

Power Meters and Power Factor Meters for panel mounting with exchangeable scales



Very powerful - Iskra Instrumenti d.d.
Power Meters and Power Factor Meters



Features

- **PANEL MOUNTING IN COMPLIANCE WITH DIN 43700**
- **ACTIVE, REACTIVE AND APPARENT POWER MEASUREMENT (EQxx07) - SINGLE OR THREE PHASE, 3 OR 4 WIRE, BALANCED OR UNBALANCED CONNECTION**
- **POWER FACTOR MEASUREMENT (YQxx07) - SINGLE OR THREE PHASE, 3 OR 4 WIRE, BALANCED OR UNBALANCED CONNECTION**
- **POWER SUPPLY FROM MEASURING POWER SYSTEM OR SEPARATED**
- **LOW POWER CONSUMPTION**
- **EXCHANGEABLE SCALE**
- **PROTECTIVE COVER FOR TERMINALS**
- **MICROPROCESSOR CONTROL**

Power meters

Our power meters' group consists of four different meters: EQ0107, EQ0207, EQ2107, EQ2207. They're in two different sizes: EQx107 with 144x144 mm front frame and EQx207 with 96x96 mm front frame. Power meters can also be divided according to their scale into EQ0x07 group with 90 degree scale and EQ2x07 with 240 degree scale.

Table 1:

Groups of Iskra Instrumenti d.d. POWER METERS

SCALE / FRONT FRAME	144 x 144 mm	96 x 96 mm
90 degree	EQ0107	EQ0207
240 degree	EQ2107	EQ2207

Power factor meters

Our power factor meters' group consists of four different meters: YQ0107, YQ0207, YQ2107, YQ2207. They're in two different sizes: YQx107 with 144x144 mm front frame and YQx207 with 96x96 mm front frame. Power meters can also be divided according to their scale into YQ0x07 group with 90 degree scale and YQ2x07 with 240 degree scale.

Table 2:

Groups of Iskra Instrumenti d.d. POWER FACTOR METERS

SCALE / FRONT FRAME	144 x 144 mm	96 x 96 mm
90 degree	YQ0107	YQ0207
240 degree	YQ2107	YQ2207

Operation of power meters and power factor meters

The instrument operates on fast sampling method of input quantities (current and voltage) on all three phases. From the input data microprocessor calculates active, reactive, apparent power or power factor. Meter comprises current transformers, voltage dividers, microcontroller and power supply unit. Measuring system with moving coil is connected to the microcontroller. The instrument scale is calibrated in W, var, VA or $\cos\phi$, considering ratios of current and voltage transformers. Long term stability of the instrument is achieved by storing setup and calibration constants into microcontroller. Easy and fast scale exchange is possible because of meter's construction

Ship versions of instruments

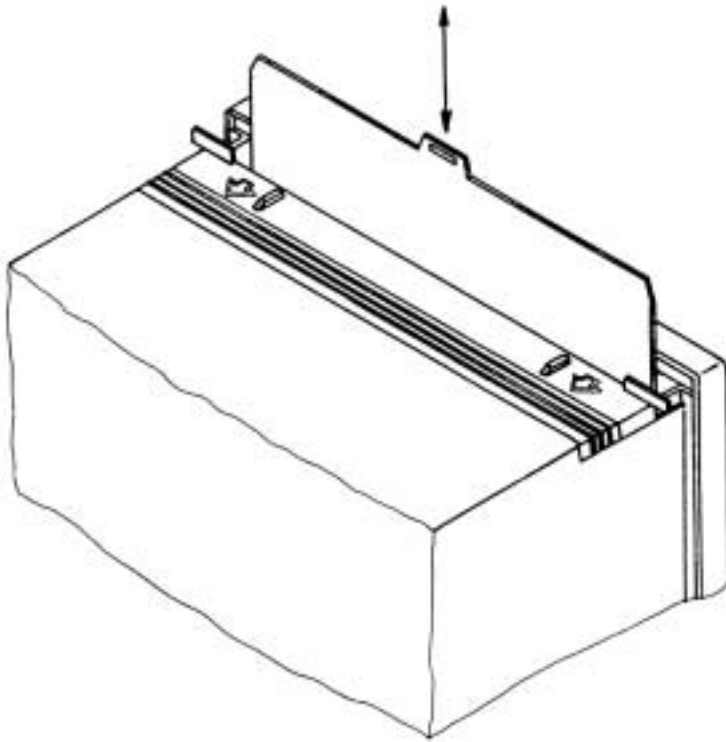
Our power meters and power factor meters are available also for mounting on ships. Their construction is very mechanically robust and is approved by CRS (Croatian Register of Shipping). Meter has mark \Downarrow and letter L at the end of the type designation.

Exchanging of scales

Press the cover, on top of the instrument, in the direction of the arrow and extract the scale with a suitable tool. After exchanging the scale, carefully close the opening with the cover.

