA
TAT2252K5-05	2500A	50VA	100VA	20VA
TAT2253K0-05	3000A	70VA	120VA	25VA
TAT2254K0-05	4000A	80VA	150VA	30VA
TAT2255K0-05	5000A	100VA	180VA	15VA
TAT2256K0-05	6000A	100VA	180VA	15VA
TAT2258K0-05	8000A	100VA	180VA	15VA
TAT22510K-05	10000A	100VA	180VA	15VA

Order Code	sec. 1A primary	burden class 0,5	burden class 1,0	burden class 5P10 *)
TAT2251K0-01	1000A	25VA	50VA	10VA
TAT2251K2-01	1200A	30VA	60VA	12VA
TAT2251K5-01	1500A	35VA	70VA	15VA
TAT2252K0-01	2000A	40VA	80VA	20VA
TAT2252K5-01	2500A	50VA	100VA	20VA
TAT2253K0-01	3000A	70VA	120VA	25VA
TAT2254K0-01	4000A	80VA	150VA	30VA
TAT2255K0-01	5000A	100VA	180VA	15VA
TAT2256K0-01	6000A	100VA	180VA	15VA
TAT2258K0-01	8000A	100VA	180VA	15VA
TAT22510K-01	10000A	100VA	180VA	15VA



Special Options

- *) Protection Transformer
- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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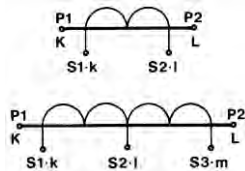
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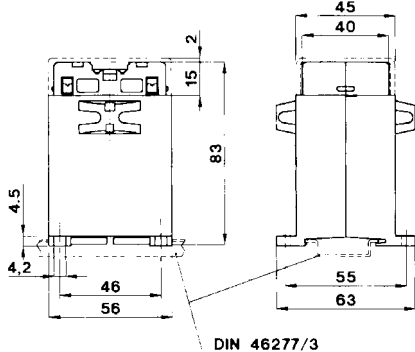
TAC5

Wound Current Transformer 56mm Width

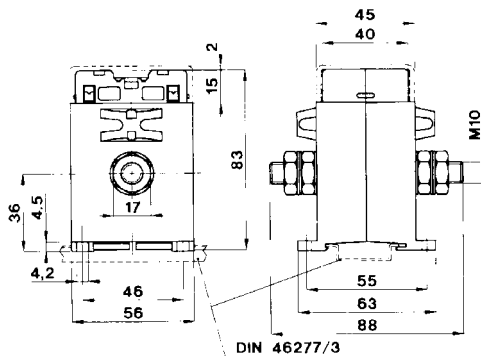
designed for 35mm DIN Rail



primary current 5A...25A



primary current 30A...100A



TECHNICAL DATA

break-proof plastic housing	UL94-V0
self-extinguishing	class E
insulation	IP 20
protection	40...60Hz
frequency	FS 5
current limiting factor	$I_{th}=60I_n$
thermal short-term current	$I_{dyn}=2,5 \times I_{th}$
dynamic short-term current	-40...+80°C
storage temperature	-25...+50°C
operating temperature	0,3...0,4kg
weight	

Order Code	sec. 5A primary	burden class 0,5	burden class 1,0
TAC005001-05	1A	5VA	7VA
TAC005005-05	5A	5VA	7VA
TAC005010-05	10A	5VA	7VA
TAC005015-05	15A	5VA	7VA
TAC005020-05	20A	5VA	7VA
TAC005025-05	25A	5VA	7VA
TAC005030-05	30A	5VA	7VA
TAC005040-05	40A	5VA	7VA
TAC005050-05	50A	5VA	7VA
TAC005060-05	60A	5VA	7VA
TAC005080-05	80A	5VA	7VA
TAC005100-05	100A	5VA	7VA

Order Code	sec. 1A primary	burden class 0,5	burden class 1,0
TAC005001-01	1A	5VA	7VA
TAC005005-01	5A	5VA	7VA
TAC005010-01	10A	5VA	7VA
TAC005015-01	15A	5VA	7VA
TAC005020-01	20A	5VA	7VA
TAC005025-01	25A	5VA	7VA
TAC005030-01	30A	5VA	7VA
TAC005040-01	40A	5VA	7VA
TAC005050-01	50A	5VA	7VA
TAC005060-01	60A	5VA	7VA
TAC005080-01	80A	5VA	7VA
TAC005100-01	100A	5VA	7VA

Special Options

- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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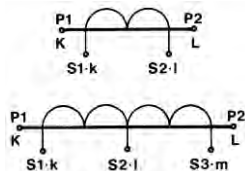
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TAC10

Wound Current Transformer 85mm Width

designed for 35mm DIN Rail

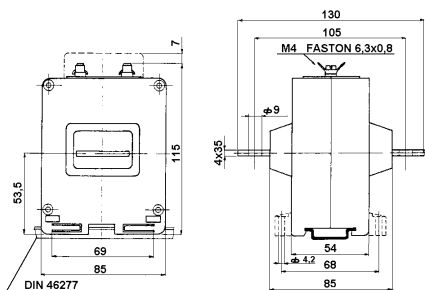


TECHNICAL DATA

break-proof plastic housing	UL94-V0
self-extinguishing	class E
insulation	IP 30
protection	50...60Hz
frequency	FS 5
current limiting factor	$I_{th}=60I_n$
thermal short-term current	$I_{dyn}=2,5 \times I_{th}$
dynamic short-term current	-40...+80°C
storage temperature	-25...+50°C
operating temperature	0,7...0,9kg
weight	

Order Code	sec. 5A primary	burden class 0,5	burden class 1,0
TAC010005-05	5A	10VA	20VA
TAC010010-05	10A	10VA	20VA
TAC010015-05	15A	10VA	20VA
TAC010020-05	20A	10VA	20VA
TAC010025-05	25A	10VA	20VA
TAC010030-05	30A	10VA	20VA
TAC010040-05	40A	10VA	20VA
TAC010050-05	50A	10VA	20VA
TAC010060-05	60A	10VA	20VA
TAC010080-05	80A	10VA	20VA
TAC010100-05	100A	10VA	20VA
TAC010150-05	150A	10VA	20VA
TAC010200-05	200A	10VA	20VA
TAC010250-05	250A	10VA	20VA
TAC010300-05	300A	10VA	20VA
TAC010400-05	400A	10VA	20VA
TAC010500-05	500A	10VA	20VA
TAC010600-05	600A	10VA	20VA

Order Code	sec. 1A primary	burden class 0,5	burden class 1,0
TAC010005-01	5A	10VA	20VA
TAC010010-01	10A	10VA	20VA
TAC010015-01	15A	10VA	20VA
TAC010020-01	20A	10VA	20VA
TAC010025-01	25A	10VA	20VA
TAC010030-01	30A	10VA	20VA
TAC010040-01	40A	10VA	20VA
TAC010050-01	50A	10VA	20VA
TAC010060-01	60A	10VA	20VA
TAC010080-01	80A	10VA	20VA
TAC010100-01	100A	10VA	20VA
TAC010150-01	150A	10VA	20VA
TAC010200-01	200A	10VA	20VA
TAC010250-01	250A	10VA	20VA
TAC010300-01	300A	10VA	20VA
TAC010400-01	400A	10VA	20VA
TAC010500-01	500A	10VA	20VA
TAC010600-01	600A	10VA	20VA



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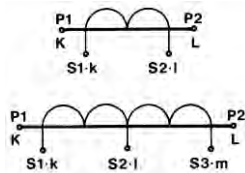
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TAC20

Wound Current Transformer 85mm Width

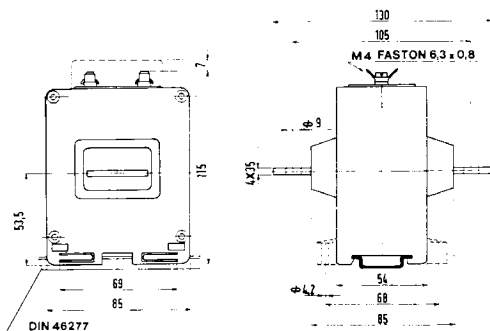
designed for 35mm DIN Rail



TECHNICAL DATA

break-proof plastic housing	UL94-V0
self-extinguishing	class E
insulation	IP 30
protection	50...60Hz
frequency	FS 5
current limiting factor	$I_{th}=60I_n$
thermal short-term current	$I_{dyn}=2,5 \times I_{th}$
dynamic short-term current	-40...+80°C
storage temperature	-25...+50°C
operating temperature	0,8...1,0kg
weight	

Order Code	sec. 5A primary	burden class 0,5	burden class 1,0	burden class 5P10 *)
TAC020005-05	5A	20VA	35VA	3VA
TAC020010-05	10A	20VA	35VA	3VA
TAC020015-05	15A	20VA	35VA	3VA
TAC020020-05	20A	20VA	35VA	3VA
TAC020025-05	25A	20VA	35VA	3VA
TAC020030-05	30A	20VA	35VA	3VA
TAC020040-05	40A	20VA	35VA	3VA
TAC020050-05	50A	20VA	35VA	3VA
TAC020060-05	60A	20VA	35VA	3VA
TAC020080-05	80A	20VA	35VA	3VA
TAC020100-05	100A	20VA	35VA	3VA
TAC020150-05	150A	20VA	35VA	3VA
TAC020200-05	200A	20VA	35VA	3VA
TAC020250-05	250A	20VA	35VA	3VA
TAC020300-05	300A	20VA	35VA	3VA
TAC020400-05	400A	20VA	35VA	3VA
TAC020500-05	500A	20VA	35VA	3VA
TAC020600-05	600A	20VA	35VA	3VA



Special Options

- *) Protection Transformer
- Tropical Design
- Frequency 400Hz
- Secondary 1A
- Special current measuring ranges (on demand)

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TAA031

Current Transformer with Split Core

designed for Busbar 30x20mm / Cable \varnothing 20mm



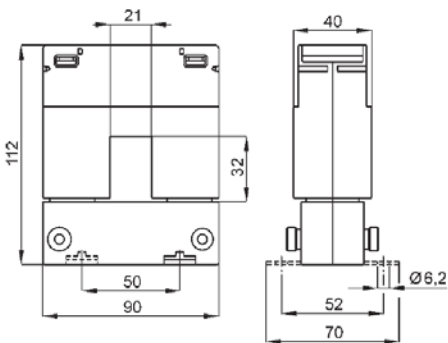
TECHNICAL DATA

break-proof plastic housing with
integrated terminal cover
self-extinguishing
insulation
protection
frequency
current limiting factor
thermal short-term current
dynamic short-term current
storage temperature
operating temperature
weight

UL94-V0
class E
IP 20
50..60Hz
FS 5
 $I_{th}=60I_n$
 $I_{dyn}=2,5 \times I_{th}$
-20..+80°C
-5..+50°C
0,60..0,80kg

Order Code	sec. 5A	burden	burden	burden
	primary	class	class	class
TAA031100X05	100A	0,5	1,0	1,5VA
TAA031150X05	150A			1,5VA
TAA031250X05	250A	1VA	2,5VA	4VA
TAA031400X05	400A	2,5VA	3,75VA	6VA

Order Code	sec. 1A	burden	burden	burden
	primary	class	class	class
TAA031100X01	100A	0,5	1,0	1,5VA
TAA031150X01	150A			1,5VA
TAA031250X01	250A	1VA	2,5VA	4VA
TAA031400X01	400A	2,5VA	3,75VA	6VA



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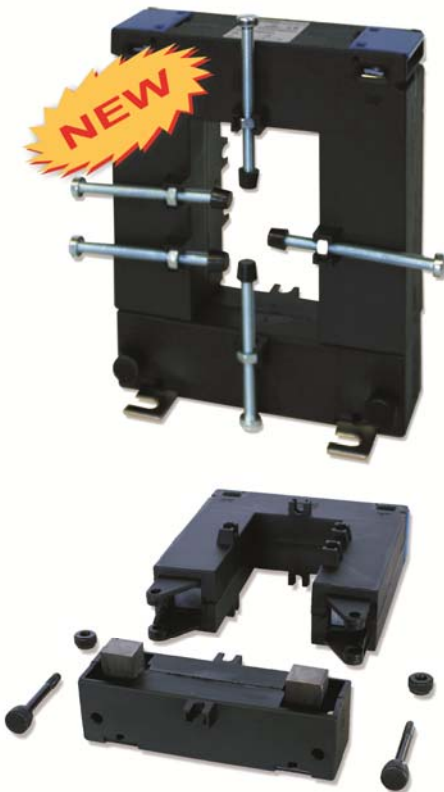
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TAA081

Current Transformer with Split Core

designed for Busbar 80x50mm / Cable \varnothing 50mm



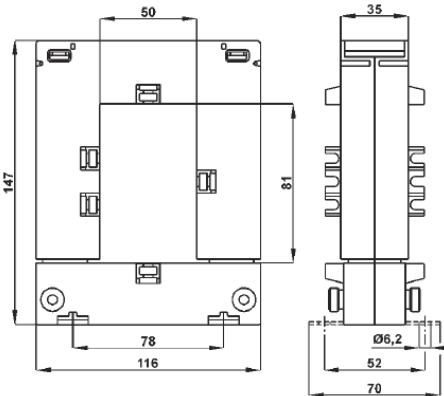
TECHNICAL DATA

break-proof plastic housing with
integrated terminal cover
self-extinguishing
insulation
protection
frequency
current limiting factor
thermal short-term current
dynamic short-term current
storage temperature
operating temperature
weight

UL94-V0
class E
IP 20
50..60Hz
FS 5
 $I_{th}=60I_n$
 $I_{dyn}=2,5 \times I_{th}$
-20..+80°C
-5..+50°C
1,00..1,20kg

Order Code	sec. 5A primary	burden class 0,5	burden class 1,0
TAA081250X05	250A	1VA	2VA
TAA081400X05	400A	1,5VA	3VA
TAA081500X05	500A	2,5VA	5VA
TAA081600X05	600A	2,5VA	5VA
TAA081800X05	800A	4VA	5VA
TAA0811K0X05	1000A	5VA	10VA

Order Code	sec. 1A primary	burden class 0,5	burden class 1,0
TAA081250X01	250A	1VA	2VA
TAA081400X01	400A	1,5VA	3VA
TAA081500X01	500A	2,5VA	5VA
TAA081600X01	600A	2,5VA	5VA
TAA081800X01	800A	4VA	5VA
TAA0811K0X01	1000A	5VA	10VA



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TAA121

Current Transformer with Split Core

designed for Busbar 120x80mm / Cable \varnothing 80mm



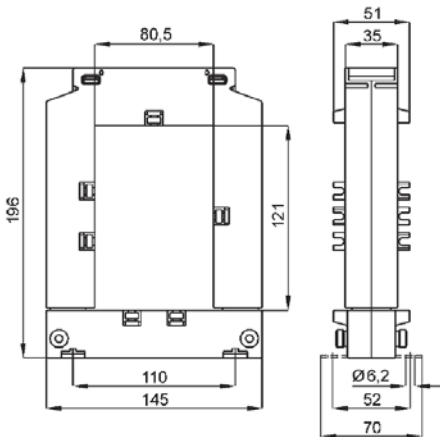
TECHNICAL DATA

break-proof plastic housing with
integrated terminal cover
self-extinguishing
insulation
protection
frequency
current limiting factor
thermal short-term current
dynamic short-term current
storage temperature
operating temperature
weight

UL94-V0
class E
IP 20
50..60Hz
FS 5
 $I_{th}=60I_n$
 $I_{dyn}=2,5 \times I_{th}$
-20..+80°C
-5..+50°C
1,30..1,50kg

Order Code	sec. 5A primary	burden class 0,5	burden class 1,0
TAA121800X05	800A	3VA	6VA
TAA1211K0X05	1000A	4VA	8VA
TAA1211K2X05	1200A	5VA	10VA
TAA1211K5X05	1500A	7,5VA	10VA

Order Code	sec. 1A primary	burden class 0,5	burden class 1,0
TAA121800X01	800A	3VA	6VA
TAA1211K0X01	1000A	4VA	8VA
TAA1211K2X01	1200A	5VA	10VA
TAA1211K5X01	1500A	7,5VA	10VA



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TAA161

Current Transformer with Split Core

designed for Busbar 160x80mm / Cable \varnothing 80mm



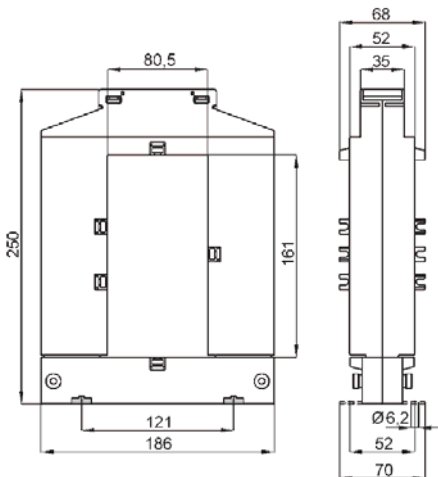
TECHNICAL DATA

break-proof plastic housing with
integrated terminal cover
self-extinguishing
insulation
protection
frequency
current limiting factor
thermal short-term current
dynamic short-term current
storage temperature
operating temperature
weight

UL94-V0
class E
IP 20
50..60Hz
FS 5
 $I_{th}=60I_n$
 $I_{dyn}=2,5 \times I_{th}$
-20..+80°C
-5..+50°C
3,00..3,30kg

Order Code	sec. 5A	burden	burden
	primary	class	class
		0,5	1,0
TAA1611K0X05	1000A	6VA	10VA
TAA1611K5X05	1500A	8VA	10VA
TAA1612K0X05	2000A	10VA	15VA
TAA1612K5X05	2500A	15VA	20VA
TAA1613K0X05	3000A	20VA	25VA
TAA1614K0X05	4000A	20VA	25VA
TAA1615K0X05	5000A	20VA	25VA

Order Code	sec. 1A	burden	burden
	primary	class	class
		0,5	1,0
TAA1611K0X01	1000A	6VA	10VA
TAA1611K5X01	1500A	8VA	10VA
TAA1612K0X01	2000A	10VA	15VA
TAA1612K5X01	2500A	15VA	20VA
TAA1613K0X01	3000A	20VA	25VA
TAA1614K0X01	4000A	20VA	25VA
TAA1615K0X01	5000A	20VA	25VA



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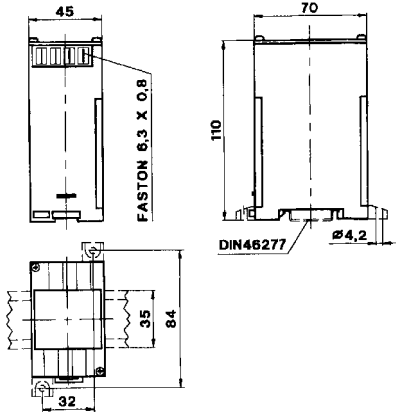
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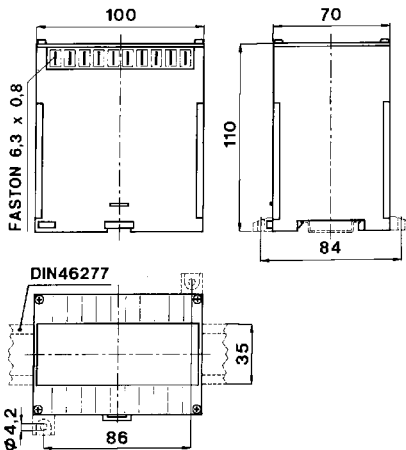
TASC10

Summation Current Transformer designed for Current Transformers of *same* or *different* Ratio

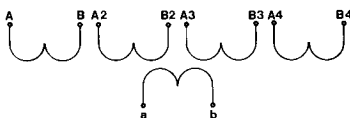
TASC10
2 and 3 input signals



TASC10
4 up to 6 input signals



wiring diagram
TASC transformer



TECHNICAL DATA

break-proof plastic housing	UL94-V0
self-extinguishing	class E
insulation	IP 30
protection	50...60Hz
frequency	FS 5
current limiting factor	$I_{th}=60I_n$
thermal short-term current	$I_{dyn}=2,5 \times I_{th}$
dynamic short-term current	-40...+80°C
storage temperature	-25...+50°C
operating temperature	0,6...1,5kg
weight	

Summation current transformer to be combined with current transformers of *same* ratio:

Order Code	sec. 5A and primary 5A	burden class 0,5	burden class 1,0
TASC102X5-05	5+5	10VA	20VA
TASC103X5-05	5+5+5	10VA	20VA
TASC104X5-05	5+5+5+5	10VA	20VA
TASC105X5-05	5+5+5+5+5	10VA	20VA
TASC106X5-05	5+5+5+5+5+5	10VA	20VA

Order Code	sec. 1A and primary 1A	burden class 0,5	burden class 1,0
TASC102X1-01	1+1	10VA	20VA
TASC103X1-01	1+1+1	10VA	20VA
TASC104X1-01	1+1+1+1	10VA	20VA
TASC105X1-01	1+1+1+1+1	10VA	20VA
TASC106X1-01	1+1+1+1+1+1	10VA	20VA

Summation current transformer to be combined with current transformers of *different* ratio:

Order Code	sec. 5A and primary 5A	burden class 0,5	burden class 1,0
TASC102UX5-05	5+5	10VA	20VA
TASC103UX5-05	5+5+5	10VA	20VA
TASC104UX5-05	5+5+5+5	10VA	20VA
TASC105UX5-05	5+5+5+5+5	10VA	20VA
TASC106UX5-05	5+5+5+5+5+5	10VA	20VA

Order Code	sec. 1A and primary 1A	burden class 0,5	burden class 1,0
TASC102UX1-01	1+1	10VA	20VA
TASC103UX1-01	1+1+1	10VA	20VA
TASC104UX1-01	1+1+1+1	10VA	20VA
TASC105UX1-01	1+1+1+1+1	10VA	20VA
TASC106UX1-01	1+1+1+1+1+1	10VA	20VA



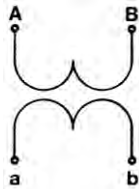
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TTV6

Low-Voltage Transformer

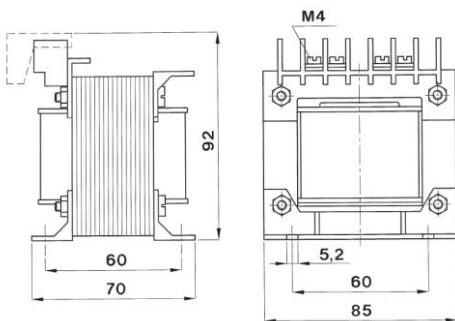


TECHNICAL DATA

metal housing	
insulation	class E
protection	IP 30
frequency	50...60Hz
test voltage	3kV x 1' at 50Hz
continuous overload	1,2 Un
thermal power	6x nominal burden
storage temperature	-40...+80°C
operating temperature	-25...+50°C
weight	approx. 1,6kg
manufactured according to	IEC/EN 60044-2 VDE-BS, UTE

Order Code	primary	secondary	burden class
			1,0
TTV006CO+P+S	100V	100V : 3	6VA
TTV006CO+P+S	110V	110V : 3	6VA
TTV006CO+P+S	115V	110V : 3	6VA
TTV006CO+P+S	220V	100V : $\sqrt{3}$	6VA
TTV006CO+P+S	230V	110V : $\sqrt{3}$	6VA
TTV006CO+P+S	380V	110V : $\sqrt{3}$	6VA
TTV006CO+P+S	400V	100V	6VA
TTV006CO+P+S	440V	110V	6VA
TTV006CO+P+S	500V	110V	6VA
TTV006VCO+P+S	100V : $\sqrt{3}$	100V : 3	3VA
TTV006VCO+P+S	110V : $\sqrt{3}$	110V : 3	3VA
TTV006VCO+P+S	115V : $\sqrt{3}$	110V : 3	3VA
TTV006VCO+P+S	220V : $\sqrt{3}$	100V : $\sqrt{3}$	3VA
TTV006VCO+P+S	230V : $\sqrt{3}$	110V : $\sqrt{3}$	3VA
TTV006VCO+P+S	380V : $\sqrt{3}$	110V : $\sqrt{3}$	3VA
TTV006VCO+P+S	400V : $\sqrt{3}$	100V	3VA
TTV006VCO+P+S	440V : $\sqrt{3}$	110V	3VA
TTV006VCO+P+S	500V : $\sqrt{3}$	110V	3VA

