

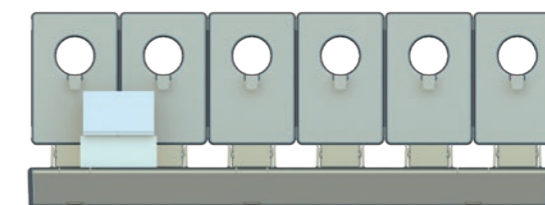
# EM 300 L, EM 300 LR, EM 300 LRW with Sensor Bars



Die perfekte Kombination zum Erfassen und Verstehen von Energiedaten.



EM 300



Sensorbar with current sensors

**The Energy Manager for ISO 50001 and communal energy management**  
**3-phase energy measurement in real time and transmission of the measurement data**  
**at configurable intervals via standard interfaces**

## SCOPE OF EM 300:

- ▶ Measurement of real and reactive power, apparent power, real, reactive and apparent energy, current, voltage and power factor per phase, connection of up to 96 current sensors
- ▶ Automatic export of data as csv file by FTP File Transfer or e-mail, shortest data interval, 1 minute
- ▶ Transmission of measurement data in addition via standard interfaces Modbus-TCP / Modbus-RTU, configurable for master/slave operation (with additional connection of current sensors, transmission of measurement data only over Modbus-TCP)
- ▶ Interval for transmission of measurement data configurable from 1 second, 200 ms on request (master/slave)
- ▶ In Modbus-TCP slave mode, polling interval <1 second possible
- ▶ Transmission of measurement data also by http request (output in JSON format)
- ▶ Integral Web-server for easy configuration of the unit and clear display of the consumption values on a smartphone, tablet or PC, additional visualisation with IOs/Android app
- ▶ Analysis software can be subsidised on the basis of ISO 50001 via the Bundesamt für Wirtschaft und Ausfuhrkontrolle (BAFA – Federal Department for

Business and Export Control)

- ▶ LAN interface (EM300 L), LAN/RS485 interface (EM300 LR), LAN/WLAN/RS485 interface (EM300 LRW)

## MAIN FEATURES EM 300:

- ▶ Fully integrated smart meter \*
- ▶ Real-time data capture
- ▶ Four quadrant meter
- ▶ 3-phase energy measurement, consumption and feed-in
- ▶ Direct connection up to 63 A or with external instrument transformer(s) 100 A to 1000 A (for example)
- ▶ Option to connect up to 96 further current sensors for detailed monitoring of the distribution system / at the circuit/ring level
- ▶ Calculation of the real energies on the basis of the bus currents of the current sensors, automatic assignment of the power factor of the corresponding phase, manual input or automatic operation possible
- ▶ Decentral data archive with capacity of, e.g. up to 15 years, according to setting, 2 GByte available
- ▶ Top-hat rail mounting (4 TE)

\* Not approved for the production of data for billing

**TQ-Systems GmbH**  
 Mühlstraße 2 | Gut Delling | 82229 Seefeld | Germany  
 Tel.: +49 8153 9308-655 | info@tq-automation.com

[tq-automation.com](http://tq-automation.com)

## TECHNICAL DATA EM 300

|                                   |   |
|-----------------------------------|---|
| <b>Processing Unit</b>            | ARM9 processor with 450 MHz, DDR2 RAM with 128 Mbyte eMMC Flash 4 GByte   |
| <b>Operating System</b>           | Embedded Linux with integral TCP/IP Stack   |
| <b>Interfaces (Standard)</b>      | LAN (10/100 Mbit), WLAN (802.11b/g/n) for data transmission over Modbus TCP or by Json/Ajax<br>RS485 (half-duplex, 115200 Baud max.) for data transmission over Modbus RTU  |
| <b>Produkt Standards</b>          | EN 61010, EN 50428, EN 60950  |
| <b>Voltage and current Inputs</b> | Rated voltage: 230/400 V AC<br>Operating voltage: 230 V $\pm$ 10%<br>Frequency: 50 Hz $\pm$ 5%,<br>110 V 60 Hz on request   |
| <b>Meter Losses</b>               | Voltage path: < 0,01 VA per phase<br>Current path: < 2 VA per phase<br>Complete unit: < 5 W without WLAN enabled<br>Current: Nominal current 5 A,<br>Current limit 63 A<br>Start-up current: < 25 mA  |
| <b>Assembly</b>                   | Connection cross-section: 10–25 mm <sup>2</sup> *<br>Torque for screw terminals: 2.0 Nm<br>* Mechanically: from 1.5–25 mm <sup>2</sup>  |
| <b>Measuring Accuracy</b>         | Accuracy class according to IEC 61557-12<br>Referred to the Energy Manager measured value<br>Voltage: $\pm$ 0,5 %<br>Current: $\pm$ 0,5%<br>Real power: $\pm$ 1,0 %<br>Apparent power: $\pm$ 1,0 %<br>Reactive power: $\pm$ 1,0 %<br>Power factor: $\pm$ 1,0 %<br>With reference to IEC 62053-22 or -23 (typical)<br>Real energy: Class 1<br>Reactive energy: Class 1<br>When using external current transformers, their measuring accuracy must be taken into account. When using the current sensors via the sensor bar, the accuracy, depending on the power factor, is class 2. |
| <b>Mechanical Specifications</b>  | Housing material: glass reinforced polyamide<br>Hot wire test: according to IEC 695-2-1<br>Protection class/type: II / IP2X<br>Weight / Size: 0.3 kg / 88×70×65 mm  |
| <b>Housing Width</b>              | 4 PU  |
| <b>Operating Conditions</b>       | Ambient temperature: -25°C ... +45°C with IN reduced to 32 A: -25°C ... +55°C*<br>Storage temperature: -25°C ... +70°C<br>Relative humidity: up to 75 % annual average, (non-condensing) up to 95 % on up to 30 days/year max.<br>Operating altitude: 2000 m above sea level  |

