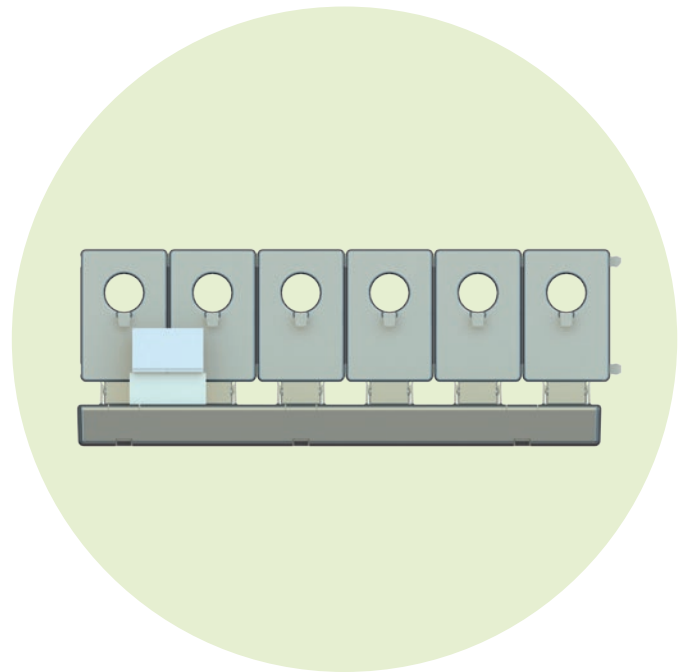# 8B-control
BUILDING AUTOMATION

TECHNICAL DATA SHEET
ENERGY MANAGER EM300 L, EM300 LR, EM300 LRW WITH SENSOR BARS

B-control EM for ISO 50001 and communal energy management
3-phase energy measurement in real time and transmission of the measurement data
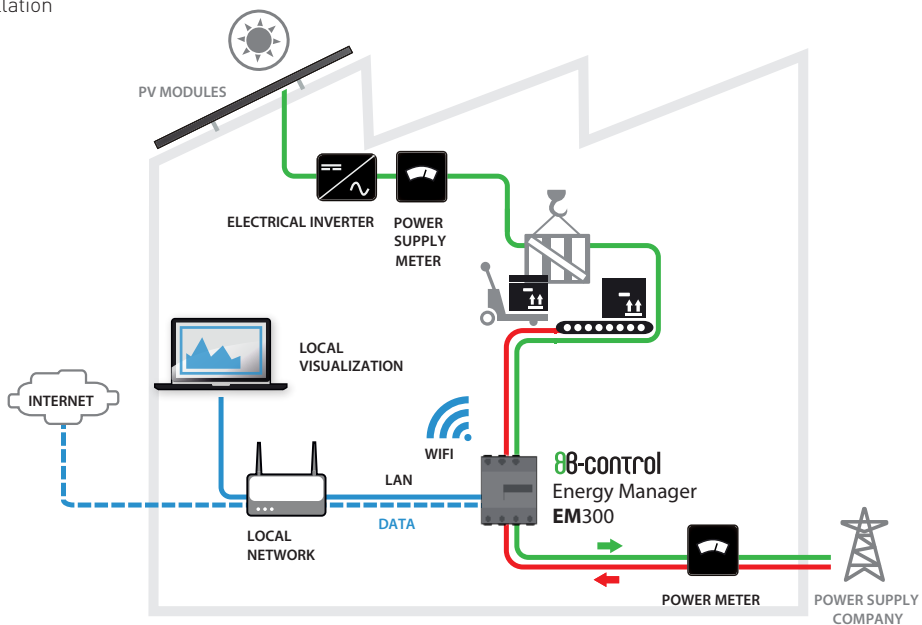at configurable intervals via standard interfaces

B-control EM 300

B-control sensor bar with current sensors

Illustration: industrial installation

B-control
BUILDING AUTOMATION

SCOPE OF PERFORMANCE, ENERGY MANAGER EM300

- 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)

THE CORE FUNCTIONS OF THE ENERGY MANAGER EM 300 AT A GLANCE:

- 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

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 φ 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 supoply 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.