P = primary voltage
S = secondary voltage



Order Information and Special Options

- Order Code plus Primary Voltage / Secondary Voltage
- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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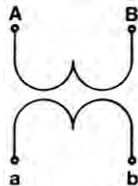
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TTV10

Low-Voltage Transformer

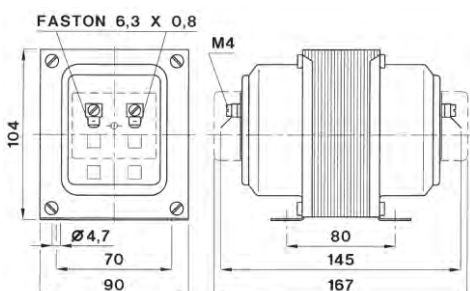


TECHNICAL DATA

metal housing	
insulation	class E
protection	IP 30
frequency	50...60Hz
test voltage	3kV x 1' at 50Hz
continuous overload	1,2 Un
thermal power	6x nominal burden
storage temperature	-40...+80°C
operating temperature	-25...+50°C
weight	approx. 2,9kg
manufactured according to	IEC/EN 60044-2 VDE-BS, UTE

Order Code	primary	secondary	burden acc. class		
			3P *)	0,5	1,0
TTV010CO+P+S	100V		10VA	10VA	20VA
TTV010CO+P+S	110V	100V : 3	10VA	10VA	20VA
TTV010CO+P+S	115V	110V : 3	10VA	10VA	20VA
TTV010CO+P+S	220V	100V : $\sqrt{3}$	10VA	10VA	20VA
TTV010CO+P+S	230V		10VA	10VA	20VA
TTV010CO+P+S	380V	110V : $\sqrt{3}$	10VA	10VA	20VA
TTV010CO+P+S	400V	100V	10VA	10VA	20VA
TTV010CO+P+S	440V		10VA	10VA	20VA
TTV010CO+P+S	500V	110V	10VA	10VA	20VA
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TTV010VCO+P+S	100V : $\sqrt{3}$	100V : 3	5VA	5VA	10VA
TTV010VCO+P+S	110V : $\sqrt{3}$		5VA	5VA	10VA
TTV010VCO+P+S	115V : $\sqrt{3}$	110V : 3	5VA	5VA	10VA
TTV010VCO+P+S	220V : $\sqrt{3}$	100V : $\sqrt{3}$	5VA	5VA	10VA
TTV010VCO+P+S	230V : $\sqrt{3}$		5VA	5VA	10VA
TTV010VCO+P+S	380V : $\sqrt{3}$	110V : $\sqrt{3}$	5VA	5VA	10VA
TTV010VCO+P+S	400V : $\sqrt{3}$	100V	5VA	5VA	10VA
TTV010VCO+P+S	440V : $\sqrt{3}$		5VA	5VA	10VA
TTV010VCO+P+S	500V : $\sqrt{3}$	110V	5VA	5VA	10VA

P = primary voltage
S = secondary voltage



Order Information and Special Options

- *) Protection Transformer
- Order Code plus Primary Voltage / Secondary Voltage
- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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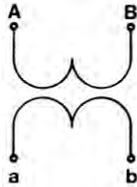
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TTV20

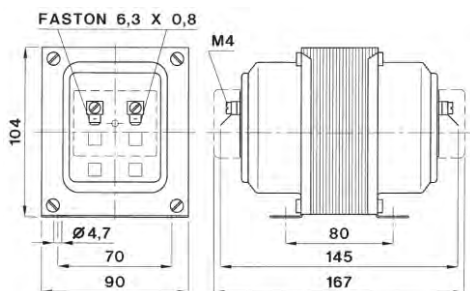
Low-Voltage Transformer



TECHNICAL DATA

metal housing	
insulation	class E
protection	IP 30
frequency	50...60Hz
test voltage	3kV x 1' at 50Hz
continuous overload	1,2 Un
thermal power	6x nominal burden
storage temperature	-40...+80°C
operating temperature	-25...+50°C
weight	approx. 4,1kg
manufactured according to	IEC/EN 60044-2 VDE-BS, UTE

Order Code	primary	secondary	burden acc. class		
			3P *)	0,5	1,0
TTV020CO+P+S	100V		20VA	20VA	40VA
TTV020CO+P+S	110V	100V : 3	20VA	20VA	40VA
TTV020CO+P+S	115V		20VA	20VA	40VA
TTV020CO+P+S	220V	110V : 3	20VA	20VA	40VA
TTV020CO+P+S	230V		20VA	20VA	40VA
TTV020CO+P+S	380V	100V : √3	20VA	20VA	40VA
TTV020CO+P+S	400V		20VA	20VA	40VA
TTV020CO+P+S	440V	110V : √3	20VA	20VA	40VA
TTV020CO+P+S	500V		20VA	20VA	40VA
TTV020CO+P+S	600V	100V	20VA	20VA	40VA
TTV020CO+P+S	800V	110V	20VA	20VA	40VA
TTV020CO+P+S	1000V		20VA	20VA	40VA
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TTV020VCO+P+S	100V : √3		10VA	8VA	16VA
TTV020VCO+P+S	110V : √3	100V : 3	10VA	8VA	16VA
TTV020VCO+P+S	115V : √3		10VA	8VA	16VA
TTV020VCO+P+S	220V : √3	110V : 3	10VA	8VA	16VA
TTV020VCO+P+S	230V : √3		10VA	8VA	16VA
TTV020VCO+P+S	380V : √3	100V : √3	10VA	8VA	16VA
TTV020VCO+P+S	400V : √3		10VA	8VA	16VA
TTV020VCO+P+S	440V : √3	110V : √3	10VA	8VA	16VA
TTV020VCO+P+S	500V : √3		10VA	8VA	16VA
TTV020VCO+P+S	600V : √3	100V	10VA	8VA	16VA
TTV020VCO+P+S	800V : √3	110V	10VA	8VA	16VA
TTV020VCO+P+S	1000V : √3		10VA	8VA	16VA



P = primary voltage
S = secondary voltage

Order Information and Special Options

- *) Protection Transformer
- Order Code plus Primary Voltage / Secondary Voltage
- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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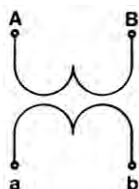
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TTV50

Low-Voltage Transformer



TECHNICAL DATA

metal housing	
insulation	class E
protection	IP 30
frequency	50...60Hz
test voltage	3kV x 1' at 50Hz
continuous overload	1,2 Un
thermal power	6x nominal burden
storage temperature	-40...+80°C
operating temperature	-25...+50°C
weight	approx. 6kg
manufactured according to	IEC/EN 60044-2 VDE-BS, UTE

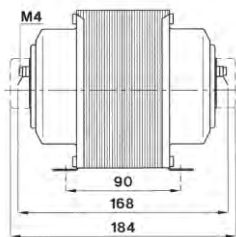
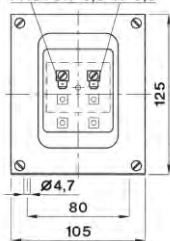
Order Code	primary	secondary	burden acc. class		
			3P *)	0,5	1,0
TTV050CO+P+S	100V		50VA	50VA	100VA
TTV050CO+P+S	110V	100V : 3	50VA	50VA	100VA
TTV050CO+P+S	115V		50VA	50VA	100VA
TTV050CO+P+S	220V	110V : 3	50VA	50VA	100VA
TTV050CO+P+S	230V		50VA	50VA	100VA
TTV050CO+P+S	380V	100V : √3	50VA	50VA	100VA
TTV050CO+P+S	400V		50VA	50VA	100VA
TTV050CO+P+S	440V	110V : √3	50VA	50VA	100VA
TTV050CO+P+S	500V		50VA	50VA	100VA
TTV050CO+P+S	600V	100V	50VA	50VA	100VA
TTV050CO+P+S	800V	110V	50VA	50VA	100VA
TTV050CO+P+S	1000V		50VA	50VA	100VA
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TTV050VCO+P+S	100V : √3		25VA	25VA	50VA
TTV050VCO+P+S	110V : √3	100V : 3	25VA	25VA	50VA
TTV050VCO+P+S	115V : √3		25VA	25VA	50VA
TTV050VCO+P+S	220V : √3	110V : 3	25VA	25VA	50VA
TTV050VCO+P+S	230V : √3		25VA	25VA	50VA
TTV050VCO+P+S	380V : √3	100V : √3	25VA	25VA	50VA
TTV050VCO+P+S	400V : √3		25VA	25VA	50VA
TTV050VCO+P+S	440V : √3	110V : √3	25VA	25VA	50VA
TTV050VCO+P+S	500V : √3		25VA	25VA	50VA
TTV050VCO+P+S	600V : √3	100V	25VA	25VA	50VA
TTV050VCO+P+S	800V : √3	110V	25VA	25VA	50VA
TTV050VCO+P+S	1000V : √3		25VA	25VA	50VA

P = primary voltage
S = secondary voltage

Order Information and Special Options

- *) Protection Transformer
- Order Code plus Primary Voltage / Secondary Voltage
- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

FASTON 6,3 X 0,8



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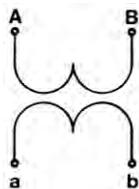
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TTV100

Low-Voltage Transformer

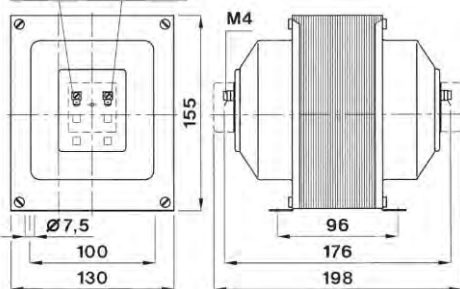


TECHNICAL DATA

metal housing	
insulation	class E
protection	IP 30
frequency	50...60Hz
test voltage	3kV x 1' at 50Hz
continuous overload	1,2 Un
thermal power	6x nominal burden
storage temperature	-40...+80°C
operating temperature	-25...+50°C
weight	approx. 8kg
manufactured according to	IEC/EN 60044-2 VDE-BS, UTE

Order Code	primary	secondary	burden class	burden class
			0,5	1,0
TTV100CO+P+S	100V		100VA	200VA
TTV100CO+P+S	110V	100V : 3	100VA	200VA
TTV100CO+P+S	115V		100VA	200VA
TTV100CO+P+S	220V	110V : 3	100VA	200VA
TTV100CO+P+S	230V		100VA	200VA
TTV100CO+P+S	380V	100V : √3	100VA	200VA
TTV100CO+P+S	400V	110V : √3	100VA	200VA
TTV100CO+P+S	440V		100VA	200VA
TTV100CO+P+S	500V	100V	100VA	200VA
TTV100CO+P+S	600V		100VA	200VA
TTV100CO+P+S	800V	110V	100VA	200VA
TTV100CO+P+S	1000V		100VA	200VA
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TTV100VCO+P+S	100V : √3		50VA	100VA
TTV100VCO+P+S	110V : √3	100V : 3	50VA	100VA
TTV100VCO+P+S	115V : √3		50VA	100VA
TTV100VCO+P+S	220V : √3	110V : 3	50VA	100VA
TTV100VCO+P+S	230V : √3		50VA	100VA
TTV100VCO+P+S	380V : √3	100V : √3	50VA	100VA
TTV100VCO+P+S	400V : √3	110V : √3	50VA	100VA
TTV100VCO+P+S	440V : √3		50VA	100VA
TTV100VCO+P+S	500V : √3	100V	50VA	100VA
TTV100VCO+P+S	600V : √3		50VA	100VA
TTV100VCO+P+S	800V : √3	110V	50VA	100VA
TTV100VCO+P+S	1000V : √3		50VA	100VA

FASTON 6,3 X 0,8



P = primary voltage
S = secondary voltage

Order Information and Special Options

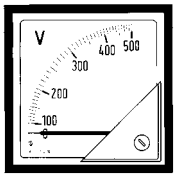
- Order Code plus Primary Voltage / Secondary Voltage
- Tropical Design
- Frequency 400Hz
- Special current measuring ranges (on demand)

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AREA 1
Analog Panel Meter

page 4 - 28



AREA 2
Multifunction Meter

page 30 - 40



AREA 3
Static Energy Meter

page 42 - 54



AREA 4
Shunts
Current Transformer
Voltage Transformer

page 56 - 90



AREA 5
Digital Panel Meter

page 92 - 109



AREA 6
Transducer

page 112 - 130

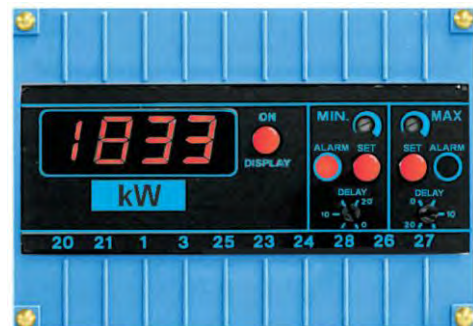


AREA 7
Low Tension Insulators
Modular Busbar System















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AREA 5

Digital Panel Meter



Digital Panel Meter

symbol	frame size	digits	display range	installation type	measured parameters	page
	48x24mm	3	999	switchboard	Vdc, Adc	94
	48x24mm	3 ½	1999	switchboard	Vdc, Adc	94
	48x48mm	3+0	9990	switchboard	5Aac – 600Vac	95
	48x48mm	3	999	switchboard	Vdc, Adc, Vac, Aac, Hz	96
	48x48mm	3 ½	1999	switchboard	Vdc, Adc, Vac, Aac, Hz	96
	72x36mm	3+0	9990	switchboard	5Aac – 600Vac	97
	72x36mm	3	999	switchboard	Vdc, Adc, Vac, Aac, Hz	98
	72x36mm	3 ½	1999	switchboard	Vdc, Adc, Vac, Aac, Hz	98
	72x72mm	3+0	9990	switchboard	5Aac – 600Vac	99
	72x72mm	3	999	switchboard	Vdc, Adc, Vac, Aac, Hz	100
	96x48mm	3 ½ +0	19990	switchboard	5Aac + 600Vac, Vdc, Adc	101
	96x48mm	3	999	switchboard	Vdc, Adc, Vac, Aac, Hz	102
	96x48mm	3 ½	1999	switchboard	Vdc, Adc, Vac, Aac, Hz	103
	96x48mm	4 ½	19999	switchboard	Vdc, Adc, Vac, Aac, Hz	104
	96x48mm	4 ½	19999	switchboard	Vdc, Adc, Vac, Aac alarm output	105
	96x96mm	4 ½	19999	switchboard	Vdc, Adc, Vac, Aac alarm output	105
	96x96mm	3 ½ +0	19990	switchboard	5Aac + 600Vac, Vdc, Adc	106
	96x96mm	3	999	switchboard	Vdc, Adc, Vac, Aac, Hz	107
	96x96mm	3 ½	1999	switchboard	Vdc, Adc, Vac, Aac, Hz	107
		3	999	35mm DIN-rail	Vdc, Adc, Vac, Aac, Hz	108
		3 ½	1999	35mm DIN-rail	Vdc, Adc, Vac, Aac alarm output	109

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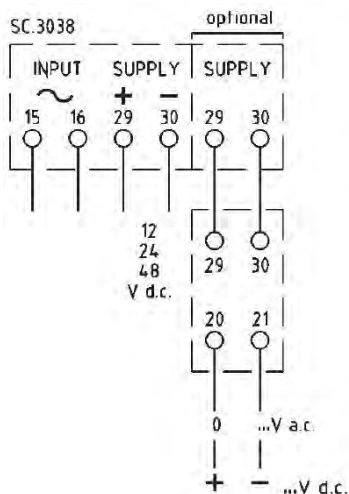
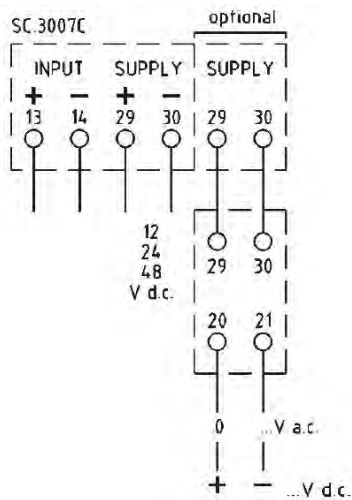
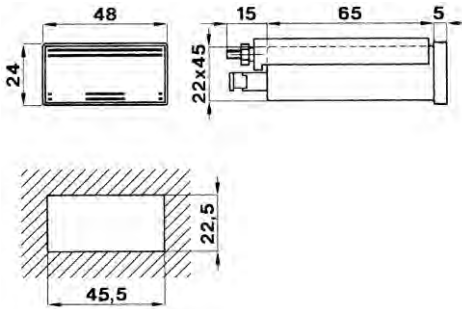
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Digital Panel Meter 48x24mm

3-digit and 3 1/2-digit



TECHNICAL DATA

3-digit digital display device with automatic polarity indication.
 bidirectional
 seven-segment red LED display
 digit height h=10mm
 display range ±999 or ±1999
 accuracy (class) 0,5 ±1 digit
 frequency 40...400Hz
 self-consumption 0,1VA
 sampling rate 2/s
 overload indication 1/-1
 continuous overload 2In; 1,2Un
 short-term overload 10In; 2Un
 test voltage 2kV-50Hz-60s
 operating temperature -10...+50°C
 storage temperature -30...+70°C
 standard auxiliary voltage 24V DC ±10%
 galvanic insulation of measurement voltage and auxiliary voltage

measuring range	input resistance	Order Code
direct voltage and direct current (d.c.)		
60-150mV	>3kΩ xV	D44MV-3
0-1V up to 0-150V	>3kΩ xV	D44MV-3
4-20mA	1kΩ/mA (1VA max.)	D44MA-3
0-1mA up to 0-5A	1kΩ/mA (1VA max.)	D44MA-3
alternating voltage and alternating current (a.c.)		
0-1V up to 0-150V	>3kΩ xV	D44EV-3
0-1mA up to 0-5A	1kΩ/mA (1VA max.)	D44EA-3
Order Code for 3 1/2-digit type (D44...-5):		

Order Information

- Order Code
- Measuring Range / Display Range
- Please state custom scale printing when ordering
- Additional auxiliary voltages (external modules) on demand

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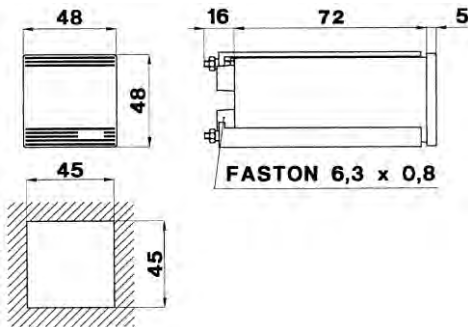
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Adjustable Digital Panel Meter 48x48mm

3-digit plus additional fixed zero ones field



TECHNICAL DATA

3-digit digital display device.

Shows 3 floating characters or 4 characters with fixed zero ones field.

seven-segment red LED display

digit height

h=14mm

display range

9990

accuracy (class)

0,5 ±1 digit

frequency

40...400Hz

self-consumption

0,1VA

sampling rate

2/s

overload indication

flashing display

continuous overload

2In; 1,2Un

short-term overload

10In; 2Un

test voltage

2kV-50Hz-60s

operating temperature

-10...+50°C

storage temperature

-30...+70°C

auxiliary voltage

115+230V ±10% 50Hz

galvanic insulation of measurement

voltage and auxiliary voltage

measuring range

input resistance

Order Code

current transformer ..5A AC
600V AC

30mΩ
≥4MΩ

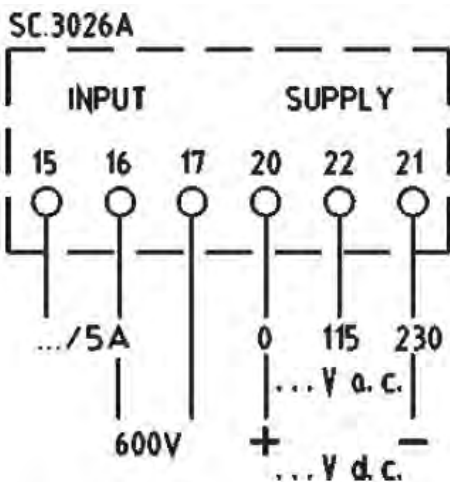
D48EA-G

Digital panel meters type **D48EA-G** are designed for current transformer measurements (5A) or direct mains voltage (600V) measuring.

In case of current transformer measurements, the display range may be adjusted via DIP-switches. The DIP-switches are located behind the front panel.

The following display ranges are adjustable via DIP-switches:

15,0	20,0	25,0	40,0	50,0	60,0	80,0	99,9
150	200	250	400	500	600	800	999
1500	2000	2500	4000	5000	6000	8000	9990



Order Information

- Order Code
- Please state custom scale printing when ordering
- DC auxiliary voltage on demand

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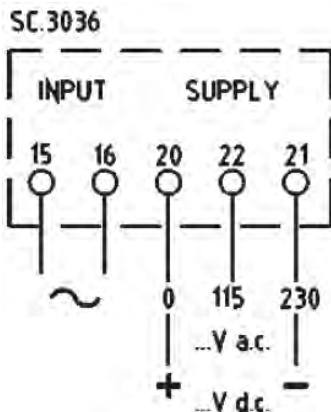
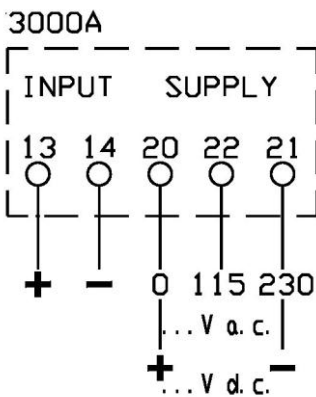
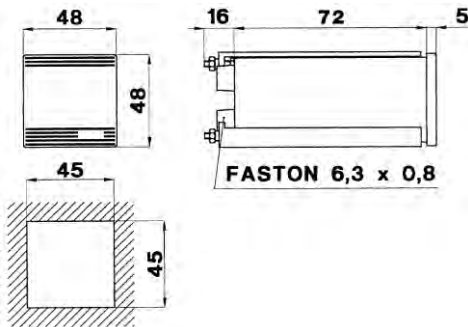
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Digital Panel Meter 48x48mm

3-digit and 3 1/2-digit



TECHNICAL DATA

3- or 3 1/2-digit digital display device with automatic polarity indication.
 bidirectional
 seven-segment red LED display
 digit height h=14mm
 display range ±999 or ±1999
 accuracy (class) 0,5 ±1 digit
 frequency 40...400Hz
 self-consumption 0,1VA
 sampling rate 2/s
 overload indication flashing display
 continuous overload 2In; 1,2Un
 short-term overload 10In; 2Un
 test voltage 2kV-50Hz-60s
 operating temperature -10...+50°C
 storage temperature -30...+70°C
 auxiliary voltage 115+230V ±10% 50Hz
 galvanic insulation of measurement voltage and auxiliary voltage

measuring range	input resistance	Order Code
direct voltage and direct current (d.c.)		
40-60-150mV	≥10kΩ	D48MV-3
0-1V up to 0-600V	50kΩ up to 4MΩ	D48MV-3
0-100μA	≅600Ω	D48MA-3
4-20mA	≅3Ω	D48MA-3
0-1mA up to 0-100mA	60Ω up to 600mΩ	D48MA-3
0-1A up to 0-10A	60mΩ up to 6mΩ	D48MA-3
alternating voltage and alternating current (a.c.)		
0-1V up to 0-600V	4kΩ up to 4MΩ	D48EV-3
0-100mA	1,5Ω	D48EA-3
0-1A	150mΩ	D48EA-3
0-5A up to 0-10A	30mΩ up to 15mΩ	D48EA-3
frequency measurement		
45-65Hz	frequency of input voltage	D48FP-3
other measurement ranges on demand		

Order Code for 3 1/2-digit type (D48...-5):

Order Information

- Order Code
- Measuring Range / Display Range
- Please state custom scale printing when ordering
- DC auxiliary voltage on demand

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Adjustable Digital Panel Meter 72x36mm

3-digit plus additional fixed zero ones field



TECHNICAL DATA

3-digit digital display device.