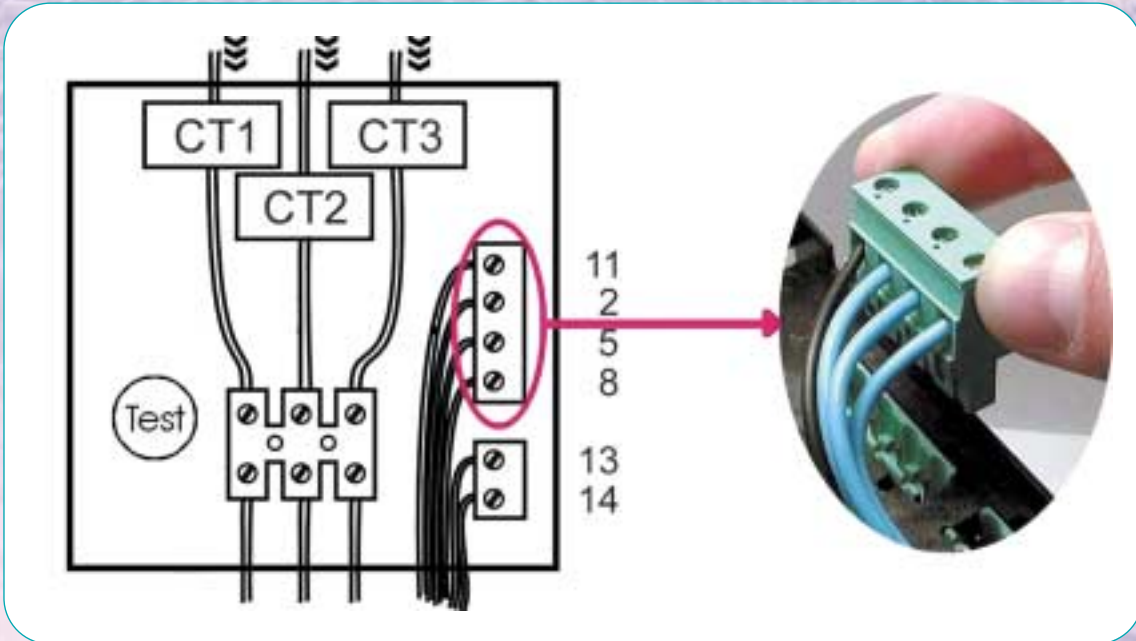
The instrument must be disconnected during the scale exchange!

Figure 1: Exchanging of scales



Connection

Figure 2:
Connections for full equipped device and picture of connectors



Note: For detailed information see Service manual

Figure 3:
Single phase system (1b)

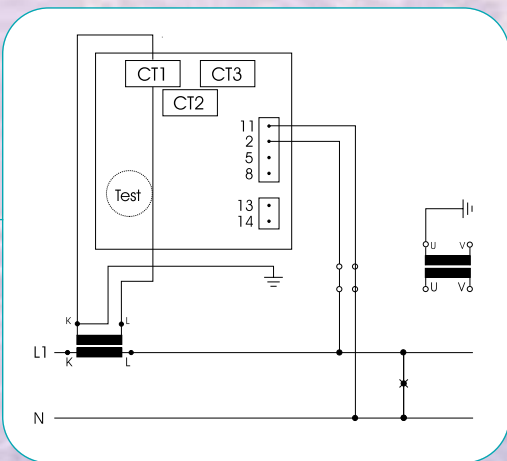


Figure 4:
Three phase system
(three wire balanced - 3b)

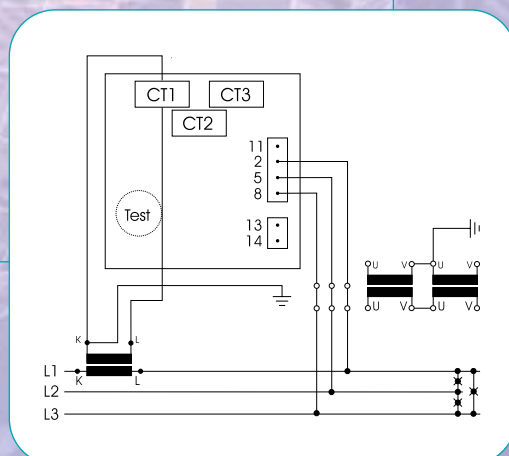


Figure 5:
Three phase system
(three wire unbalanced - 3u)

