Electrical installation solutions for buildings
Energy efficiency

Index

M2M. The measure of efficiency

Measurement and advanced analysis of electrical parameters

Multi-voltage auxiliary power supply range, from 24 V DC to 230 V AC

Easy fixing system with clips which ensure the device is held reliably on the front-panel.

Real time display of energy consumption also in Euros and kg CO_2

Communication without limits thanks to the availability of different protocols for any types of network

Multilingual backlit display with two lines of scrolling text to guide and help the user in reading data and programming.

Intuitive and easy-to-use front keypad for navigating in the menu and configuring the device.

Reduced depth: only 57 mm inside the panel.

M2M. The measure of efficiency
Measurement and advanced analysis of electrical parameters

The fixing system allows the device to be installed safely and reliably on the panel, not only upon installation but also during the working period when the unit is subject to vibrations and temperature fluctuations.

The removable terminals, accessible from three sides, along with wiring parallel to the panel guarantee ease of installation. The screw fastenings of the amperometric measurement circuits offer reliability and precision. The network analyser performs constant verification of correct wiring thanks to its autodiagnostic function, signalling any operating errors.

With the M2M analyser it is possible to keep the electrical consumption of all types of system under control, measuring them in real time both in economic and environmental impact terms, thanks to the immediate conversion into Euros and CO_2 kg.

All the information gathered by the M2M analyzer can be transmitted quickly to remote locations through specific communication interfaces – RS485, RJ45 - with the support of numerous protocols including Modbus RTU, Modbus TCP/IP and Profibus DP. Interaction with the control and supervision systems is possible via digital inputs and digital, relay or analogue outputs, all programmable.

The reduced depth of only 57 mm inside the panel makes the analyser ideal for installation even in switchboard with reduced space.
At only 96 mm x 96 mm x 77 mm it still contains everything necessary to measure power quality parameters in real time.

Advanced functionalities to optimise consumptions like monitoring of absorbed power by measuring maximum demand to avoid paying penalties to the electricity distributor, bidirectional reading to display the amount of produced and consumed energy and verification of energy quality through THD measurement.

Energy efficiency

DMTME, M2M and ANR selection table

	Modular and front panel multimeters			Front panel network analysers	
					
	DMTME	**DMTME-72**	**DMTME-96**	**M2M**	**ANR96**
Overall dimensions	6 DIN modules	72x72x90	96x96x103	96x96x77	96x96x130
Display	LED			LCD backlit	LCD graphic backlit
Power supply	110 V a.c. 230 V a.c.	230 V a.c. 400 V a.c.	110 V a.c. 230 V a.c.	24-240 V a.c./d.c.	20-60 V a.c./d.c.
TRMS voltage	**Electrical parameters measurement**				
TRMS current					
Frequency					
Power factor					
Cosφ					
Active power					
Reactive power					
Apparent power					
Active energy					
Reactive energy					
Apparent energy					
Peak value Min/Max/Avg					
Timer and count-down					
Power 4Q	**Power quality**				
Energy 4Q					
Current THD					
Voltage THD					
Password set up					
Neutral current					
Maximum demand	**Energy management**				
Tariff					
Harmonic analysis up to 31°					
Wave form visualisation					
Memory 1 MB					
Outputs	**Digital**			**Digital Electromechanical relays Analogue**	**Digital**
Inputs				**Digital**	
Serial port	**RS485**			**RS485 RJ45**	**RS485 RS232 RJ45**
Protocols	**Modbus RTU**			**Modbus RTU Ethernet TCP/IP Profibus DP**	

Energy efficiency

DMTME, M2M and ANR selection table

M2M

Technical features		
Auxiliary power supply		
Voltage range	[V]	From 24 to 240 V AC/DC From 48 to 240 V AC/DC M2M I/O From 24 to 240 V DC and from 48 to 240 V AC M2M ETHERNET, M2M PROFIBUS
Frequency range	[Hz]	45 - 65
Protection fuse		T 0.5 A from 24 V to 100 V T 0.25 A from 100 V to 240 V
Power consumption	[VA]	7 max
Measurement type		Sampling TRMS
Measurement accuracy		
Voltage		±0.5% F.S. ±1 digit
Current		±0.5% F.S. ±1 digit
Frequency		40.0 - 99.9 Hz: ± 0,2% ± 0,1 100 - 500 Hz: ± 0.2% ± 1
Power factor		± 1% ± 1 digit (from cosφ= 0.3 Inductive to cosφ = 0.3 Capacitive)
Active power		± 1% ± 0.1% F.S (from cosφ= 0.3 Inductive to cosφ = 0.3 Capacitive)
Active energy		Class 1
Measurement range		
Voltage	[V]	From 10 to 500 V AC phase to neutral; From 17 to 865 V AC phase to phase. No decimal places.
Current		From 50 mA to 5 A TRMS 2 decimal places displayed
Frequency	[Hz]	From 40 to 500 1 decimal place displayed up to 99,9 and in integers above 100
Power factor		2 decimal places displayed
Installation		
Distribution networks		Low and medium voltage Low voltage M2M LV, M2M LV MODBUS Single-phase connection Three-phase with neutral - Three-phase without neutral
Current inputs	[A]	Always use external CT
		Primary from 1 to 10,000 A AC approx.
		Secondary 5 A and 1 A AC approx.
		N.B.: in case of CT secondary at 1 A the accuracy class is reduced to 2.5% F.S. ±1 digit, in the range 5-100% F.S.
Voltage inputs	[V]	Direct insertion up to 500 AC approx.
		Indirect insertion with VT:
		Primary from 60 to 60,000 V AC approx - secondary from 60 to 190 V AC
		N.B.: In case of VT secondary at less than 100 V the accuracy class is reduced to 2.5% F.S. ±1 digit, in the range 5-100% F.S.
Protection fuse for voltage inputs	[A]	0.1
Data update frequency		2 times/second

Energy efficiency

M2M network analyser

THD		
Voltage and current		Up to 31st harmonic
Energy measurement		
Single-phase maximum value counted		10 GWh / GVarh / GVAh
Three-phase maximum value counted		30 GWh / GVarh / GVAh
Energy balance maximum value counted		10 GWh / GVarh / GVAh with sign
Input pulses maximum energy value counted		40 GWh / GVarh
Terminal characteristics		
Current inputs		Cross section 6 mm^2 - Step 6.35 mm
Voltage inputs		Cross section 2.5 mm^2 - Step 7.62 mm
Impulsive outputs		Cross section 2.5 mm^2 - Step 5.08 mm
RS485 Serial port		Cross section 2.5 mm^2 - Step 5.08 mm
Relay outputs		Cross section 2.5 mm^2 - Step 5.08 mm
Overall dimensions		96 mm x 96 mm x 77 mm (Depth inside switchboard: 57 mm)
Weight	[Kg]	0.400 max
Standards		
Overall dimensions		IEC 61554
Protection degree		IEC 60529
Accuracy class		IEC 60688, IEC 61326-1, IEC 62053-21 , IEC 62053-23, IEC 62053-31.
Electrical safety		IEC 61010-1
User interface		
Display		Scrolling text in user-selectable language
Display type		LCD with backlighting which can be set by user
Display dimensions	[mm]	72x57
Communication interface		
RS485 (M2M MODBUS, M2M LV MODBUS, M2M ALARM, M2M I/O)		
- Protocol		Modbus RTU
- Electrical standard		RS485 with optical isolation
- Baud rate		4.8, 9.6, 19.2 kbps
- Parity number		Odd, Even, None
- Stop bit		1, 2
- Address		1-247
- Connectors		4-pole terminal (integrated 120 Ohm termination)
Profibus (M2M PROFIBUS)		
- Protocol		Profibus with slave DP-V0 function in compliance with IEC 61158 regulations
- Electrical standard		RS485 with optical isolation
- Baud rate		Automatic detection [9.6 - 12 Mbps]
- LED indicators		Green for communication status and Red for communication error
- Address		0-126
- Connectors		DB 9 female connector (do not use connectors with 90° cable outlet)
Ethernet (M2M ETHERNET)		
- Protocol		Modbus TCP/IP
- Connectors		RJ45

Energy efficiency

M2M network analyser

Digital output programmed as pulse		
Contact supply external voltage	[V]	48 max (peak AC/DC)
Maximum current	[mA]	100 (peak AC/DC)
Pulse duration	[ms]	50 OFF (min) / 50 ON closed contact
Pulse frequency		10 pulses/s (max)
Digital output programmed as alarm		
Contact supply external voltage	[V]	48 max (peak AC/DC)
Maximum current	[mA]	100 (peak AC/DC)
Alarm activation delay	[s]	1 - 900 s (programmable)
Alarm return hysteresis		0 - 40% (programmable)
Relay output (M2M ALARM)		
Normal current	[A]	16 AC1 - 3 AC15
Max. instantaneous current	[A]	30
Nominal voltage	[V]	250 V AC
Max. instantaneous voltage	[V]	400 V AC
Nominal load	[VA]	4000 AC1 - 750 AC15
Analogue output (M2M I/O)		
Programmable electrical parameters		Span [0 - 20 mA or 4 - 20 mA]
Load		Typical 250 Ohm, max 600 Ohm
Digital intputs (M2M I/O)		
Nominal voltage	[V]	24 V DC (absorption = 13 mA)
Maximum voltage	[V]	32 V DC (absorption = 22 mA)
Max. voltage for OFF status	[V]	8 V DC
Min. voltage for ON status	[V]	18 V DC
Hour counters		
Countdown timer		Countdown of system operating time with the activation of a programmable threshold on total current.
		Upon expiry of the maintenance period set an icon will appear on the display.
Count-up timer		Operational time of device
Climatic conditions		
Storage	[°C]	from -10 to +60
Operation	[°C]	from -5 to +55
Relative humidity		Max 93% (non-condensing) at 40°C
Protection degree		
Frontal		IP54
At terminals		IP25

Energy efficiency

M2M network analyser

M2M

M2M network analyser has advanced analysis functions which allow effective measurement of the main single-phase or three-phase electrical parameters: voltage, current, frequency, power factor, active and reactive power, active and reactive energy.
Fitted to low- and medium-voltage electrical panels (except for LV versions, suitable only for low voltage applications), the new analyser allows the measurement and analysis in real time of electrical parameters, also verifying the quality of the energy thanks to THD measurement.

M2M keeps the system's consumption under control, giving figures in CO_2 kg and Euros to ensure more efficient and rational use of energy. Bidirectional metering of energy and power on the 4 quadrants allows both production and consumption of energy to be monitored with a single device.
Aside from optimising the use of loads, real time measurement contributes to containing both environmental and budgetary impact.
All information gathered by the analyser can be transmitted quickly to remote locations through specific communication interfaces (RS485, RJ45), with the support of numerous protocols including Modbus RTU, Modbus TCP/IP and Profibus DP.

For interaction with control and supervision systems are available digital pulse outputs to remotely control active and reactive energy consumption, digital outputs programmable as threshold alarms with activation delay and return hysteresis, relay outputs with nominal current up to 16 A, and analogue outputs with programmable span (0 - 20 mA or 4 - 20 mA) for remoting status and events. Digital inputs allow pulse acquisition from other energy counters or users.

Communication protocol and interface	2 relay outputs	3 digital inputs, 2 analogue outputs	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
			EAN	Type code	Order code	piece	kg	pc.
			998839	M2M	2CSG299883R4052		0.300	1
Modbus RTU RS485			998938	M2M MODBUS	2CSG299893R4052		0.350	1
Ethernet RJ45			999034	M2M ETHERNET	2CSG299903R4052		0.400	1
Profibus RS485			999133	M2M PROFIBUS	2CSG299913R4052		0.400	1
Modbus RTU RS485	■		999232	M2M ALARM	2CSG299923R4052		0.400	1
Modbus RTU RS485		■	999331	M2M I/O	2CSG299933R4052		0.400	1
			999430	M2M LV	2CSG299943R4052		0.300	1
Modbus RTU RS485			969921	M2M LV MODBUS	2CSG296992R4052		0.350	1

Energy efficiency

ANR network analyser

ANR

Technical features			
Dimensions			
Overall dimensions	[mm]	96 x 96 x 130	IEC 61554
Max cable section	[mm²]	2.5	
Protection degree		IP52 on front - IP20 on terminal	EN 60529
Weight	[g]	430	
Display			
Graphic LCD		Backlit 128 x 128 pixel graphic LCD display	
Display dimensions	[mm]	ANR96: 50 x 50	
Voltage (TRMS)			
Direct measurement	[V]	10-600 Vrms between phase-phase.	
Ratio transformer range kVT	[V]	0.01 - 5,000.00	
Max over voltage	[V]	750, beyond this value must use VT	
Consumption	[VA]	0.2	
Input resistor	[MW]	>2	
Current (TRMS). always use external CT .../5A			
3 isolated inputs	[A]	0.01 - 5	
Min current value	[mA]	10	
Consumption	[VA]	0.2	
Max over current	[A]	10 (100 A for 1 second)	
Ratio transformer range kCT		0.01 - 5,000.00	
THD			
Voltage and current		Up to 31st harmonic	
Frequency			
Range	[Hz]	30 - 500	
Accuracy class			
Current	[%]	<0.5	
Voltage	[%]	<0.5	
Power	[%]	<1	
Power factor	[%]	<1	
Active energy	[%]	<1	IEC 62052-11 IEC 62053-11
Reactive energy	[%]	2	IEC 62053-23
Auxiliary supply			
ANR96-230, ANR96P-230, ANR96LAN-230, ANR96PRF-230, ANR96-230 02	[V]	85 ÷265 a.c./d.c.	
ANR96-24, ANR96P-24, ANR96LAN-230, ANR96PRF-230, ANR96-230 02	[V]	20 ÷ 60 a.c./d.c.	
Internal fuse		5x20 mm 315 mA 250 V Fast	
Frequency	[Hz]	50-60	
Operating environment			
Operating temperature	[°C]	-10 ÷ +50	
Storage temperature	[°C]	-15 ÷ +70	
Operating humidity	[°C]	90% without condensation	
Insulation			
Voltage insulation		3,700 V a.c. rms for 1 minute	
Remote coomunication			
RS485, RJ45			
Baud rate	[bps]	1,200 - 19,200	
Protocols		Modbus RTU, ASCII, Modbus TCP/IP, Profibus DP	

Energy efficiency

ANR network analyser

Internal memory		
For ANR96	[kbytes]	128 (usable: 80)
For ANR96P	[Mbytes]	1
Memory		Non-volatile data storage using internal battery
Data retention		5 years at 25 °C
Internal clock		
RTC clock		IEC 61038
Class of accuracy	[ppm]	5
Digital output		
Connection area	[mm^2]	0 ÷ 2.5
External pulse voltage	[V]	12 ÷ 230 V a.c./d.c.
Max current	[mA]	150
Digital input		
Voltage	[V]	12 - 24 d.c.