Shows 3 floating characters or 4 characters with fixed zero ones field.

seven-segment red LED display

digit height

h=14mm

display range

9990

accuracy (class)

0,5 ±1 digit

frequency

40...400Hz

self-consumption

0,1VA

sampling rate

2/s

overload indication

first digit lights up

continuous overload

2In; 1,2Un

short-term overload

10In; 2Un

test voltage

2kV-50Hz-60s

operating temperature

-10...+50°C

storage temperature

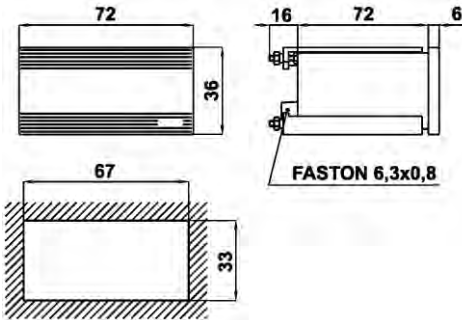
-30...+70°C

auxiliary voltage

115+230V ±10% 50Hz

galvanic insulation of measurement

voltage and auxiliary voltage



measuring range

input resistance

Order Code

current transformer ..5A AC
600V AC

30mΩ
800kΩ

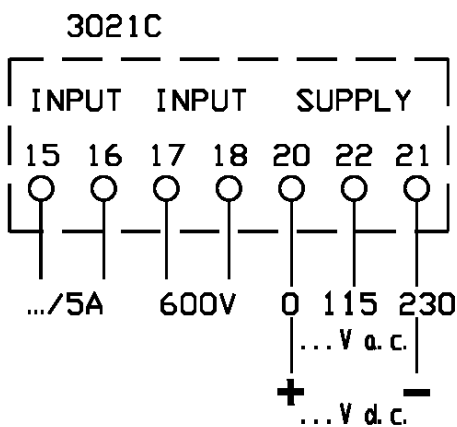
D76EA-G

Digital panel meters type **D76EA-G** are designed for current transformer measurements (5A) or direct main voltage (600V) measuring.

In case of current transformer measurements, the display range may be adjusted via DIP-switches. The DIP-switches are located behind the front panel.

The following display ranges are adjustable via DIP-switches:

15,0	20,0	25,0	40,0	50,0	60,0	80,0	99,9
150	200	250	400	500	600	800	999
1500	2000	2500	4000	5000	6000	8000	9990



Order Information

- Order Code
- Please state custom scale printing when ordering
- DC auxiliary voltage on demand

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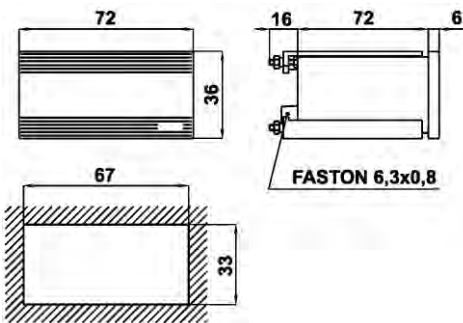
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Digital Panel Meter 72x36mm

3-digit and 3 1/2-digit



TECHNICAL DATA

3- or 3 1/2-digit digital display device with automatic polarity indication.
 bidirectional
 seven-segment red LED display
 digit height h=14mm
 display range ±999 bzw. ±1999
 accuracy (class) 0,5 ±1 digit
 frequency 40...400Hz
 self-consumption 0,1VA
 sampling range 2/s
 overload indication first digit lights up
 continuous overload 2In; 1,2Un
 short-term overload 10In; 2Un
 test voltage 2kV-50Hz-60s
 operating temperature -10...+50°C
 storage temperature -30...+70°C
 auxiliary voltage 115+230V ±10% 50Hz
 galvanic insulation of measurement
 voltage and auxiliary voltage

measuring range	input resistance	Order Code
-----------------	------------------	------------

direct voltage and direct current (d.c.)

40-60-150mV	≥10kΩ	D76MV-3
0-1V up to 0-600V	50kΩ up to 1,6MΩ	D76MV-3
0-100μA	≅600Ω	D76MA-3
4-20mA	≅3Ω	D76MA-3
0-1mA up to 0-200mA	60Ω up to 600mΩ	D76MA-3
0-1A up to 0-10A	60mΩ up to 6mΩ	D76MA-3

alternating voltage and alternating current (a.c.)

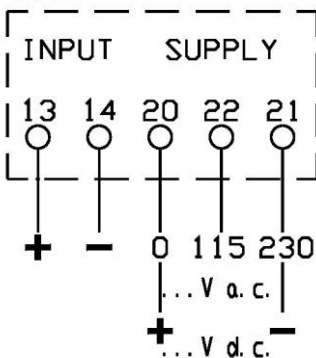
0-1V up to 0-600V	4kΩ up to 4MΩ	D76EV-3
0-200mA	750mΩ	D76EA-3
0-1A	150mΩ	D76EA-3
0-5A up to 0-10A	30mΩ up to 15mΩ	D76EA-3

frequency measurement

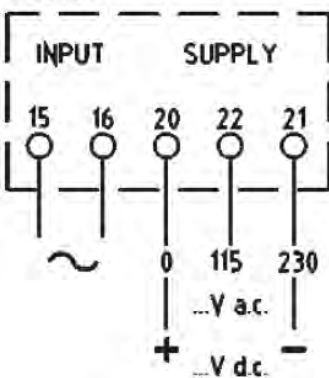
45-65Hz	frequency of input voltage	D76FP-3
other measurement ranges on demand		

Order Code for 3 1/2-digit type (D76...-5):

3000A



SC.3036



Order Information

- Order Code
- Measuring Range / Display Range
- Please state custom scale printing when ordering
- DC auxiliary voltage on demand

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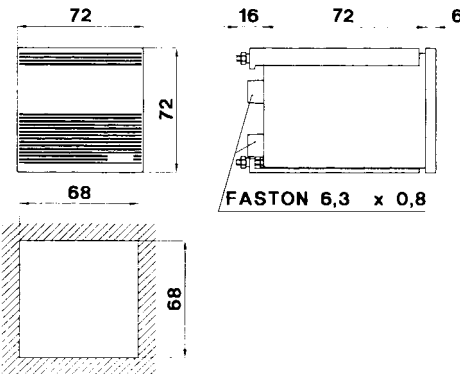
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Adjustable Digital Panel Meter 72x72mm

3-digit plus additional fixed zero ones field



TECHNICAL DATA

3-digit digital display device.

Shows 3 floating characters or 4 characters with fixed zero ones field.

seven-segment red LED display

digit height

h=14mm

display range

9990

accuracy (class)

0,5 ±1 digit

frequency

40...400Hz

self-consumption

0,1VA

sampling rate

2/s

overload indication

flashing display

continuous overload

2In; 1,2Un

short-term overload

10In; 2Un

test voltage

2kV-50Hz-60s

operating voltage

-10...+50°C

storage temperature

-30...+70°C

auxiliary voltage

115+230V ±10% 50Hz

galvanic insulation of measurement

voltage and auxiliary voltage

measuring range	input resistance	Order Code
current transformer ..5A AC	30mΩ	D72EA-G
600V AC	800kΩ	

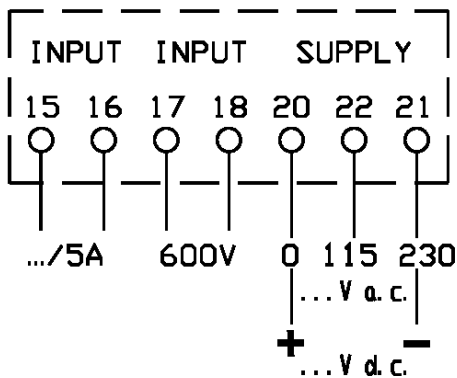
Digital panel meter type **D72EA-G** are designed for current transformer measurements (5A) or direct mains voltage (600V) measuring.

In case of current transformer measurements, the display range may be adjusted via DIP-switches. The DIP-switches are located behind the front panel.

The following display ranges are adjustable via DIP-switches:

15,0	20,0	25,0	40,0	50,0	60,0	80,0	99,9
150	200	250	400	500	600	800	999
1500	2000	2500	4000	5000	6000	8000	9990

3021C



Order Information

- Order Code
- Please state custom scale printing when ordering
- DC auxiliary voltage on demand

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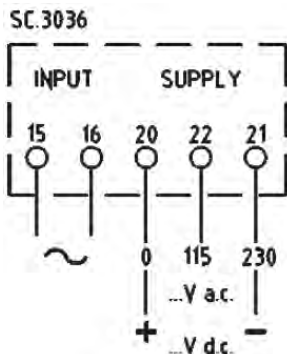
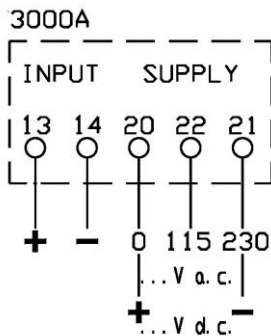
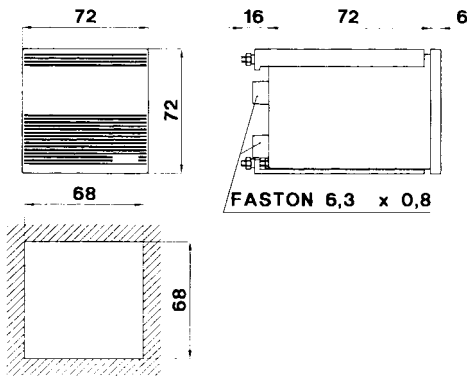
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Digital Panel Meter 72x72mm

3-digit



TECHNICAL DATA

3-digit digital display device with automatic polarity indication.
bidirectional

seven-segment red LED display

digit height

h=14mm

display range

±999

accuracy (class)

0,5 ±1 digit

frequency

40...400Hz

self-consumption

0,1VA

sampling range

2/s

overload indication

flashing display

continuous overload

2In; 1,2Un

short-term overload

10In; 2Un

test voltage

2kV-50Hz-60s

operating temperature

-10...+50°C

storage temperature

-30...+70°C

auxiliary voltage

115+230V ±10% 50Hz

galvanic insulation of measurement

voltage and auxiliary voltage

measuring range

input resistance

Order Code

direct voltage and direct current (d.c.)

40-60-150mV	≥10kΩ	D72MV-3
0-1V up to 0-600V	50kΩ up to 800kΩ	D72MV-3
0-100μA	≅600Ω	D72MA-3
4-20mA	≅3Ω	D72MA-3
0-1mA up to 0-100mA	60Ω up to 600mΩ	D72MA-3
0-1A up to 0-10A	60mΩ up to 6mΩ	D72MA-3

alternating voltage and alternating current (a.c.)

0-1V up to 0-600V	4kΩ up to 800kΩ	D72EV-3
0-100mA	1,5Ω	D72EA-3
0-1A	150mΩ	D72EA-3
0-5A up to 0-10A	30mΩ up to 15mΩ	D72EA-3

frequency measurement

45-65Hz	frequency of input voltage	D72FP-3
other measurement ranges on demand		

Order Information

- Order Code
- Measuring Range / Display Range
- Please state custom scale printing when ordering
- DC auxiliary voltage on demand

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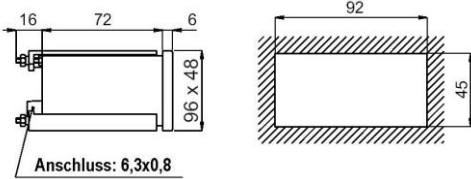
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Adjustable Digital Panel Meter 96x48mm

3 1/2-digit plus additional fixed zero ones field



TECHNICAL DATA

3 1/2-digit digital display device with automatic polarity indication.
Shows 5 characters with fixed zero ones field.

seven-segment red LED display

digit height

h=14mm

display range

±19990

accuracy (class)

0,5 ±1 digit

frequency

40...400Hz

sampling rate

2/s

overload indication

first digit lights up

continuous overload

2In; 1,2Un

short-term overload

10In; 2Un

test voltage

2kV-50Hz-60s

operating temperature

-10...+50°C

storage temperature

-30...+70°C

auxiliary voltage

115+230V ±10% 50Hz

galvanic insulation of measurement

voltage and auxiliary voltage

measuring range	input resistance	Order Code
direct voltage and direct current (d.c.)		
0-10V	≅470kΩ	D98MV-G10
shunt 60mV	≅10kΩ	D98MA-G60
0-20mA	≅3Ω	D98MMA-G20
4-20mA	≅3Ω	D98MMA-G42

alternating voltage and alternating current (a.c.)		
0-600V	≅4MΩ	D98EA-G
current transformer ..1A	≅150mΩ	D98EA-G
current transformer ..1/5A	≅30mΩ	D98EA-G

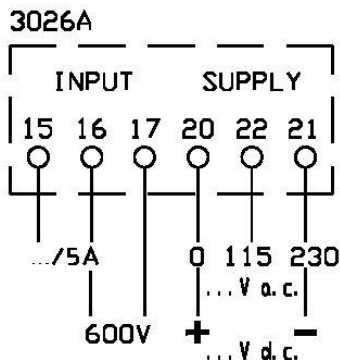
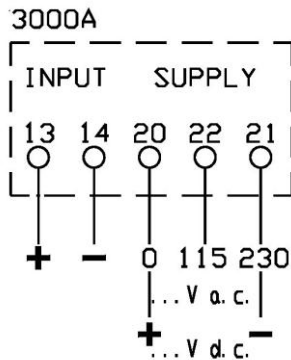
The display range may be adjusted via DIP-switches by the customer. DIP-switches are located behind the front panel.

This digital meters show 3 1/2 floating characters plus one additional fixed zero ones field character, if needed.

The following display ranges are adjustable via DIP-switches:

1,000	10,00	100,0	1000	10000
1,200	12,00	120,0	1200	12000
1,500	15,00	150,0	1500	15000
0,150	1,50	15,0	150	1500
1,999	19,99	199,9	1999	19990
0,200	2,00	20,0	200	2000
0,250	2,50	25,0	250	2500

0,300	3,00	30,0	300	3000
0,400	4,00	40,0	400	4000
0,500	5,00	50,0	500	5000
0,600	6,00	60,0	600	6000
0,750	7,50	75,0	750	7500
0,800	8,00	80,0	800	8000



Order Information

- Order Code
- Measuring Range
- Please state custom scale printing when ordering
- DC auxiliary voltage on demand

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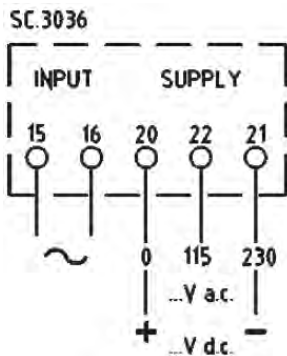
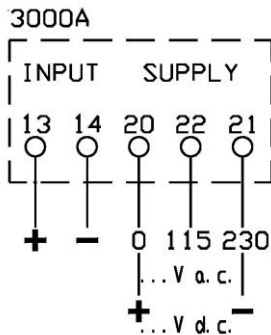
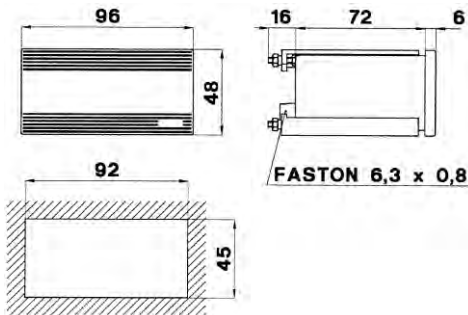
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Digital Panel Meter 96x48mm

3-digit



TECHNICAL DATA

3-digit digital display device with automatic polarity indication.
bidirectional

seven-segment red LCD display

digit height

h=14mm

display range

±999

accuracy (class)

0,5 ±1 digit

frequency

40...400Hz

self-consumption

0,1VA

sampling rate

2/s

overload indication

first digit lights up

continuous overload

2In; 1,2Un

short-term overload

10In; 2Un

test voltage

2kV-50Hz-60s

operating temperature

-10...+50°C

storage temperature

-30...+70°C

auxiliary voltage

115+230V ±10% 50Hz

galvanic insulation of measurement

voltage and auxiliary voltage

measuring range	input resistance	Order Code
direct voltage and direct current (d.c.)		
40-60-150mV	10kΩ	D98MV-3
0-1V up to 0-600V	50kΩ up to 1MΩ	D98MV-3
0-100μA	600Ω	D98MA-3
4-20mA	3Ω	D98MA-3
0-1mA up to 0-100mA	60Ω up to 600mΩ	D98MA-3
0-1A up to 0-10A	60mΩ up to 6mΩ	D98MA-3
alternating voltage and alternating current (a.c.)		
0-1V up to 0-600V	4kΩ up to 4MΩ	D98EV-3
0-100mA	1,5Ω	D98EA-3
0-1A	150mΩ	D98EA-3
0-5A up to 0-10A	30mΩ up to 15mΩ	D98EA-3
frequency measurement		
45-65Hz	frequency of input voltage	D98FP-3
other measurement ranges on demand		

Order Information

- Order Code
- Measuring Range / Display Range
- Please state custom scale printing when ordering
- DC auxiliary voltage on demand

Langer
MESSTECHNIK

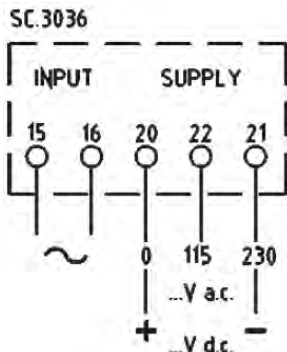
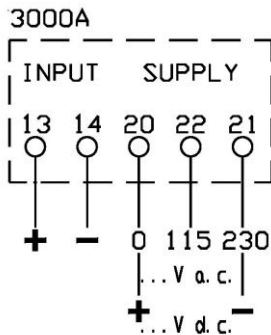
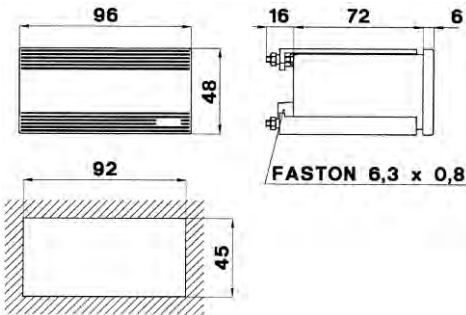
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Digital Panel Meter 96x48mm

3 1/2-digit



TECHNICAL DATA

3 1/2-digit digital display device with automatic polarity indication.
bidirectional

seven-segment red LED display

digit height

h=14mm

display range

±1999

accuracy (class)

0,5 ±1 digit

frequency

40...400Hz

self-consumption

0,1VA

sampling range

2/s

overload indication

first digit lights up

continuous overload

2In; 1,2Un

short-term overload

10In; 2Un

test-voltage

2kV-50Hz-60s

operating temperature

-10...+50°C

storage temperature

-30...+70°C

auxiliary voltage

115+230V ±10% 50Hz

galvanic insulation of measurement

voltage and auxiliary voltage

measuring range	input resistance	Order Code
direct voltage and direct current (d.c.)		
40-60-150mV	10kΩ	D98MV-5
0-1V up to 0-600V	50kΩ up to 1MΩ	D98MV-5
0-100μA	600Ω	D98MA-5
4-20mA	3Ω	D98MA-5
0-1mA up to 0-100mA	60Ω up to 600mΩ	D98MA-5
0-1A up to 0-10A	60mΩ up to 6mΩ	D98MA-5
alternating voltage and alternating current (a.c.)		
0-1V up to 0-600V	4kΩ up to 4MΩ	D98EV-5
0-100mA	1,5Ω	D98EA-5
0-1A	150mΩ	D98EA-5
0-5A up to 0-10A	30mΩ up to 15mΩ	D98EA-5

Order Information

- Order Code
- Measuring Range / Display Range
- Please state custom scale printing when ordering
- DC auxiliary voltage on demand

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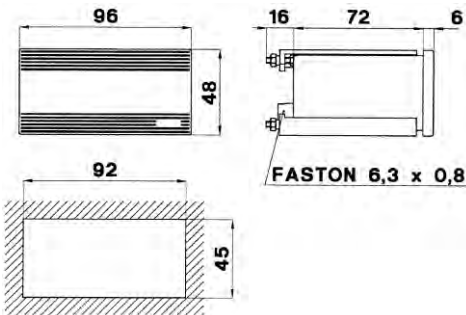
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Digital Panel Meter 96x48mm

4 1/2-digit



TECHNICAL DATA

4 1/2-digit digital display device with automatic polarity indication.
bidirectional

seven-segment red LED display

digit height

h=14mm

display range

±19999

accuracy (class)

0,2 (d.c.); 0,35 (a.c.)

frequency

45...65Hz

self-consumption

0,1VA

sampling rate

5/s

overload indication

display „over“

continuous overload

2In; 1,2Un

short-term overload

10In; 2Un

test voltage

2kV-50Hz-60s

operating temperature

-10...+50°C

storage temperature

-30...+70°C

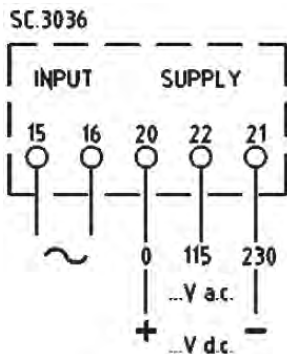
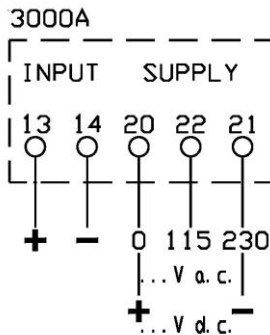
auxiliary voltage

115+230V ±10% 50Hz

galvanic insulation of measurement

voltage and auxiliary voltage

measuring range	input resistance	Order Code
direct voltage and direct current (d.c.)		
40-60-150mV	≥10kΩ	D98MV-6
0-1V up to 0-600V	1kΩ up to 600kΩ	D98MV-6
0-100μA	≅10kΩ	D98MA-6
4-20mA	≅50Ω	D98MA-6
0-1mA up to 0-100mA	1kΩ up to 10mΩ	D98MA-6
0-1A up to 0-10A	75mΩ up to 7,5mΩ	D98MA-6
alternating voltage and alternating current (a.c.)		
0-1V up to 0-600V	1kΩ up to 600kΩ	D98EV-6
0-100mA	1,5Ω	D98EA-6
0-1A	150mΩ	D98EA-6
0-5A up to 0-10A	30mΩ up to 15mΩ	D98EA-6
frequency measurement		
45-65Hz	frequency of input voltage	D98FP-6
other measurement ranges on demand		



Order Information

- Order Code
- Measuring Range / Display Range
- Please state custom scale printing when ordering
- DC auxiliary voltage on demand

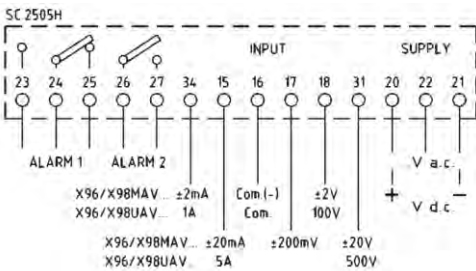
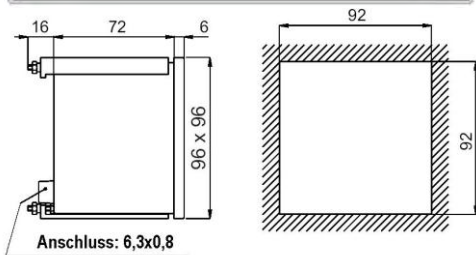
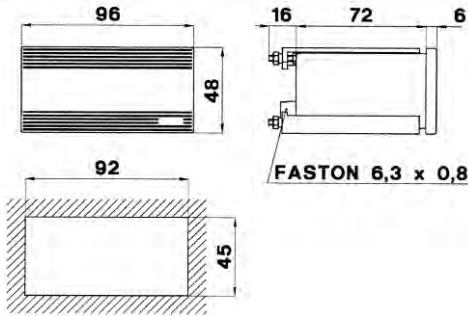
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Programmable Digital Panel Meter with Min.-/ Max.-Contact



