

POWER MEASUREMENT IN ELECTRICAL SYSTEMS

BUILT-IN DEVICES FOR MEASUREMENT IN POWER SYSTEMS



SIRAX MONITOR LINE

SIRAX BM1200 • SIRAX BM1250 • SIRAX BM1400 • SIRAX BM1450
SIRAX MM1200 • SIRAX MM1400 • SIRAX BT5700



Built-in devices for measurement in power systems



Camille Bauer Metrawatt offers a broad spectrum of high-quality measuring instruments for all tasks within electrical power systems. With the built-in units of the SIRAX monitor series, we complement our SINEAX high-performance measuring transducers thus completing our portfolio. They have the basic functionalities of a transmitter at a very good price / performance ratio and are used as cost-effective standard solutions for the acquisition of measurement values in the single-phase or three-phase power network.

The device series is divided into the categories Basic Monitor (BM) and Multifunctional Monitor (MM). The distinguishing features can be found in the display, operating and measuring range of the devices. The SIRAX monitor series is designed for universal use in electrical distribution networks, automation technology and industrial equipment and machinery.

SIMPLE AND CLEAR

Compact and robust design saves space and costs during installation

Easy installation and commissioning saves time during installation

Simple device operation thanks to intuitive menu guidance

Clear display of the measured data via large LCD, LED or TFT displays

Easy switching of measured values via push button

Comprehensive design

MULTIFUNCTIONAL

Measurement of electrical characteristics

Versatile monitoring functions of electrical characteristics

Recording of energy consumption for cost analysis

COMMUNICATIVE

Open communication via RS485 (Modbus RTU) or Ethernet (Modbus TCP)

Software for configuration

Integration as a standard object into the SMARTCOLLECT software

FLEXIBLE

Universal measuring inputs

Configurable analog and digital measurement outputs

Easy on-site parameterization by push button or configuration software

Access authorization / password protection



OVERVIEW SIRAX MONITOR SERIES



	BM1200	BM1250	BM1400
	1-phase network 2-wire 3-phase network 3- / 4-wire	1-phase network 2-wire 3-phase network 3- / 4-wire	3-phase mains 3- / 4-wire unequally loaded
MEASURING INPUT			
Nominal voltage	63.5 / 133 / 239 V _{LN} 100 ... 480 V _{LL} (110 / 230 / 415 V _{LL})	57.5...346.42 V _{LN} 100 ... 600 V _{LL}	57.7...277 V _{LN} 100 ... 480 V _{LL} (110 / 415 V _{LL})
Nominal current	1 or 5 A	1 or 5 A	1 or 5 A
Shunt adjustment range	–	–	–
Frequency range	45 ... 50/60 ... 65 Hz	45 ... 50/60 ... 65 Hz	45 ... 50/60 ... 66 Hz
POWER SUPPLY	60 ... 300 V AC/DC –	100 ... 550 V AC/DC –	100 ... 250 V AC/DC –
ACCURACY			
Voltage / current	±0,5 % / ±0,5 %	±0,2 % / ±0,2 % / ±0,2 %	±0,5 % / ±0,5 %
Power / reactive power	±0,5 % / ±1,0 %	±0,2 % / ±1,0 % / ±0,2 %	±0,5 % / ±0,5 %
power factor	±3,0 %	±3,0 °	±3,0 %
THD voltage, current	±2,0 %	±3,0 %	±1,0 %
Active / reactive / apparent energy	Class 1,0 / Class 1,0 / Class 2	Class 0,2S / Class 2,0 / Class 1	Class 0.5 / Class 2
SAFETY			
Insulation	Double	Double	Double
Pollution degree	2	2	2
Overvoltage category	300 V CAT III	300 V CAT III	300 V CAT III
Protection rating	Front IP54, Housing IP20	Front IP54, Housing IP20	Front IP54, Housing IP20
OUTPUTS	Puls 4000 Imp/kWh –	2 relay (Limit, Puls, Timer) –	Analog 2 x 4...20 mA 1 relay (1NO / 1NC)
METERS			
Active and reactive energy meter	Import and Export	Import and Export	Import and Export
Operating hours counter	Consumer and device	Consumer and device	Consumer and device
COMMUNICATION	RS485 (Modbus RTU) –	RS485 (Modbus RTU) –	RS485 (Modbus RTU) Ethernet (Modbus TCP)
MECHANICAL PROPERTIES			
Display	LCD display, 1 line, 4 digits, 3 measurements	LCD display, 4 lines for readings, 1 line for energy values, 3 graphs	LED display, 3 line, 4 digits 3 measurements
Measurement display number			
Housing material	LEXAN 940 (polycarbonate)	LEXAN 940 (polycarbonate)	LEXAN 940 (polycarbonate)
Flammability class	V-0 acc. to UL94, self-extinguishing, non-dripping, free of halogen	V-0 acc. to UL94, self-extinguishing, non-dripping, free of halogen	V-0 acc. to UL94, self-extinguishing, non-dripping, free of halogen
Relative humidity	0 ... 90 % (without condensation)	0 ... 95 % (without condensation)	0 ... 90 % (without condensation)
Operating temperature	-10 ... +55 °C	-20 ... +70 °C	-10 ... +55 °C
Mounting / installation position	Panel mounting / any	Panel mounting / any	Panel mounting / any
Connection	1 x < 4.0 mm ² oder 2 x 1.5 mm ²	1 x < 4.0 mm ² oder 2 x 1.5 mm ²	1 x < 4.0 mm ² oder 2 x 1.5 mm ²
Weight	approx. 320 g	approx. 620 g	approx. 620 g
Dimensions [W x H x D]	96 X 96 X 35/55 mm	96 X 96 X 57/75 mm	96 x 96 x 80 mm

