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

Features
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>
<thead>
<tr>
<th>Groups of Iskra Instrumenti d.d. POWER METERS</th>
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<tr>
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<tr>
<td>90 degree</td>
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<td>240 degree</td>
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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.

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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 cosϕ, 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 ↓ 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.
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

<table>
<thead>
<tr>
<th>SYSTEM / POWER</th>
<th>ACTIVE</th>
<th>REACTIVE</th>
<th>APPARENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER IN SINGLE PHASE SYSTEM</td>
<td>( U I \cos \phi )</td>
<td>( U I \sin \phi )</td>
<td>( U I )</td>
</tr>
<tr>
<td>POWER IN THREE PHASE 3-WIRE SYSTEM</td>
<td>( \sqrt{3} U I \cos \phi )</td>
<td>( \sqrt{3} U I \sin \phi )</td>
<td>( \sqrt{3} U I )</td>
</tr>
<tr>
<td>POWER IN THREE PHASE 4-WIRE SYSTEM</td>
<td>( 3 U I \cos \phi )</td>
<td>( 3 U I \sin \phi )</td>
<td>( 3 U I )</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Type</th>
<th>1b 230 / C 500 / S 1 100k W E</th>
</tr>
</thead>
<tbody>
<tr>
<td>EQ0207</td>
<td></td>
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<tr>
<td>EQ0107</td>
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<tr>
<td>EQ0207</td>
<td></td>
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<tr>
<td>EQ2107</td>
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<tr>
<td>EQ2207</td>
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</tbody>
</table>

**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 - 63.6 V L-N
- C - 230 V L-N
- D - 100 V L-L
- E - 100/√3 V L-N
- F - 110 V L-L
- G - 110/√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 <= calculated max value (look table 4)

**Type of powermeter**

- W - watmter
- Q - varmeter
- S - VA meter

**Auxiliary power supply**

- A - 57 V
- B - 63.6 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 EQxxx is possible also through our ordering program EQORDER - free download available from our web page.
# Ordering info for power meters YQxx07

<table>
<thead>
<tr>
<th>Type</th>
<th>1b</th>
<th>230 / C</th>
<th>500 / S</th>
<th>l</th>
<th>E</th>
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<tbody>
<tr>
<td>YQ0107</td>
<td></td>
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<td>YQ0207</td>
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<td>YQ2207</td>
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**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/√3 V L-N
- F - 110 V L-L
- G - 110/√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

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**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)