Energy efficiency
ANR network analyser

ANR96

ANR Network analyser
In highly demanding applications, where the need is to monitor not only the electrical parameters of the network, but also the network quality, ABB has in its range of front-panel devices the ANR network analysers - measuring instruments that permit advanced analysis of single- and three-phase electrical distribution networks. In particular, the ANR devices are able to measure and also record network parameters and alarms, associating them to a time-stamp for the retrieval of load profiles and exact time and date of occurrence of pre-programmed events; it finally allows routing data towards supervision and monitoring systems.

It also works as panel manager thanks to its digital inputs; the latter allows to have in a central unit the information about more devices like breakers, fuses and energy meters which convey to it the information about their status, alarms and energy pulses (whether equipped with output relays).

Available in 96 x 96 mm front-panel format, ANRs are equipped with a backlit graphic LCD display, allowing clear and immediate readings even in unlighted environments.
The ANR analysers measure TRMS current, TRMS voltage, frequency and temperature of the connected phases; they calculate concatenate voltages and three-phase system voltage and current, power factor and cosj, apparent, active and reactive power, THD total harmonic distortion up to the 31st harmonic, and measure active energy consumed and produced.
All codes have built-in communication features allowing remote communication via Modbus RTU, Modbus TCP/IP and Prodfibus DP.

All the parameters can be stored in the 128 kbyte internal memory, expanded to 1 Mbyte in the ANR96P version. All the measures can be stored in the internal memory; the amount of information that can be stored is further specified in the specific manual.

The devices come with the calibration certificate of the specific S/N and a mini-CD containing:
- Instruction manual
- Technical datasheet
- SW-01 software for managing the recorded data: the software can be used as first-hand tool to retrieve and record the measures, to set alarms and to create load profile. For more detailed information about its features and use, refer to the software's manual.

All ANR versions have 2 digital inputs, 2 digital outpus and RS485/RS232 serial port.
ANR96PRF models have built-in Profibus DP protocol. ANR96LAN models have built-in Modbus TCP/IP protocol and RJ45 port. ANR96 02 models have improved 0,2% accuracy class of measures.

Auxiliary supply	Storage	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
V a.c./d.c.		EAN	Type code	Order code	piece	kg	pc.
20÷60	128 Kb	943402	ANR96-24	2CSG113000R4051		0.430	1
85÷265	128 Kb	943501	ANR96-230	2CSG213000R4051		0.430	1
20÷60	1 Mb	943600	ANR96P-24	2CSG123000R4051		0.430	1
85÷265	1 Mb	943709	ANR96P-230	2CSG223000R4051		0.430	1
20÷60	128 kb	583332	ANR96PRF-24	2CSG258333R4051		0.430	1
85÷265	128 kb	571537	ANR96PRF-230	2CSG257153R4051		0.430	1
20÷60	128 kb	772538	ANR96LAN-24	2CSG277253R4051		0.430	1
85÷265	128 kb	770336	ANR96LAN-230	2CSG277033R4051		0.430	1
20÷60	128 kb	573838	ANR96-24 02	2CSG257383R4051		0.430	1
85÷265	128 kb	562030	ANR96-230 02	2CSG256203R4051		0.430	1

Energy efficiency

DMTME multimeters

DMTME

1,3 mm			
Auxiliary supply	[V rms]	230 +15% - 10% DMTME, DMTME-72 and DMTME-96	
[V rms]		400 +15% - 10% DMTME-72	
[V rms]		115 +15% - 10% DMTME , DMTME-96	
Frequency	[Hz]	45…65	
Power consumption	[VA]	<6	
Fuse protection		T0.1A	
Voltage measuring inputs			
Range	[V rms]	From 10 to 500 V AC phase to neutral; From 17 to 865 V AC phase to phase.	
Max. non destructive	[V rms]	550	
Impedance (L-N)	[MΩ]	>8	
Current measuring inputs (only external CTs .../5 A)			
Range	[A rms]	0.05…5	
Overload		1.1 permanent	
Measurement accuracy			
Voltage		±0.5% F.S. ±1 digit in range	
Current		±0.5% F.S. ±1 digit in range	
Active power		±1% ±0.1% F.S. from cosφ = 0.3 to cosφ = -0.3	
Frequency		±0.2% ±0.1Hz from 40.0 to 99.9 Hz	
		±0.2% ±1Hz from 100 to 500 Hz	
Energy metering			
Maximum metered value for single phase		4,294.9 MWh (MVarh) with KA = KV = 1	
Maximum metered value for three phase		4,294.9 MWh (MVarh) with KA = KV = 1	
Accuracy		Class 1	
Max. power consumption	[VA]	1.4 for each input (with Imax = 5A rms)	
Digital outputs			
Pulse duration		50 ms OFF (min)/ 50 ms ON	
Vmax on contact		48 V (d.c. or a.c. peak)	
Wmax dissipation		450 mW	
Max frequency		10 pulses/sec	
Imax contact		100 mA (d.c. or a.c. peak value)	
Insulation		750 Vmax	
Programmable parameters			
kVT transformer ratio Vprim/Vsec		1…500	
kCT transformer ratio Iprim/Isec		1…1,250	
Free hour counter	[h]	0…10,000,000, resettable	
Countdown	[h]	1…32,000	
Operating temperature	[°C]	0…+50	
Storage temperature	[°C]	-10…+60	
Relative humidity		90% max. (non condensing) at 40°C	
Overall dimensions	[mm]	105x90x58	DMTME
	[mm]	96x96x103	DMTME-96
	[mm]	72x72x90	DMTME-72

Energy efficiency
DMTME multimeters

DMTME

DMTME-96

DMTME-72

DMTME multimeters

The instruments DMTME are digital multimeters that allow the measurement, in TRMS mode, of the principal electrical parameters in three-phase and single-phase 110/230/400 Vac networks, including the max/min/average detection of the main electrical parameters and the active and reactive energy count. The multiple measured variables are displayed locally on four red 7-segment LED displays providing easy readability and simultaneous display of the measures of the electrical parameters of the phases individually and of the whole network.

The instruments DMTME combine, in a single instrument, the functions of multiple devices: voltmeter, ammeter, power factor meter, wattmeter, varmeter, frequency meter, active and reactive energy meters; it allows remarkable financial savings thanks to the reduction of space taken up in the panel and also of time required for cabling, along with the advantage of providing clear readings on a single device.

The DMTME-I-485, DMTME-I-485-96 and DMTME-I-485-72 models are additionally equipped with two digital outputs, fully programmable as either pulse outputs for remote metering of energy consumption, or as alarm outputs. The output relay can be set as NO or NC. Communication over Modbus RTU protocol is possible through the RS485 serial port. All versions come complete with Mini CD containing the instruction manual, technical documentation, Modbus communication protocol and the DMTME-SW tool, intended to be a first-hand PC-based application for the remote visualization of the measures.

DMTME modular multimeters

Auxiliary supply 230 V a.c. and 110 V a.c.

RS485 serial port	Program. digital output	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
		EAN	Type code	Order code	piece	kg	pc.
-	-	975700	DMTME	2CSM170040R1021		0.450	1
■	2	975809	DMTME-I-485	2CSM180050R1021		0.450	1

DMTME-96 panel multimeters

Auxiliary supply 230 V a.c. and 110 V a.c. Dimensions 96x96 mm

RS485 serial port	Program. digital output	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
		EAN	Type code	Order code	piece	kg	pc.
-	-	046752	DMTME-96	2CSG133030R4022		0.450	1
■	2	046851	DMTME-I-485-96	2CSG163030R4022		0.450	1

DMTME-72 panel multimeters

Auxiliary supply 230 V a.c. and 400 V a.c. Dimensions 72x72 mm

RS485 serial port	Program. digital output	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
		EAN	Type code	Order code	piece	kg	pc.
-	-	046554	DMTME-72	2CSG132030R4022		0.450	1
■	2	046653	DMTME-I-485-72	2CSG162030R4022		0.450	1

Energy efficiency

CUS 485 TCP/IP converter

CUS 485 TCP/IP

Technical features CUS 485 TCP/IP		
Supply voltage	[V]	220-240 a.c. ±15%
Power consumption	[VA]	4 max
Ethernet		100 base -T, RJ45 connector, TCP/IP protocol
RS485 serial port		standard, baudrate from 4800 to 19200 bps
Display, buttons		3 LED (1 green: ON, 1 red: LINK, 1 yellow: DATA) programming button
Mechanical features		protection degree: IP52 front - IP20 case and terminals - weight: 0.40 kg, connections with screw terminal for cable max. 2.5 mm^2, self extinguishing plastic case, DIN rail mounting, 3 modules-17,5 mm each
Environmental features		operating temperature: -10 +60 °C, humidity <90% storage temperature: -25 +70 °C
Standards		IEC EN 50081-2
		IEC EN 50082-1
		IEC EN 61010-1

CUS 485 TCP/IP converter

The CUS 485 TCP/IP converter allows the conversion of an RS485 serial communication port into a TCP/IP ethernet bus.
The CUS 485 TCP/IP converter acts as a bridge between Modbus/TCP/IP and Modbus/ASCII/RTU.
The serial port is linked to a device using Modbus/ASCII or Modbus/RTU communication or to a network of devices, while the ethernet port is linked to server/PC or PLC systems.
Server commands are sended via ethernet to CUS 485 TCP/IP that convert and send the commands to the slave device.

Version	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
serial converter - LAN TCP/IP network	585633	CUS 485 TCP/IP	2CSG258563R4051		0.5	1

Electricity meters
The details make the difference

Seals for terminals

Infrared port for communication between communications adapter and meter

DIN-Rail mounted and pro M design

MID approved and verified

Pixel or Segment LCD back-lit display

Configurable for both 3 and 4 wire networks

Seals for access to the SET button

Energy efficiency

Electricity meters. The details make the difference.

A series

Key applications

- Facility management installations
- Critical power
- Production lines
- System solutions
- Power quality
- Etc.

Key performance

Single phase or three phase
Direct connected up to 80 A or transformer current- and/or voltage transformers (CTVT)
Active energy measurement
- Class B (Cl. 1) or
- Class C (Cl. 0,5 S) on CTVT connected meters

Wide voltage range
- 100 - 690 V phase to phase
- 57,7 - 400 V phase to neutral

Alarm functions
MID (Module B and D)
Reactive energy measurement
Import/export measurement of energy
Optional communication
- via M-Bus or
- RS-485 (For Modbus RTU or EQ bus)

4 tariffs controlled by inputs,
- communication or
- built-in clock

Previous values by
- day or
- week or
- month

Demand measurement (per period)
- 3 maximum
- 1 minimum

Load profiles
- 8 channels independently configurable
- 40 000 values total

Harmonics measurement up to 16th harmonic
- Current
- Voltage
- and evaluation of THD

Pulse outputs (S0 compatible)

Instrumentation

The A series meters support reading of instrument values. A large number of electrical properties can be read. Depending on version of the meter the following data is available:
- Active power
- Apparent power
- Reactive power
- Current
- Voltage
- Frequency
- Power factor
- Harmonics (Current and Voltage)
- Total harmonic distortion

B series

Key applications

- Cost transfer/billing
- Solar power
- EV chargers
- Elevators/escalators
- Lighting
- Installation beside machines
- Etc.

Key performance

Single phase or three phase
Direct connected up to 65 A or CT connected (three phase types)
Active energy measurement
- Class B (Cl. 1) or
- Class C (Cl. 0,5 S) on CT connected meters

Alarm functions
MID (Module B and D)
Reactive energy measurement
Import/export measurement of energy
- Optional communication via via M-Bus or
- RS-485 (For Modbus RTU or EQ bus)

4 tariffs controlled by
- input or
- communication

Pulse outputs (S0 compatible)

Instrumentation

The B series meters support reading of instrument values.
A large number of electrical properties can be read. Depending on version of the meter the following data is available:
- Active power
- Apparent power
- Reactive power
- Current
- Voltage
- Frequency
- Power factor

C series

Key applications

- HVAC applications
- Stand-alone applications
- Domestic applications
- Camping and Marinas
- Etc.