**BM1450**

DC energy measurement
4 channels / external shunt

10...60 VDC / 61...200 VDC /
201...1000 VDC

1 ... 20 KA

50...150 mV

45 ... 50/60 ... 65 Hz

60 ... 300 V AC/DC

–

±0,5 % / ±0,5 %
±0,5 %

Class 1

Double

2

1000V CAT II / 600 V CAT III
Front IP54, Housing IP20

4 relay (1NO / 1NC)

–

Import and Export
Consumer and device

RS485 (Modbus RTU)

–

LED display, 4 line, 8 digits,
4 measurements
LEXAN 940 (polycarbonate)
V-0 acc. to UL94, self-extinguishing,
non-dripping, free of halogen
0 ... 90 % (without condensation)
-10 ... +55 °C
Panel mounting / any
1 x < 4.0 mm² oder 2 x 1.5 mm²
approx. 620 g
96 x 96 x 80 mm

**MM1200**

3-phase mains 3- / 4-wire unequally loaded

57.7...277 V_{LN}
100 ... 480 V_{LL} (440 V_{LL})

1 or 5 A

–

45 ... 50/60 ... 66 Hz

100 ... 250 V AC/DC

–

±0,5 % / ±0,5 %
±0,5 % / ±0,5 %

±3,0 %

±1,0 %

Class 0,5 / Class 0,5 / Class 2

Double

2

300 V CAT III
Front IP54, Housing IP20

Analog 2 x 4...20 mA

1 relay (1NO / 1NC)

Import and Export
Consumer and device

RS485 (Modbus RTU)
Ethernet (Modbus TCP)

TFT touch screen, digital and graphical
3 measurements and graphs
LEXAN 940 (polycarbonate)
V-0 acc. to UL94, self-extinguishing,
non-dripping, free of halogen
0 ... 90 % (without condensation)
-10 ... +55 °C
Panel mounting / any
1 x < 4.0 mm² oder 2 x 1.5 mm²
approx. 620 g
96 x 96 x 80 mm

**MM1400**

3-phase mains 3- / 4-wire unequally loaded

57.7...288 V_{LN}
100 ... 500 V_{LL} (500 V_{LL})

1 or 5 A

–

45 ... 50/60 ... 66 Hz

60 ... 300 V AC/DC

–

±0,2 % / ±0,2 %
±0,2 % / ±0,2 %

±2,0 %

±1,0 %

Class 0,5S / Class 0,5S / Class 2,0

Double

2

300 V CAT III
Front IP54, Housing IP20

Puls 4000 Imp/kWh

2 relay (1NO / 1NC)

Import and Export
Consumer and device

RS485 (Modbus RTU)
Ethernet (Modbus TCP)

TFT touch screen, digital and graphical
3 measurements and graphs
LEXAN 940 (polycarbonate)
V-0 acc. to UL94, self-extinguishing,
non-dripping, free of halogen
0 ... 90 % (without condensation)
-10 ... +55 °C
Panel mounting / any
1 x < 4.0 mm² oder 2 x 1.5 mm²
approx. 620 g
96 x 96 x 80 mm