### \* For operation upto 55°C ambient temperature, the following conditions apply:

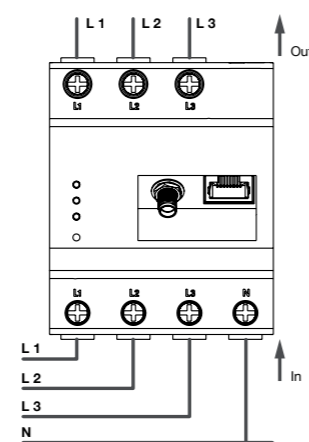
Continuous operation at 55°C ambient temperature not permitted. CB trip current may not exceed 32 A. For higher currents, external current transformers must be used.

The Energy Manager must be connected with 10 mm<sup>2</sup> min. leads. Their length may not exceed 1 m.

## EMC

|  |   |
|--|---|
| <b>ESD (IEC 61000-4-2)</b>                             | 4 kV contact discharge,<br>8 kV air discharge                 |
| <b>RF Field Immunity (IEC 61000-4-3)</b>               | 3 Vm, 10 Vm with some loss of measurement accuracy            |
| <b>Burst (IEC 61000-4-4)</b>                           | Mains: $\pm$ 4 kV, Ethernet: $\pm$ 2 kV                       |
| <b>Surge (IEC 61000-4-5)</b>                           | phase-phase: 1 kV, phase-earth: 2 kV,<br>Ethernet: $\pm$ 2 kV |
| <b>Conducted Interference Immunity (IEC 61000-4-6)</b> | 150 kHz-80 MHz, 3 V (rms value)                               |
| <b>RF Radiation (EN55022)</b>                          | class B   |

## CONNECTION DIAGRAM EM300



The device runs from phase L1\*

\* For detailed information on connection, see the installation instructions.

## SCOPE OF PERFORMANCE, SENSOR BARS / CURRENT SENSORS

- ▶ With the sensor bar, currents in a.c. networks of up to 63 A can be measured.
- ▶ This permits power measurement and output of, for example, the real energy of individual consumers in low-voltage networks. The phase voltage and  $\cos \phi$  of the Energy Manager are included in the calculation.
- ▶ The measurement data are forwarded to the Energy Manager over the RS485 bus and analysed. In addition, the Energy Manager delivers the supply voltage of 9 V DC to the sensor bar. The sensor bar is offered in three versions, with three (EB203), six (EB206), nine (EB209) and twelve (EB212) plug-in points respectively for the current sensors. The current sensors sit directly on the circuit breakers and record the actual currents.
- ▶ Up to eight sensor bars can be connected to an Energy Manager. With the sensor bar EB212 with twelve current sensors, the currents in up to 96 lines can thus be measured and sent to the Energy Manager.

## MAIN FEATURES SENSOR BARS/ CURRENT SENSORS

- ▶ Extension of the energy monitoring to circuit level
- ▶ Connection of up to 96 current sensors to a Energy Manager
- ▶ Consumer groups can be connected together and monitored
- ▶ Simple and space-saving mounting over circuit breakers, easy retro-fitting
- ▶ No additional power supply required to supply the current sensors

## TECHNICAL DATA EM SENSORBAR

|                                 |  |
|---------------------------------|--|
| <b>Electrical Connections</b>   | Supply voltage: 9 V DC<br>Supply current: 20 mA max.<br>Power consumption: 0.5 W max.<br>Rated voltage / conductor insulation: 300 V RMS<br>Overvoltage category: CAT III 300 V<br>Rated working voltage: 250 V AC<br>Rated current: 63 A<br>Rated transient overvoltage: 4000 V |
| <b>Field Bus</b>                | RS485 line length: 10 m max.<br>Modbus address range: 1 to 247   |
| <b>Line Connections</b>         | Connection cross-section: 0,25 mm <sup>2</sup> bis 1,5 mm <sup>2</sup>   |
| <b>Housing Protection Class</b> | Protection class: IP2X   |
| <b>Operating Conditions</b>     | Ambient temperature<br>- operating: -25°C ... +55°C<br>- storage/transport: -25°C ... +70°C<br>Relative humidity: 50 % to 95 % (non-condensing)<br>Air pressure during operation: 790 hPa bis 1070 hPa   |
| <b>Product Safety</b>           | DIN EN 61010-1   |
| <b>EMV</b>                      | EN61000-6-2  |
| <b>Accuracy</b>                 | Better than +/- 1 % of full-scale value  |
| <b>Resolution</b>               | 12 bit   |
| <b>Sampling Frequency</b>       | 5 kHz  |
| <b>RMS Value</b>                | Fundamental basis  |