CONTROL SECTION 10

Measuring and monitoring

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EQ energy meters
Introduction

B23 112-500

B23 312-500

B23 112-500 and B23 312-500 are precise meters for three phase measuring.

Both meters are mounted on a DIN-rail and are suitable for installation in industrial control panels and power panels.

Thanks to the direct connection for current up to 65A, they can be used for applications in EV chargers, solar inverters, PDUs/RPPs, HVAC systems, pumps and many more.

General features
The UL range includes performance levels “Steel” B23 112-500 and “Silver” B23 312-500 meters. Both meters are suitable for three phase metering via direct connection up to 65A. Reliable energy measurements are performed with ANSI approved Class 1.0 accuracy, making them suitable for revenue metering.
In addition, the two meters are coupled with a broad range of measured parameters.

Communication
Both the B23 112-500 and B23 312-500 meters come standard with Modbus RTU for easy readout of measurements. Additionally, an infrared port for communication with an external Serial Communication Adapter (SCA) such as the KNX adapter is also provided.

UL and ANSI Approval
Both meters are approved according to standards of the UL 61010-1 and UL 61010-2-030 which regulate the safety requirements of electrical equipment for measurement, control, and laboratory use, also in testing and measuring applications.

Additionally, the two meters are ANSI C12.1 approved. In fact, their performance levels are suitable for revenue metering, which they execute with Class 1 accuracy.

Supported measurements
The meters support the readout of the following values both via LCD and Modbus RTU:

Steel
- Active energy
- Class 1
- Pulse output
- Alarm

Silver
- Steel+
- Reactive energy
- Apparent energy
- Import/export energy
- Class 1
- Resettable energy register
- Tariffs
- Fixed I/O

EQ energy meters
Ordering information

Ordering information

Catalog number	Global material number	EAN code	Weight 1 piece kg
B23 112-500	2CMA105928R1000	8012542389057	0.31
B23 312-500	2CMA105931R1000	8012542389255	0.31

Voltage/current inputs	**B23 112-500**	**B23 312-500**
Nominal voltage	120/208/240/415 VAC 3	
Voltage range	3x120-240 VAC (-20% to +15%)	
Power dissipation voltage circuits	1.6 VA (0.7 W) total	
Power dissipation current circuits	0.007 VA (0.007 W) per phase at 230 VAC and I_b	
Base current I_b	5A	
Rated current I_n	–	
Reference current I_{ref}	5A	
Maximum current I_{max}	65A	
Terminal wiring area (L * W)	4/10 AWG Stranded, 10/14 AWG Solid	
General data		
Frequency	50 or 60 Hz ±5%	
Accuracy class	1% ANSI C12.1 / B (Cl. 1) and Reactive Cl. 2	
Active energy	1%	
Display of energy	7-digit LCD	
Mechanical		
Material	Polycarbonate in transparent front glass. Glass reinforced polycarbonate in bottom case and upper case. Polycarbonate in terminal cover.	
Weight	0.31 kg	
Environmental		
Operating temperature	-40°C to +70°C	
Storage temperature	-40°C to +85°C	
Humidity	75% yearly average, 95% on 30 days/year	
Resistance to water and dust	IP20 on terminal block without protective enclosure and IP51 in protective enclosure (IEC 60529)	
Mechanical environment	Class M2 (MID 2014/32/UE)	
Electromagnetic environment	Class E2 (MID 2014/32/UE)	
Outputs	1 DO	2 DO
Current	2 - 100 mA	
Voltage	5 - 40 VDC	5 - 240 VAC/VDC
Pulse output frequency	Programmable: 1 - 999999 imp/kWh	
Pulse length	Programmable: 10 - 990 ms	
Terminal wire area	0.5 - 1 mm²	
Inputs	N/A	2 DI
Voltage	0 - 240 VAC/VDC	
OFF	0 - 5 VAC/VDC	
ON	57 - 240 VAC/24 - 240 VDC	
Min. pulse length	30 ms	
Terminal wire area	0.5 - 1 mm²	
Standards	IEC 62052-11, IEC 62053-21 class 1, IEC 62053-23 class 2, EN 50470-1, EN 50470-3 category B, UL 61010-1, UL 61010-2-030, UL/ANSI C12.1	
Dimensions		
Width	70 mm	
Height	97 mm	
Depth	65 mm	