**BT5700**

3-phase mains 3- / 4-wire unequally loaded

63.5 V_{LN}
100 ... 692.8 kV_{LL} (440 V_{LL})

1 oder 5 A

–

45 ... 50/60 ... 65 Hz

100 ... 250 V AC/DC

12 ... 48 V AC/DC

±0,5 % / ±0,5 %
±0,5 % / ±0,5 %

±1,0 %

–

Class 0.5 / Class 2

Double

2

300 V CAT III
Housing IP20

–

–

Import and Export

–

RS485 (Modbus RTU)

–

LCD display, 2 line, 13 digits
2 measurements
LEXAN 940 (polycarbonate)
V-0 acc. to UL94, self-extinguishing,
non-dripping, free of halogen
0 ... 90 % (without condensation)
-5 ... +60 °C
DIN rail mounting / any
1 x < 4.0 mm² oder 2 x 1.5 mm²
approx. 620 g
96 x 96 x 117 mm



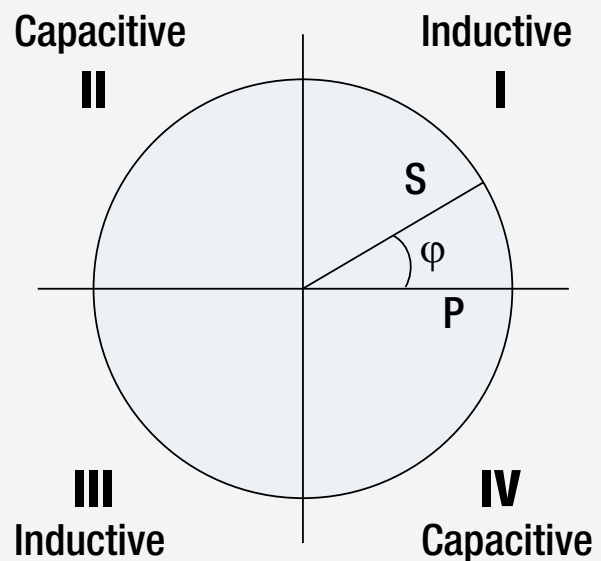
MEASURED VALUES

The measured values listed below are a selection of options for the individual device variants. It should be taken into consideration that not every device version can measure the same measured values.

MEASURED VALUE GROUP	APPLICATION
INSTANTANEOUS VALUES U, I, F, P, Q, S, PF, LF, QF ... Angle between voltage phasors Min/max of instantaneous values	Transparent monitoring of present system state Fault detection, connection check, sense of rotation check Determination of grid variable variance with time reference
EXTENDED REACTIVE POWER ANALYSIS Total reactive power, fundamental frequency, harmonics, $\cos\varphi$, $\tan\varphi$ of the fundamental frequency with min values in all quadrants	Reactive power compensation Verification of specified power factor
HARMONICS ANALYSIS Total harmonics content THD U/I Individual harmonics U/I up to 56 th	Evaluation of the thermic load of equipment Analysis of system perturbation and consumer structure
ENERGY BALANCE ANALYSIS Meters for Import/Export of active / blind energy and active / apparent power	Determination of energy consumption, preparation of (internal) energy billing
OPERATING HOURS Run hour of the device On hour of the device Number of interruptions	Monitoring of service and maintenance intervals of equipments

IMPORT / EXPORT / INDUCTIVE / CAPACITIVE

The device variants SIRAX MM1200 and SIRAX MM140 provide information for all of the four quadrants. Depending on whether the measured system is considered from a generator or consumer perspective, the interpretation of the quadrants changes: The energy formed from active power in Quadrants I+IV can then be regarded, e.g., as supplied or demanded active energy. The energy level is clockwise.





VISUALISATION

CLEAR REPRESENTATION OF MEASURED VALUES

Depending on the device variant, different displays are available. The measured values can be displayed directly on-site via the LCD display, LED display or TFT display

- Display of input and output parameters
- High-contrast display with backlit for good reading of measurement values
- Clear and unambiguous display of measured data
- Graphical representation of vector diagram, curve and bar graphs possible with TFT display
- Simple navigation via two push buttons



SIMPLE ON-SITE PROGRAMMING OF MEASURED VALUES

The following parameters can be set directly on site by means of the display and two or three push buttons.