TECHNICAL DATA

Digital display device with two programmable contact outputs.
seven-segment red LED display

digit height	h=14mm
display range	± 19999
accuracy (class)	0,2 (d.c.); 0,35 (a.c.)
frequency	45...65Hz
self-consumption	5 VA
adjustable delay	0,1...999s
sampling rate	5/s
overload indication	display „over“
continuous overload	2In; 1,2Un
short-term overload	10In; 2Un
number of alarm contacts	2
max. contact rating	10A, 250V AC
test voltage	4kV-50Hz-60s
operating temperature	-10...+50°C
storage temperature	-30...+70°C
plastic housing	
test for flammability	UL94-V0
auxiliary voltage	115 o. 230V ±10% 50Hz
galvanic insulation of measurement	
voltage and auxiliary voltage	

measuring range	Order Code 96x48mm	Order Code 96x96mm
direct voltage and direct current (d.c.)		
2mA, 20mA, 200mV, 2V, 20V	X98MAV-Q41	X96MAV-Q41
1A, 5A, 100V, 500V	X98UAV-QU	X96UAV-QU
alternating voltage and alternating current (a.c.)		
2mA, 20mA, 200mV, 2V, 20V	X98MAV-Q41	X96MAV-Q41
1A, 5A, 100V, 500V	X98UAV-QU	X96UAV-QU

Order Information

- Order Code
- Measuring Range / Display Range
- Please state custom scale printing when ordering
- Special measuring ranges on demand
- DC auxiliary voltage on demand

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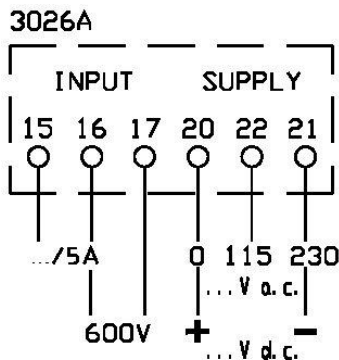
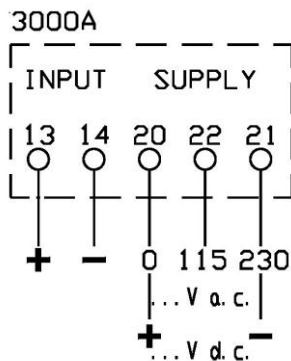
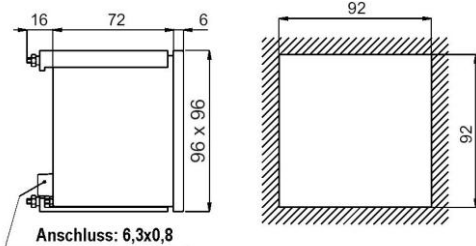
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Adjustable Digital Panel Meter 96x96mm

3 1/2-digit plus additional fixed zero ones field



TECHNICAL DATA

3 1/2-digit digital display device with automatic polarity indication.
Shows 5 characters with fixed zero ones field.

seven-segment red LED display

digit height	h=14mm
display range	±19990
accuracy (class)	0,5 ±1 digit
frequency	40...400Hz
sampling rate	2/s
overload indication	first digit lights up
continuous overload	2In; 1,2Un
short-term overload	10In; 2Un
test voltage	2kV-50Hz-60s
operating temperature	-10...+50°C
storage temperature	-30...+70°C
auxiliary voltage	115+230V ±10% 50Hz
galvanic insulation of measurement voltage and auxiliary voltage	

measuring range	input resistance	Order Code
direct voltage and direct current (d.c.)		
0-10V	≅470kΩ	D96MV-G10
shunt 60mV	≅10kΩ	D96MA-G60
0-20mA	≅3Ω	D96MMA-G20
4-20mA	≅3Ω	D96MMA-G42

alternating voltage and alternating current (a.c.)		
0-600V	≅4MΩ	D96EA-G
current transformer ..1A	≅150mΩ	D96EA-G
current transformer ..1/5A	≅30mΩ	D96EA-G

The display range may be adjusted via DIP-switches by the customer. DIP-switches are located behind the front panel.

This digital meters show 3 1/2 floating characters plus one additional fixed zero ones field character, if needed.

The following display ranges are adjustable via DIP-switches:

1,000	10,00	100,0	1000	10000
1,200	12,00	120,0	1200	12000
1,500	15,00	150,0	1500	15000
0,150	1,50	15,0	150	1500
1,999	19,99	199,9	1999	19990
0,200	2,00	20,0	200	2000
0,250	2,50	25,0	250	2500

0,300	3,00	30,0	300	3000
0,400	4,00	40,0	400	4000
0,500	5,00	50,0	500	5000
0,600	6,00	60,0	600	6000
0,750	7,50	75,0	750	7500
0,800	8,00	80,0	800	8000

Order Information

- Order Code
- Measuring Range
- Please state custom scale printing when ordering
- DC auxiliary voltage on demand

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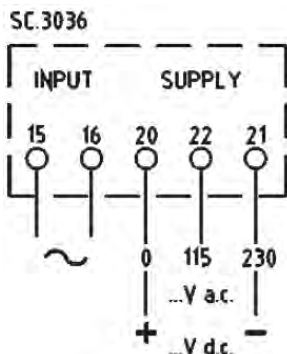
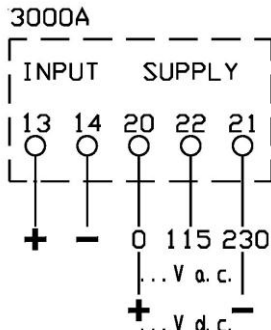
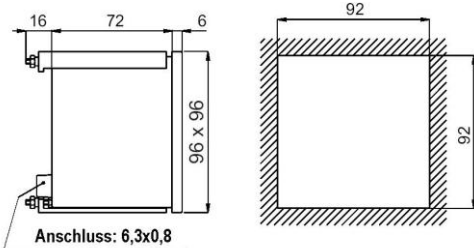
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Digital Panel Meter 96x96mm

3-digit and 3 1/2-digit



TECHNICAL DATA

3- or 3 1/2-digit digital display device with automatic polarity indication. bidirectional

seven-segment red LED display

digit height

h=14mm

display range

±999 or ±1999

accuracy (class)

0,5 ±1 digit

frequency

40...400Hz

self-consumption

0,1VA

sampling rate

2/s

overload indication

first digit lights up

continuous overload

2In; 1,2Un

short-term overload

10In; 2Un

test voltage

2kV-50Hz-60s

operating temperature

-10...+50°C

storage temperature

-30...+70°C

auxiliary voltage

115+230V ±10% 50Hz

galvanic insulation of measurement

voltage and auxiliary voltage

measuring range	input resistance	Order Code
-----------------	------------------	------------

direct voltage and direct current (d.c.)

40-60-150mV	10kΩ	D96MV-3
0-1V up to 0-600V	50kΩ bis 1MΩ	D96MV-3
0-100μA	600Ω	D96MA-3
4-20mA	3Ω	D96MA-3
0-1mA up to 0-100mA	60Ω up to 600mΩ	D96MA-3
0-1A up to 0-10A	60mΩ up to 6mΩ	D96MA-3

alternating voltage and alternating current (a.c.)

0-1V up to 0-600V	4kΩ up to 4MkΩ	D96EV-3
0-100mA	1,5Ω	D96EA-3
0-1A	150mΩ	D96EA-3
0-5A up to 0-10A	30mΩ up to 15mΩ	D96EA-3

frequency measurement

45-65Hz	frequency of	D96FP-3
other measurement ranges on demand	input voltage	

Order Code for 3 1/2-digit type (D96...-5):

Order Information

- Order Code
- Measuring Range / Display Range
- Please state custom scale printing when ordering
- DC auxiliary voltage on demand

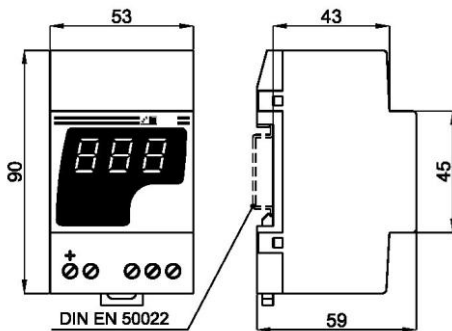
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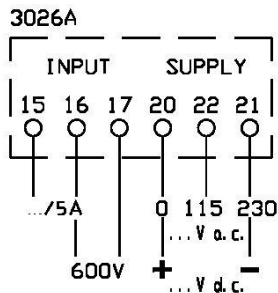
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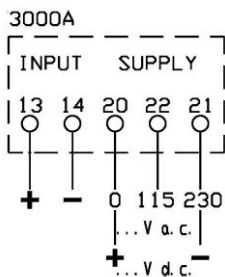
Digital Meter 3-digit designed for 35mm DIN-Rail



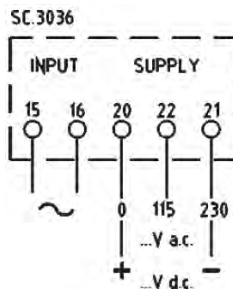
D52EA-G



D52M..3



D52E..3



TECHNICAL DATA

3-digit digital display device with automatic polarity indication.
bidirectional

seven-segment red LED display

digit height

h=14mm

display range

±999

accuracy (class)

0,5 ±1 digit

frequency

40...400Hz

self-consumption

0,1VA

sampling rate

2/s

overload indication

flashing display

continuous overload

2In; 1,2Un

short-term overload

10In; 2Un

test voltage

2kV-50Hz-60s

operating temperature

-10...+50°C

storage temperature

-30...+70°C

auxiliary voltage

115+230V ±10% 50Hz

galvanic insulation of measurement

voltage and auxiliary voltage

measuring range	input resistance	Order Code
direct voltage and direct current (d.c.)		
40-60-150mV	10kΩ	D52MV-3
0-1V up to 0-600V	50kΩ up to 1MΩ	D52MV-3
0-100μA	600Ω	D52MA-3
4-20mA	3Ω	D52MA-3
0-1mA up to 0-100mA	60Ω up to 600mΩ	D52MA-3
0-1A up to 0-10A	60mΩ up to 6mΩ	D52MA-3
alternating voltage and alternating current (a.c.)		
0-1V up to 0-600V	4kΩ up to 4MΩ	D52EV-3
0-100mA	3Ω	D52EA-3
0-1A	300mΩ	D52EA-3
0-5A up to 0-10A	60mΩ up to 30mΩ	D52EA-3
current transformer ..5A AC	30mΩ	D52EA-G
600V AC	800kΩ	
frequency measurement		
45-65Hz	frequency of input voltage	D52FP-3
other measuring ranges on demand		

Digital meters type **D52EA-G** are designed for current transformer measurements (5A) or direct mains voltage (600V) measuring.

In case of current transformer measurements, the display range may be adjusted via DIP-switches. The DIP-switches are located behind the front panel.

The following display ranges are adjustable via DIP-switches:

15,0	20,0	25,0	40,0	50,0	60,0	80,0	99,9
150	200	250	400	500	600	800	999
1500	2000	2500	4000	5000	6000	8000	9990

Order Information

- Order Code
- Measuring Range / Display Range
- DC auxiliary voltage on demand

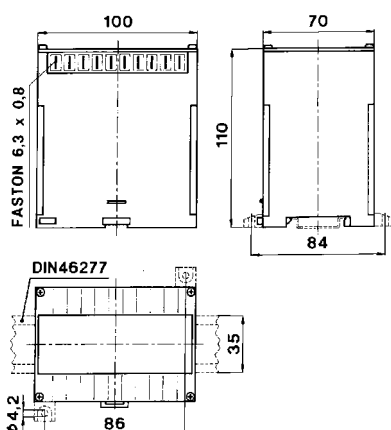
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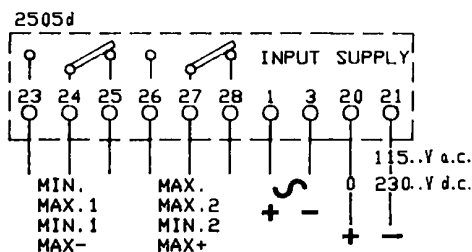
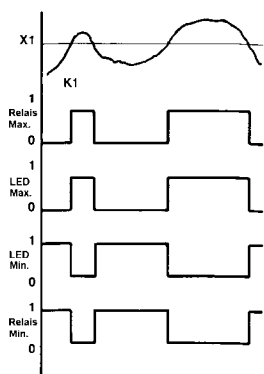
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Digital Limit Value Switch with Min.-/ Max.-Contact



switching behavior



TECHNICAL DATE

Digital display device with limit value switch designed for 35mm DIN-rail
 bidirectional
 seven-segment red LED display
 digit height h=14mm
 display range max. ± 1999
 accuracy (class) 0,5 ± 1 digit
 frequency 40...400Hz
 self-consumption 5 VA
 adjustable delay 0,1...20s
 max. contact rating 5A / 230V
 overload indication first digit lights up
 continuous overload 2In; 1,2Un
 short-term overload 10In; 2Un
 test voltage 2kV-50Hz-60s
 operating temperature -10...+50°C
 storage temperature -30...+70°C
 auxiliary voltage 115 or 230V $\pm 10\%$ 50Hz
 galvanic insulation of measurement
 voltage and auxiliary voltage

measuring range	Order Code	
	1 max.	1 min.
direct voltage and direct current (d.c.)		
0-60mV	XCOMMV-X	XCOMMV-N
0-1V up to 0-600V	XCOMMV-X	XCOMMV-N
0-20mA; 4-20mA	XCOMMA-X	XCOMMA-N
0-1mA up to 0-10A	XCOMMA-X	XCOMMA-N

alternating voltage and alternating current (a.c.)		
0-1V up to 0-600V	XCOEV-X	XCOEV-N
current transformer ..5A	XCOEA-X	XCOEA-N
0-1A up to 0-10A	XCOEA-X	XCOEA-N

measuring range	Order Code		
	2 max.	1 min.	1 max. - 1 max.+
direct voltage and direct current (d.c.)			
0-60mV	XCOMMV-M	XCOMMV-H	XCOMMV-E
0-1V up to 0-600V	XCOMMV-M	XCOMMV-H	XCOMMV-E
0-20mA; 4-20mA	XCOMMA-M	XCOMMA-H	XCOMMA-E
0-1mA up to 0-10A	XCOMMA-M	XCOMMA-H	XCOMMA-E

alternating voltage and alternating current (a.c.)			
0-1V up to 0-600V	XCOEV-M	XCOEV-H	
current transformer ..5A	XCOEA-M	XCOEA-H	
0-1A up to 0-10A	XCOEA-M	XCOEA-H	

Order Information

- Order Code
- Measuring Range / Display Range
- Please state custom scale printing when ordering
- DC auxiliary voltage on demand

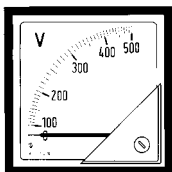
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AREA 6 Transducer



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AREA 6

Transducer

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MCOPYL.....	3-phase and 3-wires balanced load.....	cos phi.....	126
MCOPNL.....	3-phase and 4-wires balanced load.....	cos phi.....	126
MCOFP.....	alternating current single-phase.....	Hz.....	127
MCOS2.....	direct current 2 signals sum.....	2 x mA od. V.....	128
MCOS3.....	direct current 3 signals sum.....	3 x mA od. V.....	128
MCOS4.....	direct current 4 signals sum.....	4 x mA od. V.....	128
MCOS5.....	direct current 5 signals sum.....	5 x mA od. V.....	128
MCOS6.....	direct current 6 signals sum.....	6 x mA od. V.....	128
MCOMA.....	direct current.....	Ampere.....	129
MCOMV.....	direct current voltage.....	Volt.....	129
MCOWM.....	direct current power.....	Watt.....	130
MCOWMT.....	direct current, d.c. voltage and d.c. power.....	Ampere-Volt-Watt.....	130

General Information

Transducer Features

- wide range of current and voltage outputs
- load independent output
- complete galvanic insulation of input/output and auxiliary voltage
- partial self-powered or with separate auxiliary voltage
- high linear output signal
- low burden on added transformers
- connection via blade receptacles 6,3x0,8mm

Standards

Our transducers are manufactured according to following standards:

general: IEC 60688 environment standards: IEC 60068; IEC 60654; IEC 60721
safety standards: IEC 61010; VDE 0410
protection: IEC 60529

Housing

Self-extinguishing ABS plastic housing according to following standards:

Protection class for housing: IP40

Protection class for blade receptacles: IP20

Operation

A wide range of input signals can be connected to the transducer. Depending on the input signal connection takes place directly or via suitable current transformers, voltage transformers and shunts.

Common design of transducers is self-powered, except for transducers with 4 up to 20mA output signal. These types of transducers need an auxiliary voltage (d.c. voltage or a.c. voltage). With an auxiliary voltage an application range from 0 up to 120% of the nominal value is ensured.

The housing is designed for 35-DIN-rail mounting according to DIN EN 50 022.

Special Options

- Tropical Design according to DIN 3540 page 2, climate class 3
- Shipbuilding Design
- nonstandard Input Signals
- nonstandard Output Signals
- Frequency 400 Hz

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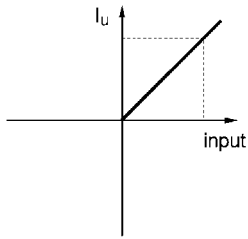
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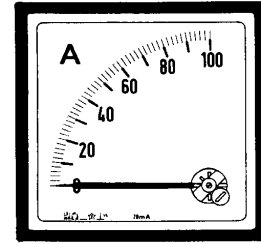
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Transmission Behavior

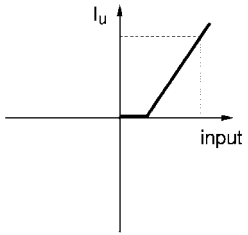
characteristic curve A:



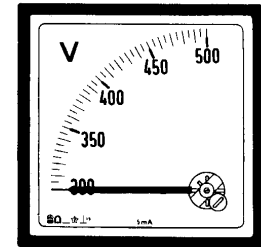
output 0 - 5 mA
 0 - 10 mA
 0 - 20 mA
 0 - 10 V



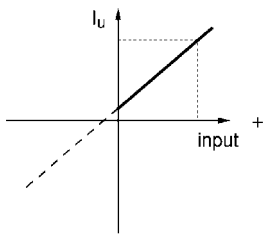
characteristic curve B:



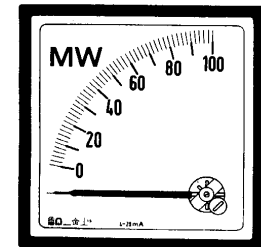
output 0 - 5 mA
 0 - 10 mA
 0 - 20 mA
 0 - 10 V



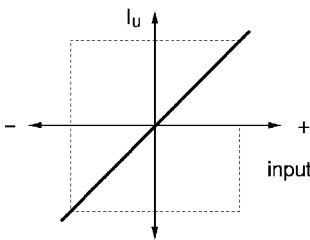
characteristic curve C:



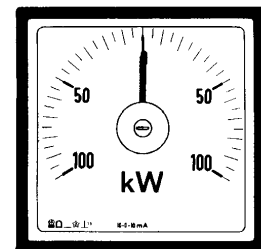
output 4 - 20 mA



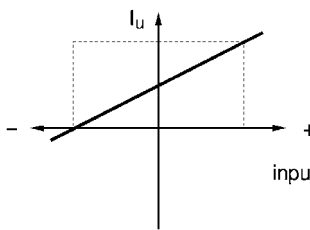
characteristic curve D:



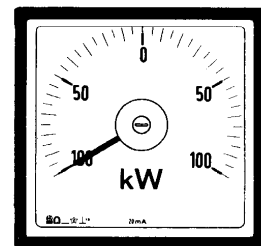
output 2,5-0-2,5 mA
 5 - 0 - 5 mA
 10 - 0 - 10 mA
 20 - 0 - 20 mA
 10 - 0 - 10 V



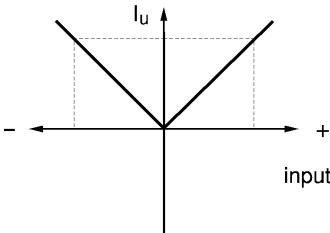
characteristic curve E:



output 0 - 2,5 - 5 mA
 0 - 5 - 10 mA
 0 - 10 - 20 mA



characteristic curve F:



output A1 0,0001, 10 Hz +TTL
 A2 0,0001, 10 Hz - TTL
 B1 0,0001, 10 Hz + relay
 B2 0,0001, 10 Hz - relay



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MAC../MAT..

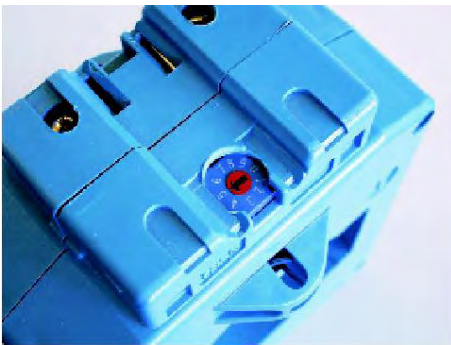
Multi-range Current Transformer with integrated Measuring Transducer Output: 4..20mA D.C.



TECHNICAL DATA

break-proof plastic housing with integrated terminal cover	UL94-V0
self-extinguishing insulation	class E
protection	IP 20
response time	< 200ms
ripple	< 1% p.p.
frequency	50...60Hz
continuous overload	1,2 In
insulation voltage	0,72 KV
test voltage	3kV-50Hz-60s
current limiting factor	FS 5
thermal short-term current	$I_{th}=60I_n$
dynamic short-term current	$I_{dyn}=2,5 \times I_{th}$
storage temperature	-40...+80°C
operating temperature	-25...+50°C
galvanic insulation	input / output
manufactured according to:	EN60044-1; EN60688

primary current	20 – 6000A AC
output	4..20mA DC
burden	100 – 1100 Ω
auxiliary voltage	12..32V DC



Description

Multi-range current transformer with passive 4..20mA DC output provide a DC current output which is directly proportional to the primary current. There is no add-on module necessary.

Different primary current values can be adjusted with a build-in rotary switch. This means, only a few transducers are necessary to cover the range from 20A up to 6000A primary current.

TRMS

This type is also available as TRMS-version.

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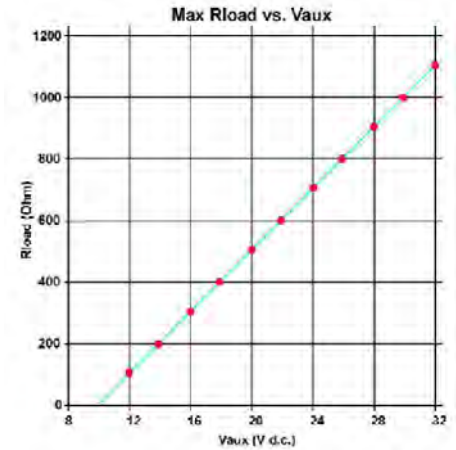
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MAC../MAT.. Multi-range Current Transformer with integrated Measuring Transducer

Output: 4..20mA D.C.

Type	Cable-/ Rail Size	Primary Current / Adjustment Range
MAC017-G42	∅ 17mm 1x15x10mm	20-40-40-50-60-80-100-120A
MAC032-G42	∅ 24mm 1x30x10mm	50-75-100-125-150-200-250-300A
MAC040-G42	∅ 32mm 1x40x10mm	100-150-200-250-300-400-500-600A
MAT061-G42	∅ 51mm 2x60x10mm	200-300-400-500-600-800-1000-1200A
MAT101-G42	3x100x10mm	400-600-800-1000-1200-1600-2000-2400A
MAT127-G42	3x120x10mm	500-750-1000-1250-1500-2000-2500-3000A
MAT128-G42	4x120x10mm	1000-1500-2000-2500-3000-4000-5000-6000A
MAT129-G42	5x120x10mm	1000-1500-2000-2500-3000-4000-5000-6000A
MAT165-G42	6x160x10mm	1000-1500-2000-2500-3000-4000-5000-6000A
MAT225-G42	6x220x10mm	1000-1500-2000-2500-3000-4000-5000-6000A

burden according to auxiliary voltage (12..32V DC):



Type / Code

MAC017-G42
 MAC032-G42
 MAC040-G42
 MAT061-G42
 MAT101-G42
 MAT127-G42
 MAT128-G42
 MAT129-G42
 MAT165-G42
 MAT225-G42

For dimensions please refer to page...