Circuit monitoring system (CMS)

Control unit comparison

Characteristics	Control unit CMS-600	Control unit CMS-700
CMS sensors		
Sensors	64 (2x32)	96 (3x32)
Measured values		
Power supply		●
Current	●	●
Power		●
Energy		●
Built-in power pack		●
Power factor		●
Interfaces		
RS485	●	●
LAN		●
WiFi		
Protocols		
Modbus RTU	●	●
Modbus TCP		●
SNMP		●
Visualization		
Built-in web server		●
App		
Touch display	●	
CSV data export		●
Approvals		
IEC 61010-1	●	●
UL 508/CSA C22.2 No. 14	●	●

Circuit monitoring system (CMS)

Ordering information

Control unit

Product	Product name	Description	Catalog number
	CMS-600	Modbus RTU (24 VDC)	CMS-600
	CMS-700	Modbus RTU	CMS-700

Sensors

Product	Product name	Description	Catalog number
	CMS-120PS	**Open core**	
		Sensors 18 mm for pro M compact and SMISSLINE installation devices with twin terminals	
		80 A	CMS-120PS
		40 A	CMS-121PS
		20 A	CMS-122PS
	CMS-120DR	**Sensors 18 mm for DIN-rail mounting (universal use)**	
		80 A	CMS-120DR
		40 A	CMS-121DR
		20 A	CMS-122DR
	CMS-120CA	**Sensors 18 mm for cable mounting (universal use)**	
		80 A	CMS-120CA
		40 A	CMS-121CA
		20 A	CMS-122CA
	CMS-100PS	**Closed core**	
		Sensors 18 mm for pro M compact and SMISSLINE installation devices with twin terminals	
		80 A	CMS-100PS
		40 A	CMS-101PS
		20 A	CMS-102PS
	CMS-100S8	**Sensors 18 mm for S800 installation devices with cage terminals**	
		80 A	CMS-100S8
		40 A	CMS-101S8
		20 A	CMS-102S8
	CMS-100DR	**Sensors 18 mm for DIN-rail mounting (universal use)**	
		80 A	CMS-100DR
		40 A	CMS-101DR
		20 A	CMS-102DR
	CMS-100CA	**Sensors 18 mm for cable mounting (universal use)**	
		80 A	CMS-100CA
		40 A	CMS-101CA
		20 A	CMS-102CA
	CMS-200S8	**Sensors 25 mm for S800 installation devices with cage terminals**	
		160 A	CMS-200S8
		80 A	CMS-201S8
		40 A	CMS-202S8
	CMS-200DR	**Sensors 25 mm for DIN-rail mounting (universal use)**	
		160 A	CMS-200DR
		80 A	CMS-201DR
		40 A	CMS-202DR
	CMS-200CA	**Sensors 25 mm for cable mounting (universal use)**	
		160 A	CMS-200CA
		80 A	CMS-201CA
		40 A	CMS-202CA

Accessories

Description	Catalog number
Flat cable 2 m	CMS-800
Flat cable 5 m	CMS-802
Flat cable 10 m	CMS-803
Flat cable 30 m	CMS-805
Connector set	CMS-820

Circuit monitoring system (CMS)

Technical specifications

CMS-600 control unit (Modbus RTU)

CMS-600

Supply voltage	(VDC)	24 (±10%)
Power consumption	(W)	max. 24 W (with 64 sensors)
Interface		RS485 2-wire
Protocol		Modbus RTU
Data rate	(Baud)	2400 ... 115 200
Data refresh time		≤1 sec with max 64 sensors
Insulation voltage	(VAC)	400
Screw-type terminals		0.5 ... 2.5 mm², max 0.6 Nm
Mounting		DIN-rail 35 mm acc. DIN50022 or SMISSLINE TP busbar system
Dimension	(mm)	71.8 x 87.0 x 64.9 (4 DIN modules)
Operating temperature	(°C)	-25 ... +70
Storage temperature	(°C)	-40 ... +85
Standards		DIN EN 61010-1, UL508