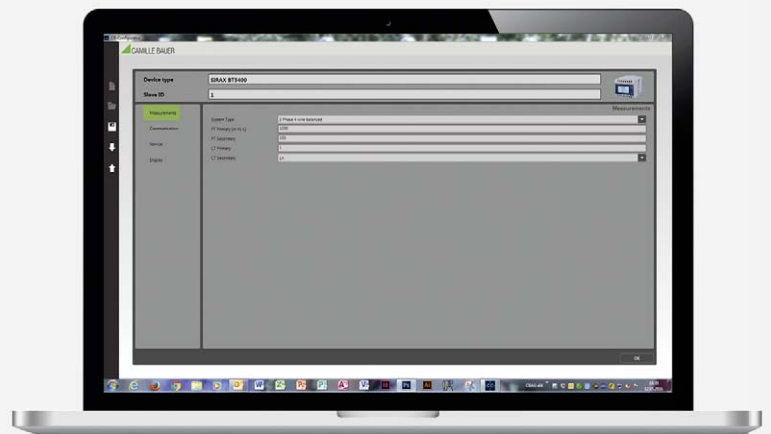
- Network configuration
- Values of current and voltage transformers
- Input and output parameters
- Communication parameter Modbus RTU
- Password protection



ADDITIONAL PROGRAMMING OF MEASURED VALUES VIA CB-CONFIGURATOR SOFTWARE

Via RS485 (Modbus RTU) or Ethernet (Modbus TCP) interface and the CB-Configurator software the measured values may be programmed even more easily.

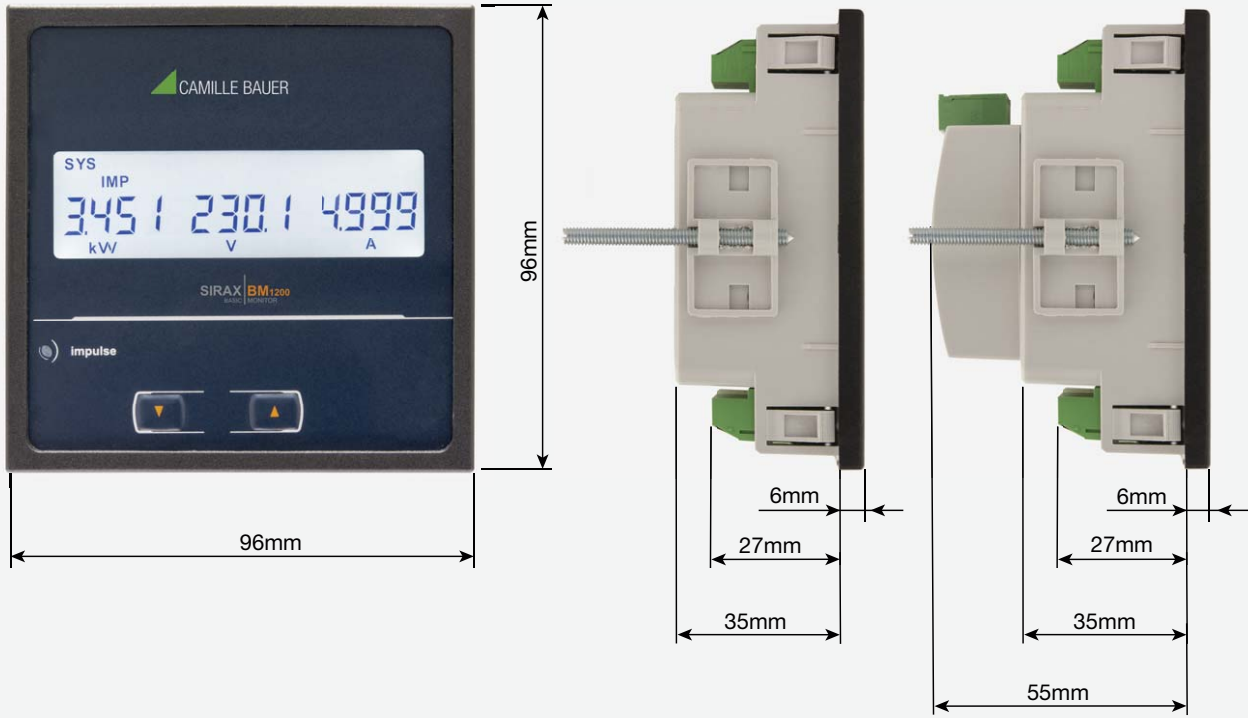
- Devices may be selected directly in the software
- Setting of input and output parameters
- Offline parameterization of measured values
- Loading and storage of configuration
- Upload of predefined configurations to several devices at the same time
- Password protection