Key performance

Single phase or three phase
Very compact
- 1 & 3 modules.

Direct connected up to 40 A
Active energy measurement
Accuracy class 1
Alarm functions
MID (Module B and F) as option
Pulse output (S0 compatible)

Instrumentation

The C series meters support reading of instrument values. A number of electrical properties can be read:
- Power factor
- Active power
- Current
- Voltage

G13

Key applications

- Meter management and configuration
- Remote reading of meter data
- Integration of meters in system solutions
- Etc.

Key performance

Connection to meters via
- RS-485 EQ bus or
- M-Bus
- IR (one port)

Ethernet connection
- https, JSON

Upgrade of firmware
- Gateway
- Meters (EQ bus)

Time synchronization
Routing of data

Built-in webserver

Meter readout via webserver
- Individual meters
- Cluster of meters
- CSV export of meter data
- Read instrument values

User authentication
- Administrator
- Restricted user

Gateway settings
- IP address
- Gateway name
- Time and date

Meter communication
- Meter registration
- Scan network
- Register meter
- Add meter access rights
- Read all data, all data found in the meters could be read in the webserver
- Meter settings

Meter configuration via webserver
Basic meter settings
- Ratio
- Time/date
- Pulse output/alarm
- Tariff settings
- Inputs/outputs settings

Advanced function settings
- Demand
- Previous values
- Load profile

Energy efficiency

Selection guide EQ meters.

How do I select the best meter for my application?
There are many versions of EQ meters in order to meet your requests. The EQ program comprises meters with different functionalities such as tariffs, communication interfaces or advanced clock functions. Spend a little time to evaluate the functions and imagine how they could add extra value to your metering. For example, the input counter (from Silver level) on an EQ meter can be used to count products produced by a machine and be read out together with the energy consumption of the same machine. In one easy go you can allocate energy to any produced product from one source. Another useful function is previous values (from Gold level). If you charge users in intervals the meter can secure the data even in the event of a broken communication link. You can collect the correct interval data later and also make it visible for your counterpart immediately on the meters display in case of any discussions.

Make the meter to an asset.
Take the step from passive meter reading to an active user of the data you can retrieve. The meter can be an important asset for you in order to avoid costs like penalties or extra charge for reactive energy (from Bronze level). Keep track of your maximum demand and reduce them to avoid charges. EQ meters can tell you the value of the maximum/minimum demand and also when it occurred. Harmonics is the source of many problems for all sorts of equipment connected to the low voltage network. Use an EQ meter (Platinum level) to measure the THD and isolate the source before you have to take the cost and consequences of poor power quality.

Function	Single phase					Three phase				
	C11	B21	A41	A42	C13	B23	B24	A43	A44
Direct connected	1	1 3	1 3 4		1	1 2 3		1 2 3 5	
Transformer connected				1 3 5			1 2 3		1 2 3 4 5
2 element metering						1 2 3	1 2 3	1 2 3 5	1 2 3 4 5
3 element metering					1	1 2 3	1 2 3	1 2 3 5	1 2 3 4 5
Accuracy 1 %, Class 1, Class B	1	1 3	1 3 4	1 3	1	1 2 3	1 2	1 2 3 5	1 2 3
Accuracy 0.5 %, Class 0,5 S, Class C				5			3		3 4 5
Active energy	1	1 3	1 3 4	1 3 5	1	1 2 3	1 2 3	1 2 3 5	1 2 3 4 5
Reactive energy		3	3 4	3 5		2 3	2 3	2 3 5	2 3 4 5
Apparent energy		3	3 4	3 5		2 3	2 3	2 3 5	2 3 4 5
Import/Export energy		3	3 4	3 5		2 3	2 3	2 3 5	2 3 4 5
Tariff registers, 1-4		3	3 4	3 5		3	3	3 5	3 4 5
Instrument values	1	1 3	1 3 4	1 3 5	1	1 2 3	1 2 3	1 2 3 5	1 2 3 4 5
Alarm function	1	1 3	1 3 4	1 3 5	1	1 2 3	1 2 3	1 2 3 5	1 2 3 4 5
Harmonics, 2th-16th and THD				5				5	5
Previous values - day, week, month			4	5				5	4 5
Max and min demand			4	5				5	4 5
Load profiles - 8 channels				5				5	5
Pulse output	1	1	1	1	1	1 2	1 2	1 2	1 2
I/O board - 2 in, 2 out		3	3 4	3		3	3	3	3 4
Configurable I/O - 4 I/O channels				5				5	5
Tariffs controlled by input		3	3 4	3 5		3	3	3 5	3 4 5
Tariffs controlled by communication		3	3 4	3 5		3	3	3 5	3 4 5
Tariffs controlled by clock			4	5				5	4 5
MID approved, verified	optional	1 3	1 3 4	1 3 5	optional	1 2 3	1 2 3	1 2 3 5	1 2 3 4 5
IEC approved	1	1 3	1 3 4	1 3 5	1	1 2 3	1 2 3	1 2 3 5	1 2 3 4 5
Communication - Infrared (M-Bus)		1 3	1 3 4	1 3 5		1 2 3	1 2 3	1 2 3 5	1 2 3 4 5
Communication - M-Bus		optional	optional	optional		optional	optional	optional	optional
Communication - RS-485 Modbus		optional	optional	optional		optional	optional	optional	optional
Communication - RS-485 EQ bus		optional	optional	optional		optional	optional	optional	optional

1 = Steel
2 = Bronze
3 = Silver
4 = Gold
5 = Platinum
☐ = Not available
Optional = Available on some order codes

Energy efficiency

Energy meters selection table





	EQ meters C11	EQ meters C13	EQ meters B21	EQ meters B23	EQ meters B24
Overall dimensions	1 DIN module	3 DIN modules	2 DIN modules	4 DIN modules	
Display	LCD		Backlit LCD		
Operating voltage	230 V AC	3x230/400 V AC	220...240 V AC	3x220/380...240/415 V AC	
Frequency	50 / 60 Hz				
Max current	40 A		65 A		6 A
CTVT connection	Direct	Direct	Direct	Direct	CT
Active energy	Standard feature				
Reactive energy	-	-	Optional		
Apparent energy	-	-			
Accuracy	Cl. 1 (B)				Cl. 1 (B), Cl. 0,5 S (C)
Up to 4 tariffs	-	-	Optional		
Max/min demand	-	-	-	-	-
Previous values	-	-	-	-	-
Load profiles	-	-	-	-	-
Alarm function	Standard feature				
Harmonic analysis	-	-	-	-	-
Event log	-	-	Standard feature		
Active power	Instrumentation parameters (standard)				
Voltage					
Current					
Power factor					
Frequency	-	-	Instrumentation parameters		
Pulse output	Standard feature				
I/O	1 Output*		1 Output* or 2 outputs/2 inputs (optional)		
Built-in serial communication	-	-	IR / M-Bus (optional) / RS-485 (optional)		
Protocols	-	-	M-Bus, Modbus RTU, EQ bus		

*) The pulse output can be assigned as an output if it is not used for pulses
**) For 16,7 Hz meters





	EQ meters A41	EQ meters A42	EQ meters A43	EQ meters A44	EQ meters G13
	4 DIN modules		7 DIN modules		4 DIN modules
	Backlit Pixel (LCD)				No display
	57.7...288 V AC	57.7...288 V AC or 100...288** V AC	3x57.7/100 ... 288/500	3x57.7/100 ... 288/500 or 3x57.7/100 ... 400/690	100...240 V AC
	50 / 60 Hz	50 / 60 Hz (or 16,7 / 50 / 60 Hz)		50 / 60 Hz	
	80 A	6 A	80 A	6 A	-
	Direct	CTVT	Direct	CTVT	-
	Standard feature				-
	optional				-
					-
	Cl. 1 (B)	Cl. 1 (B), Cl. 0,5 S (C)	Cl. 1 (B)	Cl.1 (B), Cl. 0,5 S (C)	-
	Optional				-
	Optional				-
					-
					-
	Standard feature				
	Power quality (optional)				-
	Standard feature				-
	Instrumentation parameters (standard)				-
					-
					-
					-
	Instrumentation parameters (optional)				-
	Standard feature				-
	1 output or 2 outputs/2 inputs (optional) or 4 configurable inputs and outputs (optional)				-
	IR / M-Bus (optional) / RS-485 (optional)				IR, RS-485, M-Bus, Ethernet
	M-Bus, Modbus, EQ bus				HTTPS, EQ bus, M-Bus, JSON

Energy efficiency

EQ meters A series

A-series

Technical features	
	A41
Voltage/current inputs	
Nominal voltage	230 V AC
Voltage range	57.7 - 288 V AC (-20% - +15%)
Power dissipation voltage circuits	1.5 VA (0.6 W) total at 230 V AC
Power dissipation current circuits	0.006 VA (0.006 W) at I_{ref} and I_b
Base current I_b	5 A
Rated current I_n	-
Reference current I_{ref}	5 A
Transitional current I_{tr}	0.5 A
Maximum current I_{max}	80 A
Minimum current I_{min}	0.25 A
Starting current I_{st}	< 20 mA
Terminal wire area	1 - 25 mm^2
Recommended tightening torque	2 Nm
Communication	
Terminal wire area	0.5 - 1 mm^2
Recommended tightening torque	0.25 Nm
Transformer ratios	
Configurable current ratio (CT)	-
Configurable voltage ratio (VT)	-
Pulse indicator (LED)	
Pulse frequency	1000 imp/kWh
Pulse length	40 ms
Frequency	50 or 60 Hz ± 5%
Accuracy Class	B (Cl.1) and Reactive Cl. 2
Active energy	1%
Display of energy	Pixel oriented display (LCD)
Environmental	
Operating temperature	-40°C - +70°C
Storage temperature	-40°C - +85°C
Humidity	75% yearly average, 95% on 30 days/year
Resistance to fire and heat	Terminal 960°C, cover 650°C (IEC 60695-2-1)
Resistance to water and dust	IP20 on terminal block without protective enclosure and IP51 in protective enclosure, according to IEC 60529.
Mechanical environment	Class M2 in accordance with the Measuring Instrument Directive (MID). (2014/32/EU).
Electromagnetic environment	Class E2 in accordance with the Measuring Instrument Directive (MID), (2014/32/EU).

*) For 690 V AC meters:
Power dissipation voltage circuits 2.2 VA (1.0 W) total at 230 V AC
Power dissipation current circuits 0.001 VA (0.001 W) per phase at Iref and In

A42	A43	A44
	3x230/400 V AC	
57.7 - 288 or 100 ... 288 V AC (-20% - +15%)	3x57.7/100 ... 288/500 V AC (-20% - +15%)	3x57.7/100 ... 288/500 or 3x100/173 ... 400/690 V AC (-20% - +15%)
	1.8 VA (0.8 W) total at 230 V AC	
0.001 VA (0.001 W) at I_{ref} and I_n	0.006 VA (0.006 W) per phase at I_{ref}	0.001 VA (0.001 W) at I_{ref} and I_n*
-	5 A	-
1 A	-	1 A
1 A	5 A	1 A
0.05 A	0.5 A	0.05 A
6 A	80 A	6 A
0.02 A	0.25 A	0.01 A
< 1 mA	< 20 mA	< 1 mA
0.5 - 10 mm²	1 - 25 mm²	0.5 - 10 mm²
1.2 Nm	2 Nm	1.2 Nm
		0.5 - 1 mm²
		0.25 Nm
1/9 - 9999/1	-	1/9 - 9999/1
1/999 - 999999/1	-	1/999 - 999999/1
5000 imp/kWh	1000 imp/kWh	5000 imp/kWh
40 ms		
50 or 60 Hz ± 5 % (or 16.7 Hz optional)	50 or 60 Hz ± 5 %	
B (Cl.1), C (Cl. 0,5 S) and Reactive Cl. 2	A (Cl.2), B (Cl.1) and Reactive Cl. 2	B (Cl.1), C (Cl. 0,5 S) and Reactive Cl. 2
0.5%, 1%	1%	0.5%, 1%
-40°C - +70°C		
-40°C - +85°C		
75% yearly average, 95% on 30 days/year		
Terminal 960°C, cover 650°C (IEC 60695-2-1)		
IP20 on terminal block without protective enclosure and IP51 in protective enclosure, according to IEC 60529.		
Class M2 in accordance with the Measuring Instrument Directive (MID). (2014/32/EU).		
Class E2 in accordance with the Measuring Instrument Directive (MID), (2014/32/EU).		

Energy efficiency
EQ meters A series

The A series meters ranges from single phase to three phase meters and from basic up to advanced functionality without any comparison. The A series meters are mounted on a DIN rail and are suitable for installation in distribution boards and small enclosures such as consumer units. With the main terminals in accordance with DIN 43857 and accessible from the below the meters, the A series is suitable for many applications.

The low rated or base currents of these products ensures high dynamic performance with superior accuracy even at low currents. The meters support a wide voltage range as well as a wide temperature range. The display is pixel-oriented and can display up to four quantities at the same time. Navigating the meter is easily done via the push-buttons below the display. To configure the meter settings, the set button must be accessed and this
button is protected against unauthorized use when the “glass lid” on the front of the meter is closed and sealed. The exceptional low power consumption of the meters makes them economical in the long run - an important feature specially for large meter populations.

