Measuring transducers

P 400 for active power
Q 400 for reactive power

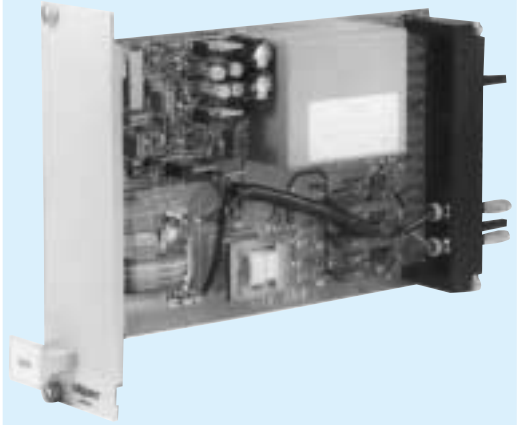
The measuring transducer P 400 and Q 400 are used for measuring active respectively reactive power of a single phase system or of balanced or unbalanced three-phase systems.
The transducers are connected to the mains directly or via measuring transformers. They have galvanic separation between in- and output and power supply. Transducers in plastic case are directly clipped on DIN bars TS35. Connected to selfopening terminals, wire max 6 mm^2. Transducers for mounting in 19" racks have width 8 TE or 10 TE according to type.

When measuring on equipment powered by frequency inverters with pulse width modulated (PWM) wave form the transducer must be modified for this.

The transducers are constructed according to standard IEC688.

P400-FA

P400-FB



Order facts:

	Enclosed for mounting on profiled bar 35 EN 50022		19" rack module		
	Active power	Reactive power	Active power	Reactive power	
	Type	**Type**	**Type**	**Type**	Modul width
Single phase	**P 400-01x**	**Q 400-01x**	**P 400R-01x**	**Q 400R-01x**	
3 phase balanced load	**P 400-05x**	**Q 400-05x**	**P 400R-05x**	**Q 400R-05x**	8 TE
3 phase 3 wire unbalanced load	**P 400-09x**	**Q 400-09x**	**P 400R-09x**	**Q 400R-09x**	10 TE
3 phase 4 wire unbalanced load	**P 400-11x**	**Q 400-11x**	**P 400R-11x**	**Q 400R-11x**	10 TE

Order form:

Measuring transducer for active power
Type **P400-052**
Balanced loaded three phase system
Connected to 11/0,11kV, 500/5A, 50 Hz
Measuring range -10...0...+10 MW
Output -10...0...+10 mA
Power supply 110 V, 50 Hz

Replace **x** with last digit for output according to table below

Output	External resistance load	Last digit **x**
0 -5 or ±5 mA	0-3000 Ω	**1**
0 -10 or ±10 mA	0-1500 Ω	**2**
0 -20 or ±20 mA	0- 750 Ω	**3**
4 -20 mA	0- 750 Ω	**4**
0 -10 or ±10 V	> 700 Ω	**5**

Technical data

Input

Voltage	any value between 50 and 500 V (rackversion 300 V)
Consumption (burden)	U_{in} x 1 mA, VA per phase
Current	any value between 0,5 and 5 A
Consumption (burden	< 0,05 VA per phase
Permissible measuring range	any value between 0,75-1,3 x apparent power other values on request.
Apparent power,	1 phase $U_{in} \times I_{in}$ 3 phase $U_{in} \times I_{in} \times \sqrt{3}$

When measuring transformer is used calculate upon primary values for U_{in} and I_{in}. By measuring ranges in both directions, e.g. 10-0-100 MW, calculate the factor on the largest part, i.e. on 100 MW

Frequency	50 or 60 Hz
Overload	current 2 × I_{in} continuously 10 x I_{in} during 15 s, 40 × I_{in} during 1 s voltage 1,5×U_{in} continuously, 2 × U_{in} during 10 s

Output

Output signal (span)	min 0-1 mA max 0-20 mA
Standard ranges	0...5/10/20 mA, 4-20 mA
Load	max 15 V
Current limitation	< 30 mA
Voltage	0-10 V
Burden	> 700 W
Ripple	< 1% p.p.