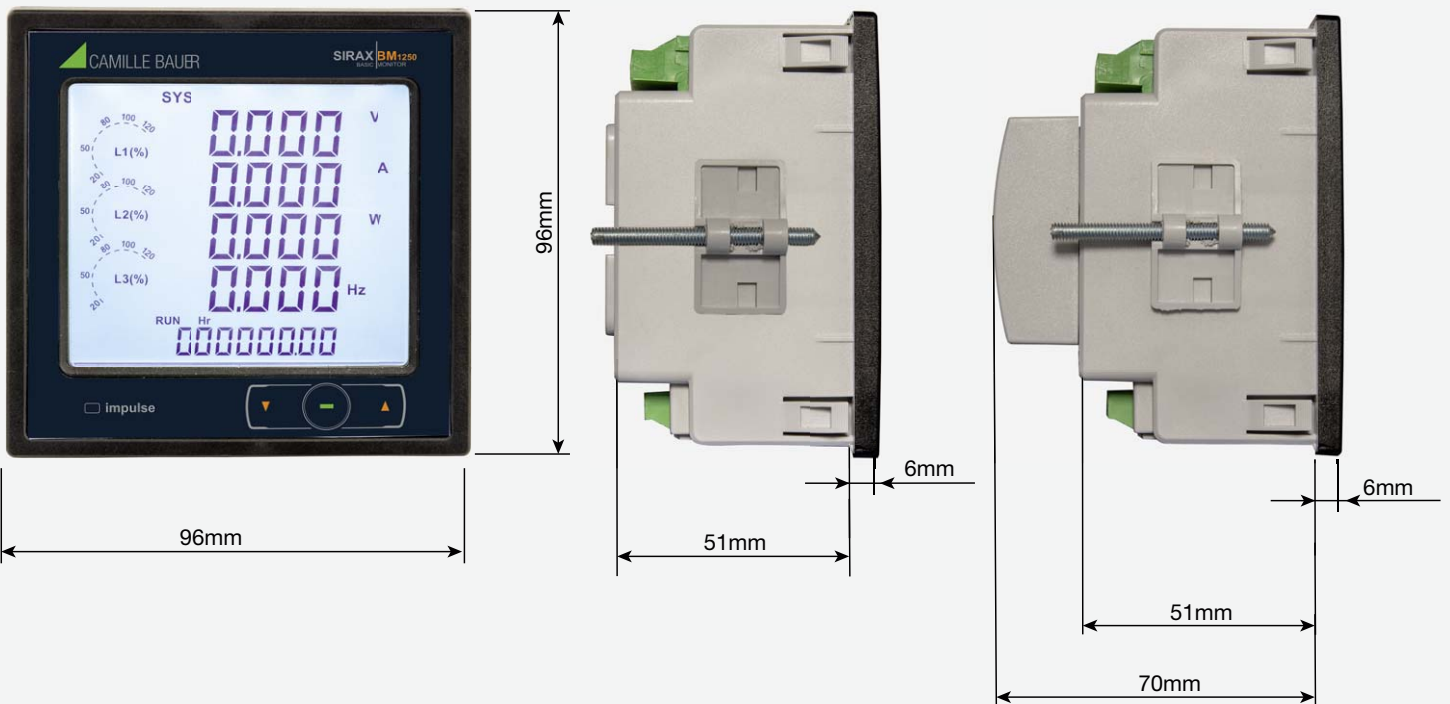


DIMENSIONS

SIRAX BM1200



SIRAX BM1250

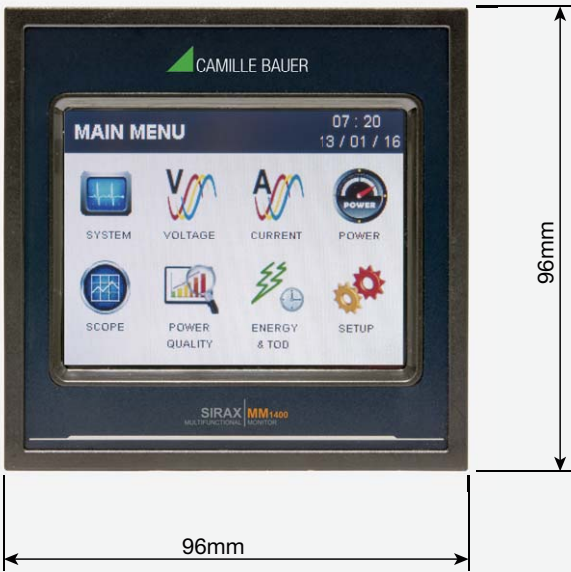




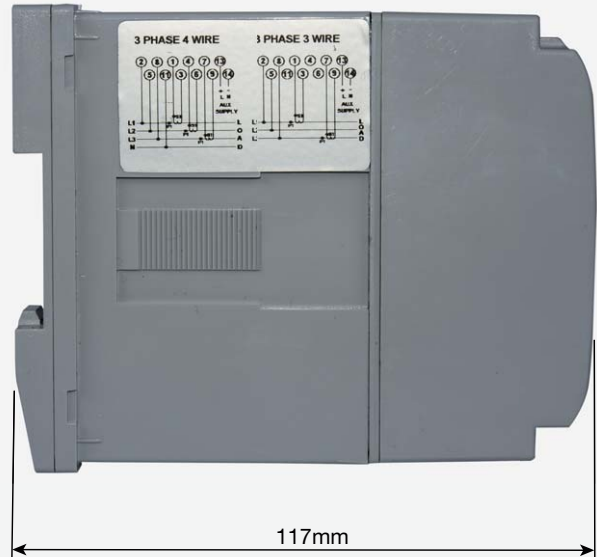
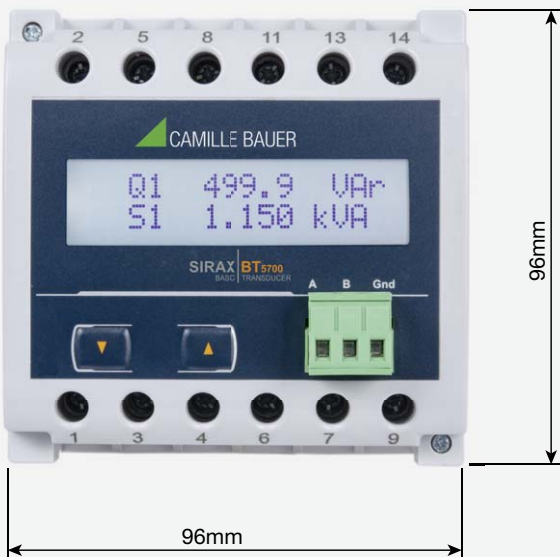
SIRAX BM1400 AND BM1450



SIRAX MM1200 AND MM1400



SIRAX BT5700





ORDER CODE

SIRAX BM1200

ARTICLE-NO.	DESCRIPTION	NETWORK	VOLTAGE	CURRENT	POWER SUPPLY	OUTPUT
174 962	SIRAX BM1200	3PH	415VL-L	5A/1A	60...300V AC/DC	–
174 970	SIRAX BM1200	3PH	415VL-L	5A/1A	60...300V AC/DC	RS485

SIRAX BM1250

ARTICLE-NO.	DESCRIPTION	NETWORK	VOLTAGE	CURRENT	POWER SUPPLY	OUTPUT
182 858	SIRAX BM1250 - Basic	3PH	100 ... 600 VL-L	5A/1A	100...550V AC/DC	–
182 866	SIRAX BM1250 - Advanced	3PH	100 ... 600 VL-L	5A/1A	100...550V AC/DC	RS485, 2 relay
182 874	SIRAX BM1250 - Expert	3PH	100 ... 600 VL-L	5A/1A	100...550V AC/DC	RS485, 2 relay, datalogger, USB

SIRAX BM1400

ARTICLE-NO.	DESCRIPTION	NETWORK	VOLTAGE	CURRENT	POWER SUPPLY	OUTPUT
176 695	SIRAX BM1400	3PH	110VL-L	5A/1A	100...250V AC/DC	–
176 702	SIRAX BM1400	3PH	110VL-L	5A/1A	100...250V AC/DC	RS485, 1 relay, 2x4...20 mA analog
176 710	SIRAX BM1400	3PH	110VL-L	5A/1A	100...250V AC/DC	Ethernet
174 988	SIRAX BM1400	3PH	440VL-L	5A/1A	100...250V AC/DC	–
174 996	SIRAX BM1400	3PH	440VL-L	5A/1A	100...250V AC/DC	RS485, 1 relay, 2x4...20 mA analog
175 001	SIRAX BM1400	3PH	440VL-L	5A/1A	100...250V AC/DC	Ethernet