Data from the A series meters can be collected via pulse output or serial communication. The pulse output is a solid state relay that generates pulses proportionally to the measured energy. The meters can also be equipped with built-in serial communication interfaces for M-Bus or Modbus RTU (RS-485). Meters with RS-485 interface can also be set to communicate over the new EQ bus with the gateway G13. All meters in the A series come with an infrared port for communication with an external Serial Communication Adapter (SCA) such as the KNX adapter.

A series supports following instrumentation values dependent on version of meter:
- Active energy
- Current
- Voltage
- Power factor
- Reactive power
- Total harmonic distortion
- Apparent power
- Frequency
- Harmonics

A series meters with a functionality level of Gold or Platinum have an internal clock for advanced functionality:
- Event log
- Previous values
- Load profile
- Maximum and minimum demand

The tariffs are controlled via inputs, via communication or via an internal clock in Gold and Platinum versions.

The A series support up to four I/O’s. It can be two inputs and two outputs in a fixed configuration or four I/O points that are freely configured to input or output. Inputs can be used for counting pulses from e.g. a water meter, or reading status from external devices. Outputs can be used as pulse outputs or controlling external apparatus like
a contactor or an alarm (connected via an external relay). The I/O’s need an external voltage supply. The A series meters are type approved according to IEC and they are both type approved and verified according to MID. MID is the Measuring Instruments Directive 2014/32/EU from the European Commission. MID type approval and verification is mandatory for meters in billing applications within EU and EEA. The type approval is according to standards that covers all relevant technical aspects of the meter. These include climate conditions, electromagnetic compatibility (EMC), electrical requirements, mechanical requirements and accuracy.

Energy efficiency

EQ meters A series

A series

Technical features		
	A series	
Outputs		
Type	Transistor or MOSFET	
Current	2 - 100 mA	
Voltage	5 - 240 V AC/DC. For meters with only 1 output, 5 - 40 V DC.	
Pulse output frequency	Programmable: 1 - 999999 imp/kWh	
Pulse length	Programmable: 10 - 990 ms	
Terminal wire area	0.5 - 1 mm^2	
Recommended tightening torque	0.25 Nm	
Inputs		
Voltage	0 - 240 V AC/DC	
OFF	0 - 5 V AC/DC	
ON	57 - 240 V AC/24 - 240 V DC	
Min. pulse lenght	30 ms	
Terminal wire area	0.5 - 1 mm^2	
Recommended tightening torque	0.25 Nm	
EMC compatibility		
Impulse voltage test	6 kV 1.2/50 µs (IEC 60060-1)	
Surge voltage test	4 kV 1.2/50 µs (IEC 61000-4-5)	
Fast transient burn test	4 kV (IEC 61000-4-4)	
Immunity to electromagnetic HF-fields	80 MHz - 2 GHz at 10 V/m (IEC 61000-4-3)	
Immunity to conducted disturbance	150 kHz - 80 MHz, (IEC 61000-4-6)	
Immunity to disturbance with harmonics	2kHz - 150kHz	
Radio frequency emission	EN 55022, class B (CISPR22)	
Electrostatic discharge	15 kV (IEC 61000-4-2)	
Standards	EC 62052-11, IEC 62053-21 class 1 & 2, IEC 62053-22 class 0,5 S, IEC 62053-23 class 2, IEC 62054-21, GB/T 17215.211-2006, GBT 17215.321-2008 class 1 & 2, GB/T 17215.322-2008 class 0,5 S, GB 4208-2008, EN 50470-1, EN 50470-3 category A, B & C EQ meters.	
Mechanical		
Material	Polycarbonate in transparent front glass, bottom case, upper case and terminal cover, Glass reinforced polycarbonate in terminal block.	
Dimensions	**A41 / A42**	**A43 / A44**
Width	70 mm	123 mm
Height	97 mm	97 mm
Depth	65 mm	65 mm
DIN modules	4	7

Energy efficiency

EQ meters A series

A41

Direct connected electricity meter up to 80 A. Verified and approved according to MID. IEC approval.Instrument values. Alarm function. Communication - Infrared (M-Bus). Optional - Communication with M-Bus, RS-485 Modbus, RS-485 EQ bus.

EQ meters single phase electricity meter, 4 DIN with IR port, 80 A

Class B (Cl. 1) with functionality level Steel. Active energy

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
57.7...288 V AC, Pulse output	705547	A41 111 - 100	2CMA170554R1000		0.230	1
57.7...288 V AC, Pulse output, RS-485	705004	A41 112 - 100	2CMA170500R1000		0.230	1
57.7...288 V AC, Pulse output, M-Bus	002400	A41 113 - 100	2CMA100240R1000		0.230	1

Class 1 (Reactive Class 2) with functionality level Silver. Active and reactive energy, import/export, tariffs 1-4, tariff controll via inputs and communication.

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
57.7...288 V AC, 2 output, 2 input, RS-485	705035	A41 312 - 100	2CMA170503R1000		0.230	1
57.7...288 V AC, 2 output, 2 input. M-Bus	705042	A41 313 - 100	2CMA170504R1000		0.230	1

Class B (Cl. 1) (Reactive Cl. 2) with functionality level Gold. Active and reactive energy, import/export, tariffs 1-4, tariff controlled via inputs, communication or clock, previous values, max and min demand.

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
57.7...288 V AC, 2 output, 2 input, RS-485	705059	A41 412 - 100	2CMA170505R1000		0.230	1

Energy efficiency
EQ meters A series

A42

Transformer CTVT connected electricity meter up to 6 A. Verified and approved according to MID. IEC approval. Voltage V - 57...288 V AC. Instrument values. Alarm function. Communication - Infrared (M-Bus). Optional - Communication with M-Bus, RS-485 Modbus, RS-485 EQ bus.

EQ meters single phase electricity meter, 4 DIN with IR port, 6 A

Class B (Cl. 1) with functionality level Steel. Active energy

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
57.7...288 V AC, Pulse output	705554	A42 111 - 100	2CMA170555R1000		0.200	1
57.7...288 V AC, Pulse output, RS-485	705103	A42 112 - 100	2CMA170510R1000		0.200	1
57.7...288 V AC, Pulse output, M-Bus	002424	A42 113 - 100	2CMA100242R1000		0.200	1

Class B (Cl. 1) (Reactive Cl. 2) with functionality level Silver. Active and reactive energy, import/export, tariffs 1-4, tariff controll via inputs and communication.

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
57.7...288 V AC, 2 output, 2 input, RS-485	705127	A42 312 - 100	2CMA170512R1000		0.200	1

Class C (Cl. 0.5 S) (Reactive Cl. 2) with functionality level Platinum. Active and reactive energy, import/export, tariffs 1-4, tariff controlled via inputs, communication or clock, previous values, max and min demand, advanced load profiles, harmonics and THD. Versions for 16.7, 50 or 60 Hz.

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
57.7...288 V AC, Configurable 4 I/O channels, RS-485	002387	A42 552 - 100	2CMA100238R1000		0.200	1
100...288 V AC, Configurable 4 I/O channels, RS-485 16.7*, 50 or 60 Hz	705189	A42 552 - 120	2CMA100518R1000		0.200	1
100...288 V AC, Configurable 4 I/O channels, M-Bus 16.7*, 50 or 60 Hz	705196	A42 553 - 120	2CMA100519R1000		0.200	1

*) The meters are not tested and approved for placement on rolling stock.

Energy efficiency

EQ meters A series

A43

Direct connected electricity meter up to 80 A. Verified and approved according to MID. IEC approval. 2- and 3-element metering. Instrument values. Alarm function. Communication - Infrared (M-Bus). Optional - Communication with M-Bus, RS-485 Modbus, RS-485 EQ bus.

EQ meters three phase electricity meter, 7 DIN with IR port, 80 A

Class B (Cl. 1) with functionality level Steel. Active energy

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
3 x 57.7/100...288/500 V AC, Pulse output	705202	A43 111 - 100	2CMA170520R1000		0.440	1
3 x 57.7/100...288/500 V AC, Pulse output, RS-485	002448	A43 112 - 100	2CMA100244R1000		0.440	1
3 x 57.7/100...288/500 V AC, Pulse output, M-Bus	002455	A43 113 - 100	2CMA100245R1000		0.440	1

Class B (Cl. 1) (Reactive Cl. 2) with functionality level Bronze. Active and reactive energy, import/export.

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
3 x 57.7/100...288/500 V AC, Pulse output, RS-485	705226	A43 212 - 100	2CMA170522R1000		0.440	1
3 x 57.7/100...288/500 V AC, Pulse output, M-Bus	705233	A43 213 - 100	2CMA170523R1000		0.440	1

Class B (Cl. 1) (Reactive Cl. 2) with functionality level Silver. Active and reactive energy, import/export, tariffs 1-4, tariff controll via inputs and communication.

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
3 x 57.7/100...288/500 V AC, 2 output, 2 input, RS-485	705257	A43 312 - 100	2CMA170525R1000		0.440	1
3 x 57.7/100...288/500 V AC, 2 output, 2 input, M-Bus	705264	A43 313 - 100	2CMA170526R1000		0.440	1

Class B (Cl. 1) (Reactive Cl. 2) with functionality level Platinum. Active and reactive energy, import/export, tariffs 1-4, tariff controlled via inputs, communication or clock, previous values, max and min demand, advanced load profiles, harmonics and THD.

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
3 x 57.7/100...288/500 V AC, Configurable 4 I/O channels, RS-485	705318	A43 512 - 100	2CMA170531R1000		0.440	1
3 x 57.7/100...288/500 V AC, Configurable 4 I/O channels, M-Bus	705325	A43 513 - 100	2CMA170532R1000		0.440	1

Energy efficiency

EQ meters A series

A44

Transformer CTVT connected electricity meter up to 6 A. Verified and approved according to MID. IEC approval. 2- and 3-element metering. Instrument values. Alarm function. Communication - Infrared (M-Bus). Optional - Communication with M-Bus, RS-485 Modbus, RS-485 EQ bus.

EQ meters three phase electricity meter, 7 DIN with IR port, 6 A

Class B (Cl. 1) with functionality level Steel. Active energy

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
3 x 57.7/100...288/500 V AC, Pulse output	705332	A44 111 - 100	2CMA170533R1000		0.350	1
3 x 57.7/100...288/500 V AC, Pulse output, RS-485	002486	A44 112 - 100	2CMA100248R1000		0.350	1
3 x 57.7/100...288/500 V AC, Pulse output, M-Bus	002493	A44 113 - 100	2CMA100249R1000		0.350	1

Class B (Cl. 1) (Reactive Cl. 2) with functionality level Bronze. Active and reactive energy, import/export.

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
3 x 57.7/100...288/500 V AC, Pulse output	000130	A44 211 - 100	2CMA100013R1000		0.350	1
3 x 57.7/100...288/500 V AC, Pulse output, RS-485	705349	A44 212 - 100	2CMA170534R1000		0.350	1
3 x 57.7/100...288/500 V AC, Pulse output, M-Bus	705356	A44 213 - 100	2CMA170535R1000		0.350	1

Class B (Cl. 1) (Reactive Cl. 2) with functionality level Silver. Active and reactive energy, import/export, tariffs 1-4, tariff controll via inputs and communication.

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
3 x 57.7/100...288/500 V AC, 2 output, 2 input	705363	A44 311 - 100	2CMA170536R1000		0.350	1

Class C (Cl. 0.5 S) (Reactive Cl. 2) with functionality level Silver. Active and reactive energy, import/export, tariffs 1-4, tariff controll via inputs and communication.

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
3 x 57.7/100...288/500 V AC, 2 output, 2 input, RS-485	705370	A44 352 - 100	2CMA170537R1000		0.350	1
3 x 57.7/100...288/500 V AC, 2 output, 2 input, M-Bus	705387	A44 353 - 100	2CMA170538R1000		0.350	1

Class C (Cl. 0.5 S) (Reactive Cl. 2) with functionality level Gold. Active and reactive energy, import/export, tariffs 1-4, tariff controlled via inputs, communication or clock,previous values, max and min demand.

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
3 x 57.7/100...288/500 V AC, 2 output, 2 input, RS-485	705400	A44 452 - 100	2CMA170540R1000		0.350	1

Class C (Cl. 0.5 S) (Reactive Cl. 2) with functionality level Platinum. Active and reactive energy, import/export, tariffs 1-4, tariff controlled via inputs, communication or clock, previous values, max and min demand, advanced load profiles, harmonics and THD.