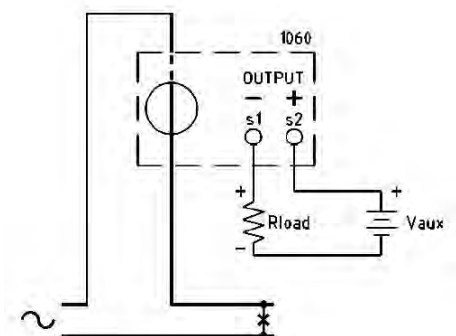
page 65 (identical to TAC17)
 page 67 (identical to TAC32)
 page 69 (identical to TAC40)
 page 71 (identical to TAT61)
 page 74 (identical to TAT101)
 page 76 (identical to TAT127)
 page 77 (identical to TAT128)
 page 78 (identical to TAT129)
 page 79 (identical to TAT165)
 page 80 (identical to TAT225)

Order Code for TRMS-type: „xxx-R42“ instead of „xxx-G42“

Order Information

- Order Code

wiring diagram:

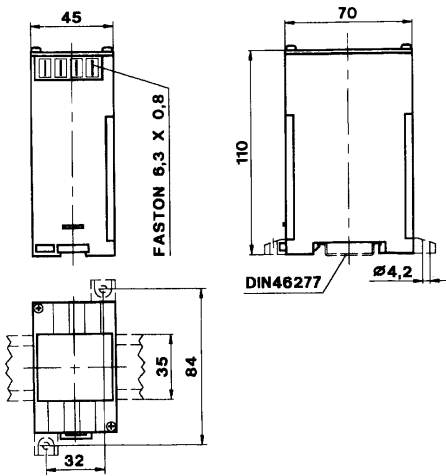


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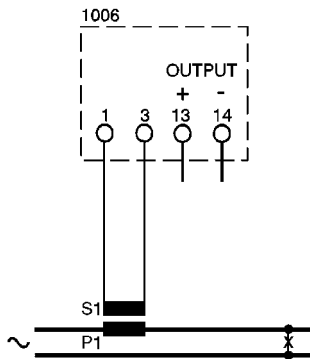
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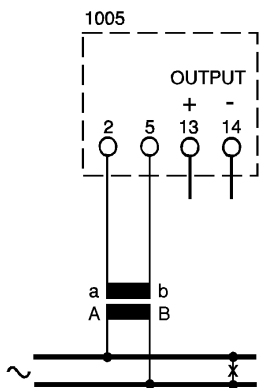
Self-supplied AC Transducer for A.C. Current and A.C. Voltage



MCOEA



MCOEV



Up to 500V there is no voltage transformer necessary.

TECHNICAL DATA

accuracy (class)	1%
frequency	50, 60 or 400 Hz
self-consumption	3VA
continuous overload	2 In; 1,2 Un
short-term overload	20 In; 2 Un
ripple	<1%
response time	<200ms
storage temperature	-30...+70°C
operating temperature	-10...+50°C
test voltage	2kV-50Hz-60s
surge test	5kV
input range	20...120%
galvanic insulation of input and output	

input A.C.	output D.C.	max. burden	Order Code
1A; 2,5A; 5A	0-5mA	2000 Ω	MCOEA
1A; 2,5A; 5A	0-10mA	1000 Ω	MCOEA
1A; 2,5A; 5A	0-20mA	500 Ω	MCOEA
1A; 2,5A; 5A	0-10V	≥ 2000 Ω	MCOEA
100-110- 230-250-400 440 or 500V	0-5mA 0-10mA 0-20mA 0-10V	2000 Ω 1000 Ω 500 Ω ≥ 2000 Ω	MCOEV MCOEV MCOEV MCOEV

These transducers are used for converting a sinusoidal A.C. current or A.C. voltage into a proportional impressed D.C. current or D.C. voltage.

There is no additional auxiliary voltage necessary.

Transmission behavior: characteristic curve A

Order Information

- Order Code
- Primary Current or Voltage
- Frequency
- Secondary Current or Voltage

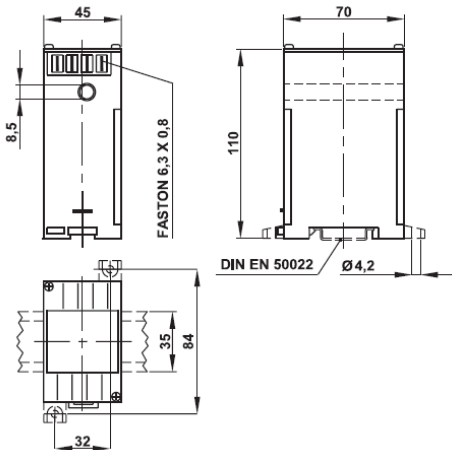
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A.C. Transducer for A.C. Current with Auxiliary Voltage



TECHNICAL DATA

accuracy (class)	1%
frequency	50, 60 or 400 Hz
self-consumption	3VA
continuous overload	2 I _n
short-term overload	20 I _n
ripple	<1%
response time	<200ms
storage temperature	-30...+70°C
operating temperature	-10...+50°C
test voltage	2kV-50Hz-60s
surge test	5kV
input range	5...120%
galvanic insulation of input, output and auxiliary voltage	

input A.C.	output D.C.	max. burden	Order Code
10A, 15A, 20A, 25A, 30A, 40A, 50A, 60A	0-1mA 0-5mA 0-20mA 4-20mA 0-10V	15 kΩ 3000 Ω 750 Ω 750 Ω ≥ 2000 Ω	MCOEAQ50 MCOEAQ50 MCOEAQ50 MCOEAQ50 MCOEAQ50
10A, 15A, 20A, 25A, 30A, 40A, 50A, 60A	0-1mA 0-5mA 0-20mA 4-20mA 0-10V	15 kΩ 3000 Ω 750 Ω 750 Ω ≥ 2000 Ω	MCOEAR50 MCOEAR50 MCOEAR50 MCOEAR50 MCOEAR50

Transducers type **MCOEAQ50** are used for converting a sinusoidal A.C. current into a proportional impressed D.C. current or D.C. voltage.

Transducers type **MCOEAR50** are used for converting a **non-sinusoidal** (TRMS) A.C. current into a proportional impressed D.C. current or D.C. voltage.

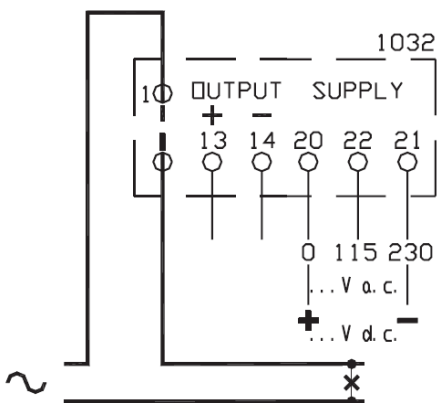
possible additional error: (crest factor) <3 = 0,5% or <7 = 1%

auxiliary voltage: 115V and 230V A.C. ±10% (3VA)
on demand: 24 - 400V A.C. (3VA)
24-48-110V D.C. -10 +20% (3VA)

Transmission behavior: characteristic curve A or curve C

Order Information

- Order Code
- Primary Current
- Frequency
- Secondary Current or Voltage
- Auxiliary Voltage



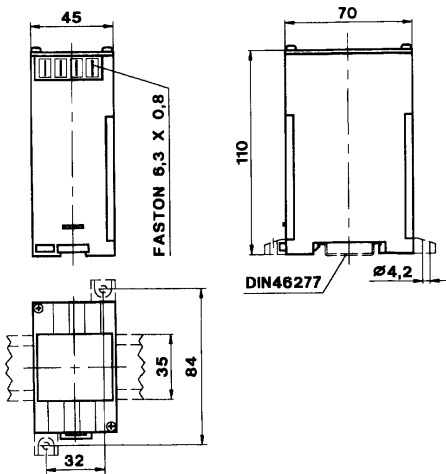
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A.C. transducer for A.C. current with auxiliary voltage



TECHNICAL DATA

accuracy (class)	1%
frequency	50, 60 or 400 Hz
self-consumption	0,5VA
continuous overload	2 I _n
short-term overload	20 I _n
ripple	<1%
response time	<200ms
storage temperature	-30...+70°C
operating temperature	-10...+50°C
test voltage	2kV-50Hz-60s
surge test	5kV
input range	0...120%
galvanic insulation of input, output and auxiliary voltage	

input A.C.	output D.C.	max. burden	Order Code
1A; 2,5A; 5A	0-1mA	15 kΩ	MCOEAQ
1A; 2,5A; 5A	0-5mA	3000 Ω	MCOEAQ
1A; 2,5A; 5A	0-20mA	750 Ω	MCOEAQ
1A; 2,5A; 5A	4-20mA	750 Ω	MCOEAQ
1A; 2,5A; 5A	0-10V	≥ 2000 Ω	MCOEAQ
1A; 2,5A; 5A	0-1mA	15 kΩ	MCOEAR
1A; 2,5A; 5A	0-5mA	3000 Ω	MCOEAR
1A; 2,5A; 5A	0-20mA	750 Ω	MCOEAR
1A; 2,5A; 5A	4-20mA	750 Ω	MCOEAR
1A; 2,5A; 5A	0-10V	≥ 2000 Ω	MCOEAR

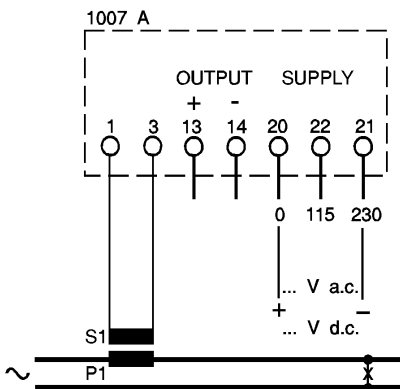
Transducers type **MCOEAQ** are used for converting a sinusoidal A.C. current into a proportional impressed D.C. current or D.C. voltage.

Transducers type **MCOEAR** are used for converting a **non-sinusoidal** (TRMS) A.C. current into a proportional impressed D.C. current or D.C. voltage.

possible additional error: (crest factor) <3 = 0,5% or <7 = 1%

auxiliary voltage: 115V und 230V A.C. ±10% (3VA)
on demand: 24 - 400V A.C. (3VA)
24-48-110V D.C. -10 +20% (3VA)

Transmission behavior: characteristic curve A or curve C



Order Information

- Order Code
- Primary Current
- Frequency
- Secondary Current or Voltage
- Auxiliary Voltage

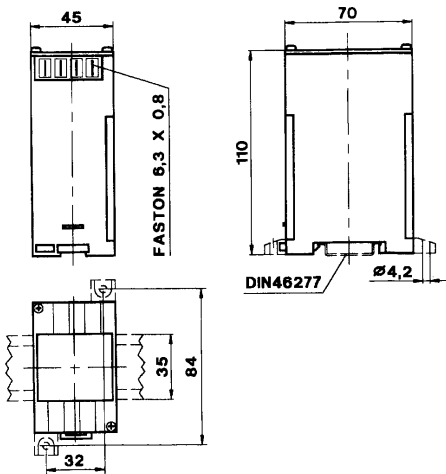
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A.C. Transducer for A.C. Voltage with Auxiliary Voltage



TECHNICAL DATA

accuracy (class)	1%
frequency	50, 60 or 400 Hz
self-consumption	0,5VA
continuous overload	1,2 Un
short-term overload	2 Un
ripple	<0,1%
response time	<200ms
storage temperature	-30...+70°C
operating temperature	-10...+50°C
test voltage	2kV-50Hz-60s
surge test	5kV
input range	0...120%
galvanic insulation of input, output and auxiliary voltage	

input A.C.	output D.C.	max. burden	Order Code
100-110-	0-1mA	15 kΩ	MCOEVQ
230-250-	0-5mA	3000 Ω	MCOEVQ
400-440-	0-20mA	750 Ω	MCOEVQ
500V	4-20mA	750 Ω	MCOEVQ
	0-10V	≥ 2000 Ω	MCOEVQ
100-110-	0-1mA	15 kΩ	MCOEVR
230-250-	0-5mA	3000 Ω	MCOEVR
400-440-	0-20mA	750 Ω	MCOEVR
500V	4-20mA	750 Ω	MCOEVR
	0-10V	≥ 2000 Ω	MCOEVR

Transducers type **MCOEVQ** are used for converting a sinusoidal A.C. voltage into a proportional impressed D.C. current or D.C. voltage.

Transducers type **MCOEVR** are used for converting a **non-sinusoidal** (TRMS) A.C. voltage into a proportional impressed D.C. current or D.C. voltage.

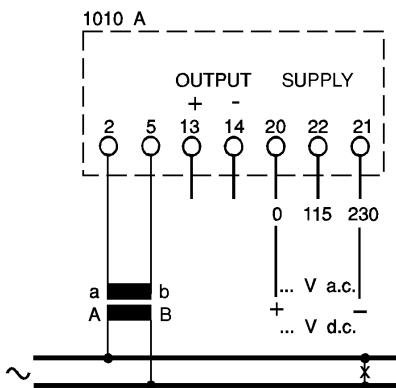
possible additional error: (crest factor) <3 = 0,5% or <7 = 1%

auxiliary voltage: 115V and 230V A.C. ±10% (3VA)

on demand: 24 - 400V A.C. (3VA)

24-48-110V D.C. -10 +20% (3VA)

Transmission behavior: characteristic curve A or curve C



Up to 500V there is no voltage transformer necessary.

Order Information

- Order Code
- Primary Voltage
- Frequency
- Secondary Current or Voltage
- Auxiliary Voltage

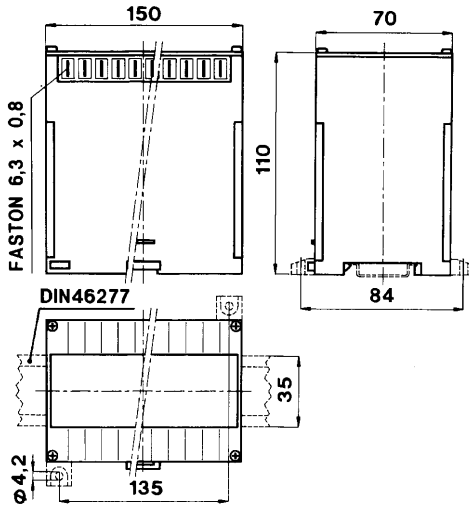
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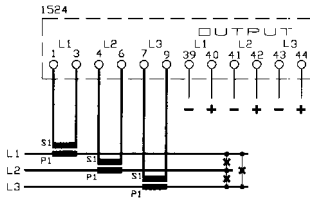
Self-supplied A.C. Transducer designed for 3 x Current or 3 x Voltage



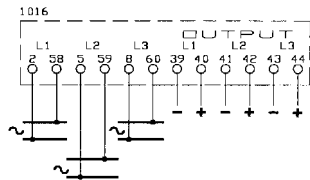
TECHNICAL DATA

accuracy (class)	1%
frequency	50, 60 or 400 Hz
self-consumption	3x3VA
continuous overload	2 In; 1,2 Un
short-term overload	20 In; 2 Un
ripple	<1%
response time	<200ms
storage temperature	-30...+70°C
operating temperature	-10...+50°C
test voltage	2kV-50Hz-60s
surge test	5kV; 1,2/50µs
input range	20...120%
galvanic insulation of input and output	

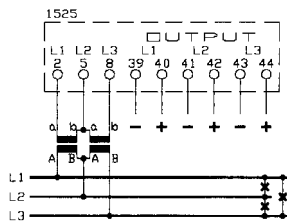
MCOA3



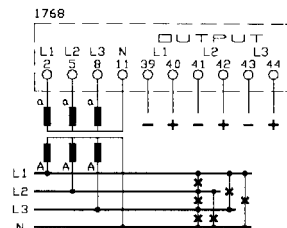
MCOV3



MCOD3



MCOT3



input voltage:	100V/√3; 110V/√3; 100V; 110V; 230V; 250V; 400V; 440V		
input current:	1A; 5A		
output:	0-5mA	0-10mA	0-20mA
burden:	2000Ω	1000Ω	500Ω

Measuring Range

Order Code

3 x A.C. current
3 x A.C. voltage
3 x A.C. voltage
3 x A.C. voltage

L1L2 - L2L3 - L3L1
L1N - L2N - L3N

MCOA3
MCOV3
MCOD3
MCOT3

These transducers are used for converting three sinusoidal A.C. currents or three sinusoidal A.C. voltages into three proportional impressed D.C. currents.

There is no additional auxiliary voltage necessary.

Transmission behavior: characteristic curve A

Order Information

- Order Code
- Primary Current or Voltage
- Frequency
- Secondary Current

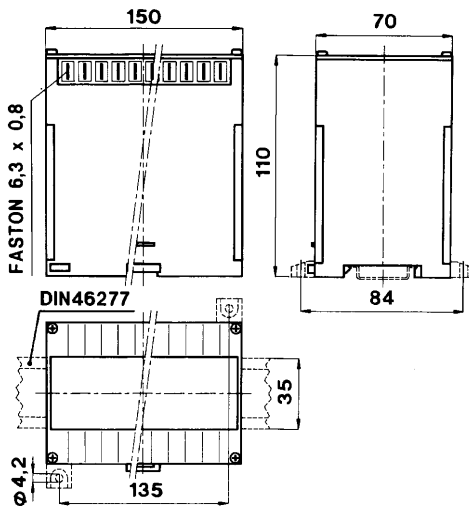
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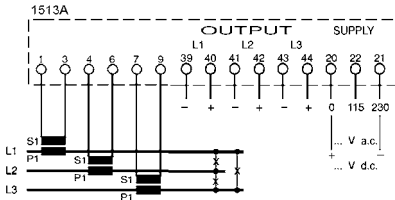
A.C. Transducer with Auxiliary Voltage designed for 3 x Current or 3 x Voltage



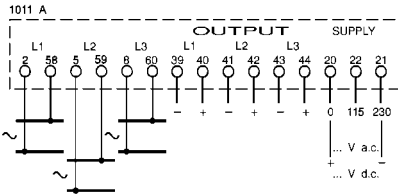
TECHNICAL DATA

accuracy (class)	1%
frequency	50, 60 or 400 Hz
self-consumption	3x0,5VA
continuous overload	2 In; 1,2 Un
short-term overload	20 In; 2 Un
ripple	<1%
response time	<200ms
storage temperature	-30...+70°C
operating temperature	-10...+50°C
test voltage	2kV-50Hz-60s
surge test	5kV; 1,2/50µs
input range	0...120%
galvanic insulation of input, output and auxiliary voltage	

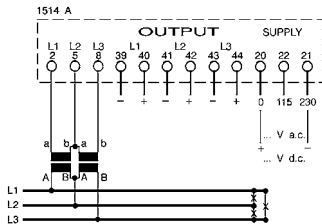
MCOEQ3 & MCORQ3



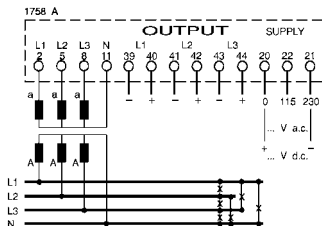
MCOEV3 & MCORV3



MCOED3 & MCORD3



MCOET3 & MCORT3



input voltage:	100V/√3; 110V/√3; 100V; 110V; 230V; 250V; 400V; 440V
input current:	1A; 2,5A; 5A
output:	0 - 1mA 0 - 5mA 0 - 20mA 4 - 20mA 0 - 10V
burden:	15kΩ 3000Ω 750Ω 750Ω >2000Ω

Measuring Range / Combinations

		Order Code
3 x sinusoidal A.C. current	single phase current	MCOEQ3
3 x sinusoidal A.C. voltage	single phase voltage	MCOEV3
3 x sinusoidal A.C. voltage	L1L2 - L2L3 - L3L1	MCOED3
3 x sinusoidal A.C. voltage	L1N - L2N - L3N	MCOET3
3 x RMS A.C. current	single phase current	MCORQ3
3 x RMS A.C. voltage	single phase voltage	MCORV3
3 x RMS A.C. voltage	L1L2 - L2L3 - L3L1	MCORD3
3 x RMS A.C. voltage	L1N - L2N - L3N	MCORT3

Transducer type **MCOE.3** are used for converting three sinusoidal A.C. currents or three sinusoidal A.C. voltages into three proportional impressed D.C. currents.
Transmission behavior: characteristic curve A, B or C

Transducer type **MCOE.3** are used for converting three **non-sinusoidal** (TRMS) A.C. currents or three sinusoidal A.C. voltages into three proportional impressed D.C. currents.

possible additional error: (crest factor) <3 = 0,5% or <7 = 1%

Transmission behavior: characteristic curve A, B or C

auxiliary voltage: 115V and 230V A.C. ±10% (3VA)
on demand: 24 - 400V A.C. (3VA); 24-48-110V D.C. -10 +20% (3W)

Order Information

- Order Code
- Primary Current or Voltage
- Secondary Current or Voltage
- Auxiliary Voltage
- Frequency

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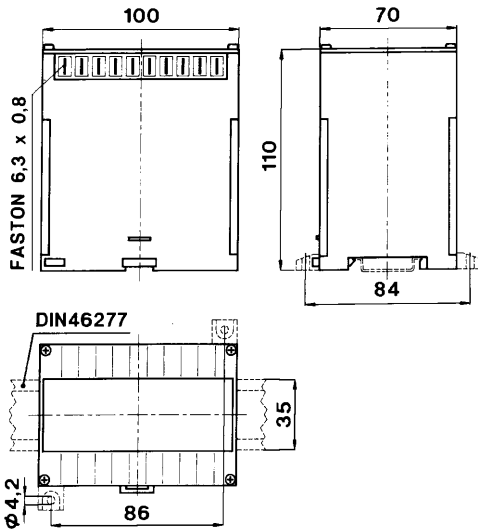
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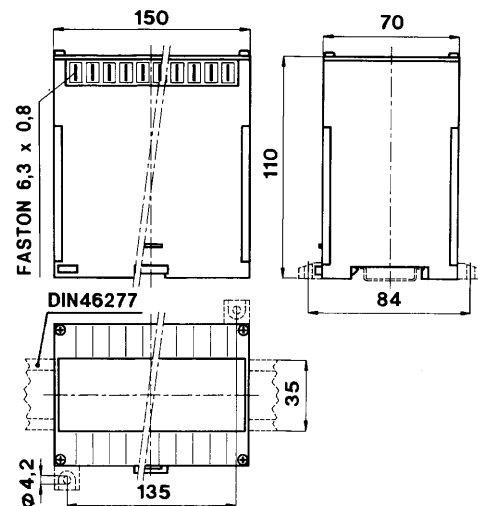
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Transducer designed for Active Power and/or Reactive Power

MCOW.. - MCOR..



MCOWR..