SIRAX BM1450

ARTICLE-NO.	DESCRIPTION	NETWORK	VOLTAGE	CURRENT	POWER SUPPLY	OUTPUT
177 065	SIRAX BM1450	4	10...60 VDC	50...150 mA	60...300V AC/DC	RS485, 4 relay
177 073	SIRAX BM1450	4	61...200 VDC	50...150 mA	60...300V AC/DC	RS485, 4 relay
177 081	SIRAX BM1450	4	201...1000 VDC	50...150 mA	60...300V AC/DC	RS485, 4 relay

SIRAX MM1200 / MM1400

ARTICLE-NO.	DESCRIPTION	NETWORK	VOLTAGE	CURRENT	POWER SUPPLY	OUTPUT
175 019	SIRAX MM1200 / DE	3PH	440VL-L	5A/1A	100...250V AC/DC	–
175 027	SIRAX MM1200 / EN	3PH	440VL-L	5A/1A	100...250V AC/DC	–
175 035	SIRAX MM1200 / ES	3PH	440VL-L	5A/1A	100...250V AC/DC	–
175 043	SIRAX MM1200 / FR	3PH	440VL-L	5A/1A	100...250V AC/DC	–
175 051	SIRAX MM1200 / DE	3PH	440VL-L	5A/1A	100...250V AC/DC	RS485, 1 relay, 2x4...20 mA analog
175 069	SIRAX MM1200 / EN	3PH	440VL-L	5A/1A	100...250V AC/DC	RS485, 1 relay, 2x4...20 mA analog
175 077	SIRAX MM1200 / ES	3PH	440VL-L	5A/1A	100...250V AC/DC	RS485, 1 relay, 2x4...20 mA analog
175 085	SIRAX MM1200 / FR	3PH	440VL-L	5A/1A	100...250V AC/DC	RS485, 1 relay, 2x4...20 mA analog
177 099	SIRAX MM1200 / DE	3PH	440VL-L	5A/1A	100...250V AC/DC	Ethernet
177 106	SIRAX MM1200 / EN	3PH	440VL-L	5A/1A	100...250V AC/DC	Ethernet
175 093	SIRAX MM1400 / DE	3PH	500VL-L	5A/1A	60...300V AC/DC	RS485
175 100	SIRAX MM1400 / EN	3PH	500VL-L	5A/1A	60...300V AC/DC	RS485
175 118	SIRAX MM1400 / ES	3PH	500VL-L	5A/1A	60...300V AC/DC	RS485
175 126	SIRAX MM1400 / FR	3PH	500VL-L	5A/1A	60...300V AC/DC	RS485
177 114	SIRAX MM1400 / DE	3PH	500VL-L	5A/1A	60...300V AC/DC	RS485, 2 relai
177 122	SIRAX MM1400 / EN	3PH	500VL-L	5A/1A	60...300V AC/DC	RS485, 2 relay
177 130	SIRAX MM1400 / DE	3PH	500VL-L	5A/1A	60...300V AC/DC	Ethernet
177 148	SIRAX MM1400 / EN	3PH	500VL-L	5A/1A	60...300V AC/DC	Ethernet

SIRAX BT5700

ARTICLE-NO.	DESCRIPTION	NETWORK	VOLTAGE	CURRENT	POWER SUPPLY	OUTPUT
175 134	SIRAX BT5700	3PH	440VL-L	5A/1A	100...250V AC/DC	RS485
175 275	SIRAX BT5700	3PH	440VL-L	5A/1A	12...48V AC/DC	RS485



SMARTCOLLECT



SMARTCOLLECT is a data management software which can acquire measured data in an easy manner and store the same in an open SQL database. This software offers basic functionalities for data analysis and for easy energy monitoring as well as the easy preparation and disposal of reports.

Providing a mature graphic user interface, the SMARTCOLLECT software is clearly structured and easily operated.

SMARTCOLLECT is modularly designed and permits supplementing modules or functions at any time.