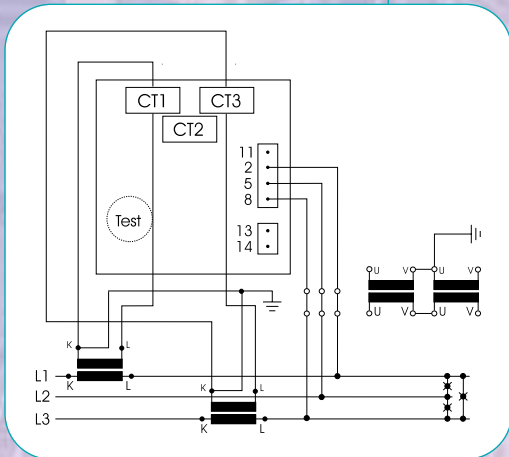


Figure 6:
Three phase system
(four wire balanced - 4b)

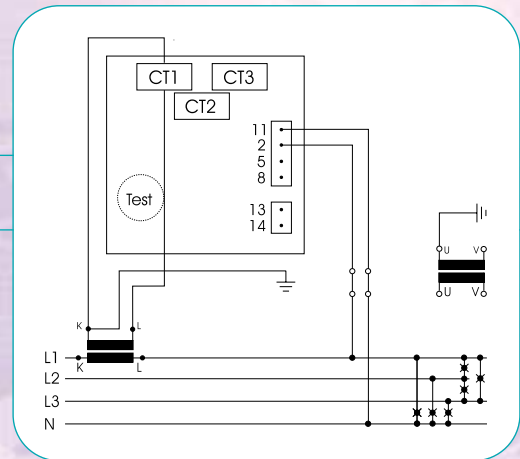
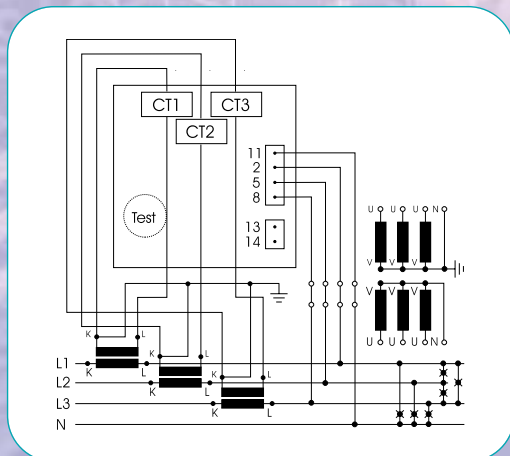


Figure 7:
Three phase system
(four wire balanced - 4u)



Note: Connection terminals 13, 14 are for auxiliary power supply, 15 through 18 are present only on power factor meters' housing

Dimensional drawings

Figure 8:
Dimensional drawing of power meters
EQxx07 (all dimensions are in mm)

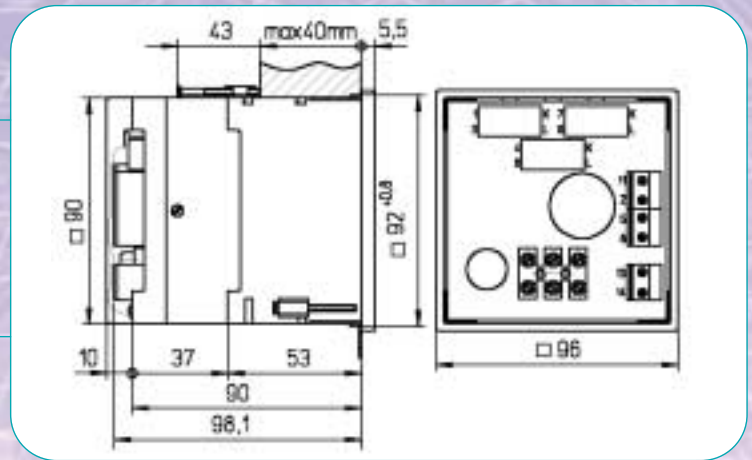
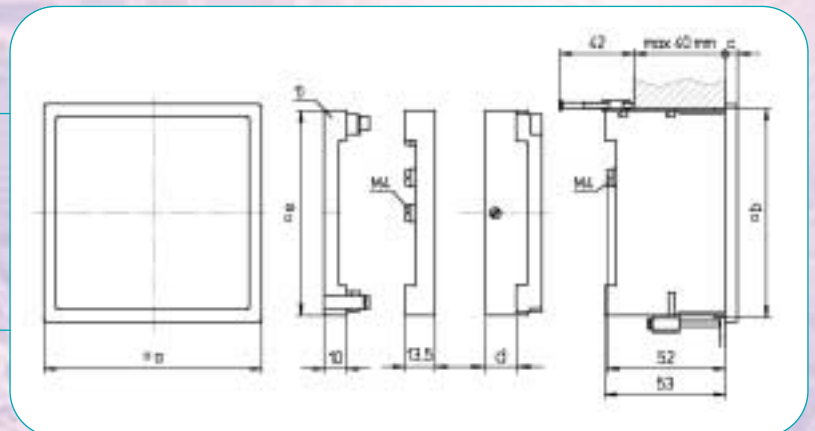