TECHNICAL DATA

accuracy (class)	1%
frequency	50, 60 or 400 Hz
self-consumption per current path	0,5VA
self-consumption per voltage path	1,5VA
continuous overload	2 In; 1,2 Un
short-term overload	20 In; 2 Un
ripple	<1%
response time	<200ms
storage temperature	-30...+70°C
operating temperature	-10...+50°C
test voltage	2kV-50Hz-60s
surge test	5kV; 1,2/50µs
input range	(20) 90...120%
galvanic insulation of input, output and auxiliary voltage	

primary voltage:	100V/√3; 110V/√3; 100V; 110V; 230V; 250V; 400V; 440V
primary current:	1A; 2,5A; 5A
output:	±1mA ±5mA ±20mA 4 - 20mA ±10V
burden:	15kΩ 3000Ω 750Ω 750Ω >2000Ω

Power Grid / Measured Value(s)		Order Code
single phase A.C. current	W	MCOWS
3-phase and 3-wires balanced load	W	MCOWY
3-phase and 3-wires unbalanced load	W	MCOWD
3-phase and 4-wires balanced load	W	MCOWN
3-phase and 4-wires unbalanced load	W	MCOWT
single phase A.C. current	var	MCORS
3-phase and 3-wires balanced load	var	MCORY
3-phase and 3-wires unbalanced load	var	MCORD
3-phase and 4-wires balanced load	var	MCORN
3-phase and 4-wires unbalanced load	var	MCORT
3-phase and 3-wires balanced load	W + var	MCOWRY
3-phase and 3-wires unbalanced load	W + var	MCOWRD
3-phase and 4-wires unbalanced load	W + var	MCOWRT

Order Information

- Transducer Type
- Input Voltage or Input Voltage Transformer
- Input Current or Input Current Transformer
- Frequency
- Auxiliary Voltage (on demand)
- Secondary Current or Voltage
- Full scale value for 3 phase current
 $P = \sqrt{3} \times U \times I \times \cos\phi$ (W) or
 $Q = \sqrt{3} \times U \times I \times \sin\phi$ (var)

These transducers are designed for measurements of active and/or reactive power in single phase or 3-phase grids. The input signal is converted into an impressed output signal (D.C. current or D.C. voltage), which is proportional to the electric power. The multiplier is calculated by the product of the instantaneous current, voltage and $\cos\phi$. Suitable full scale values are between 60% and 120% of the calculated apparent power. Usually these transducers work self-supplied. The input range is between 90%-120% for voltage and 20%-120% for current. If equipped with an additional auxiliary supply the input range extends to 20%-120% for both, voltage and current.

auxiliary voltage: 115V and 230V A.C. ±10% (3VA)
on demand: 24 - 400V A.C. (3VA); 24-48-110V D.C. -10 +20% (3W)
Transmission behavior: characteristic curve A, C, D or E



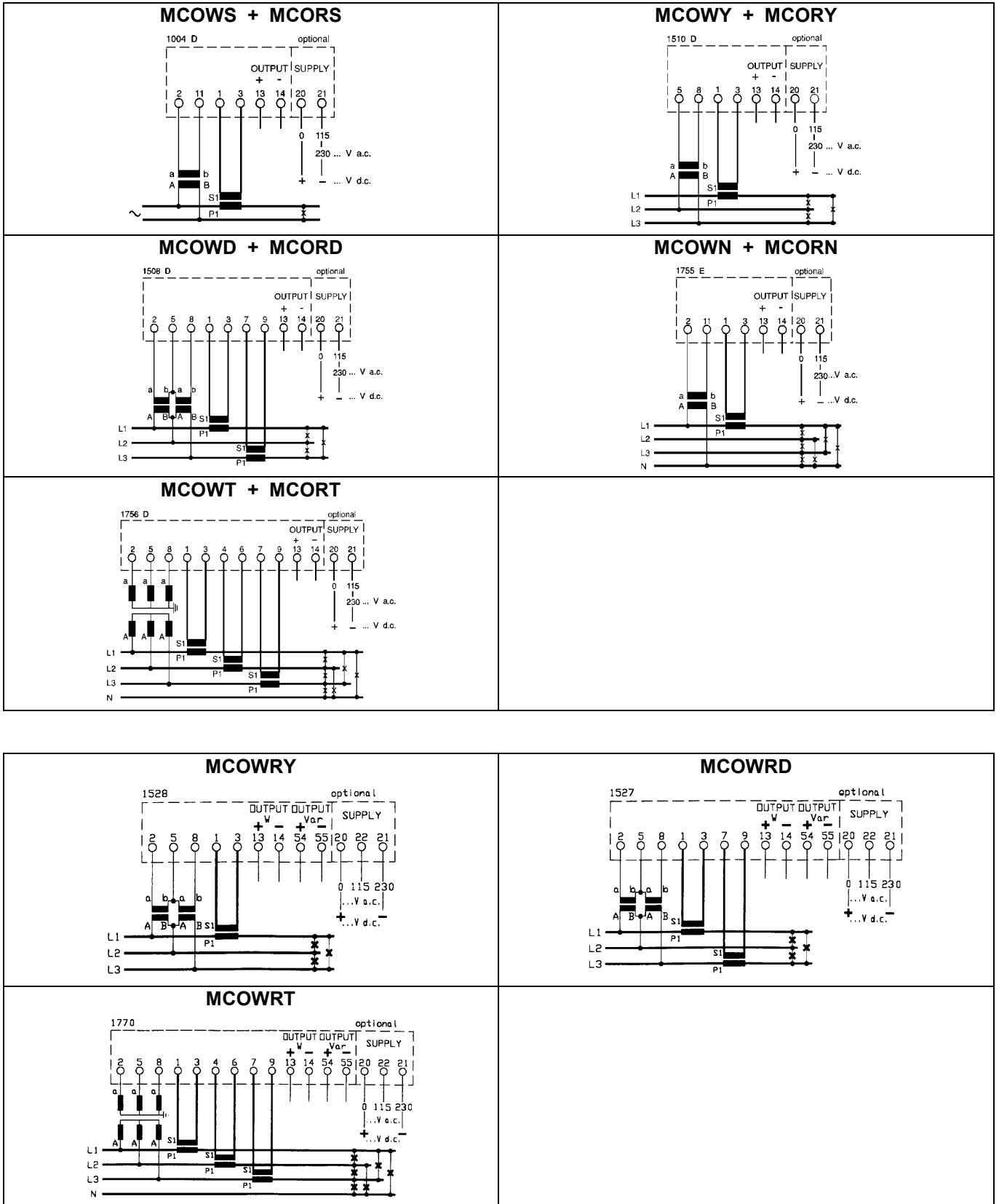
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Wiring Diagrams

Transducer for Active or Reactive Power

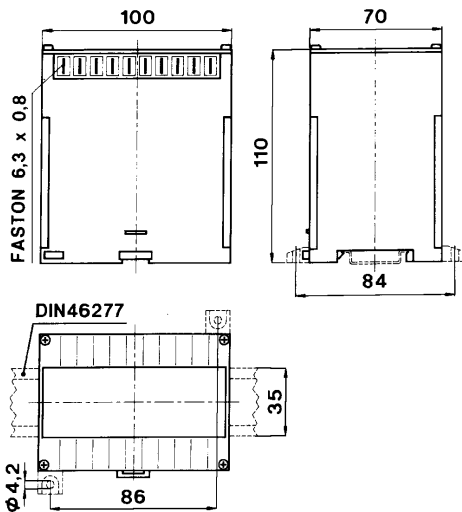


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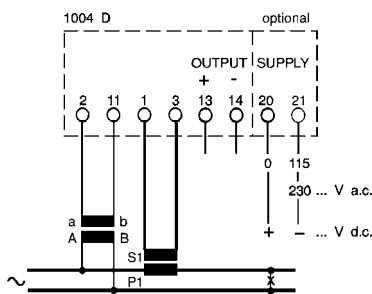
Transducer designed for Power Factor Measurement



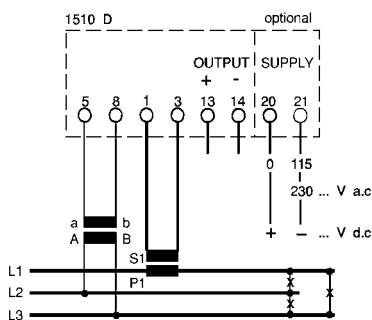
TECHNICAL DATA

accuracy (class)	1%
frequency	50, 60 or 400 Hz
self-consumption per current path	0,5VA
self-consumption per voltage path	1,5VA
continuous overload	1,2 Un - 2 In
short-term overload	2 Un - 20 In
ripple	<1%
response time	<300ms
storage temperature	-30...+70°C
operating temperature	-10...+50°C
test voltage	2kV-50Hz-60s
surge test	5kV; 1,2/50µs
input range	20...120%
galvanic insulation of input, output and auxiliary voltage	

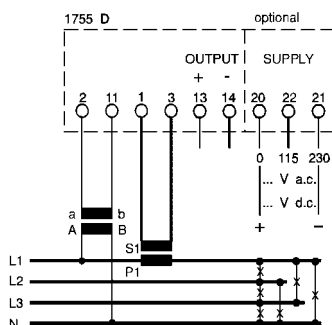
MCOPSL & MCOPS



MCOPYL & MCOPY



MCOPNL & MCOPN



primary voltage:	100V/√3; 110V/√3; 100V; 110V; 230V; 250V; 400V; 440V
primary current:	1A; 2,5A; 5A
output:	±1mA ±5mA ±20mA 4 - 20mA ±10V
burden:	15kΩ 3000Ω 750Ω 750Ω >2000Ω
scale:	cap 0,5-1-0,5 ind or cap 0,8-1-0,2 ind

transducer types with *linear output*

a.c. single phase
3-phase and 3-wires balanced load
3-phase and 4-wires balanced load

Order Code

MCOPSL
MCOPYL
MCOPNL

transducer types with *phase angle proportional output*

a.c. single phase
3-phase and 3-wires balanced load
3-phase and 4-wires balanced load

MCOPS
MCOPY
MCOPN

These transducers are designed for measurements of the power factor in single phase or 3-phase grids. For type MCOPSL, MCOPYL and MCOPNL the input signal is converted into an impressed output signal (D.C. current or D.C. voltage), which is proportional to the phase angle value.

For type MCOPS, MCOPY and MCOPN the output signal has to be linearized by a matching network.

Usually these transducers work self-supplied. The input range is between 90%-120% for voltage and 20%-120% for current.

If equipped with an additional auxiliary supply the input range extends to 20%-120% for both, voltage and current.

auxiliary voltage: 115V and 230V A.C. ±10% (3VA)
on demand: 24 - 400V A.C. (3VA); 24-48-110V D.C. -10 +20% (3W)
Transmission behavior: characteristic curve D, A, C or E

Order Information

- Order Code
- Primary Voltage
- Primary Current
- Auxiliary Voltage (on demand)
- Secondary Current or Voltage
- Frequency

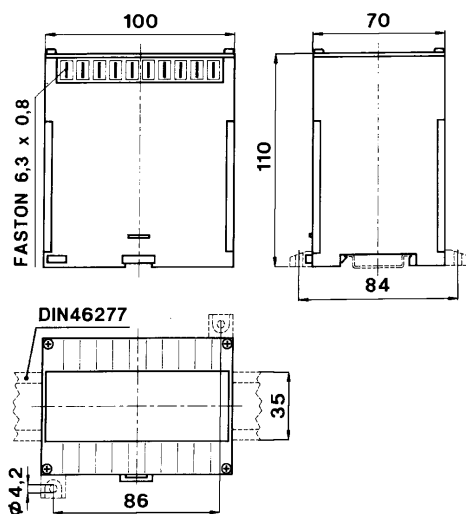
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Transducer designed for Frequency Measurement



TECHNICAL DATA

accuracy (class)	0,5%
self-consumption	2VA
continuous overload	1,2 Un
short-term overload	2 Un
ripple	<0,5%
response time	<500ms
storage temperature	-30...+70°C
operating temperature	-10...+50°C
test voltage	2kV-50Hz-60s
surge test	5kV; 1,2/50µs
input range	90...120% or 0...120%
galvanic insulation of input, output and auxiliary voltage	

input A.C.	frequency	output D.C.	max. burden
100V/√3	45 - 55Hz	0-1mA	15kΩ
110V/√3		0-5mA	3000 Ω
100V	45 - 65Hz	0-20mA	750 Ω
110V		4-20mA	750 Ω
230V	350 - 450Hz	0-10V	≥ 2000 Ω
400V			
440V			

Order Code

MCOFP

MCOFP with auxiliary voltage
(input range: 0...120%)

Transducer type **MCOFP** is designed for converting the frequency of a sinusoidal A.C. voltage into a proportional impressed D.C. current or D.C. voltage.

Usually these transducers work self-supplied.

The voltage input range is between 90%-120%.

If equipped with an additional auxiliary supply the input range extends to 0%-120%.

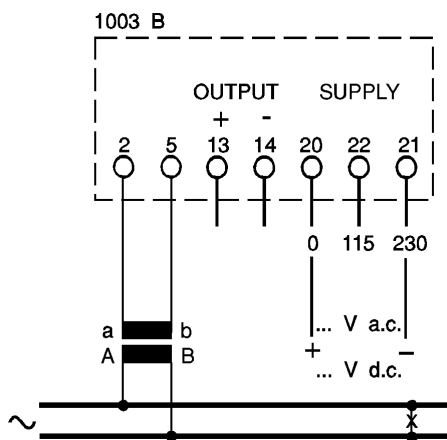
auxiliary voltage: 115V and 230V A.C. ±10% (3VA)

on demand: 24 - 400V A.C. (3VA); 24-48-110V D.C. -10 +20% (3VA)

Transmission behavior: characteristic curve B, A or C

Order Information

- Order Code
- Primary Voltage
- Frequency
- Secondary Current or Voltage
- Auxiliary Voltage (on demand)



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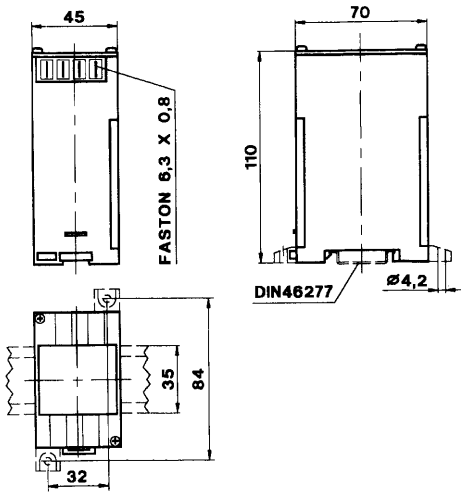
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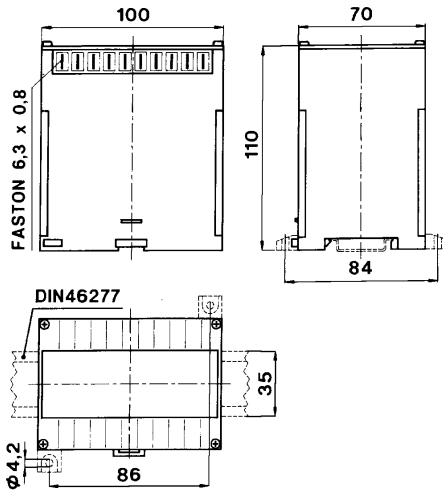
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Transformer designed for Summation without Galvanic Insulation

MCOS2



MCOS3 - MCOS6



TECHNICAL DATA

accuracy (class)	1%
self-consumption auxiliary voltage	3-6 VA
continuous overload	2 In
short-term overload	20 In
response time	<300ms
storage temperature	-30...+70°C
operating temperature	-10...+50°C
test voltage	2kV-50Hz-60s
surge test	5kV; 1,2/50µs
no galvanic insulation of input and output	

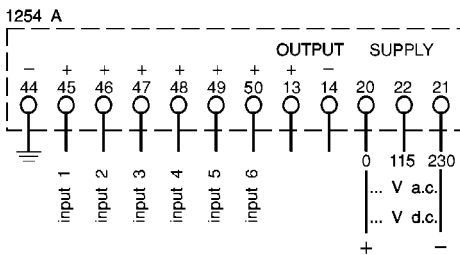
input (max. 6):	±1mA	±5mA	±20mA	4-20mA	±10V
burden (input):	1000Ω	200Ω	100Ω	50Ω	2000Ω
output:	±1mA	±5mA	±20mA	4-20mA	±10V
burden (output):	15kΩ	3000Ω	750Ω	750Ω	>2000Ω

number of inputs:	Order Code
2	MCOS2
3	MCOS3
4	MCOS4
5	MCOS5
6	MCOS6

Transducer for summation are used for adding or subtracting up to 6 galvanic insulated D.C. current or D.C. voltage signals. For summation please state the measuring ranges of the transducers arranged upstream when ordering.

Please note: Transducers designed for summation do not have a galvanic insulation of input and output signal.

auxiliary voltage: 115 and 230V A.C. ±10% (3VA)
 on demand: 24 - 400V A.C. (3VA)
 24-48-110V D.C. -10 +20% (3W)



Order Information

- Order Code
- Primary Current or Voltage
- Secondary Current or Voltage
- Auxiliary Voltage

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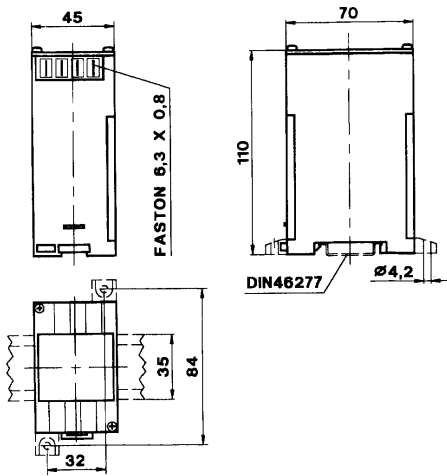
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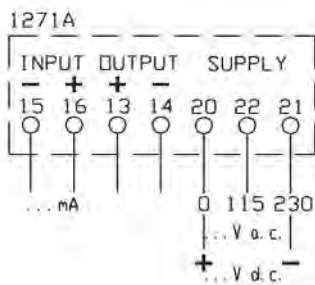
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Transducer

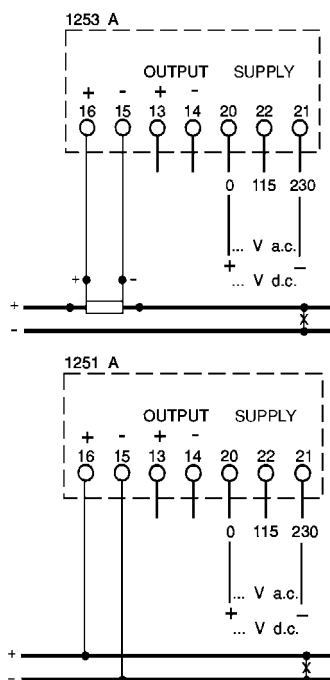
designed for D.C. Current or D.C. Voltage



MCOMA



MCOMV



TECHNICAL DATA

accuracy (class)	1%
self-consumption – current path	60mV
self-consumption – voltage path	100µA (Un>10V) 10µA (400mV<Un<10V)
	Ri=100kΩ (Un<400mV)
continuous overload	2 In, 1,2 Un
short-term overload (1s)	20 In, 2 Un
response time	<200ms
storage temperature	-30...+70°C
operating temperature	-10...+50°C
test voltage	2kV-50Hz-60s
surge test	5kV; 1,2/50µs
input range	0...120%
input and output bipolar	
galvanic insulation of input, output and auxiliary voltage	

input D.C.	output D.C.	burden	MCOMA
0-1 mA	0-1 mA	15KΩ	
0-5 mA	0-5 mA	3KΩ	
0-10 mA	0-10 mA	1500 Ω	
0-20 mA	0-10 mA	750 Ω	
0-1 A	4-20 mA	750 Ω	
0-5 A	0-10 V	≥ 2KΩ	
0-10 A			
			MCOMV
0-60 mV	0-1 mA	15KΩ	
0-100 mV	0-5 mA	3KΩ	
0-150 mV	0-10 mA	1500 Ω	
0-1 V	0-20 mA	750 Ω	
0-5 V	4-20 mA	750 Ω	
0-10 V	0-10 V	≥ 2KΩ	
0-500 V			
0-600 V			

Transducer type **MCOMA** is designed for converting a D.C. current into a proportional impressed D.C. current or D.C. voltage.

auxiliary voltage: 115V and 230V A.C. ±10% (3VA)

on demand: 24 - 400V A.C. (3VA) ±10%; 24-48-110V D.C. -10 +20% (3W)

Transmission behavior: characteristic curve A, C, D or E

Transducer type **MCOMV** is designed for converting a D.C. voltage into a proportional impressed D.C. current or D.C. voltage.

auxiliary voltage: 115V and 230V A.C. ±10% (3VA)

on demand: 24 - 400V A.C. (3VA) ±10%; 24-48-110V D.C. -10 +20% (3W)

Transmission behavior: characteristic curve A, C, D or E

Order Information

- Order Code
- Primary Current or Voltage
- Secondary Current or Voltage
- Auxiliary Voltage

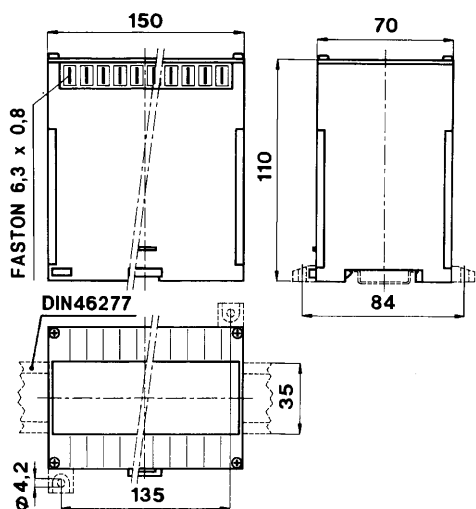
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Transducer designed for D.C. Current, D.C. Voltage and Power

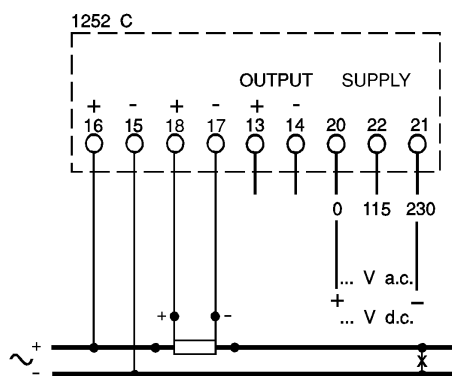


TECHNICAL DATA

accuracy (class)	1%
self-consumption – current path	60mV Ri=100kΩ
self-consumption – voltage path	100µA
continuous overload	2 In, 1,2 Un
short-term overload (1s)	20 In, 2 Un
response time	<200ms
storage temperature	-30...+70°C
operating temperature	-10...+50°C
test voltage	2kV-50Hz-60s
surge test	5kV; 1,2/50µs
input range	20...120%
galvanic insulation of input, output and auxiliary voltage	

input voltage:	0-12V; 0-24V; 0-48V; 0-110V; 0-230V; 0-400V
input current:	0-1A; 0-5A; 0-10A <i>D.C. direct connection</i>
input current:	60mV; 100mV; 150mV <i>connected via shunt</i>
output:	0-1mA 0-5mA 0-20mA 4 - 20mA 0-10V
burden:	15KΩ 3000Ω 750Ω 750Ω >2000Ω

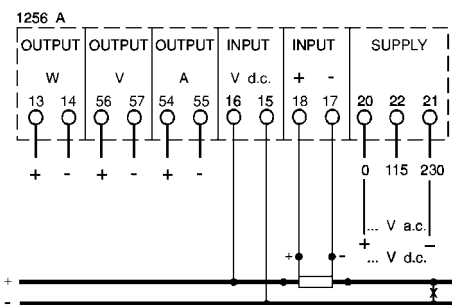
MCOWM



input signal	Order Code
D.C. power	MCOWM
D.C. current, D.C. voltage and power	MCOWMT

Transducer type **MCOWM** is used for converting a D.C. circuit power into a proportional impressed D.C. current or D.C. voltage.
 Primary current is connected either directly or via shunt.
 Primary voltage is connected directly.
 Input and output are bipolar.

MCOWMT



Transducer type **MCOWMT** is used for converting D.C. circuit power, D.C. current and D.C. voltage into a proportional impressed D.C. current or D.C. voltage.
 Primary current is connected either directly or via shunt.
 Primary voltage is connected directly.
 Input and output are unipolar.

auxiliary voltage: 115V and 230V A.C. ±10% (3VA)
 on demand: 24 - 400V A.C. (3VA) ±10%; 24-48-110V D.C. -10 +20% (3W)
 Transmission behavior: characteristic curve A, C, D or E

Order Information

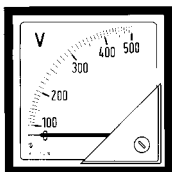
- Order Code
- Primary Voltage
- Primary Current
- Secondary Current or Voltage
- Auxiliary Voltage



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AREA 1
Analog Panel Meter

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AREA 2
Multifunction Meter

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AREA 3
Static Energy Meter

page 42 - 54



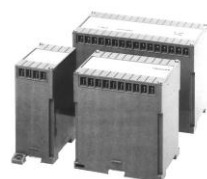
AREA 4
Shunts
Current Transformer
Voltage Transformer

page 56 - 90



AREA 5
Digital Panel Meter

page 92 - 109



AREA 6
Transducer

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AREA 7
Low Tension Insulators
Modular Busbar System

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AREA 7

Low Tension Insulators Busbar Systems

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Low Tension Insulators



Material Properties

density	1,75 - 1,80 g/cm ³	ASTM D 792; DIN 53479
tensile strength	30 - 35 N/mm ²	ASTM D 638
bending strength	90 - 100 N/mm ²	ASTM D 790; DIN 53452
impact strength	35 - 45 kJ/m ²	ASTM D 256; DIN 53453
heat resistance under burden	> 200°C (392 Fahrenheit)	ASTM D 643
water absorption	< 0,3%	ASTM D 570; DIN 53495
dielectric constant	4 - 5	ASTM D 150
surface resistance	10 ¹² - 10 ¹³ Ω	ASTM D 257; DIN 53482
specific internal resistance	10 ¹³ - 10 ¹⁴ Ω/cm	ASTM D 257; DIN 53482
arc resistance	> 180s	ASTM D 495
creep age resistance	> 300min.	ASTM D 2303
glow resistance	V0	UL 94
dielectric resistance	> 160 kV/cm	DIN 53481

Our insulators are produced out of polyester strengthened with 18% fiberglass. Standard color is red (RAL3002). Mainly they are designed for interior use. Their temperature working range starts from -40°C up to +130°C (-40°F up to +266°F). Threaded ISO-metric bushings out of galvanic steel are pressed in on both sides. The insulators are available in heights from 10mm up to 100mm with a graduation of 5mm. A central hexagonal band provides easy fastening.