CMS-700 control unit

CMS-700

Supply voltage	(VAC)	80 – 277 (L1-N, +5%)
Frequency	(Hz)	50/60
Power input (L1-N)	(W)	5 ... 40 (dep. on number of sensors)
Power input, current transformer, secondary side	(VA)	Current circuit <2 (per phase)
Voltage measurement range	(VAC)	80 – 277 (L1, L2, L3-N)
Measurement range, current transformer, secondary side	(A)	nominal: 5 max.: 6
Harmonic component	(Hz)	up to 2000
Data rate of Modbus RTU	(Baud)	RS485 2-wire, 2400 ... 115 200
Refresh time		≤1 sec with max. 96 sensors
LAN	(Mbit/s)	100
Conductor cross-section	(mm²)	0.5 ... 2.5
Mounting method		35 mm DIN-rail (DIN 50022)
Degree of protection		IP20
Dimensions	(mm)	160.0 x 87.0 x 64.9 (9 WM)
Operating temperature	(°C)	-25 ... +60
Bearing temperature	(°C)	-40 ... +85
Standards		IEC61010-1 UL 508/CSA C22.2 No. 14
Main circuit accuracy		
Voltage		±1%
Current		±1%
Harmonic component		1%
Active power		±2%
Apparent power		±2%
Reactive power		±2%
Power factor		±0.2%

Circuit monitoring system (CMS)

Technical specifications

Open core sensors 18 mm

Product	Type		CMS-120xx	CMS-121xx	CMS-122xx
 CMS-120PS	Measurement range	(A)	80	40	20
	Measurement values		–	–	TRMS, AC 50/60 Hz, DC
	Crest factor of distorted wave forms		≤1.5	≤3	≤6
	AC accuracy (TA = +25°C)[1]		–	–	≤ ±1%
	AC temperature coefficient[1]		–	–	≤ ±0.04%
	DC accuracy (TA = +25°C)[1]		≤ ±1.2%	≤ ±1.4%	≤ ±1.8%
	DC temperature coefficient[1]		≤ ±0.14%	≤ ±0.24%	≤ ±0.44%
 CMS-120DR	Resolution	(A)	–	–	0.01
	Sampling rate internal	(Hz)	–	–	5000
	Settling time (±1%)	(sec)	–	–	typ. 0.34
	Cable feed through	(mm)	–	–	9.5
	Insulation voltage		–	–	690 AC/1500 DC
	Operating/storage temperature	(°C)	–	–	-25 ... +70/-40 ... +85
 CMS-120CA	Standards		–	–	DIN EN 61010-1, UL508
	Overall dimensions				
	CMS-120PS series	(mm)	17.4 x 41.0 x 26.5	17.4 x 41.0 x 26.5	17.4 x 41.0 x 26.5
	CMS-120CA series	(mm)	17.4 x 41.0 x 29.0	17.4 x 41.0 x 29.0	17.4 x 41.0 x 29.0
	CMS-120DR series	(mm)	17.4 x 51.5 x 43.2	17.4 x 51.5 x 43.2	17.4 x 51.5 x 43.2