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
3 x 57.7/100...288/500 V AC, Configurable 4 I/O channels, RS-485	705455	A44 552 - 100	2CMA170545R1000		0.350	1
3 x 57.7/100...288/500 V AC, Configurable 4 I/O channels, M-Bus	705462	A44 553 - 100	2CMA170546R1000		0.350	1
3 x 57.7/100...400/690 V AC, 1 input + 1 output, RS-485	705493	A44 552 - 110	2CMA170549R1000		0.350	1
3 x 57.7/100...400/690 V AC, 1 input + 1 output, M-Bus	705486	A44 553 - 110	2CMA170548R1000		0.350	1

Energy efficiency

EQ meters B series

B series

Technical features	
	B21
Voltage/current inputs	
Nominal voltage	230 V AC
Voltage range	220...240 VAC (-20% - +15%)
Power dissipation voltage circuits	1.1 VA (0.5 W) total at 230 V AC
Power dissipation current circuits	0.012 VA (0.012 W) at I_{ref} and I_b
Base current I_b	5 A
Rated current I_n	-
Reference current I_{ref}	5 A
Transitional current I_{tr}	0.5 A
Maximum current I_{max}	65 A
Minimum current I_{min}	0.25 A
Starting current I_{st}	< 20 mA
Terminal wire area	1 - 25 mm^2
Recommended tightening torque	2 Nm
Communication	
Terminal wire area	0.5 - 1 mm^2
Recommended tightening torque	0.25 Nm
Transformer ratios	
Configurable current ratio (CT)	-
Pulse indicator (LED)	
Pulse frequency	1000 imp/kWh
Pulse length	40 ms
General data	
Frequency	50 or 60 Hz ± 5%
Accuracy Class	B (Cl. 1) and Reactive Cl. 2
Active energy	1%
Display of energy	6 digit LCD
Environmental	
Operating temperature	-40°C - +70°C
Storage temperature	-40°C - +85°C
Humidity	75% yearly average, 95% on 30 days/year
Resistance to fire and heat	Terminal 960 °C, cover 650°C (IEC 60695-2-1)
Resistance to water and dust	IP20 on terminal block without protective enclosure and IP51 in protective enclosure, according to IEC 60529.
Mechanical environment	Class M2 in accordance with the Measuring Instrument Directive (MID). (2014/32/EU).
Electromagnetic environment	Class E2 in accordance with the Measuring Instrument Directive (MID), (2014/32/EU).

B23	**B24**
3x230/400 V AC	
3x220/380...240/415 VAC (-20% - +15%)	
1.7 VA (0.8 W) total at 230 V AC	
0.007 VA (0.007 W) per phase at I_{ref} and I_b	0.0007 VA (0.0005 W) per phase at I_{ref} and I_n
	-
	1 A
	-
	0.05 A
	6 A
	0.02 A
	< 1 mA
	0.5 - 10 mm^2
	1.2 Nm
	1/9 - 9999/1
	5000 imp/kWh
B (Cl. 1) or C (Cl. 0.5 S) and Reactive Cl. 2	
	0.5%, 1%
7 digit LCD	
IP20 on terminal block without protective enclosure and IP51 in protective enclosure, according to IEC 60529.	
Class M2 in accordance with the Measuring Instrument Directive (MID). (2014/32/EU).	
Class E2 in accordance with the Measuring Instrument Directive (MID), (2014/32/EU).	

Energy efficiency
EQ meters B series

The EQ meters, B series is a range of meters for single phase and three phase metering. The B series meters are mounted on a DIN rail and are suitable for installation in distribution boards and small enclosures such as consumer units. The B series are suitable in applications where there is a need for reliable energy measurements and where space is limited.

The low rated or base currents of these products ensures high dynamic performance with superior accuracy even at low currents. The B series meters are meters for many applications and installations. Navigating the meter is easily done via the push-buttons below the display. To configure the meter settings, the set button must be accessed and this button is protected against unauthorized use when the “glass lid” on the front of the meter is closed and sealed. The exceptional low power consumption of the meters, less than 0.9 VA and 1.6 VA, makes them economical in the long run - an important feature specially for large meter populations.

Data from the B series meters can be collected via pulse output or serial communication. The pulse output is a solid state relay that generates pulses proportionally to the measured energy. The meters can also be equipped with built-in serial communication interfaces for M-Bus or Modbus RTU (RS-485). Meters with RS-485 interface can also be set to communicate over the new EQ bus with the new gateway G13. All meters in the B series come with an infrared port for communication with an external Serial Communication Adapter (SCA) such as the KNX adapter.

The B series meters support reading of instrument values. A large number of electrical properties can be read. Depending on version of the meter the following data is available:
- Active power
- Apparent power
- Reactive power
- Current
- Voltage
- Frequency
- Power factor

Up to 4 tariffs are controlled via inputs or communication.

The B series support two inputs and two outputs in a fixed configuration. Inputs can be used for counting pulses from e.g. a water meter, or reading status from external devices. Outputs can be used as pulse outputs or controlling external apparatus like a contactor or an alarm (connected via an external relay).

The B series meters are type approved according to IEC and they are both type approved and verified according to MID. MID is the Measuring Instruments Directive 2014/32/EU from the European Commission. MID type approval and verification is mandatory for meters in billing applications within EU and EEA. The type approval is according to standards that covers all relevant technical aspects of the meter. These include climate conditions, electromagnetic compatibility (EMC), electrical requirements, mechanical requirements and accuracy.

Energy efficiency
EQ meters B series

B series

Technical features		
	B series	
Outputs		
Type	Transistor or MOSFET	
Current	2 - 100 mA	
Voltage	5 - 240 V AC/DC. For meters with only 1 output 5 - 40 VDC.	
Pulse output frequency	Programmable 1 - 999999 imp/kWh	
Pulse length	Programmable 10 - 990 ms	
Terminal wire area	0.5 - 1 mm^2	
Recommended tightening torque	0.25 Nm	
Inputs		
Voltage	0 - 240 V AC/DC	
OFF	0 - 5 V AC/DC	
ON	57 - 240 V AC/24 - 240 V DC	
Min. pulse length	30 ms	
Terminal wire area	0.5 - 1 mm^2	
Recommended tightening torque	0.25 Nm	
EMC compatibility		
Impulse voltage test	6 kV 1.2/50µs (IEC 60060-1)	
Surge voltage test	4 kV 1.2/50µs (IEC 61000-4-5)	
Fast transient burn test	4kV (IEC 61000-4-4)	
Immunity to electromagnetic HF-fields	80 MHz - 2 GHz (IEC 61000-4-6)	
Immunity to conducted disturbance	150kHz - 80MHz (IEC 61000-4-6)	
Immunity to disturbance with harmonics	2kHz - 150kHz	
Radio frequency emission	EN 55022, class B (CISPR22)	
Electrostatic discharge	15 kV (IEC 61000-4-2)	
Standards	IEC 62052-11, IEC 62053-21 class 1 & 2, IEC 62053-22 class 0,5 S, IEC 62053-23 class 2, IEC 62054-21, GB/T 17215.211-2006, GB/T 17215.312-2008 class 1 & 2, GB/T 17215.322-2008 class 0,5 S, GB 4208-2008, EN 50470-1, EN 50470-3 category A, B & C	
Mechanical		
Material	Polycarbonate in transparent front glass. Glass reinforced polycarbonate in bottom case and upper case. Polycarbonate in terminal cover.	
Dimensions	**B21**	**B23/B24**
Width	35 mm	70 mm
Height	97 mm	97 mm
Depth	65 mm	65 mm
DIN modules	2	4

Energy efficiency

EQ meters B series

B21

Direct connected electricity meter up to 65 A. Verified and approved according to MID. IEC approval. Instrument values. Alarm function. - Communication - Infrared (M-Bus). Optional - Communication with M-Bus, RS-485 Modbus, RS-485 EQ bus.

EQ meters single phase electricity meter, 2 DIN with IR port, 65 A

For direct connection up to 65 A. Class B (Cl. 1) with functionality level Steel.
Active energy

Description	Bbn	Order details		Price	Weight	Pack
	7392696			1 piece	1 piece	unit
	EAN	Type code	Order code		kg	pc.
1 x 230 V AC, Pulse output	001496	B21 111 - 100	2CMA100149R1000		0.140	1
1 x 230 V AC, Pulse output, RS-485	001502	B21 112 - 100	2CMA100150R1000		0.150	1
1 x 230 V AC, Pulse output, M-Bus	001519	B21 113 - 100	2CMA100151R1000		0.150	1

For direct connection up to 65 A. Class B (Cl. 1) (Reactive Cl. 2) with functionality level Silver.
Active and reactive energy, import/export, tariffs 1-4, tariff controll via inputs and communication.

Description	Bbn	Order details		Price	Weight	Pack
	7392696			1 piece	1 piece	unit
	EAN	Type code	Order code		kg	pc.
1 x 230 V AC, 2 output, 2 input	001540	B21 311 - 100	2CMA100154R1000		0.140	1
1 x 230 V AC, 2 output, 2 input, RS-485	001557	B21 312 - 100	2CMA100155R1000		0.150	1
1 x 230 V AC, 2 output, 2 input, M-Bus	001564	B21 313 - 100	2CMA100156R1000		0.150	1

Energy efficiency
EQ meters B series

B23

Direct connected electricity meter up to 65 A. Verified and approved according to MID. IEC approval. 2- and 3-element metering. Instrument values. Alarm function. Communication - Infrared (M-Bus). Optional - Communication with M-Bus, RS-485 Modbus, RS-485 EQ bus.

EQ meters three phase electricity meter, 4 DIN with IR port, 65 A

Class B (Cl. 1) with functionality level Steel.
Active energy

Description	Bbn	Order details		Price	Weight	Pack
	7392696			1 piece	1 piece	unit
	EAN	Type code	Order code		kg	pc.
3 x 230/400 V AC, Pulse output	001632	B23 111 - 100	2CMA100163R1000		0.310	1
3 x 230/400 V AC, Pulse output, RS-485	001649	B23 112 - 100	2CMA100164R1000		0.320	1
3 x 230/400 V AC, Pulse output, M-Bus	001656	B23 113 - 100	2CMA100165R1000		0.330	1

Class B (Cl. 1) (Reactive Cl. 2) with functionality level Bronze.
Active and reactive energy, import/export.

Description	Bbn	Order details		Price	Weight	Pack
	7392696			1 piece	1 piece	unit
	EAN	Type code	Order code		kg	pc.
3 x 230/400 V AC, Pulse output, RS-485	001663	B23 212 - 100	2CMA100166R1000		0.320	1

Class B (Cl. 1) (Reactive Cl. 2) with functionality level Silver.
Active and reactive energy, import/export, tariffs 1-4, tariff controll via inputs and communication.

Description	Bbn	Order details		Price	Weight	Pack
	7392696			1 piece	1 piece	unit
	EAN	Type code	Order code		kg	pc.
3 x 230/400 V AC, 2 output, 2 input	001687	B23 311 - 100	2CMA100168R1000		0.330	1
3 x 230/400 V AC, 2 output, 2 input, RS-485	001694	B23 312 - 100	2CMA100169R1000		0.340	1
3 x 230/400 V AC, 2 output, 2 input, M-Bus	001700	B23 313 - 100	2CMA100170R1000		0.350	1

Energy efficiency

EQ meters B series

B24

Transformer CT connected electricity meter up to 6 A. Verified and approved according to MID. IEC approval. 2- and 3-element metering. Instrument values. Alarm function. Communication - Infrared (M-Bus). Optional - Communication with M-Bus, RS-485 Modbus, RS-485 EQ bus.

EQ meters three phase electricity meter, 4 DIN with IR port, 6 A

Class B (Cl. 1) with functionality level Steel. Active energy

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
3 x 230/400 V AC, Pulse output	001779	B24 111 - 100	2CMA100177R1000		0.250	1
3 x 230/400 V AC, Pulse output, RS-485	001786	B24 112 - 100	2CMA100178R1000		0.250	1
3 x 230/400 V AC, Pulse output, M-Bus	001793	B24 113 - 100	2CMA100179R1000		0.270	1

Class B (Cl. 1) (Reactive Cl. 2) with functionality level Bronze.
Active and reactive energy, import/export.

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
3 x 230/400 V AC, Pulse output, RS-485	001809	B24 212 - 100	2CMA100180R1000		0.250	1

Class C (Cl. 0.5 S) (Reactive Cl. 2) with functionality level Silver.
Active and reactive energy, import/export, tariffs 1-4, tariff controll via inputs and communication.

Description	Bbn 7392696 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
3 x 230/400 V AC, 2 output, 2 input, RS-485	001830	B24 352 - 100	2CMA100183R1000		0.270	1
3 x 230/400 V AC, 2 output, 2 input, M-Bus	001847	B24 353 - 100	2CMA100184R1000		0.290	1

Energy efficiency
EQ meters C series

The EQ meters, C series are truly compact meters for single phase and three phase metering. The C series is mounted on a DIN rail and is suitable for installation in distribution boards and small consumer units.

Only one or three module wide, the C series is a very compact meter for single phase and three phase applications. The meters have an LCD with large digits showing energy register and instrumentation values. The meters have a wide temperature range which makes it possible to install the meters in many locations. Navigating the meters are easily done via the push-button below the display. The exceptional low power consumption of the meters, less than 0,3 W and 0,6 W at 230 V AC, makes them economical in the long run - an important feature specially for large meter populations.

The C series meters support reading of instrument values. A number of electrical properties can be read:
- Power factor
- Active power
- Current
- Voltage

The C series meters have an output that can be used as pulse output or alarm output. The alarm quantity and levels is easily configured on the meter with the push button. The output can be used for controlling external apparatus like a contactor or an alarm indicator (connected via an external relay).

The C series meters are type approved according to IEC and MID. MID is the Measuring Instruments Directive 2014/32/EU from the European Commission. The type approval is according to standards that covers all relevant technical aspects of the meter. These include climate conditions, electromagnetic compatibility (EMC), electrical requirements, mechanical requirements and accuracy.

MID versions have initial verification according to annex F of the Measuring Instruments Directive.