We assure that our products are manufactured according to the RoHS-directive.

Our insulators are free of the following substances:

- lead and lead compounds
- mercury and mercury compounds
- cadmium and cadmium compounds
- hexavalent chromium
- polybrominated biphenyles (PBB)
- polybrominated diphenyl ethers (PBDE)

Our insulators are **free of SILICON** and **free of HALOGEN**.



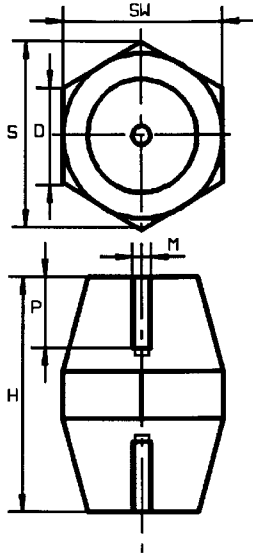
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Standard Insulators



H = height
 SW = wrench opening
 M = thread
 D = diameter of support
 S = max. width
 P = thread depth

Mechanical Properties:

- **BF:** bending strength by bending stress in kN
- **ZF:** tensile strength by tensile stress in kN
(1kN \approx 100kg)
- **DM:** torque in Nm for steel DIN ISO class 8.8 (8G)

Operating voltage, acc. VDE 0110b/2,79 table 4 / insulation class D:

VeAC = operating alternating voltage in V (50Hz)
VeDC = operating direct voltage in V
VtAC = AC test voltage in V (50Hz)
VtPeak = test surge voltage, peak amplitude in V
VtDC = DC test voltage in V

PLEASE NOTE:

**Insulators are supplied in closed packaging units only.
 minimum order quantity = 1 packaging unit**

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Standard Insulators

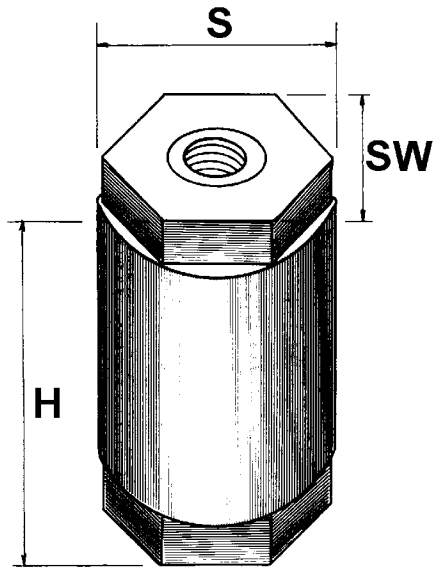
Order Code	dimensions in mm						mechanical properties				electrical properties					PU ¹⁾	weight per PU kg
	H	SW	M	D	S	P	BF	ZF	DM	VeAC	VeDC	VtAC	VtPeak	VtDC			
1209	12	10	M3	10	11	3				125	150					100	0,30
1506	16	15	M4	12	17	4	1	2	3	500	600	3000	5500	4200		100	1,00
1563	16	15	M5	12	17	4	1	2	3	500	600	3000	5500	4200		100	1,00
2009	20	19	M4	15	21	6	2	3	3	750	900	5000	9000	7000		100	1,25
2017	20	19	M5	15	21	6	2	3	6	750	900	5000	9000	7000		100	1,25
2033 *	20	19	M6	15	21	6	2	3	10	750	900	5000	9000	7000		100	1,15
2801	25	22	M4	18	24	6	2	4	3	1000	1200	6000	11000	8500		100	2,00
2819 *	25	22	M5	18	24	6	2	4	6	1000	1200	6000	11000	8500		100	2,00
2827	25	22	M6	18	24	6	2	4	10	1000	1200	6000	11000	8500		100	2,00
3049 *	30	30	M6	26	33	9	3	6	10	1200	1500	8000	14000	11000		100	6,00
3056 *	30	30	M8	26	33	9	3	6	25	1200	1500	8000	14000	11000		100	6,00
0318	31	30	M8	26	33	9	3	6	25	1200	1500	8000	14000	11000		100	6,00
3544 *	35	32	M6	29	35	10	5	9	10	1400	1600	9000	16000	12500		120	9,00
3551 *	35	32	M8	29	35	10	5	9	25	1400	1600	9000	16000	12500		120	9,00
3569	35	32	M10	29	35	10	5	9	50	1400	1600	9000	16000	12500		120	9,00
3890	35	41	M6	34	45	10	5	9	10	1400	1600	9000	16000	12500		80	7,80
3916	35	41	M8	34	45	10	5	9	25	1400	1600	9000	16000	12500		80	7,80
3924	35	41	M10	34	45	10	5	9	50	1400	1600	9000	16000	12500		80	7,80
4047 *	40	41	M6	34	45	10	9	11	10	1600	1900	10000	18000	14000		60	7,00
4054 *	40	41	M8	34	45	10	9	11	25	1600	1900	10000	18000	14000		60	7,50
4062 *	40	41	M10	34	45	10	9	11	50	1600	1900	10000	18000	14000		60	6,50
4070 *	40	41	M12	34	45	10	9	11	85	1600	1900	10000	18000	14000		60	6,00
4112	40	46	M8	40	50	10	9	11	25	1600	1900	10000	18000	14000		48	7,50
4120	40	46	M10	40	50	10	9	11	50	1600	1900	10000	18000	14000		48	7,00
4160	40	46	M12	40	50	10	9	11	85	1600	1900	10000	18000	14000		48	7,00
4617 *	45	46	M8	38	50	13	10	15	25	1800	2100	11000	20000	15500		48	7,50
4625 *	45	46	M10	38	50	13	10	15	50	1800	2100	11000	20000	15500		48	7,00
4633 *	45	46	M12	38	50	13	10	15	85	1800	2100	11000	20000	15500		48	7,25
5044	50	36	M6	30	39	13	6	10	10	2000	2400	12000	21500	17000		75	8,00
5051	50	36	M8	30	39	13	6	10	25	2000	2400	12000	21500	17000		75	8,00
5069	50	36	M10	30	39	13	6	10	50	2000	2400	12000	21500	17000		75	8,00
5531 *	50	50	M8	40	55	13	11	18	25	2000	2400	13000	23500	18000		36	6,50
5549 *	50	50	M10	40	55	13	11	18	50	2000	2400	13000	23500	18000		36	6,50
5556 *	50	50	M12	40	55	13	11	18	85	2000	2400	13000	23500	18000		36	6,50
6059 *	60	55	M8	43	60	15	10	22	25	2400	2800	15000	27000	21000		24	6,50
6067 *	60	55	M10	43	60	18	10	22	50	2400	2800	15000	27000	21000		24	6,50
6075 *	60	55	M12	43	60	18	10	22	85	2400	2800	15000	27000	21000		24	6,50
7065	70	60	M10	48	65	18	12	25	50	3000	3600	18000	32500	25000		15	5,50
7073 *	70	60	M12	48	65	18	12	25	85	3000	3600	18000	32500	25000		15	5,50
7099	70	60	M16	48	65	24	12	25	200	3000	3600	18000	32500	25000		15	6,50
8063	80	65	M10	52	70	18	16	30	50	3500	4200	22000	39500	31000		12	5,75
8071 *	80	65	M12	52	70	18	16	30	85	3500	4200	22000	39500	31000		12	5,50
8089	80	65	M16	52	70	24	16	30	200	3500	4200	22000	39500	31000		12	6,50
9962	100	65	M10	52	70	18	15	40	50	5000	6000	26000	47000	36000		9	5,50
9970	100	65	M12	52	70	18	15	40	85	5000	6000	26000	47000	36000		9	5,00
9988 *	100	65	M16	52	70	24	15	40	200	5000	6000	26000	47000	36000		9	5,50

* preferred types – usually on stock!

¹⁾ PU = packaging unit

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Special Insulators



H = height
 SW = wrench opening
 M = thread
 S = max. width
 P = thread depth

Mechanical Properties:

- **BF:** bending strength by bending stress in kN
- **ZF:** tensile strength by tensile stress in kN (1kN ≈ 100kg)
- **DM:** torque in Nm for steel DIN ISO class 8,8 (8G)

Operating voltage, acc. VDE 0110b/2,79 table 4 / insulation class D:

VeAC = operating alternating voltage in V (50Hz)
VeDC = operating direct voltage in V
VtAC = AC test voltage in V (50Hz)
VtPeak = test surge voltage, peak amplitude in V
VtDC = DC test voltage in V


PLEASE NOTE:

**Insulators are supplied in closed packaging units only.
 minimum order quantity = 1 packaging unit**

In addition to our assortment of products, we offer custom designed insulators as well.

for example:


- threaded bolts instead of internal threaded bushings (one side / both sides)
- two piece insulators
- hexagonal or cylindrical shape in various heights
- insulators for electronic use

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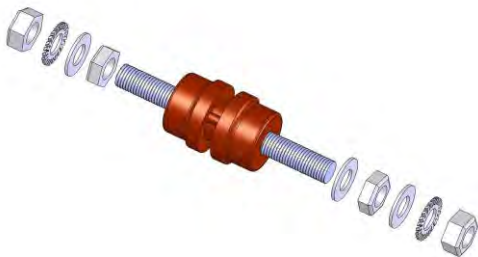
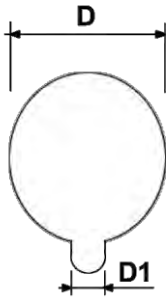
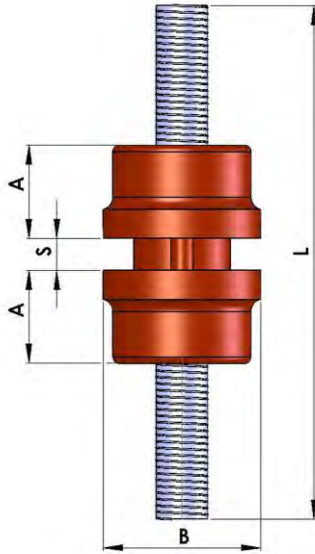
Special Insulators

Order Code	dimensions in mm					mechanical properties			electrical properties					PU ¹⁾	weight per PU kg
	H	SW	M	S	P	BF	ZF	DM	VeAC	VeDC	VtAC	VtPeak	VtDC		
2307	30	18	M6	20	8	2,0	4,0	10	600	720	5000	6600	7000	100	3,0
2308	30	18	M8	20	8	2,0	4,0	10	600	720	5000	6600	7000	100	3,0
2356	35	18	M6	20	8	1,5	4,0	10	600	720	5000	6600	7000	100	3,0
2358	35	18	M8	20	8	1,5	4,0	10	600	720	5000	6600	7000	100	3,0
2406	40	18	M6	20	8	1,5	4,0	10	600	720	8000	6600	11000	100	3,0
2408	40	18	M8	20	8	1,5	4,0	10	600	720	8000	6600	11000	100	3,0
2456	45	18	M6	20	8	1,0	4,0	10	600	720	8000	6600	11000	100	3,2
2458	45	18	M8	20	8	1,0	4,0	10	600	720	8000	6600	11000	100	3,2
2506	50	18	M6	20	8	1,0	4,0	10	750	900	10000	8000	14000	100	3,5
2508	50	18	M8	20	8	1,0	4,0	10	750	900	10000	8000	14000	100	3,5
2606	60	18	M6	20	8	1,0	4,0	10	850	1000	10000	9500	14000	80	3,0
2608	60	18	M8	20	8	1,0	4,0	10	850	1000	10000	9500	14000	80	3,0
3306	30	27	M6	30	10	4,5	9,0	15	600	720	8000	6600	11000	100	6,5
3308	30	27	M8	30	10	4,5	9,0	15	600	720	8000	6600	11000	100	6,5
3356	35	27	M6	30	10	4,0	9,0	15	750	900	8000	8000	11000	140	9,5
3358	35	27	M8	30	10	4,0	9,0	15	750	900	8000	8000	11000	140	9,5
3406	40	27	M6	30	10	3,0	9,0	15	750	900	10000	8000	14000	140	10,0
3408	40	27	M8	30	10	3,0	9,0	15	750	900	10000	8000	14000	140	10,0
3456	45	27	M6	30	10	2,5	9,0	15	1000	1200	10000	11000	14000	120	9,5
3458	45	27	M8	30	10	2,5	9,0	15	1000	1200	10000	11000	14000	120	9,5
3506	50	27	M6	30	13	2,0	9,0	15	1500	1800	10000	16500	14000	100	9,0
3508	50	27	M8	30	13	2,0	9,0	15	1500	1800	10000	16500	14000	100	9,0
3606	60	27	M6	30	13	1,5	9,0	15	1500	1800	15000	16500	21000	80	7,5
3608	60	27	M8	30	13	1,5	9,0	15	1500	1800	15000	16500	21000	80	7,5
4408	40	36	M8	40	10	5,0	10,0	30	1000	1200	10000	11000	14000	80	9,0
4400	40	36	M10	40	10	5,0	10,0	30	1000	1200	10000	11000	14000	80	9,0
4458	45	36	M8	40	10	4,5	10,0	30	1000	1200	10000	11000	14000	60	7,0
4650	45	36	M10	40	10	4,5	10,0	30	1000	1200	10000	11000	14000	60	7,0
4508	50	36	M8	40	13	4,0	10,0	30	1500	1800	10000	16500	14000	60	7,5
4500	50	36	M10	40	15	4,0	10,0	30	1500	1800	10000	16500	14000	60	7,5
4608	60	36	M8	40	15	3,7	10,0	30	1500	1800	15000	16500	21000	50	7,5
4600	60	36	M10	40	18	3,7	10,0	30	1500	1800	15000	16500	21000	50	7,5

¹⁾ PU = packaging unit

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Two Piece Insulators



Properties:

plastic parts:

color	red
material	polyamide (PA6)
glass fiber content	30%
incandescence resistance	UL 94 V0
free of PBB and PBDE	yes
RoHS compliant	yes
UL certification	yes
max. voltage	1000V
max. operating temperature	+110°C

standard metal parts:

material	steel (galvanized)
RoHS conform	yes

Solid brass instead of standard steel is available for an additional charge.

Order Code	M	max. load	L mm	A mm	B mm	S mm	D mm	D1 mm	PU ¹⁾
PAS8R	M8	80A	80	13,5	25	2..5	15,5	3,5	250
PAS10R	M10	120A	95	15	30	2..5	17,5	4,5	250
PAS12R	M12	200A	105	17	35	2..5	20,5	5,0	250

¹⁾ PU = packaging unit

Scope of delivery:

- 1 two piece insulator
- 1 threaded bolt
- 4 nuts
- 3 washer
- 2 lock washers

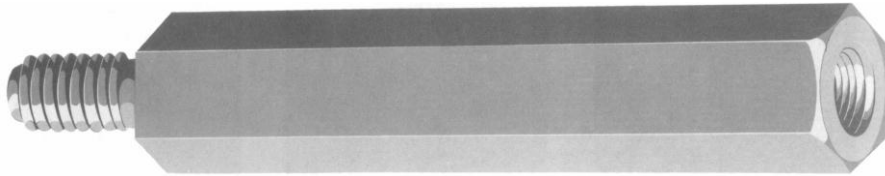
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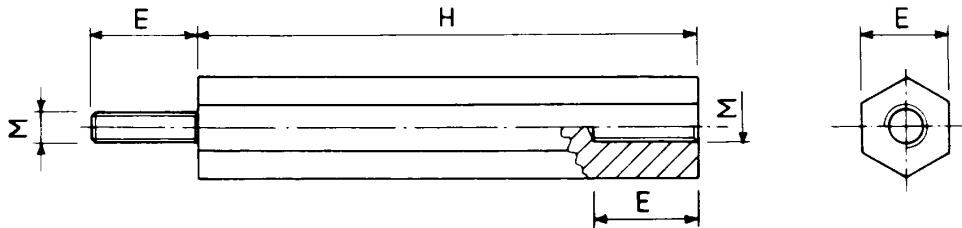
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Distance Bolts



Our distance bolts are made of galvanic steel, DIN ISO class 8.8 (8G). They have a threaded blind hole on the one side and a screw bolt on the other side.

For different types and dimensions refer to table below, please:




Order Code	dimensions in mm			PU ¹⁾ pieces
	E	H	M	
3650	6	10	M3	100
3668	6	12	M3	100
3718	6	15	M3	100
3726	6	20	M3	100
3734	6	25	M3	100
3742	6	30	M3	100
3759	6	35	M3	100
3767	6	40	M3	100
3775	6	45	M3	100
3783	6	50	M3	100
3791	6	60	M3	100
4690	7	10	M4	100
4708	7	15	M4	100
4716	7	20	M4	100
4724	7	25	M4	100
4732	7	30	M4	100
4740	7	35	M4	100
4757	7	40	M4	100
4765	7	45	M4	100
4773	7	50	M4	100
4781	7	60	M4	100
4799	7	70	M4	100
5804	8	15	M5	100
5812	8	20	M5	100
5820	8	25	M5	100
5838	8	30	M5	100
5846	8	35	M5	100
5853	8	40	M5	100
5861	8	45	M5	100
5879	8	50	M5	100
5887	8	60	M5	100
5895	8	70	M5	100
5903	8	80	M5	100

Order Code	dimensions in mm			PU ¹⁾ pieces
	E	H	M	
6810	10	15	M6	100
6828	10	20	M6	100
6836	10	25	M6	100
6885	10	30	M6	100
6893	10	35	M6	100
6901	10	40	M6	100
6919	10	45	M6	100
6927	10	50	M6	100
6935	10	60	M6	100
6943	10	70	M6	100
6950	10	80	M6	100
6968	10	90	M6	100
6976	10	100	M6	100
8709	12	15	M8	100
8717	12	20	M8	100
8808	12	25	M8	100
8816	12	30	M8	100
8899	12	35	M8	100
8907	12	40	M8	100
8915	12	45	M8	100
8923	12	50	M8	100
8931	12	60	M8	100
8949	12	70	M8	100
8956	12	80	M8	100
8964	12	90	M8	100
8972	12	100	M8	100
8980	12	120	M8	100

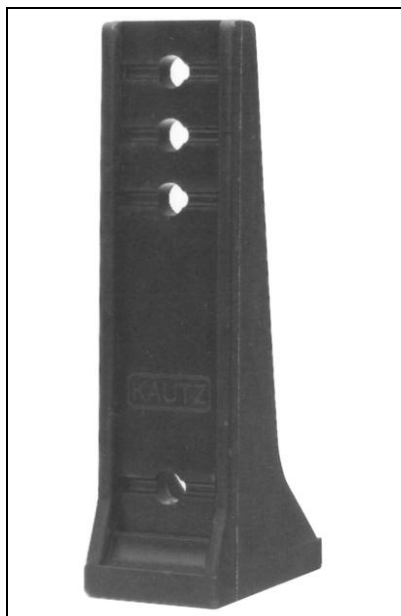
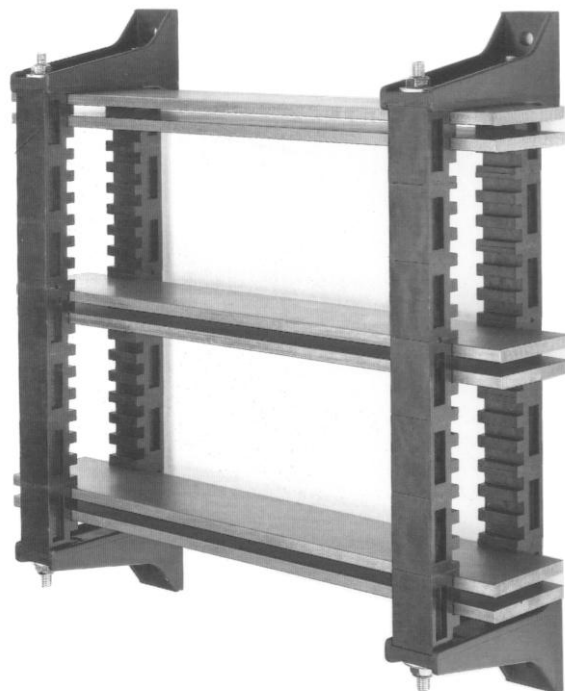
¹⁾ PU = packaging unit

PLEASE NOTE: Distance bolts are supplied in closed packaging units only.

