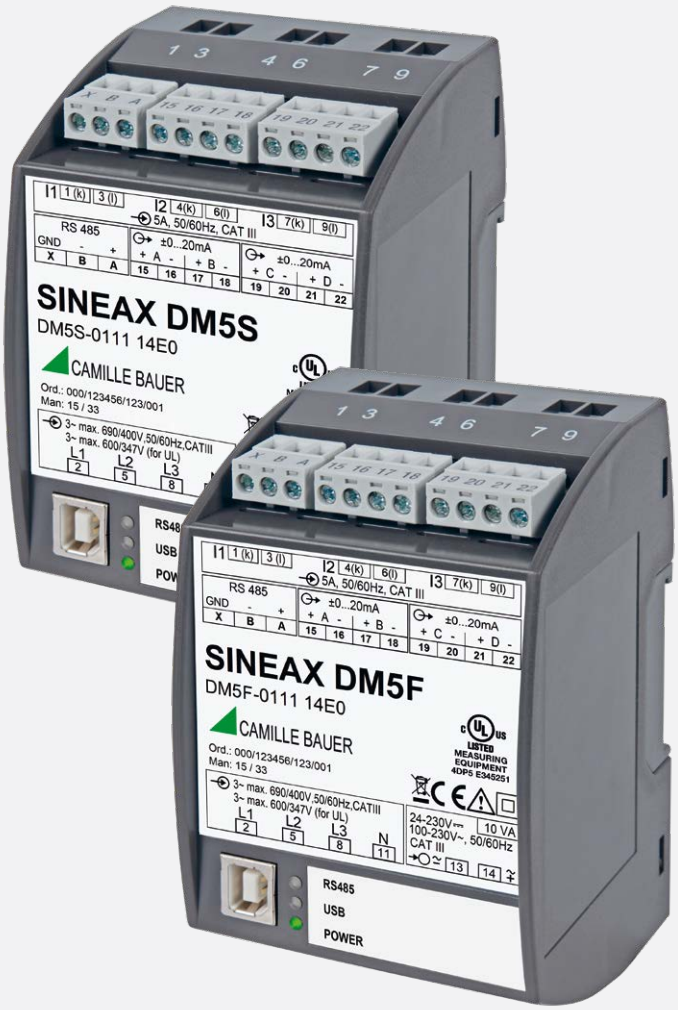
Heavy-current sensor for grid monitoring.



SINEAX DM5S and SINEAX DM5F are free-programmable universal measurement devices for heavy-current systems: Classical high-accuracy transducers, suited for monitoring tasks and retrofit applications in energy distribution and industry. The devices can be adapted fast and easily to the measurement task by means of the CB-Manager software – even if there is no power supply available. Depending on the device version measured quantities can be mapped proportionally to analog DC current outputs or to Modbus.

DM5S/DM5F

The measurement is done uninterrupted in all four quadrants and can be adapted optimally to the system to be monitored. Both the average time of the measurement and the expected maximum signal level can be configured.

Commissioning is very easy and is supported by means of service functions, such as nameplate printing, connection check, measurement acquisition as well as simulation and trimming of the analog outputs.

DEVICE VERSION	SINEAX DM5S	SINEAX DM5F
Measurement time, programmable	4...1024 cycles	½, ½ (1), 2,4, 8 cycles
Fastest response time (at 50Hz)	85...165 ms	15...25 ms
Energy metering	max. 32 meters	not supported
Individual harmonics and THD V/I	via Modbus interface	not supported
Auto-scaling V/I inputs	supported	not supported

SYSTEM STATE MONITORING IN CLASS 0.2

These instantaneous values will be calculated in regular configurable intervals and provided to analog outputs and Modbus interface.