Energy efficiency

EQ meters C series

C series

Technical features		
	C11	**C13**
Voltage/current inputs		
Nominal voltage	230 V AC	3x230/400 V AC
Voltage range	230 V AC (-20% - +15%)	3x230/400 V AC (-20% - +15%)
Power dissipation voltage circuits	7.4 VA (0.3 W) at 230 V	1.5 VA (0.6 W) total at 230 V
Power dissipation current circuits	0.04 VA (0.04 W) at I_b and I_{ref}	0.04 VA (0.04 W) per phase at I_b and I_{ref}
Base current I_b	5 A	
Rated current I_n	-	
Reference current I_{ref}	5 A	
Transitional current I_{tr}	0.5 A	
Maximum current I_{max}	40 A	
Minimum current I_{min}	0.25 A	
Starting current I_{st}	< 20 mA	
Terminal wire area	0.5 - 10 mm^2	0.5 - 10 mm^2
Recommended tightening torque	0.8 Nm	
General data		
Frequency	50 or 60 Hz ± 5%	
Accuracy Class	B (Cl.1)	
Active energy	1%	
Display of energy	6 digit LCD	7 digits LCD
Communication		
Terminal wire area	-	
Recommended tightening torque	-	
Pulse indicator (LED)		
Pulse frequency	1000 (imp/kWh)	
Pulse length	40 ms	
Environmental		
Operating temperature	- 25°C - +70°C	
Storage temperature	- 25°C - +85°C	
Humidity	75% yearly average, 95% on 30 days/year	
Resistance to fire and heat	Terminal 960°C, cover 650°C (IEC 60695-2-1)	
Resistance to water and dust	IP20 on terminal block without protective enclosure and IP51 in protective enclosure, according to IEC 60529.	
Mechanical environment	Class M2 in accordance with the Measuring Instrument Directive (MID). (2014/32/EU).	
Electromagnetic environment	Class E2 in accordance with the Measuring Instrument Directive (MID), (2014/32/EU).	

Energy efficiency
EQ meters C series

Technical features		
	C11	**C13**
Outputs		
Type	Transistor	
Current	2 - 100 mA	
Voltage	5 - 40 V DC	
Pulse output frequency	100 or 1000 (imp/kWh)	
Pulse length	100 ms	
Terminal wire area	0.5 - 10 mm^2	0.5 - 6 mm^2
Recommended tightening torque	0.8 Nm	0.25 Nm
EMC compatibility		
Impulse voltage test	6 kV 1.2/50 µs (IEC 60060-1)	
Surge voltage test	4 kV 1.2/50 µs (IEC 61000-4-5)	
Fast transient burn test	4 kV (IEC 61000-4-4)	
Immunity to electromagneti HF-fields	80 MHz - 2 GHz at 10 V/m (IEC 61000-4-3)	
Immunity to conducted disturbance	150 kHz - 80 MHz, (IEC 61000-4-6)	
Immunity to disturbance with harmonics	2kHz - 150kHz	
Radio frequency emission	EN 55022, class B (CISPR22)	
Electrostatic discharge	15 kV (IEC 61000-4-2)	
Standards	IEC 62052-11, IEC 62053-21 class 1, GB/T 17215.211-2006, GBT 17215.321-2008 class 1, GB 4208-2008, EN 50470-1, EN 50470-3 category B	
Mechanical		
Material	Glass reinforced polycarbonate	
Dimensions		
Width	17,5 mm	54 mm
Height	111 mm	122 mm
Depth	65 mm	65 mm
DIN modules	1	3

Energy efficiency

EQ meters C series

C11

Direct connected electricity meter up to 40 A. IEC approval. Instrument values. Alarm function. Optional - Verified and approved according to MID.D.

EQ meters single phase electricity meter, 1 DIN, 40 A

Class B (Cl.1) with functionality level Steel. Active energy						
Description	**Bbn**	**Order details**		**Price**	**Weight**	**Pack**
	7392696			**1 piece**	**1 piece**	**unit**
	EAN	**Type code**	**Order code**		**kg**	**pc.**
1 x 230 V AC, Pulse output 1000 imp/kWh	035712	C11 110 - 101*)	2CMA103571R1000		0.070	1
Class 1 with functionality level Steel. Active energy						
1 x 230 V AC, Pulse output 1000 imp/kWh	035729	C11 110 – 301	2CMA103572R1000		0.070	1

C13

Direct connected electricity meter. IEC approval. 3 elementmetering. Instrument values. Alarm function. Optional - Verified and approved according to MID.

EQ meters three phase electricity meter, 3 DIN, 40 A

For direct connection up to 40 A. Class B (Cl.1) with functionality level Steel. Active energy						
Description	**Bbn**	**Order details**		**Price**	**Weight**	**Pack**
	7392696			**1 piece**	**1 piece**	**unit**
	EAN	**Type code**	**Order code**		**kg**	**pc.**
3 x 230/400 V AC, Pulse output 1000 imp/kWh	035743	C13 110 - 101*)	2CMA103574R1000		0.170	1
For direct connection up to 40 A. Class 1 with functionality level Steel. Active energy						
3 x 230/400 V AC, Pulse output 1000 imp/kWh	035750	C13 110 - 301	2CMA103575R1000		0.170	1

*) MID approval according to Module B and F

Energy efficiency

EQmatic and EQ meters G series

QA/S 3.16.1

QA/S 3.64.1

Energy Analyzer, M-Bus, MDRC

NEW

Compact and web-based stand-alone devices for energy management applications. For monitoring, logging, displaying and analyzing consumption data of up to 16 or 64 electricity, gas, water or heat meters via M-Bus. Automatic detection for ABB EQ meters (A/B-Series). Access to the device via web browser. The user interface provides graphical analysis functions, e.g. dashboard, historical data, instantaneous values, benchmark functions, cost allocation according to consumer groups and more.

Description	Order details		Price	Weight	Pack
			1 piece	1 piece	unit
	EAN	Type code	Order code	kg	pc.
64 Devices	4016779997768	QA/S 3.64.1	2CDG110227R0011	0.15	1
16 Devices		QA/S 3.16.1	2CDG110226R0011	0.15	1

QA/S 4.xx.1

Energy Analyzer, Modbus RTU, MDRC

NEW

Compact and web-based stand-alone devices for energy management applications. For monitoring, logging, displaying and analyzing consumption data of up to 16 or 64 electricity, gas, water or heat meters via Modbus RTU. Automatic detection for ABB EQ meters (A/B-Series). Access to the device via web browser. The user interface provides graphical analysis functions, e.g. dashboard, historical data, instantaneous values, benchmark functions, cost allocation according to consumer groups and more.

Description	Order details		Price	Weight	Pack
			1 piece	1 piece	unit
	EAN	Type code	Order code	kg	pc.
Modbus RTU, 16 Devices		QA/S 4.16.1	2CDG110228R0011	0.15	1
Modbus RTU, 64 Devices		QA/S 4.64.1	2CDG110229R0011	0.15	1

Energy efficiency

EQmatic and EQ meters G series

G13

EQ meters G series

G13 is the Ethernet gateway that will make data collection from a meter network very convenient. communication is performed using JSON (JavaScript Object Notation) on the Ethernet side. The gateway is also equipped with a webserver that provides a detailed overview of all meters installed in a network as well as the possibility to perform advanced configurations of the meters and read-out data. High data security is obtained by encryption using SSL (Secure Sockets Layer).

The gateway communicates with EQ meters over EQ bus, a communication protocol based on the IEC standards (DLMS/cosem), using RS-485, and can also work as an M-Bus master for M-Bus enabled ABB meters.

Communication protocols on the meter side: EQ bus over RS-485, M-Bus and ABB IR port. Communication protocols on the system side: Ethernet with JSON. built-in webserver for meter reading and meter management.

Description		Order details		Price 1 piece	Weight 1 piece	Pack unit
	EAN	Type code	Order code		kg	pc.
100 - 240 V AC	7392696705523	G13 100-000	2CMA170552R1000		0.190	1

ZS/S 1.1

Meter Interface Module, KNX

It records consumption and measured values of the electrical energy consumption meters. Using an infra-red interface, the ABB energy meter types of the A- and B-series are incorporated. The information and data which is read can be used, for example, for cost centre accounting, energy optimisation, monitoring of installations and visualisation.

Description		Order details		Price 1 piece	Weight 1 piece	Pack unit
	EAN	Type code	Order code		kg	pc.
KNX meter module	4016779662079	ZS/S 1.1	2CDG110083R0011		0.100	1

EQ meters

A step toward environmental improvement and fair cost allocation

Improving energy efficiency starts with metering. Find out where energy is being wasted and keep track of tenants' individual energy patterns. With EQ meters you gain control and can allocate costs to tenants or any type of energy users. Act responsibly and install an EQ meter today! Read more under Modular DIN Rail Products on **abb.com/lowvoltage.**

Energy efficiency

Analogue and digital instruments selection table

Measure	Technology	Mounting	Insertion	Characteristics	Accessories	Type	
Voltage	Analogue	3 modules	Direct	a.c. and d.c.	MCV voltage switches	VLM page 8/45	
		48x48, 72x72, 96x96	Direct		MCV voltage switches	VLM-1 VLM-2 page 8/50	
		48x48, 72x72, 96x96	Indirect		TV voltage transformers MCV voltage switches	VLM1-TV VLM2-TV page 8/50	
	Digital	3 modules	Direct	a.c. and d.c. Auxiliary supply 230 V a.c.	MCV voltage switches	VLMD page 8/42	
		36x72	Direct		MCV voltage switches	VLMD P page 8/43	
Current	Analogue	3 modules	Direct	a.c. and d.c.	MCA current switches	AMT page 8/45	
			Indirect		CT a.c. current transformer SNT shunt for d.c. SCL interchangeable scale MCA current switches	AMT1/A AMT2 page 8/46	
		48x48, 72x72, 96x96	Direct		MCA current switches	AMT1-A1 AMT2-A2 page 8/52	
			Indirect		CT a.c. current transformer SNT shunt for d.c. SCL interchangeable scale MCA current switches	AMT1-A1 AMT1-A5 AMT2-A2 page 8/52	
	Digital	3 modules	Indirect	a.c. and d.c. Auxiliary supply 230 V a.c.	CT a.c. current transformer SNT shunt for d.c. MCA current switches	AMTD page 8/42	
		36x72	Indirect		CT a.c. current transformer SNT shunt for d.c. MCA current switches	AMTD P page 8/43	
Frequency	Analogue	3 modules	Direct	a.c.		FRZ1 page 8/46	
		48x48, 72x72, 96x96	Direct			FRZ page 8/54	
	Digital	3 modules	Direct	Auxiliary supply 230 V a.c.		FRZ-DIG page 8/42	

Energy efficiency

Modular digital instruments

Digital instruments

Technical features		
Power supply	[V]	230 V a.c.
Rated frequency	[Hz]	50÷60
Ammeter full scale value	[A]	5, 20, 25, 40, 60, 100, 150, 200, 250, 400, 600, 999
Voltmeter full scale value	[V]	600
Frequency meter range	[Hz]	35...400
Tripping delay	[s]	1, 5, 10, 20, 30
Hysteresis	[%]	5, 10, 20, 30 set threshold
Output pins		3-4
Output relay		NO
Rated voltage relay	[V]	230 V a.c.
Rated current relay	[A]	AC1 16, AC15 3
Relay configuration		NO relay closes in alarm status
		NC relay opens in alarm status, positive safety
Overload	[In/Vn]	1, 2
Accuracy class	[%]	±0,5 full scale ±1digit at 25 °C
Max. signal input value for ammeters		5 A a.c./60 mV d.c.
Display		3 digit LED display
Operating temperature	[°C]	-10...+55
Storage temperature	[°C]	-40...+70
Protection degree		IP20
Power consumption	[VA]	4
Modules		3
Overall dimensions front panel devices	[mm]	36x72x61.5 (51.5 depth inside the switchboard)
Standard		IEC EN 61010

Energy efficiency

Modular digital instruments

VLMD

AMTD

FRZ

Modular digital instruments

The wide range of modular digital instruments starts with single-phase mono-function measurement devices for measuring voltage, current and frequency.
The range is composed by a voltmeter for a.c./d.c. voltage monitoring, two ammeter for a.c. and d.c. current, and a frequency meter. Ammeters measure in indirect insertion thanks to measuring accessories, like current transformer for a.c. and shunt for d.c.
The full-scale value is programmable by the user, according to the current flow on the primary windings.

Version	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
a.c./d.c. digital voltmeter	620402	VLMD-1-2	2CSM110000R1011		0,300	1
a.c. digital ammeter	620501	AMTD-1	2CSM320000R1011		0,300	1
d.c. digital ammeter	620600	AMTD-2	2CSM420000R1011		0,300	1
Digital frequency meter	620709	FRZ-DIG	2CSM710000R1011		0,300	1

Modular digital instruments with alarm relay

The range is widened by three additional devices with extended features: one voltmeter and two ammeters, trip the internal relay to signal an alarm condition if the measured parameter exceeds or falls below a programmable threshold. The measured maximum and minimum peak values are stored in the non-volatile instrument's memory.
The contact type is NO, so that the contact is open when the instrument is powered off, but it is possible to obtain positive safety operation setting, directly on the instrument, the NC relay contact type.
The instrument with relay can be used to signal the exceeding or the fall below a certain threshold, but not for both functions simultaneously.

