1. DESCRIPTION - USAGE

Active and reactive energy meter.
Measures the electricity consumed by a single phase or 3-phase circuit using current transformers (CT) downstream of the power distribution metering.
Displays the power consumption in kWh and kvarh.

2. RANGE

- Cat. No. 0 046 74: 4-module 3-phase pulse output meter (17.8 mm) self-powered on the measurement terminal.
- Cat. No. 0 046 84: 4-module 3-phase RS485 and pulse output meter (17.8 mm) self-powered on the measurement terminal.

Nominal ratings:
- Nominal rating: 5 A (per external current transformer x/5 A)
- \(i_{\text{max}}\) maximum current: 6 A

Nominal voltage and frequency:
- \(U_{\text{n}}: 3 \times 230 / 400 \text{ V} \pm 20\%\)
- \(3 \times 400 \text{ V} \pm 20\%\)
- \(3 \times 230 \text{ V} \pm 20\%\)
- \(F_{\text{n}}: 50-60 \text{ Hz} \pm 5\%\)

3. DIMENSIONS

4. POSITIONING - CONNECTION

Mounting:
- On IEC/EN 60715 symmetrical rail

Operating positions:
- Vertical, horizontal, upside down, on the side

Terminals:
- Terminal depth: 8 mm.
- Recommended stripping length: 8 mm

Screw head:
- Slotted head.

Recommended tightening torque:
- 0.4 Nm.

Maximum tightening torque:
- 0.8 Nm.

Tools required:
- For the terminals: 3 mm flat screwdriver.
- For attachment: 5.5 mm flat screwdriver (6 mm maximum).

Terminal capacity:

<table>
<thead>
<tr>
<th>Copper cable</th>
<th>Copper cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigid cable</td>
<td>1 x 0.5 mm² to 4 mm²</td>
</tr>
<tr>
<td>Flexible cable</td>
<td>1 x 0.5 mm² to 4 mm²</td>
</tr>
</tbody>
</table>

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3-phase meter with connection via CT pulse or Modbus RS485 output

4. POSITIONING – CONNECTION (continued)

Terminal protection:
- The power and communication terminals are protected with sealable terminal shields integrated in the product.

Electrical connection diagram:
- Example for Cat. No. 046 74:
  4-wire and three CT 3-phase mains supply:

![Connection Diagram for Cat. No. 046 74](image)

3-wire and two CT 3-phase mains supply:

![Connection Diagram for 3-Wire and Two CT](image)

- Example for Cat. No. 046 84:
  4-wire and three CT 3-phase mains supply:

![Connection Diagram for Cat. No. 046 84](image)

3-wire and two CT 3-phase mains supply:

![Connection Diagram for 3-Wire and Two CT](image)

Please see the product instructions for all other configurations.

5. GENERAL CHARACTERISTICS

Marking on the device box:
- By indelible pad printing:
  046 74

Marking on the device box:
- By indelible pad printing:

Front transparent marking:
- By indelible pad printing:
5. GENERAL CHARACTERISTICS (continued)

Marking on the front panel:
- By adhesive label
- Cat. No. 046 74:

Display:
- Total active energy
- Total reactive energy
- Partial active energy (reset to zero possible)
- Partial reactive energy (reset to zero possible)
- Maximum average active power (reset to zero possible)
- Average active power
- Current L1, L2, L3
- Phase-to-phase voltage L1-L2, L2-L3, L3-L1
- Instantaneous active power
- Instantaneous reactive power
- Instantaneous apparent power
- Frequency
- Power factor

Programming menu
- 046 84:
  - Password (1000 by default)
  - Connection type: mode A or mode B (see instructions)
  - CT transformation ratio
  - PT transformation ratio
  - Average power integration time (min): 5, 8, 10, 15, 20, 30, 60
  - Communication speed
  - Modbus address
  - Parity bit
  - Pulse output type
  - Pulse weight
  - Pulse duration
  - Password change
- 046 74:
  - Password (1000 by default)
  - Connection type
  - CT transformation ratio
  - PT transformation ratio
  - Average power integration time (min): 5, 8, 10, 15, 20, 30, 60
  - Pulse output type
  - Pulse weight
  - Pulse duration
  - Password change

Display:
- Type: 8-digit LCD
- Resolution: 0.01 kWh
- Maximum indication: in accordance with the CT and PT transformation ratios (see table below)

<table>
<thead>
<tr>
<th>kCT x kPT</th>
<th>Maximum display</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 → 9.9</td>
<td>999 999.9 kWh/kvarh</td>
<td>10 Wh/kvarh</td>
</tr>
<tr>
<td>10 → 99.9</td>
<td>9 999 999.9 kWh/kvarh</td>
<td>100 Wh/kvarh</td>
</tr>
<tr>
<td>100 → 999.9</td>
<td>99 999 999.9 kWh/kvarh</td>
<td>1 kWh/kvarh</td>
</tr>
<tr>
<td>1000 → 9999.9</td>
<td>999 999.99 MWh/Mvarh</td>
<td>10 kWh/kvarh</td>
</tr>
<tr>
<td>→10000</td>
<td>9 999 999.99 MWh/Mvarh</td>
<td>100 kWh/kvarh</td>
</tr>
</tbody>
</table>

¹ kCT= external CT transformation ratio
(eg. 800 A / 5 A kTA = 160).
² kPT= external TT transformation ratio
(eg. 600/100 V kTV = 6). For direct connection kPT = 1
In this example kCT x kPT = 160 x 6 = 960.