DESCRIPTION	14	2L	3G	3U	3A	4U	4O
System voltage	Yes	Yes	–	–	–	–	–
Voltage L1-N	–	Yes	–	–	–	Yes	Yes
Voltage L2-N	–	Yes	–	–	–	Yes	Yes
Voltage L3-N	–	–	–	–	–	Yes	Yes
Voltage L1-L2	–	–	Yes	Yes	Yes	Yes	Yes
Voltage L2-L3	–	–	Yes	Yes	Yes	Yes	Yes
Voltage L3-L1	–	–	Yes	Yes	Yes	Yes	Yes
Zero displacement voltage	–	–	–	–	–	Yes	Yes
System current	Yes	–	Yes	–	–	–	–
Current in phase L1	–	Yes	–	Yes	Yes	Yes	Yes
Current in phase L2	–	Yes	–	Yes	Yes	Yes	Yes
Current in phase L3	–	–	–	Yes	Yes	Yes	Yes
Neutral current (calculated)	–	Yes	–	–	–	Yes	Yes
Active power of the system	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Active power in phase L1	–	Yes	–	–	–	Yes	Yes
Active power in phase L2	–	Yes	–	–	–	Yes	Yes
Active power in phase L3	–	–	–	–	–	Yes	Yes
Reactive power of the system	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reactive power in phase L1	–	Yes	–	–	–	Yes	Yes
Reactive power in phase L2	–	Yes	–	–	–	Yes	Yes
Reactive power in phase L3	–	–	–	–	–	Yes	Yes
Apparent power of the system	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Apparent power in phase L1	–	Yes	–	–	–	Yes	Yes
Apparent power in phase L2	–	Yes	–	–	–	Yes	Yes
Apparent power in phase L3	–	–	–	–	–	Yes	Yes

DESCRIPTION	14	2L	3G	3U	3A	4U	4O
System frequency	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Active power factor of the system, PF=P / S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Active power factor in phase L1	–	Yes	–	–	–	Yes	Yes
Active power factor in phase L2	–	Yes	–	–	–	Yes	Yes
Active power factor in phase L3	–	–	–	–	–	Yes	Yes
Reactive power factor of the system, QF=Q / S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reactive power factor in phase L1	–	Yes	–	–	–	Yes	Yes
Reactive power factor in phase L2	–	Yes	–	–	–	Yes	Yes
Reactive power factor in phase L3	–	–	–	–	–	Yes	Yes
LF factor of the system, sign(Q)·(1– abs(PF))	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LF factor in phase L1	–	Yes	–	–	–	Yes	Yes
LF factor in phase L2	–	Yes	–	–	–	Yes	Yes
LF factor in phase L3	–	–	–	–	–	Yes	Yes
Average voltage	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Average current	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Average current with sign of P	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bimetal current of the system	Yes	–	Yes	–	–	–	–
Bimetal current in phase L1	–	Yes	–	Yes	Yes	Yes	Yes
Bimetal current in phase L2	–	Yes	–	Yes	Yes	Yes	Yes
Bimetal current in phase L3	–	–	–	Yes	Yes	Yes	Yes
Slave pointer of bimetal current of the system	Yes	–	Yes	–	–	–	–
Slave pointer of bimetal current in phase L1	–	Yes	–	Yes	Yes	Yes	Yes
Slave pointer of bimetal current in phase L2	–	Yes	–	Yes	Yes	Yes	Yes
Slave pointer of bimetal current in phase L3	–	–	–	Yes	Yes	Yes	Yes

14 = Single phase system or 4-wire balanced or 3-wire unbalanced phase shift
2L = two-phase system (split phase)
3G = 3-wire balanced
3U = 3-wire unbalanced
3A = 3-wire unbalanced in Aron connection
4U = 4-wire unbalanced
4O = 4-wire unbalanced in Open-Y connection

In addition to the above measurements, the DM5S provides individual harmonics and **T**otal **H**armonic **D**istortion values for all voltages and currents up to the 31**st** harmonic exclusively via Modbus interface. These values are updated approximately twice per second.

DM5S: ENERGY CONSUMPTION MONITORING IN CLASS 0.5S

The DM5S supports up to 32 energy meters. To each of these meters a base measurement quantity and a tariff can be assigned. The present tariff is set via Modbus.
For application with short measurement times, e.g. energy consumption for a single working day or production lot, the resolution can be adapted.
Thanks to uninterrupted measurement and automatic range detection a high accuracy is achieved.