Version	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
a.c./d.c. digital voltmeter with alarm relay	746935	VLMD-1-2-R	2CSM274693R1011		0,300	1
a.c. digital ammeter with alarm relay	747734	AMTD-1-R	2CSM274773R1011		0,300	1
d.c. digital ammeter with alarm relay	610731	AMTD-2-R			0,300	1

Energy efficiency

Front panel digital instruments

VLMD P

Front-panel digital instruments

The wide range of front-panel digital instruments starts with single-phase mono-function measurement devices for measuring voltage and current.
The range is composed by a voltmeter for a.c./d.c. voltage monitoring, and two ammeter for a.c. and d.c. current. Ammeters measure in indirect insertion thanks to measuring accessories, like current transformer for a.c. and shunt for d.c.
The full-scale value is programmable by the user, according to the current flow on the primary windings.

Version	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
a.c./d.c. digital voltmeter	136057	VLMD P	2CSG213605R4011		0,300	1
a.c. digital ammeter	136156	AMTD-1 P	2CSG213615R4011		0,300	1
d.c. digital ammeter	136255	AMTD-2 P	2CSG213625R4011		0,300	1

AMTD-_ P

Front-panel digital instruments with alarm relay

The range is widened by three additional devices with extended features: one voltmeter and two ammeters that trip the internal relay to signal an alarm condition if the measured parameter exceeds or falls below a programmable threshold. The measured maximum and minimum peak values are stored in the non-volatile instrument's memory.
The contact type is NO, so that the contact is open when the instrument is powered off, but it is possible to obtain positive safety operation setting, directly on the instrument, the NC relay contact type.
The instrument with relay can be used to signal the exceeding or the fall below a certain threshold, but not for both functions simultaneously.

Version	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
a.c./d.c. digital voltmeter with alarm relay	136354	VLMD-R P	2CSG213635R4011		0,300	1
a.c. digital ammeter with alarm relay	136453	AMTD-1-R P	2CSG213645R4011		0,300	1
d.c. digital ammeter with alarm relay	136552	AMTD-2-R P	2CSG213655R4011		0,300	1

Energy efficiency

Analogue instruments selection table

Instrument mounting	a.c / d.c.	Size	Full-scale value Visualization	Instrument type		Scale type	
Modular	a.c.	-	90°	AMT1/A1		SCL 1	
		-	78°	AMT1/A5		SCL 1/A5	
	d.c.	-	90°	AMT2		SCL 2	
Front-panel	a.c.	48x48 mm	90°	AMT1-A1/48		SCL-A1 ... /48	
			78°	AMT1-A5/48		SCL-A5 ... /48	
		72x72 mm	90°	AMT1-A1/72		SCL-A1 ... /72	
			78°	AMT1-A5/72		SCL-A5 ... /72	
		96x96 mm	90°	AMT1-A1/96		SCL-A1 ... /96	
			78°	AMT1-A5/96		SCL-A5 ... /96	
	d.c.	48x48 mm	90°	AMT2-A2/48		SCL-A2 ... /48	
		72x72 mm	90°	AMT2-A2/72		SCL-A2 ... /72	
		96x96 mm	90°	AMT2-A2/96		SCL-A2 ... /96	

Analogue instruments with scales

The range of mono-function analogue instruments, employable in single-phase networks, is composed of measurement devices performing the measure and visualization of one electrical parameter: voltage, current and frequency.
The range of voltmeters, both in modular and front-panel versions, is composed by devices fully equipped with the proper scale, even when the use of a voltage transformer is required. The connection, whether it's direct or indirect using VT, allows the immediate visualization of the measures on the display.
The range of ammeters is composed of devices for direct and indirect connection to the network. The devices directly connected to the network are fully equipped with proper scale, while the devices that require a current transformer or a shunt, need to be combined with a separate scale to be mounted on the front of the instrument.
The wide range of scales for ammeters allows the employability of the latter even in application with high nominal current, up to 10000 A a.c.

Energy efficiency

Modular analogue instruments

VLM1

AMT1

Technical features			
Rated voltage Un		[V]	a.c. 300, 500; d.c. 100, 300
Rated currents in a.c.	Direct reading	[A]	full scale values 5...30
	Indirect reading		full scale values 5...2500
Rated currents in d.c.	Direct reading	[A]	full scale values 0.1...30
	Indirect reading		full scale values 5...500
Frequency		[Hz]	50/60
Overload capacity		[%]	20 compared to the voltage or to the rated current
Accuracy class		[%]	1.5 (0.5 for frequency meters)
Ammeters power consumption		[VA]	5 A: 0.3 VA; 10 A: 0.6 VA; 25 A:1 VA; 30 A: 1.2 VA
Voltmeters power consumption		[VA]	300 V: 1.5 VA; 500 V: 4 VA
Frequency meters power consumption		[VA]	<1.5 VA
Modules		[No.]	3
Protection degree			IP20
Standards			EN 60051

The range of modular analogue instruments is composed by mono-function measurement devices employable in single-phase networks. It includes voltmeters, ammeters and frequency meters. In particular, the range of ammeters is composed of devices fully equipped with the appropriate scale in the range between 5 A and 30 A. In case of greater current values, the range features devices to be used together with the proper scale and CT according to the application.

Modular analogue instruments for alternating current

Suitable for direct or indirect measurement through the appropriate accessories.

Voltmeters: direct connection						
Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
300 V	007906	VLM1/300	2CSM110190R1001		0.200	1
500 V	000006	VLM1/500	2CSM110220R1001		0.200	1

Ammeters: direct connection						
Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
5 A	000709	AMT1/5	2CSM310030R1001		0.200	1
10 A	000105	AMT1/10	2CSM310040R1001		0.200	1
15 A	000204	AMT1/15	2CSM310050R1001		0.200	1
20 A	000303	AMT1/20	2CSM310060R1001		0.200	1
25 A	000402	AMT1/25	2CSM310070R1001		0.200	1
30 A	000501	AMT1/30	2CSM310080R1001		0.200	1

Energy efficiency

Modular analogue instruments

VLM2

AMT2

Ammeters without scale: connection using CT.../5						
Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
A1	000600	AMT1/A1	2CSM320250R1001		0.200	1
A5	000808	AMT1/A5	2CSM320260R1001		0.200	1

Frequency meters: 45-65 Hz, 100/280 V						
Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
	008606	FRZ1	2CSM810310R1001		0.200	1

Modular analogue instruments for direct current

Voltmeters: direct connection						
Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
100 V	008002	VLM2/100	2CSM210130R1001		0.200	1
300 V	008101	VLM2/300	2CSM210190R1001		0.200	1

Ammeters: direct connection						
Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
10 mA	028307	AMT2/0.01	2CSM410330R1001		0.200	1
100 mA	028406	AMT2/0.1	2CSM410340R1001		0.200	1
1000 mA	028505	AMT2/1	2CSM410020R1001		0.200	1
5 A	028604	AMT2/5	2CSM410030R1001		0.200	1
10 A	028703	AMT2/10	2CSM410040R1001		0.200	1
15 A	028802	AMT2/15	2CSM410050R1001		0.200	1
20 A	028901	AMT2/20	2CSM410060R1001		0.200	1
25 A	029007	AMT2/25	2CSM410070R1001		0.200	1
30 A	029106	AMT2/30	2CSM410080R1001		0.200	1

Ammeters without scale: connection using shunt						
Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
	029205	AMT2	2CSM420270R1001		0.200	1

Energy efficiency

Scales for modular analogue ammeters

SCL

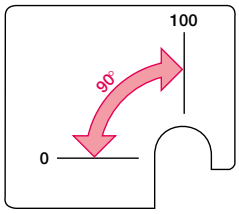
Scales for modular analogue ammeters

Scales SCL 1/A1 for AMT1						
Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
A1-5A	001201	SCL 1/5	2CSM110021R1041		0.010	10
A1-10A	001300	SCL 1/10	2CSM110032R1041		0.010	10
A1-20A	001409	SCL 1/20	2CSM110075R1041		0.010	10
A1-25A	030706	SCL 1/25	2CSM110096R1041		0.010	10
A1-30A	001508	SCL 1/30	2CSM110107R1041		0.010	10
A1-40A	030805	SCL 1/40	2CSM110128R1041		0.010	10
A1-50A	001607	SCL 1/50	2CSM110149R1041		0.010	10
A1-60A	030904	SCL 1/60	2CSM110159R1041		0.010	10
A1-75A	031000	SCL 1/75	2CSM110169R1041		0.010	10
A1-80A	001706	SCL 1/80	2CSM110179R1041		0.010	10
A1-100A	001805	SCL 1/100	2CSM110189R1041		0.010	10
A1-150A	001904	SCL 1/150	2CSM110209R1041		0.010	10
A1-200A	002000	SCL 1/200	2CSM110229R1041		0.010	10
A1-250A	031109	SCL 1/250	2CSM110249R1041		0.010	10
A1-300A	002109	SCL 1/300	2CSM110259R1041		0.010	10
A1-400A	002208	SCL 1/400	2CSM110279R1041		0.010	10
A1-500A	002307	SCL 1/500	2CSM110299R1041		0.010	10
A1-600A	031208	SCL 1/600	2CSM110309R1041		0.010	10
A1-800A	002406	SCL 1/800	2CSM110329R1041		0.010	10
A1-1000A	002505	SCL 1/1000	2CSM110339R1041		0.010	10
A1-1500A	274704	SCL 1/1500	2CSM110359R1041		0.010	10
A1-2000A	274803	SCL 1/2000	2CSM110379R1041		0.010	10
A1-2500A	274902	SCL 1/2500	2CSM110389R1041		0.010	10

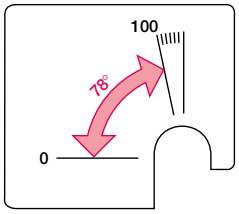
Scale SCL 1/A5 for AMT1						
Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
A5-5A	031307	SCL 1/A5/5	2CSM120021R1041		0.010	10
A5-10A	031406	SCL 1/A5/10	2CSM120032R1041		0.010	10
A5-20A	031505	SCL 1/A5/20	2CSM120075R1041		0.010	10
A5-30A	031604	SCL 1/A5/30	2CSM120107R1041		0.010	10
A5-50A	031703	SCL 1/A5/50	2CSM120149R1041		0.010	10
A5-80A	031802	SCL 1/A5/80	2CSM120179R1041		0.010	10
A5-100A	031901	SCL 1/A5/100	2CSM120189R1041		0.010	10
A5-150A	032007	SCL 1/A5/150	2CSM120209R1041		0.010	10

Energy efficiency

Scales for modular analogue ammeters



SCL1/A1/100
Full scale at 90°



SCL1/A5/100
Full scale at 78°
(with extra scale)

Scales SCL 2/A1 for AMT2

Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
A1-5A	032106	SCL 2/5	2CSM230025R1041		0.010	10
A1-6A	032205	SCL 2/6	2CSM230345R1041		0.010	10
A1-10A	032304	SCL 2/10	2CSM230035R1041		0.010	10
A1-20A	032403	SCL 2/20	2CSM230075R1041		0.010	10
A1-30A	032502	SCL 2/30	2CSM230105R1041		0.010	10
A1-50A	032601	SCL 2/50	2CSM230145R1041		0.010	10
A1-80A	032700	SCL 2/80	2CSM230179R1041		0.010	10
A1-100A	032809	SCL 2/100	2CSM230189R1041		0.010	10
A1-150A	032908	SCL 2/150	2CSM230209R1041		0.010	10
A1-200A	033004	SCL 2/200	2CSM230229R1041		0.010	10
A1-250A	033103	SCL 2/250	2CSM230249R1041		0.010	10
A1-300A	033202	SCL 2/300	2CSM230259R1041		0.010	10
A1-400A	033301	SCL 2/400	2CSM230279R1041		0.010	10
A1-500A	033400	SCL 2/500	2CSM230299R1041		0.010	10

Energy efficiency

Front-panel analogue instruments

Front panel analogue instruments

Technical features		
Rated max. reference voltage for insulation	[V]	600 (a.c meters), 300 (d.c. meters)
Test voltage	[V]	2000 eff. (50 Hz/1 min)
Accuracy class		1.5 (0.5 for frequency meters)
Overload capacity ①		
- ammetric windings		up to In x 10/< sec. up to In x 2/permanent
- voltmetric windings		up to Un x 2/< 5 sec. up to Un x 1.2/permanent
Operating temperature	[°C]	-10...+55
Storage temperature	[°C]	-40...+70
Average and max. relative humidity (DIN 40040) ②		65% (yearly average) 85% (+35 °C/60 days a year)
Vibration resistance (IEC 50-1)	[g (9.81 m/s)]	0.08-1.8 (0.35 mm/10-55 Hz; 3 axis/6 h)
Degree of protection		IP52 indoors
		IP00 on the terminals (IEC 144. DIN 40050)
		IP20 with suitable terminal covers
Materials		
- cases and front edge		self-extinguishing thermosetting material in accordance with UL94 V-0, fungus and termite resistant
- pointers (DIN 43802) ③		molded aluminium
- terminals		brass
Assembly		vertical/horizontal with special screw-on brackets ④
Dimensions W x H x D (DIN 43700/43718)	[mm]	48 x 48 X 53 72 x 72 x 53 96 x 96 X 53
Applicable standards		IEC EN 61010-1

① The overload can be greater for instruments enabled by a CT because the transformer generally keeps secondary current peaks to within 10 In.
② Tropicalization enables the instruments to withstand up to 95% max. relative humidity (+35 °C/60 days). In accordance with DIN standard 40040, they must be protected against any penetration of humidity inside the device. Terminals, screws, washers, bolts and magnets are galvanically protected against rust, while the electrical circuits are painted with the special Multicolor PC52 varnish.
③ The pointer damping time is 1 second. The recorded values are cleared by pressing the control provided.
④ With 0.5 mm -19 mm thick panels, the screws must be attached in the fixing position nearest to the front edge of the measuring device, whereas the 20 mm - 39 mm thick panels require the screws to be fixed in the position furthest away from the front edge.