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Busbar System

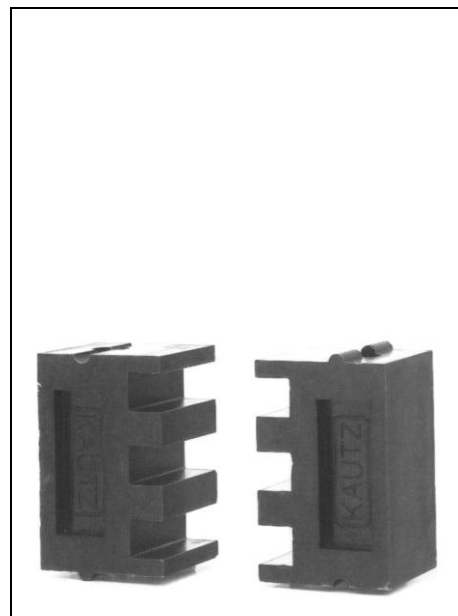
- Type-tested to DIN EN 60439-1 1994 - VDE 0660 part 500/4.94
- Rated insulation voltage 1000V/50Hz, 1200V/DC
- Bracket and support made of polyester resin with min. 18% glass fiber; self-extinguishing
- No-drilling connection technique for three-pole capability
- Different phase distances are possible



large bracket - type K60/100



small bracket - type K30/60



busbar support - type K10/10

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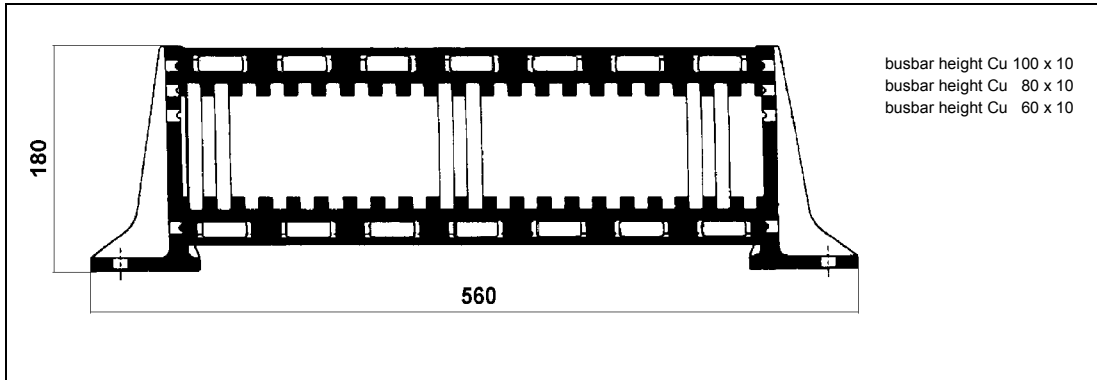
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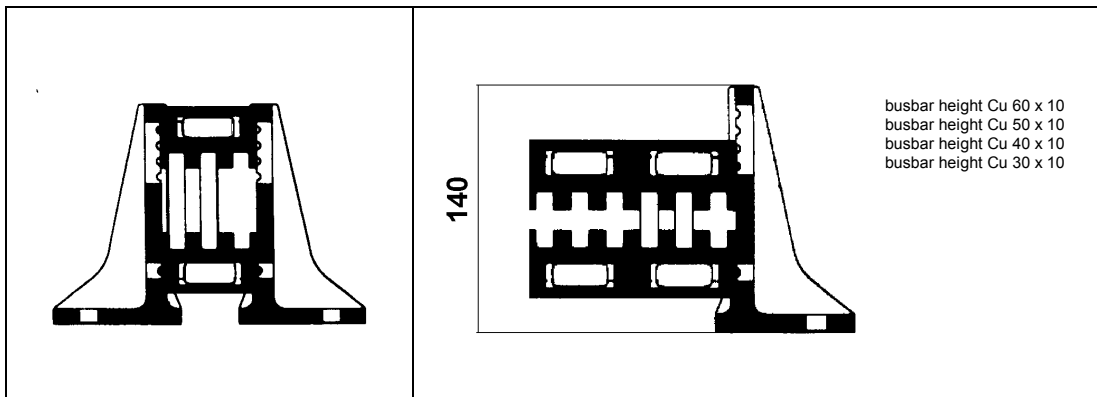
Busbar System

For busbar height 60mm - 80mm - 100mm use large bracket *K60/100*



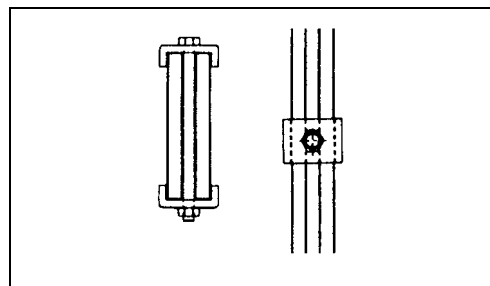
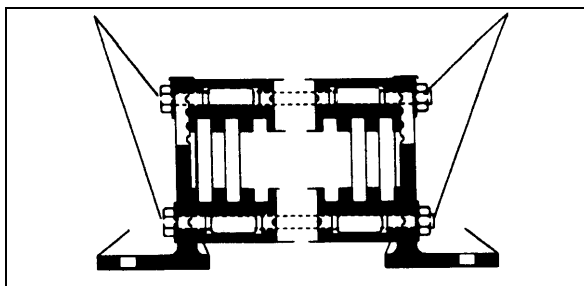
PEN-Bar

For busbar height 30mm - 40mm - 50mm - 60mm
use small bracket *K30/60*



system assembly with
self-locking nuts M10, washers
and threaded bolt
acc. to DIN ISO class 8.8

busbar stabilization



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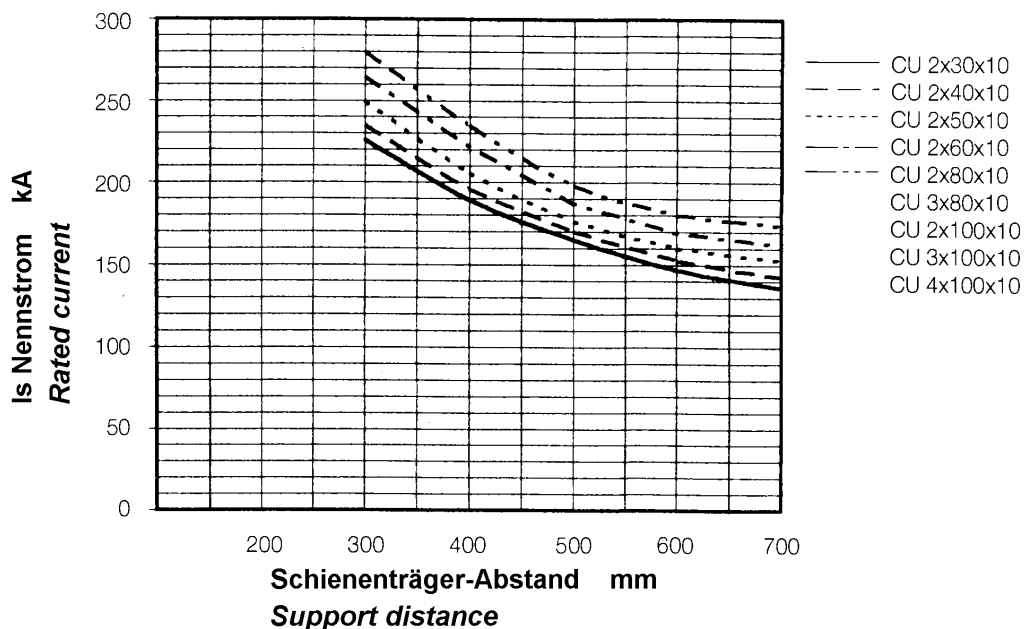
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Busbar System

SURGE CURRENT RESISTANCE					
number of bars (mm)	rated current (A)	phase distance (mm)	support distance (mm)	peak value Is (kA) 0,1s	short-term withstand current (kAeff) 1s
2 x 30 x 10	1250	180	500	165	75
2 x 40 x 10	1500	180	500	170	78
2 x 50 x 10	1800	180	500	176	80
2 x 60 x 10	2000	180	500	187	85
2 x 80 x 10	2500	180	500	198	90
3 x 80 x 10	3250	180	500	198	90
2 x 100 x 10	3000	180	500	198	90
3 x 100 x 10	4000	180	500	198	90
4 x 100 x 10	4700	180	500	198	90

Diagram for dimensioning the phase distances



Busbar System

Basic Busbar System

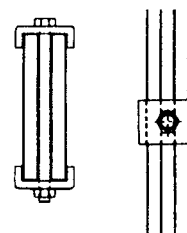
number of bars (mm)	rated current (A)	phase distance (mm)	complete system consists of:	Order Code (w/o mounting accessories)	Order Code (incl. mounting accessories)
2x30x10	1250	180	2xK30/60+14xK10/10	K30/60-14	K30/60-14-S
2x40x10	1500	180	2xK30/60+14xK10/10	K30/60-14	K30/60-14-S
2x50x10	1800	180	2xK30/60+14xK10/10	K30/60-14	K30/60-14-S
2x60x10	2000	180	2xK30/60+14xK10/10	K30/60-14	K30/60-14-S
2x60x10	2000	180	2xK60/100+14xK10/10	K60/100-14	K60/100-14-S
2x80x10	2500	180	2xK60/100+14xK10/10	K60/100-14	K60/100-14-S
3x80x10	3250	180	2xK60/100+14xK10/10	K60/100-14	K60/100-14-S
2x100x10	3000	180	2xK60/100+14xK10/10	K60/100-14	K60/100-14-S
3x100x10	4000	180	2xK60/100+14xK10/10	K60/100-14	K60/100-14-S
4x100x10	4700	180	2xK60/100+16xK10/10	K60/100-16	K60/100-16-S

PEN - Bar

complete system consists of:	Order Code (w/o mounting accessories)	Order Code (incl. mounting accessories)
2xK30/60+2xK10/10	K30/60-2	K30/60-2-S
2xK60/100+2xK10/10	K60/100-2	K60/100-2-S

Busbar Stabilization

If there are no devices mounted on the bus bar system, additional bus bar stabilization every 200mm is required for short-circuiting protection.



Individual / Spare Parts:

Article Description:	Order Code:
small bracket	K30/60
large bracket	K60/100
busbar support	K10/10
hook head nut M10 (100 pieces per packaging unit)	HKM10
hook head nut M8 (100 pieces per packaging unit)	HKM8
busbar stabilization (w/o mounting accessories)	ST1

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General Terms and Conditions

§ 1 Geltung

1. Wir liefern ausschließlich zu den nachstehenden Lieferungs- und Zahlungsbedingungen.
2. Allgemeine Geschäftsbedingungen des Bestellers gelten nur dann, wenn deren Geltung für das einzelne Geschäft ausdrücklich vereinbart ist.

§ 2 Vertragsschluss

1. Unsere Angebote sind unverbindlich.
2. Bestellungen unserer Kunden bedürfen zu ihrer Annahme unserer schriftlichen Bestätigung. Bestellungen gelten auch dann als angenommen, wenn wir ihnen durch Übersendung des Lieferscheins und/oder der Ware und der Rechnung entsprechen.
3. Vereinbarungen sind nur schriftlich wirksam.
4. Wir behalten uns Konstruktions- und Formänderungen an unseren Produkten vor.
5. Wir behalten uns sämtliche Eigentums- und Urheberrechte an den Zeichnungen und sonstigen Unterlagen über unsere Produkte vor. Diese dürfen Dritten ohne unsere ausdrückliche Zustimmung nicht zugänglich gemacht werden.

§ 3 Preise

1. Soweit keine besonderen Vereinbarungen zwischen dem Kunden und uns getroffen sind, verstehen sich unsere Preise ab Werk. Nebenkosten für Verpackung, Transport u. ä. sind in den Preisen nicht enthalten.
2. Zu den Preisen kommt die Mehrwertsteuer in der jeweiligen gesetzlichen Höhe hinzu.
3. Mündlich genannte Preise und/oder Nachlässe bedürfen unserer schriftlichen Bestätigung.

§ 4 Zahlungsbedingungen

1. Unsere Rechnungen sind innerhalb von 10 Tagen nach Rechnungsempfang ohne Abzug in Euro zahlbar.
2. Reparatur- und Ersatzteilrechnungen sind sofort netto zu bezahlen.
3. Im Falle verspäteter Zahlung oder Stundung sind wir vorbehaltlich der Geltendmachung eines weiteren konkret nachweisbaren Verzugschadens berechtigt, Zinsen in Höhe von 8% über dem jeweiligen Basiszinssatzes der Europäischen Zentralbank zu berechnen.
4. Die Annahme von Wechseln und Schecks erfolgt nur zahlungshalber. Erklären wir uns mit einer Wechselbegebung einverstanden, so trägt der Kunde die Kosten der Diskontierung und der Einziehung. Wir übernehmen keine Gewähr für rechtzeitige Vorlegung und Protesterhebung. Wechselzahlungen müssen vorher schriftlich vereinbart werden.
5. Der Kunde ist nicht berechtigt, gegenüber unseren fälligen Zahlungsansprüchen ein Zurückbehaltungsrecht geltend zu machen oder die Aufrechnung mit von uns bestrittenen, nicht rechtskräftig festgestellten Gegenforderungen zu erklären.
6. Ist der Kunde mit einer Zahlung länger als 14 Tage in Verzug geraten oder hat er seine Zahlungen eingestellt oder ist nach Vertragsschluss eine wesentliche Verschlechterung seiner Vermögensverhältnisse eingetreten, so werden unsere Forderungen aus sämtlichen bestehenden Verträgen sofort zur Zahlung fällig. Wir sind berechtigt, für künftige Lieferungen und/oder Teillieferungen Vorauszahlung oder Sicherheitsleistung zu verlangen.

§ 5 Lieferzeit

1. Die von uns angegebenen Liefertermine können im Einzelfall geringfügig überschritten werden. Unsere Lieferpflicht ruht, solange der Kunde mit einer Verbindlichkeit im Rückstand ist und/oder Unterlagen, Genehmigungen oder Freigaben beizubringen hat.
2. Höhere Gewalt und Betriebsstörungen, insbesondere kriegerische Ereignisse, Streik und Aussperrung bei uns oder bei einem unserer Vorlieferanten, Rohstoffmangel, Verfügungen staatlicher Stellen oder das Fehlen behördlicher oder sonstiger für

die Ausführung der Lieferung erforderlicher Genehmigung befreien uns für die Dauer der Störung und im Umfang ihrer Wirkung von der Verpflichtung zur Leistung, soweit die Störung nicht durch uns grob fahrlässig herbeigeführt worden ist. Dasselbe gilt, wenn die genannten Umstände bei einem unserer Vorlieferanten eintreten.

3. Wird der von uns zugesagte Liefertermin um mehr als 2 Monate überschritten, so hat der Kunde das Recht, uns eine angemessene Nachfrist von mindestens 4 Wochen zu setzen. Liefern wir auch nicht bis zum Ablauf dieser Nachfrist, so kann der Kunde durch schriftliche Erklärung vom Vertrag zurücktreten. Ansprüche auf Ersatz des Verzugschadens und Schadensersatzansprüche wegen Nichterfüllung sind auf die bei Vertragsabschluss für uns voraussehbaren Schäden beschränkt. Die Höhe des Schadensersatzes ist auf 0,5 % für jede volle Woche der Verspätung, höchstens aber auf insgesamt 5 % vom Werte desjenigen Teiles der Gesamtlieferung, der wegen der ab Ablauf der Nachfrist gerechneten Verspätung nicht rechtzeitig oder nicht vertragsgemäß benutzt werden kann, beschränkt. Diese Einschränkung gilt nicht, wenn der Verzug oder die Nichterfüllung durch uns vorsätzlich oder grob fahrlässig verursacht worden sind. Weitergehende Ansprüche des Kunden sind in allen Fällen verspäteter Lieferung, auch nach Ablauf einer uns gesetzten Nachfrist ausgeschlossen.

§ 6 Versand und Gefahrübergang

1. Spätestens mit der Absendung der Lieferung geht die Gefahr auf den Kunden über. Dies gilt auch dann, wenn Teillieferungen erfolgen oder wenn wir die Beförderung der Ware übernehmen oder wenn Franko- oder FCA-Lieferung vereinbart ist. Dies gilt auch für eine etwaige mit uns vereinbarte Rücksendung der Ware.
2. Verzögert sich die Versendung infolge von Umständen, die wir nicht zu vertreten haben, so geht die Gefahr vom Tag der Versandbereitschaft an auf den Besteller über.
3. Der Versand erfolgt auf Rechnung des Bestellers. Die Verpackung wird zu den Selbstkosten berechnet.

§ 7 Annahmeverzug des Bestellers

1. Nimmt der Besteller die bestellte Ware nicht fristgerecht ab, so sind wir berechtigt, entweder ihm eine angemessene Nachfrist zu setzen, nach deren Ablauf anderweitig zu verfügen oder die Ware ihm sofort in Rechnung zu stellen und zu Lasten und auf Risiko des Bestellers einzulagern. Unberührt davon bleiben unsere Rechte vom Vertrag zurückzutreten oder Schadensersatz wegen Nichterfüllung zu verlangen. Verlangen wir Schadensersatz wegen Nichterfüllung, können wir 20 % des vereinbarten Entgelts als Entschädigung ohne Nachweis fordern, sofern der Besteller nicht nachweist, dass nur ein wesentlich geringerer Schaden entstanden ist. Wir behalten uns vor, einen höheren tatsächlichen Schaden geltend zu machen.
2. Vorstehende Bestimmungen gelten auch, wenn der Besteller im Rahmen eines Abrufauftrages Teillieferungen nicht innerhalb der mit ihm vereinbarten Fristen abnimmt.

§ 8 Eigentumsvorbehalt

1. Wir behalten uns das Eigentum an den von uns gelieferten Sachen bis zur vollständigen Bezahlung unserer sämtlichen Forderungen aus dem Liefervertrag einschließlich aller Nebenforderungen sowie aller im Zeitpunkt des Abschlusses des Liefervertrages aus anderen Verträgen gegen den Besteller bestehender Forderungen und bis zu Einlösung sämtlicher in Zahlung gegebener Wechsel und Schecks vor. Stellen wir im Wechsel-Scheck-Verfahren gegen Zahlung des Kaufpreises in bar, gegen Scheck oder gegen Überweisung einen Wechsel aus, so behalten wir uns das Eigentum so lange vor, bis der Besteller als Akzeptant den Wechsel einlöst und damit unsere Wechselverbindlichkeit in Wegfall bringt.
2. Dies gilt auch im Fall der Verarbeitung unserer Ware, die für uns als Hersteller erfolgt (§ 950 BGB). Bei Verarbeitung, Verbindung und Vermischung mit anderen, nicht dem Besteller



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General Terms and Conditions

gehörenden Waren, steht uns Miteigentum im Verhältnis des Rechnungswerts unserer Waren zu diesen anderen Waren im Zeitpunkt der Verarbeitung, Verbindung oder Vermischung zu.

3. Der Besteller darf unsere Vorbehaltsware nur im ordnungsgemäßen Geschäftsverkehr unter Weitergabe des Eigentumsvorbehalts und nur so lange, wie er nicht im Zahlungsverzug ist, veräußern. Zu anderen Verfügungen über die Vorbehaltsware (z.B. Sicherungsübereignung, Verpfändung u.ä.) ist er nicht berechtigt. Auch Preis- oder Werklohnforderungen des Bestellers aus der Weiterveräußerung unserer Vorbehaltsware werden bereits jetzt in voller Höhe bis zum Ausgleich aller unserer Forderungen an uns abgetreten. Auf Verlangen hat uns der Besteller unverzüglich eine Aufstellung über die insoweit abgetretenen Forderungen zu übersenden. Er ist bis zum Ausgleich aller unserer Forderungen verpflichtet, sämtliche Zahlungen, die auf die abgetretenen Forderungen an ihn selbst erfolgen, unter Übersendung einer Abschrift des Zahlungsbelegs an uns weiterzuleiten. Schecks und Wechsel, die der Besteller für solche Forderungen erhält, übereignet er bereits jetzt an uns. Der Besteller verwahrt diese Wertpapiere bis zur Übergabe an uns als Treuhänder.

4. Bei Zahlungsverzug, drohender Zahlungseinstellung, im Fall unbefriedigender Auskunft über die Zahlungsfähigkeit bzw. Vermögenslage des Bestellers oder wenn Zwangsvollstreckungen oder Wechselproteste gegen ihn ergangen sind, sind wir befugt, die Vorbehaltsware an uns zu nehmen. Der Besteller ist zur Herausgabe verpflichtet. Die Geltendmachung des Eigentumsvorbehalts sowie die Pfändung der Ware durch uns gelten nicht als Rücktritt vom Vertrag, sofern nicht das Abzahlungsgesetz Anwendung findet. Sämtliche Kosten der Rücknahme und der Verwertung trägt der Besteller.

5. Von einer Pfändung oder anderen Beeinträchtigung der Liefergegenstände durch Dritte hat uns der Besteller unverzüglich zu unterrichten. Zugriffe Dritter auf die Vorbehaltsware oder auf die abgetretenen Forderungen hat uns der Besteller sofort unter Angabe der für die Intervention notwendigen Unterlagen mitzuteilen. Die Kosten der Intervention trägt der Besteller.

§ 9 Haftung für Mängel der Lieferung

1. Für Mängel der Waren haften wir wie folgt:

a) Innerhalb von 24 Monaten ab Gefahrübergang gem. § 6 werden die Geräte nach unserer Wahl nachgebessert, neu geliefert oder zum Fakturawert zurückgenommen, wenn sie sich infolge eines nachweisbar vor dem Gefahrübergang liegenden, von uns zu vertretenden Umstandes, insbesondere wegen fehlerhafter Bauart, fehlerhafter Teile oder mangelhafter Ausführung als unbrauchbar oder in ihrer Brauchbarkeit nicht unerheblich beeinträchtigt herausstellen. Forderte der Besteller unseren Kundendienst zu Unrecht an, so trägt er die uns hierdurch entstehenden Kosten. Ersetzte Teile werden unser Eigentum. Wird ohne unsere vorherige Zustimmung ein Mangel durch Dritte behoben, so tragen wir keine Kosten. Ist Nachbesserung oder Ersatz nicht möglich, endgültig fehlgeschlagen, oder wird sie unter Berücksichtigung unserer Liefermöglichkeiten unzumutbar verzögert, so kann der Besteller Herabsetzung der Vergütung (Minderung) verlangen. Kann über die Minderung des Preises mit uns keine Einigung erzielt werden, so kann der Besteller auch Wandelung des Vertrages verlangen.

b) Voraussetzung der Gewährleistungsansprüche ist, dass der Besteller die Mängelrüge unverzüglich nach Anlieferung der Ware schriftlich bei uns erhebt, ansonsten gilt die Ware als genehmigt. Die Haftung für nicht offensichtliche Mängel bleibt hiervon unberührt. Der Besteller hat jedoch, sobald sich Mängel zeigen, diese bei Meldung des Verlustes der Gewährleistung unverzüglich anzuzeigen.

2. Wir übernehmen keine Gewähr für Schäden, die durch natürliche Abnutzung, fehlerhafte oder nachlässige Behandlung, unsachgemäße Lagerung oder unsachgemäßen Transport, ungeeignete oder unsachgemäße Inbetriebnahme oder Bedienungseinweisung oder nachlässige, unsachgemäße oder ungeeignete Beratung und/oder Instandsetzung durch den

Besteller oder durch Dritte entstehen. Weiter übernehmen wir keine Gewähr für Schäden, die durch elektrotechnische oder sonstige äußere Einwirkungen auf ein Gerät sowie die Verwendung von Ergänzungs-, Austausch-, Zubehörteilen, die nicht auf unsere Geräte abgestimmt sind, entstehen.

3. Zur Nachbesserung und zur Neulieferung sind wir so lange nicht verpflichtet, als der Besteller mit der Kaufpreiszahlung in Höhe eines Betrags im Rückstand ist, der den durch den Mangel verursachten Minderwert des Liefergegenstandes übersteigt.

4. Auskünfte über Anwendungsmöglichkeiten unserer Produkte und sonstige Angaben erfolgen nach bestem Wissen, jedoch unverbindlich unter Ausschluss jeglicher Haftung, es sei denn, dass wir vorsätzlich oder durch grobe Fahrlässigkeit unsere Pflicht verletzen. Auskünfte befreien den Besteller nicht von der eigenen Prüfung unserer Produkte auf ihre Eignung für die vom Besteller beabsichtigten Zwecke.

§ 10 Haftung

1. Wenn der Liefergegenstand durch Verschuldung des Lieferers infolge unterlassener oder fehlerhafter Ausführung von vor oder nach Vertragsschluss erfolgten Vorschlägen und Beratungen oder durch die Verletzung anderer vertraglicher Nebenverpflichtungen – insbesondere Anleitung für die Bedienung und Wartung des Liefergegenstandes – vom Besteller nicht vertragsmäßig verwendet werden kann, so gelten unter Ausschluss weiterer Ansprüche des Bestellers die Regelungen der Abschnitte §9 und § 10.2.

2. Für Schäden, die nicht am Liefergegenstand selbst entstanden sind, haftet der Lieferer – aus welchen Rechtsgründen auch immer – nur

- a) bei Vorsatz,
- b) bei grober Fahrlässigkeit des Inhabers/der Organe oder leitender Angestellter,
- c) bei schuldhafter Verletzung von Leben, Körper, Gesundheit,
- d) bei Mängeln, die er arglistig verschwiegen oder deren Abwesenheit er garantiert hat,
- e) bei Mängeln des Liefergegenstandes, soweit nach Produkthaftungsgesetz für Personen- oder Sachschäden an privat genutzten Gegenständen gehaftet wird.

Bei schuldhafter Verletzung wesentlicher Vertragspflichten haftet der Lieferer auch bei grober Fahrlässigkeit nicht leitender Angestellter und bei leichter Fahrlässigkeit, in letzterem Fall begrenzt auf den vertragstypischen, vernünftigerweise vorhersehbaren Schaden.

Weitere Ansprüche sind ausgeschlossen.

§ 11 Schlussbestimmungen

1. Der Besteller darf seine Rechte aus diesem Vertrag nur mit unserer vorherigen schriftlichen Zustimmung auf Dritte übertragen.

2. Erfüllungsort für alle Lieferungen, Leistungen und Zahlungen ist München.

3. Als Gerichtsstand ist München vereinbart. Wir sind auch berechtigt, am Sitz des Bestellers zu klagen.

4. Es gilt ausschließlich deutsches Recht, soweit nicht zwingende gesetzliche Vorschriften entgegenstehen. Die Anwendung des Übereinkommens der Vereinten Nationen über Verträge über den internationalen Warenkauf (CISG) ist ausgeschlossen.

5. Sollte eine Bestimmung dieser Lieferungs- und Zahlungsbedingungen unwirksam sein oder werden, so wird die Wirksamkeit der übrigen Bestimmungen hiervon nicht berührt.

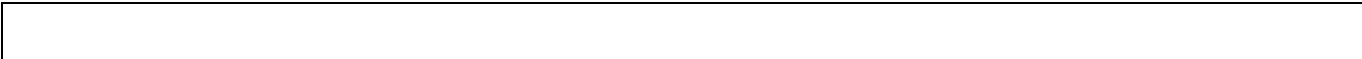
Stand: März 2011

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