. Max Cl x Vt ratio that can be selected = 100,000 (CT = x/5A)
. ATTENTION: For direct connection select CT=0001 and VT=0001:0

Meter start-up time:
- t < 5 sec (in accordance with IEC 62053-21, IEC 62053-23).

Value and programming indicator
- By pressing the front buttons (see the instructions).

Metrological LED:
- Pulse weight: 0.1 Wh/imp
5. GENERAL CHARACTERISTICS (continued)

RS485 output characteristics (Cat. No. 046 80):
- Address: from 1 to 247
- Communication speed: 2.4 - 4.8 - 9.6 - 19.2 Kbps
- Parity bit: none, even, odd
- Galvanically isolated output for the measurement inputs
- RS 485 standard - 2 pairs of twisted wires
- Modbus protocol
- Query response time < 200 ms

Pulse output characteristics (Cat. No. 046 73):
- SO according to EN62053-31, class A
- Uimp voltage: max 115 Va.c./d.c.
- Imp current: max 50 mA
- Pulse weight: programmable; possible values: 10 - 100 - 1000 - 10 k - 100 k - 1000 k Wh/imp or varh/imp
- Pulse duration: programmable; possible values: 50 - 100 - 150 - 200 - 300 - 400 - 500 ms

Ambient operating temperature:
- Min. = -25°C Max. = +55°C.

Storage ambient temperature:
- Min. = -40°C Max. = +70°C.

Device protection:
- Recommended fuse type ≤ 2 A gG

Protection rating:
- Protection index for the terminals against solid objects and liquids: IP 20 (in accordance with standards IEC 529, EN 60529 and NF C 20-010).
- Protection index for the enclosure against solid objects and liquids: IP 30 (in accordance with standards IEC 529, EN 60529 and NF C 20-010).

Protection class:
- II

Degree of pollution:
- 2

Overvoltage category:
- III

Average weight per device:
- 0.380 kg.

Packaged volume:
- 0.58 dm$^3$

Power consumption:
- ≤ 4 VA.

Heat dissipation:
- ≤ 4 W.

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Glossary:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN</td>
<td>ModBUS protocol</td>
</tr>
<tr>
<td>ModBUS A / ModBUS B</td>
<td>Configuration</td>
</tr>
<tr>
<td>CT</td>
<td>CT ratio</td>
</tr>
<tr>
<td>VTi</td>
<td>PT ratio</td>
</tr>
<tr>
<td>Addr</td>
<td>Integration time</td>
</tr>
<tr>
<td>communication address</td>
<td>Communication address</td>
</tr>
<tr>
<td>baud</td>
<td>Communication speed</td>
</tr>
<tr>
<td>Par</td>
<td>Parity bit</td>
</tr>
<tr>
<td>None</td>
<td>Even</td>
</tr>
<tr>
<td>Odd</td>
<td>Odd</td>
</tr>
<tr>
<td>Active energy pulse output</td>
<td>PLSt ACt</td>
</tr>
<tr>
<td>Reactive energy pulse output</td>
<td>PLSt rEA</td>
</tr>
<tr>
<td>Pulse weight</td>
<td>PLSU</td>
</tr>
<tr>
<td>Pulse duration</td>
<td>PLsd</td>
</tr>
<tr>
<td>Password change</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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6. COMPLIANCE

Compliance with standards:
- Electromagnetic compatibility: IEC 62052-11
- Measurement precision for the active energy: 1 (in accordance with IEC 62053-21).
- Measurement precision for the active energy: 2 (in accordance with IEC 62053-23).

7. COMMUNICATION

Modbus connection system diagram:
- The R\textsubscript{T} (120 \Omega) termination resistors must be inserted on the first and last device connected to the RS485 bus in the same terminals (+,-) where the bus cable is connected.

The pulse meters must be connected to the pulse concentrator (Cat. No. 0 046 87) for integration in a monitoring / energy metering system.

\begin{itemize}
  \item RS485: Belden 9842 Cable (or equivalent) used for a maximum bus length of 1000 m or Category 6 Cable (FTP or UTP) for a maximum length of 50 m;
  \item Integrated R\textsubscript{T} termination resistor;
  \item Ethernet: Category 6 Cable (FTP or UTP);
\end{itemize}