Closed core sensors 18 mm

Product	Type		CMS-100xx	CMS-101xx	CMS-102xx
 CMS-100PS	Measurement range	(A)	80	40	20
	Measurement values		TRMS, AC 50/60 Hz, DC	TRMS, AC 50/60 Hz, DC	TRMS, AC 50/60 Hz, DC
	Crest factor of distorted wave forms		≤1.5	≤3	≤6
	AC accuracy (TA = +25°C)[1]		≤ ±0.5%	≤ ±0.5%	≤ ±0.5%
	AC temperature coefficient[1]		≤ ±0.036%	≤ ±0.036%	≤ ±0.036%
 CMS-100S8	DC accuracy (TA = +25°C)[1]		≤ ±0.7%	≤ ±1.0%	≤ ±1.7%
	DC temperature coefficient[1]		≤ ±0.047%	≤ ±0.059%	≤ ±0.084%
	Resolution	(A)	0.01	0.01	0.01
	Sampling rate internal	(Hz)	5000	5000	5000
	Settling time (±1%)	(sec)	typ. 0.25	typ. 0.25	typ. 0.25
 CMS-100DR	Cable feed through	(mm)	10	10	10
	Insulation voltage	(V)	690 VAC/1500 VDC	690 VAC/1500 VDC	690 VAC/1500 VDC
	Operating temperature	(°C)	-25 ... +70	-25 ... +70	-25 ... +70
	Storage temperature	(°C)	-40 ... +85	-40 ... +85	-40 ... +85
	Standards		DIN EN 61010-1, UL508	DIN EN 61010-1, UL508	DIN EN 61010-1, UL508
 CMS-100CA	**Overall dimensions**				
	CMS-100PS series	(mm)	17.4 x 41.0 x 26.5	17.4 x 41.0 x 26.5	17.4 x 41.0 x 26.5
	CMS-100S8 series	(mm)	26.5 x 45.5 x 31.8	26.5 x 45.5 x 31.8	26.5 x 45.5 x 31.8
	CMS-100DR series	(mm)	17.4 x 51.5 x 43.2	17.4 x 51.5 x 43.2	17.4 x 51.5 x 43.2
	CMS-100CA series	(mm)	17.4 x 41.0 x 29.0	17.4 x 41.0 x 29.0	17.4 x 41.0 x 29.0

[1] of full range

Circuit monitoring system (CMS)

Technical specifications

Closed core sensors 25 mm

Product	Type		CMS-200xx	CMS-201xx	CMS-202xx
 CMS-200S8	Measurement range	(A)	160	80	40
	Measurement values		TRMS, AC 50/60 Hz, DC	TRMS, AC 50/60 Hz, DC	TRMS, AC 50/60 Hz, DC
	Crest factor of distorted wave forms		≤1.5	≤3	≤6
	AC accuracy (TA = +25°C)[1]		≤ ±0.5%	≤ ±0.5%	≤ ±0.5%
	AC temperature coefficient[1]		≤ ±0.036%	≤ ±0.036%	≤ ±0.036%
	DC accuracy (TA = +25°C)[1]		≤ ±0.7%	≤ ±1.0%	≤ ±1.7%
	DC temperature coefficient[1]		≤ ±0.047%	≤ ±0.059%	≤ ±0.084%
 CMS-200DR	Resolution	(A)	0.01	0.01	0.01
	Sampling rate internal	(Hz)	5000	5000	5000
	Settling time (±1%)	(sec)	typ. 0.25	typ. 0.25	typ. 0.25
	Cable feed through	(mm)	15	15	15
	Insulation voltage	(V)	690 VAC/1500 VDC	690 VAC/1500 VDC	690 VAC/1500 VDC
	Operating temperature	(°C)	-25 ... +70	-25 ... +70	-25 ... +70
	Storage temperature	(°C)	-40 ... +85	-40 ... +85	-40 ... +85
 CMS-200CA	Standards		DIN EN 61010-1, UL508	DIN EN 61010-1, UL508	DIN EN 61010-1, UL508
	Overall dimensions				
	CMS-200S8 series	(mm)	26.5 x 43.0 x 38.5	26.5 x 43.0 x 38.5	26.5 x 43.0 x 38.5
	CMS-200DR series	(mm)	25.4 x 43.0 x 43.2	25.4 x 43.0 x 43.2	25.4 x 43.0 x 43.2
	CMS-200CA series	(mm)	25.4 x 43.0 x 35.7	25.4 x 43.0 x 35.7	25.4 x 43.0 x 35.7

[1] of full range