- Up to 32 meters
- Up to 16 tariffs (control via Modbus)
- Free selectable base quantity (P, Q, S, I)
- High accuracy 0.5S
- Uninterrupted measurement
- Free selectable meter resolution

FREE DEVICE ASSEMBLY

For parameterization the DM5 is equipped with a USB interface as a standard.
The measurement output can be performed via analog outputs and / or a Modbus interface.
For the designation of the device the marking of the Power LED can be overwritten with the device description. The associated label can then be printed.

DM5X-

APPLICATION
- Universal version (for all system types)
- Balanced systems
- Single-phase systems and 4-wire balanced

ANALOGUE OUTPUTS
- Without
- 1,2,3 or 4 galvanically isolated ±20mA

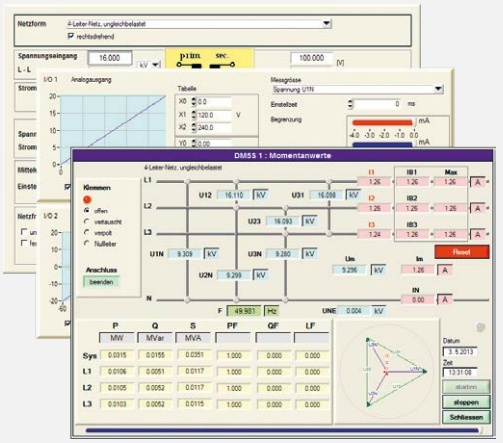
MODBUS INTERFACE (MODBUS/RTU PROTOCOL)
- Without
- With



PARAMETERIZATION, SERVICE AND MEASUREMENT ACQUISITION

The CB-Manager software provides the following functions to the user:
- Full parameterization of DM5S/DM5F
  - Locally: Via USB interface (even without power supply)
  - Remote: Via Modbus interface
  - OFFLINE: No device connected
  - Data label printing of present parameterization
  - Free selectable LED marking
- Acquisition and recording of measured quantities
- Check of proper device connection
- Archiving of configuration and measurement files
- Setting or resetting of meter contents
- Simulation and trimming of analog outputs
- Comprehensive parameterization help

A security system can be activated to restrict the access to device data.



TECHNICAL DATA

INPUTS

	via screw terminals 6 mm²
Nominal current:	adjustable 1...5 A
Maximum:	7.5 A (sinusoidal)
Consumption:	≤ I2 x 0.01 Ω per phase
Overload capability:	10 A continuous 100 A, 10 x 1 s, interval 100 s
Nominal voltage:	57.7…400 V_{LN}, 100...693 V_{LL}
Maximum:	480 V_{LN}, 832 V_{LL} (sinusoidal)
Consumption:	≤ U2 / 1.54 MΩ per phase
Impedance:	1.54 MΩ per phase
Overload capability:	480 V_{LN}, 832 V_{LL} continuous 600 V_{LN}, 1040 V_{LL}, 10 x 10 s, interval 10 s 800 V_{LN}, 1386 VLL, 10 x 1 s, interval 10 s
Nominal frequency:	45… 50 / 60 …65 Hz
Measurement TRMS:	up to 31st harmonic

TYPES OF CONNECTION

Single phase
Split phase (2 phase system)
3-wire, balanced load
3-wire, balanced load, phase shift (DM5S only)
3-wire, unbalanced load
3-wire, unbalanced load, Aron connection
4-wire, balanced load
4-wire, unbalanced load
4-wire, unbalanced load, Open-Y

POWER SUPPLY

	via screw terminals 6 mm²
Nominal voltage:	100…230 V AC ±15%, 50...400 Hz 24...230 V DC ±15%
Consumption:	≤ 10 VA

ANALOG OUTPUTS

	via plug-in terminals 2.5 mm², galvanically isolated
Linearization:	Linear or kinked
Range:	± 20 mA (24 mA max.), bipolar
Uncertainty:	± 0.1% (included in basic accuracy)
Response time (50Hz):	DM5S: 85…165ms (for 4 cycles measurement) DM5F: 15…25ms (for ½ cycle measurement) (valid for all quantities but frequency)
Burden:	≤ 500 Ω (max. 10 V / 20 mA)
Burden influence:	≤ 0.1%
Residual ripple:	≤ 0.2%