THE CORE FUNCTIONS OF THE SENSOR BAR AT A GLANCE:

- Extension of the energy monitoring to circuit level
- Connection of up to 96 current sensors to a B-control 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, EM300

PROCESSOR DATA
ARM9 processor with 450 MHz, DDR2 RAM with 128 Mbyte
eMMC Flash 4 GByte

OPERATING SYSTEM
Embedded Linux with integral TCP/IP Stack

INTERFACES (STANDARD)
LAN (10/100 Mbit), WLAN (802.11b/g/n) for data transmission
over Modbus TCP or by Json/Ajax
RS485 (half-duplex, 115200 Baud max.) for data transmission
over Modbus RTU

PRODUCT STANDARDS
EN 61010, EN 50428, EN 60950

VOLTAGE AND CURRENT INPUTS
Rated voltage: 230/400 V AC
Operating voltage: 230 V ± 10 %
Frequency   50 Hz ± 5 %, 110 V 60 Hz on request

POWER CONSUMPTION
Voltage path: ‹ 0,01 VA per phase
Current path: ‹ 2 VA per phase
Complete unit: ‹ 5 W without WLAN enabled
Current: Nominal current 5 A, Current limit 63 A
Start-up current: ‹ 25 mA

MOUNTING
Connection cross-section: 10-25 mm² *
Torque for screw terminals: 2.0 Nm
* Mechanically: from 1.5-25 mm²

MEASURING ACCURACY
Accuracy class according to IEC 61557-12
Referred to the Energy Manager measured value
Voltage: ± 0.5 %
Current: ± 0.5 %
Real power: ± 1.0 %
Apparent power: ± 1.0 %
Reactive power: ± 1.0 %
Power factor: ± 1.0 %

With reference to IEC 62053-22 or -23 (typical)
Real energy: Class 1
Reactive energy: Class 1

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.

MECHANICAL DATA
Housing material: glass reinforced polyamide
Hot wire test: according to IEC 695-2-1
Protection class/type: II / IP2X
Weight / Size: 0.3 kg / 88x70x65 mm

OPERATING CONDITIONS
Ambient temperature: -25°C ... +45°C
with I_N educed to 32 A: -25°C ... +55°C*
Storage temperature: -25°C ... +70°C
Relative humidity: up to 75 % annual average,
(non-condensing)   up to 95 % on up to 30 days/year max.
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 permit-
ted. 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 mm² min. leads.
Their length may not exceed 1 m.

EMC

ESD (IEC 61000-4-2)
4 kV contact discharge, 8 kV air discharge

RF FIELD IMMUNITY (IEC 61000-4-3)
3 Vm, 10 Vm with some loss of measurement accuracy

BURST (IEC 61000-4-4)
Mains: ± 4 kV, Ethernet: ± 2 kV

SURGE (IEC 61000-4-5)
phase-phase: 1 kV, phase-earth: 2 kV, Ethernet: ± 2 kV
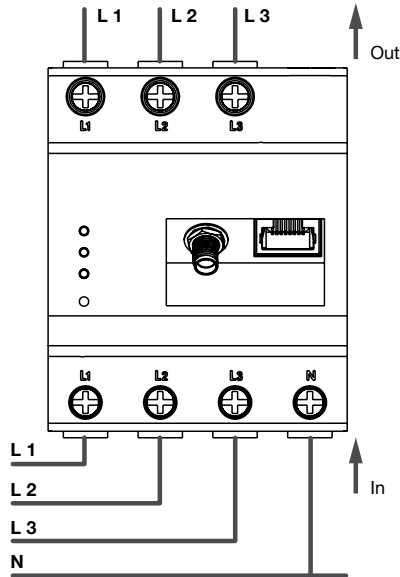
CONDUCTED INTERFERENCE IMMUNITY (IEC 61000-4-6)
150 kHz-80 MHz, 3 V (rms value)

RF RADIATION (EN55022)
class B

CONNECTION DIAGRAM EM300

The device runs from phase L1*

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

TECHNICAL DATA, SENSOR BAR

ELECTRICAL CONNECTIONS

Supply voltage:	9 V DC
Supply current:	20 mA max.
Power consumption:	0.5 W max.
Rated voltage / conductor insulation:	300 V RMS
Overvoltage category:	CAT III 300 V
Rated working voltage:	250 V AC
Rated current:	63 A
Rated transient overvoltage:	4000 V

FIELD BUS

RS485 line length:	10 m max.
Modbus address range:	1 to 247

LINE CONNECTIONS

Connection cross-section:	0.25 mm² to 1.5 mm²

HOUSING PROTECTION CLASS

Protection class:	IP2X

AMBIENT CONDITIONS

Ambient temperature
- operating:	-25°C ... +55°C
- storage/transport:	-25°C ... +70°C
Relative humidity:	50 % to 95 %
(non-condensing),	
Air pressure during operation:	790 hPa to 1070 hPa

PRODUCT SAFETY
DIN EN 61010-1

EMC
EN61000-6-2

ACCURACY
Better than +/- 1 % of full-scale value

RESOLUTION
12 bit

SAMPLING FREQUENCY
5 kHz

RMS VALUE
Fundamental basis

B-control is a brand of
TQ-Systems GmbH and nxtControl GmbH

TQ-Systems GmbH | Mühlstr. 2 | 82229 Seefeld | Germany
Tel.: +49 8153 9308-0 | Fax: +49 8153 4223 | info@b-control.com