Table 3: Dimensional table of power meters and power factor meters

Type		EQ0107	EQ0207	EQ2107	EQ2207	YQ0107	YQ0207	YQ2107	YQ2207
Front frame(mm)	□ a	144	96	144	96	144	96	144	96
Panel cut-out (mm)	□ b	138 ^{+1.0}	92 ^{+0.8}	138 ⁺¹	92 ^{+0.8}	138 ^{+1.0}	92 ^{+0.8}	138 ^{+0.8}	92 ^{+0.8}
Bezel height (mm)	c	8	5.5	8	5.5	8.0	5.5	8.0	5.5
Base (mm)	□ d	54	28	54	54	27.3	27.3	27.3	27.3
Protect cover (mm)	□ e	90	90	90	90	90	90	90	90
Scale's length (mm)		135	90	220	135	135	92	235	155
Weight approx. (kg)		0.7	0.5	0.7	0.4	0.50	0.41	0.55	0.45

Figure 9:
Dimensional drawing of power factor
meters YQxx07 (all dimensions are in mm)



End Scale Value

The end scale value is determined as follows:

The power to be measured by the instrument can be calculated by using one of the formulas in table 4. Ratio between the selected final scale value and calculated power should be within the limits from 0.6 to 1.2 at $\cos\phi = 1$ or $\sin\phi = 1$.

Table 4: The end scale value of power meter

SYSTEM / POWER	ACTIVE	REACTIVE	APPARENT
POWER IN SINGLE PHASE SYSTEM	$U I \cos\phi$	$U I \sin\phi$	$U I$
POWER IN THREE PHASE 3-WIRE SYSTEM	$\sqrt{3} U I \cos\phi$	$\sqrt{3} U I \sin\phi$	$\sqrt{3} U I$
POWER IN THREE PHASE 4-WIRE SYSTEM	$3 U I \cos\phi$	$3 U I \sin\phi$	$3 U I$

Note: U in equations is the phase voltage in single-phase system, line voltage in three-phase 3-wire system, and phase voltage in three-phase 4-wire systems. I means phase current.

Ordering info for power meters EQxx07

EQ0207 - 1b 230 / C 500 / 5 1 100k W E

Type

EQ0107
EQ0207
EQ2107
EQ2207

Connection

1b - single phase system
3b - 3-wire system with balanced load
3u - 3-wire system with unbalanced load
4b - 4-wire system with balanced load
4u - 4-wire system with unbalanced load

Primary Voltage

any with appropriate VT

Nominal Voltage

A - 57 V L-N
B - 63.5 V L-N
C - 230 V L-N
D - 100 V L-L
E - $100/\sqrt{3}$ V L-N
F - 110 V L-L
G - $110/\sqrt{3}$ V L-N
H - 380 V L-L
I - 400 V L-L
J - 440 V L-L

Primary Current

any with appropriate CT

Nominal Current

1 - 1 A
5 - 5 A

Nominal Frequency

1 - 50 Hz
2 - 60 Hz

End Scale Value

any \leq calculated max value (look table 4)

Type of powermeter

W - wattmeter
Q - varmeter
S - VA meter

Auxiliary power supply

A - 57 V
B - 63.5 V
C - 100 V
D - 110 V
E - 230 V
F - 400 V

Special versions (options):

L - ship version

Other versions:

- Zero on any point of the scale
- Special markings or blank scale

Note: Ordering of EQxxxx is possible also through our ordering program EQORDER - free download available from our web page.

Ordering info for power meters YQxx07

YQ0207 - 1b 230 / C 500 / 5 1 E

Type -

YQ0107
YQ0207
YQ2107
YQ2207

Connection

1b - single phase system
3b - 3-wire system with balanced load
3u - 3-wire system with unbalanced load
4b - 4-wire system with balanced load
4u - 4-wire system with unbalanced load

Primary Voltage

any with appropriate VT

Nominal Voltage

A - 57 V L-N
B - 63.5 V L-N
C - 230 V L-N
D - 100 V L-L
E - $100/\sqrt{3}$ V L-N
F - 110 V L-L
G - $110/\sqrt{3}$ V L-N
H - 380 V L-L
I - 400 V L-L
J - 440 V L-L

Primary Current

any with appropriate CT

Nominal Current

1 - 1 A
5 - 5 A

Measuring range

1 - 0.5 cap. .. 1.. 0.5 ind.
2 - 0.8 cap. .. 1 .. 0.3 ind.

Auxiliary power supply

A - 57 V
B - 63.5 V
C - 100 V
D - 110 V
E - 230 V
F - 400 V

Special versions (options):

L - ship version

Other versions:

- Special markings or blank scale

Note: For detailed technical specifications see user's manual (data sheets) for EQxxxx and YQxxxx instruments (also available on the internet - see our web page)



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