MODBUS/RTU

	via plug-in terminals 2.5 mm²
Physics:	RS-485, max. 1200 m (4000 ft)
Baud rate:	2.4 up to 115.2 kBaud
Number of participants:	≤ 32

CONFIGURATION INTERFACE USB

Physics:	USB, max. 3 m
Connection:	Socket USB-B
Device class:	Human interface device (HID)

MEASUREMENT UNCERTAINTY

Reference conditions: (acc. IEC/EN 60688)	Ambient 23°C ±1K, sinusoidal, PF=1, Frequency 50…60 Hz, burden 250 Ω, Measurement over 8 cycles (DM5S), 1 cycle (DM5F)
Voltage, current:	± 0.15% FSU / FSI [1) 2)]
Power:	± 0.2% (FSU x FSI) [2)]
Power factor:	± 0.1° [2)]
Frequency:	± 0.01 Hz
Active energy:	Class 0.5S, EN 62 053-22 (DM5S only)
Reactive energy:	Class 2, EN 62 053-23 (DM5S only)

[1)] FSU / FSI – Configured maximum value of voltage / current inputs

[2)] Additional uncertainty if neutral wire not connected (3-wire connections)

- Voltage, power: 0.1% of measurement value; Load factor: 0.1°
- Energy: Voltage influence x 2, angle uncertainty x 2

SAFETY

Current inputs are galvanically isolated from each other.

Protection class:	II (protective insulation, voltage inputs via protective impedance)
Pollution degree:	2
Protection rating:	IP30 (housing), IP20 (terminals)
Overvoltage category:	CAT III up to 600V

AMBIENT CONDITIONS, GENERAL INFORMATION

Operating temperature:	–20 up to 22 up to 24 up to +55°C
Storage temperature:	–25 up to +70 °C
Temperature influence:	0.5 x measurement uncertainty per 10 K
Long term drift:	0.5 x measurement uncertainty per year
Usage group:	II (acc. EN 60 688)
Relative humidity:	< 95% no condensation
Altitude:	≤ 2000m max.

Device to be used indoor only!

MECHANICAL ATTRIBUTES

Dimensions (H x B x D):	110 x 70 x 70mm
Housing material:	Polycarbonat
Weight:	500 g
Flammability class:	V-0 acc. UL94, self-extinguishing, non dripping, free of halogen

SINEAX® DM5S, programmable, up to 4 analog outputs, 32 energy meters, USB, Modbus optional
SINEAX® DM5F, programmable, 1/2 cycle measurement up to 4 analog outputs, USB, Modbus

Design	Application	Nominal frequency	Power supply	Bus connection	Standard protocol	Setting time (50Hz)		Outputs		Test certificate	Configuration	Article number
Whitout display, for top-hat rail mounting	Universal version all applications 3U/3I	45..50/60..65 Hz	Nominal voltage 24..230VDC,100..230VAC	RS485 (Modbus/RTU protocol)	Modbus	85...165 ms (with measuring time 4 periods)	15...25 ms (with measuring time ½ period)	Without outputs	4 analog outputs, bipolar ±20mA	Test certificate English	Basci configuration	
•	•	•	•	•	•	•	-	•	-	•	•	193201
•	•	•	•	•	•	•	-	-	•	•	•	193209
•	•	•	•	•	•	-	•	•	-	•	•	193217
•	•	•	•	•	•	-	•	-	•	•	•	193225

MULTI-COMPONENT DATA MANAGEMENT SMARTCOLLECT® SC²

SMARTCOLLECT® SC2 is a scalable HMI/SCADA software for the visualization of electrical distribution and other physical parameters. Unlike other SCADA software, SMARTCOLLECT® SC2 is built on a new, ultra-modern platform with a visually pleasing 2D/3D web-based graphical user interface. Powerful communications and software interfaces, expansion options, ease of use and an affordable price are just some of the other user benefits of SMARTCOLLECT® SC2. Just one look at SMARTCOLLECT® SC2 makes you wonder how you used anything else before.

SYSTEM OVERVIEW