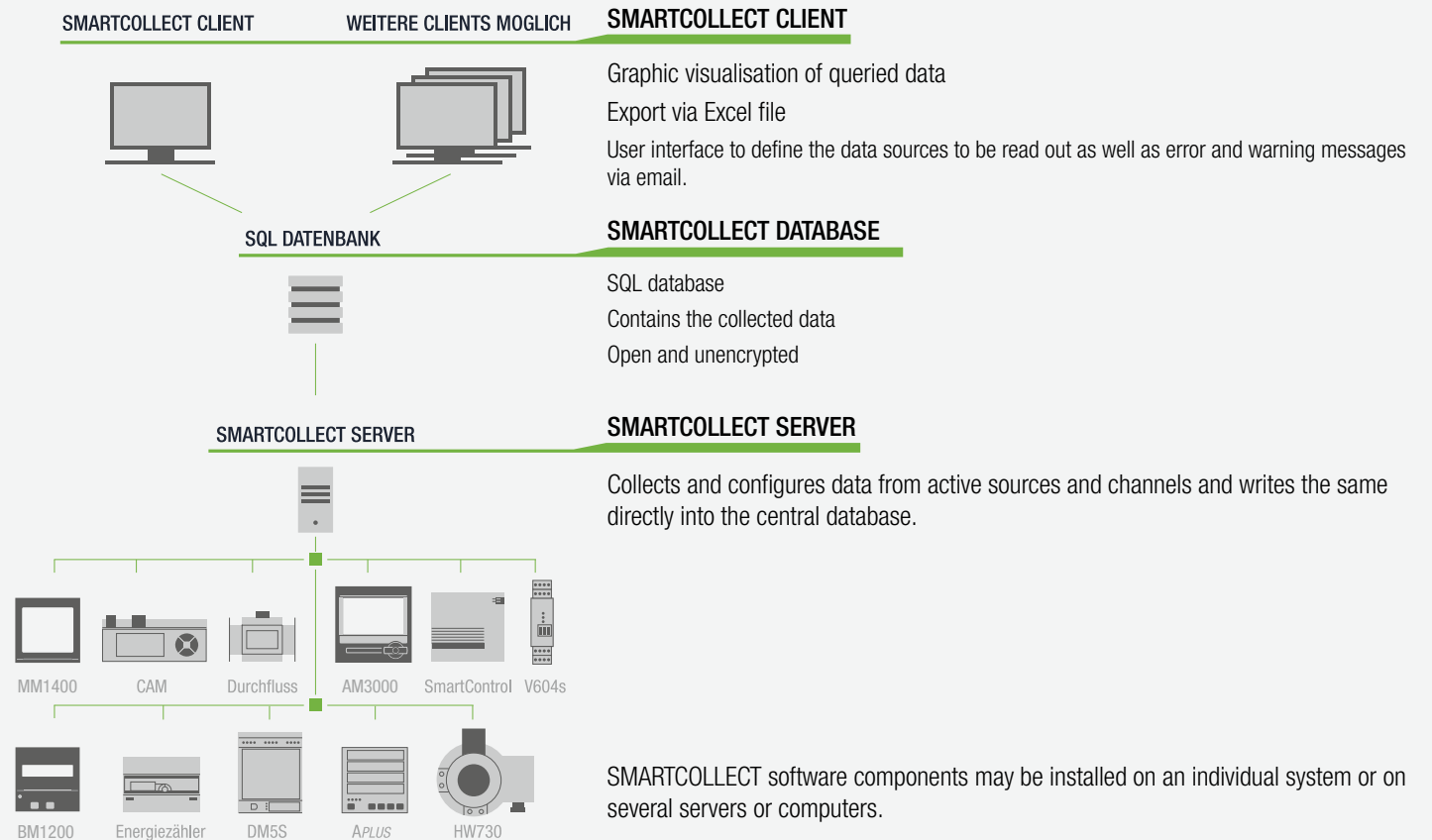
CUSTOMER BENEFITS

- Easy data communication via Modbus RTU / TCP, ECL and SmartControl-Direct
- Connection also via OPC
- Devices of Camille Bauer and Gossen Metrawatt are already predefined and selectable in the software
- Open for the devices of all manufacturers
- Data is stored in an open SQL database
- Modular cost / performance model – basic version may be extended at any time

MODULAR DESIGN

COMPONENTS

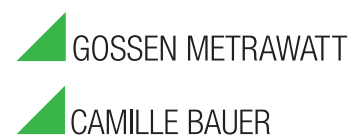
The SMARTCOLLECT data management software consists of the following components:



SMARTCOLLECT software components may be installed on an individual system or on several servers or computers.



GMC INSTRUMENTS



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