General data

Accuracy	class 0,5 according to IEC 688 0,2 on request
Linearity error	< 0,1%
Response time 0-90%	< 80 ms
Temperature influence	0,1%/10 °C
Temperature range	-25...+60 °C operation -40...+70 °C storage
Test voltage	5,6 kV, 50 Hz, 1 min (rack version 3,7 kV)
Power supply	24, 110, 230 VAC ±15 %, 47-70 Hz, ca 2 VA 24-130 VDC ±20 %, ca 2,5 W
Weight	0,6 kg

Options on request

Standards

General standards for measuring transducers EN 60688, IEC 688

EMC	emission EN 50081-2 immunity EN 50082-2*)
Safety	EN 61010-1, IEC 1010-1
Inputs	overvoltage cat. III
Outputs	overvoltage cat. II
Pollution degree	2

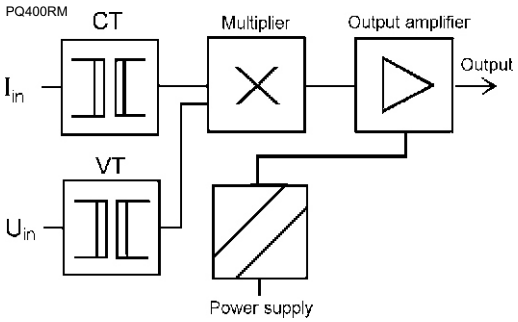
*) At certain frequencies can minor deviations from the class accuracy occur during the disturbance

Design

The input signals (current and voltage) are transformed to a proper level in the input transformers, which at the same time give galvanic separation between in- and output. Next step gives multiplication of the signals. The multiplier unit operates with the TDM-principle. From there the output amplifier transforms the signal to a proportional, load independent DC-signal.

The power supply comes by AC from a transformer that gives galvanic separation. The necessary parts are fed via a rectifier step. By DC auxiliary supply a switched unit gives galvanic separation and at the same time the whole span 24-110 VDC is covered.

PQ400RM

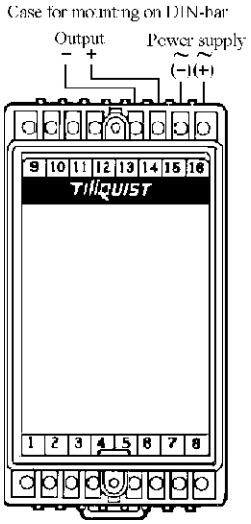


Connecting diagrams

(Same diagram for connecting to current- and/or voltagetransformers)

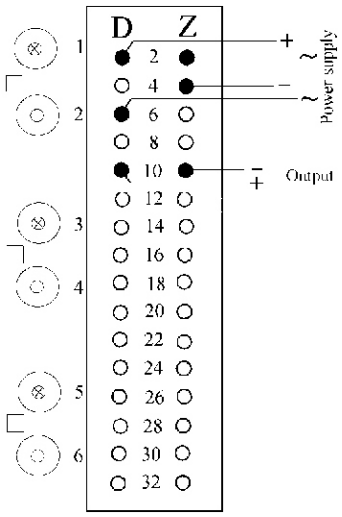
P/Q 400

PQ400-AE

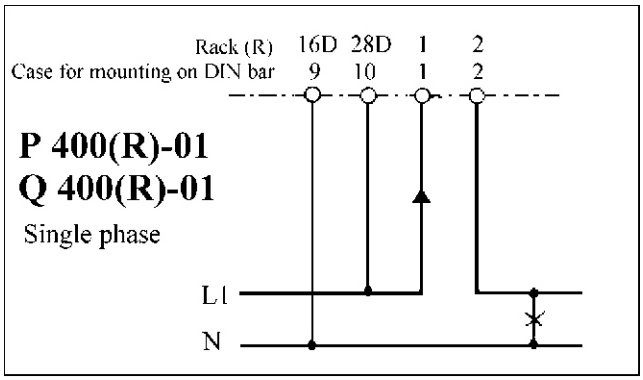


P/Q 400R

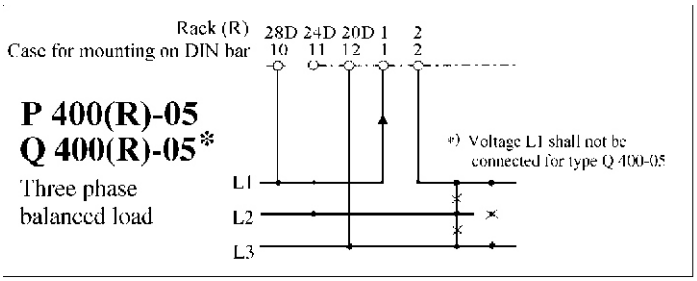
PQ400RE

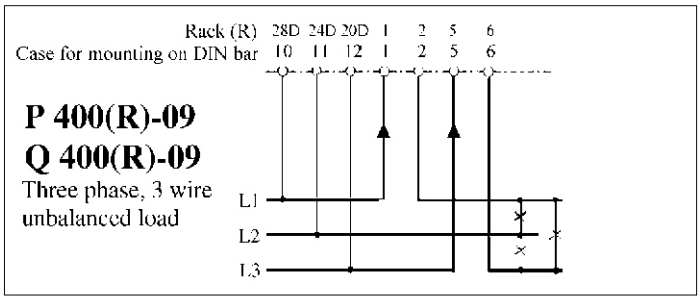


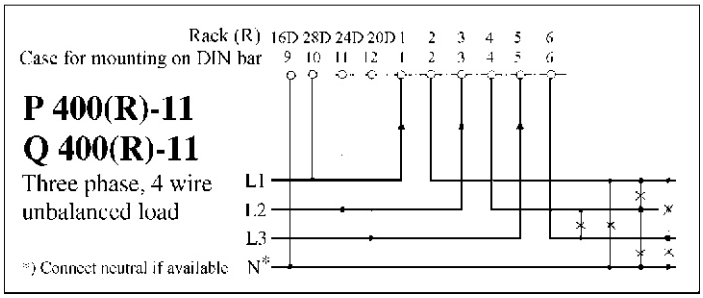
P40001E



P40005E



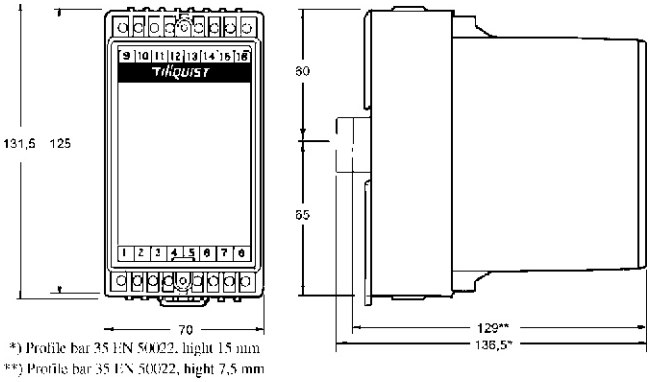


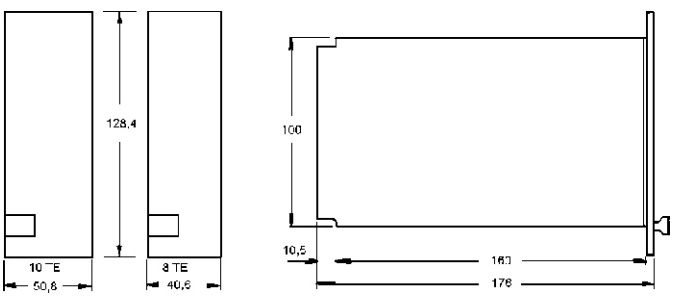


Dimensions

P/Q 400

PQ400ME



P/Q 400R

PQ400RM2