Energy efficiency

Front-panel analogue instruments

VLM-1 48

Available in both alternating current and direct current versions, the front-panel mono-function measurement devices come in three standard sizes, 48 mm x 48 mm, 72 mm x 72 mm and 96 mm x 96 mm (special versions available on request), employable in single-phase networks. The range is composed of voltmeters and ammeters for a.c. and d.c. applications, and frequency meters for a.c. applications. Ammeters without scale for indirect connection must be completed with the appropriate scale, chosen according to the full-scale value.

Front-panel analogue voltmeters for alternating current

Size	Inser-tion	Scale	VT type	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
mm		V a.c.		EAN	Type code	Order code	piece	kg	pc.
48	D	50		541707	VLM-1-50/48	2CSG111100R4001			1
48	D	60		541806	VLM-1-60/48	2CSG111110R4001			1
48	D	80		541905	VLM-1-80/48	2CSG111120R4001			1
48	D	100		542001	VLM-1-100/48	2CSG111130R4001			1
48	D	150		542100	VLM-1-150/48	2CSG111150R4001			1
48	D	200		542209	VLM-1-200/48	2CSG111160R4001			1
48	D	250		542308	VLM-1-250/48	2CSG111180R4001			1
48	D	300		542407	VLM-1-300/48	2CSG111190R4001			1
48	D	400		542506	VLM-1-400/48	2CSG111210R4001			1
48	D	500		542605	VLM-1-500/48	2CSG111220R4001			1
48	D	600		542704	VLM-1-600/48	2CSG111230R4001			1
48	I	200	110/100	743705	VLM1-TV-110-100/200/48	2CSG121140R4001			1
48	I	300	230/100	542803	VLM1-TV-230-100/300/48	2CSG121170R4001			1
48	I	500	380/100	542902	VLM1-TV-380-100/500/48	2CSG121200R4001			1
48	I	500	400/100	743804	VLM1-TV-400-100/500/48	2CSG121210R4001			1
48	I	600	500/100	543008	VLM1-TV-500-100/600/48	2CSG121220R4001			1
48	I	800	600/100	743903	VLM1-TV-600-100/800/48	2CSG121230R4001			1
48	I	1100	1000/100	744009	VLM1-TV-1000-100/1100/48	2CSG121240R4001			1

Size	Inser-tion	Scale	VT type	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
mm		V a.c.		EAN	Type code	Order code	piece	kg	pc.
72	D	50		544104	VLM-1-50/72	2CSG112100R4001			1
72	D	60		544203	VLM-1-60/72	2CSG112110R4001			1
72	D	80		544302	VLM-1-80/72	2CSG112120R4001			1
72	D	100		544401	VLM-1-100/72	2CSG112130R4001			1
72	D	150		544500	VLM-1-150/72	2CSG112150R4001			1
72	D	200		544609	VLM-1-200/72	2CSG112160R4001			1
72	D	250		544708	VLM-1-250/72	2CSG112180R4001			1
72	D	300		544807	VLM-1-300/72	2CSG112190R4001			1
72	D	400		544906	VLM-1-400/72	2CSG112210R4001			1
72	D	500		545002	VLM-1-500/72	2CSG112220R4001			1
72	D	600		545101	VLM-1-600/72	2CSG112230R4001			1
72	I	200	110/100	744108	VLM1-TV-110-100/200/72	2CSG122140R4001			1
72	I	300	230/100	545200	VLM1-TV-230-100/300/72	2CSG122170R4001			1
72	I	500	380/100	545309	VLM1-TV-380-100/500/72	2CSG122200R4001			1
72	I	500	400/100	744207	VLM1-TV-400-100/500/72	2CSG122210R4001			1
72	I	600	500/100	545408	VLM1-TV-500-100/600/72	2CSG122220R4001			1
72	I	800	600/100	744306	VLM1-TV-600-100/800/72	2CSG122230R4001			1
72	I	1100	1000/100	744405	VLM1-TV-1000-100/1100/72	2CSG122240R4001			1

Energy efficiency

Front-panel analogue instruments

VLM-1 96

VLM-2 48

Size	Inser-tion	Scale	VT type	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
mm		V a.c.		EAN	Type code	Order code	piece	kg	pc.
96	D	50		546702	VLM-1-50/96	2CSG113100R4001			1
96	D	60		546801	VLM-1-60/96	2CSG113110R4001			1
96	D	80		546900	VLM-1-80/96	2CSG113120R4001			1
96	D	100		547006	VLM-1-100/96	2CSG113130R4001			1
96	D	150		547105	VLM-1-150/96	2CSG113150R4001			1
96	D	200		547204	VLM-1-200/96	2CSG113160R4001			1
96	D	250		547303	VLM-1-250/96	2CSG113180R4001			1
96	D	300		547402	VLM-1-300/96	2CSG113190R4001			1
96	D	400		547501	VLM-1-400/96	2CSG113210R4001			1
96	D	500		547600	VLM-1-500/96	2CSG113220R4001			1
96	D	600		547709	VLM-1-600/96	2CSG113230R4001			1
96	I	200	110/100	744504	VLM1-TV-110-100 /200/96	2CSG123140R4001			1
96	I	300	230/100	547808	VLM1-TV-230-100 /300/96	2CSG123170R4001			1
96	I	500	380/100	547907	VLM1-TV-380-100 /500/96	2CSG123200R4001			1
96	I	500	400/100	744603	VLM1-TV-400-100 /500/96	2CSG123210R4001			1
96	I	600	500/100	548003	VLM1-TV-500-100 /600/96	2CSG123220R4001			1
96	I	800	600/100	744702	VLM1-TV-600-100 /800/96	2CSG123230R4001			1
96	I	1100	1000/100	744801	VLM1-TV-1000-100 /1100/96	2CSG123240R4001			1

Front-panel analogue voltmeters for direct current

Size	Inser-tion	Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
mm		V d.c.	EAN	Type code	Order code	piece	kg	pc.
48	D	10	549307	VLM-2-10/48	2CSG211040R4001			1
48	D	15	549406	VLM-2-15/48	2CSG211050R4001			1
48	D	25	549505	VLM-2-25/48	2CSG211070R4001			1
48	D	40	549604	VLM-2-40/48	2CSG211090R4001			1
48	D	60	549703	VLM-2-60/48	2CSG211110R4001			1
48	D	80	549802	VLM-2-80/48	2CSG211120R4001			1
48	D	100	549901	VLM-2-100/48	2CSG211130R4001			1
48	D	150	550006	VLM-2-150/48	2CSG211150R4001			1
48	D	200	550105	VLM-2-200/48	2CSG211160R4001			1
48	D	250	550204	VLM-2-250/48	2CSG211180R4001			1
48	D	400	550303	VLM-2-400/48	2CSG211210R4001			1
48	D	600	550402	VLM-2-600/48	2CSG211230R4001			1

D: direct connection
I: indirect connection with VT, CT and shunt, according to the type

Energy efficiency

Front-panel analogue instruments

VLM-2 96

Size	Insertion	Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
mm		V d.c.	EAN	Type code	Order code	piece	kg	pc.
72	D	10	551003	VLM-2-10/72	2CSG212040R4001			1
72	D	15	551102	VLM-2-15/72	2CSG212050R4001			1
72	D	25	551201	VLM-2-25/72	2CSG212070R4001			1
72	D	40	551300	VLM-2-40/72	2CSG212090R4001			1
72	D	60	551409	VLM-2-60/72	2CSG212110R4001			1
72	D	80	551508	VLM-2-80/72	2CSG212120R4001			1
72	D	100	551607	VLM-2-100/72	2CSG212130R4001			1
72	D	150	551706	VLM-2-150/72	2CSG212150R4001			1
72	D	200	551805	VLM-2-200/72	2CSG212160R4001			1
72	D	250	551904	VLM-2-250/72	2CSG212180R4001			1
72	D	400	552000	VLM-2-400/72	2CSG212210R4001			1
72	D	600	552109	VLM-2-600/72	2CSG212230R4001			1

Size	Insertion	Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
mm		V d.c.	EAN	Type code	Order code	piece	kg	pc.
96	D	10	552703	VLM-2-10/96	2CSG213040R4001			1
96	D	15	552802	VLM-2-15/96	2CSG213050R4001			1
96	D	25	552901	VLM-2-25/96	2CSG213070R4001			1
96	D	40	553007	VLM-2-40/96	2CSG213090R4001			1
96	D	60	553106	VLM-2-60/96	2CSG213110R4001			1
96	D	80	553205	VLM-2-80/96	2CSG213120R4001			1
96	D	100	553304	VLM-2-100/96	2CSG213130R4001			1
96	D	150	553403	VLM-2-150/96	2CSG213150R4001			1
96	D	200	553502	VLM-2-200/96	2CSG213160R4001			1
96	D	250	553601	VLM-2-250/96	2CSG213180R4001			1
96	D	400	553700	VLM-2-400/96	2CSG213210R4001			1
96	D	600	553809	VLM-2-600/96	2CSG213230R4001			1

D: direct connection
I: indirect connection with VT, CT and shunt, according to the type

AMT1-A1 48

Front-panel analogue ammeters for alternating current

Size	Insertion	Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
mm		A a.c.	EAN	Type code	Order code	piece	kg	pc.
48	D	1	543107	AMT1-A1-1/48	2CSG311020R4001			1
48	D	5	543206	AMT1-A1-5/48	2CSG311030R4001			1
48	D	10	543305	AMT1-A1-10/48	2CSG311040R4001			1
48	D	15	543404	AMT1-A1-15/48	2CSG311050R4001			1
48	D	20	543503	AMT1-A1-20/48	2CSG311060R4001			1
48	D	25	543602	AMT1-A1-25/48	2CSG311070R4001			1
48	D	30	543701	AMT1-A1-30/48	2CSG311080R4001			1
48	D	40	543800	AMT1-A1-40/48	2CSG311090R4001			1
48	I	SCL-A1	543909	AMT1-A1/48	2CSG321250R4001			1
48	I	SCL-A5	544005	AMT1-A5/48	2CSG321260R4001			1

Energy efficiency

Front-panel analogue instruments

AMT1-A1 72

Size	Insertion	Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
mm		A a.c.	EAN	Type code	Order code	piece	kg	pc.
72	D	1	545507	AMT1-A1-1/72	2CSG312020R4001			1
72	D	5	545606	AMT1-A1-5/72	2CSG312030R4001			1
72	D	10	545705	AMT1-A1-10/72	2CSG312040R4001			1
72	D	15	545804	AMT1-A1-15/72	2CSG312050R4001			1
72	D	20	545903	AMT1-A1-20/72	2CSG312060R4001			1
72	D	25	546009	AMT1-A1-25/72	2CSG312070R4001			1
72	D	30	546108	AMT1-A1-30/72	2CSG312080R4001			1
72	D	40	546207	AMT1-A1-40/72	2CSG312090R4001			1
72	D	50	546306	AMT1-A1-50/72	2CSG312100R4001			1
72	D	60	546405	AMT1-A1-60/72	2CSG312110R4001			1
72	I	SCL-A1	546504	AMT1-A1/72	2CSG322250R4001			1
72	I	SCL-A5	546603	AMT1-A5/72	2CSG322260R4001			1

AMT1-A1 96

Size	Insertion	Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
mm		A a.c.	EAN	Type code	Order code	piece	kg	pc.
96	D	1	548102	AMT1-A1-1/96	2CSG313020R4001			1
96	D	5	548201	AMT1-A1-5/96	2CSG313030R4001			1
96	D	10	548300	AMT1-A1-10/96	2CSG313040R4001			1
96	D	15	548409	AMT1-A1-15/96	2CSG313050R4001			1
96	D	20	548508	AMT1-A1-20/96	2CSG313060R4001			1
96	D	25	548607	AMT1-A1-25/96	2CSG313070R4001			1
96	D	30	548706	AMT1-A1-30/96	2CSG313080R4001			1
96	D	40	548805	AMT1-A1-40/96	2CSG313090R4001			1
96	D	50	548904	AMT1-A1-50/96	2CSG313100R4001			1
96	D	60	549000	AMT1-A1-60/96	2CSG313110R4001			1
96	I	SCL-A1	549109	AMT1-A1/96	2CSG323250R4001			1
96	I	SCL-A5	549208	AMT1-A5/96	2CSG323260R4001			1

D: direct connection
I: indirect connection with VT, CT and shunt, according to the type

AMT2-A2 48

Front-panel analogue ammeters for direct current

Size	Insertion	Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
mm		A d.c.	EAN	Type code	Order code	piece	kg	pc.
48	D	0,5	550501	AMT2-A2-0,5/48	2CSG411010R4001			1
48	D	1	550600	AMT2-A2-1/48	2CSG411020R4001			1
48	D	5	550709	AMT2-A2-5/48	2CSG411030R4001			1
48	D	10	550808	AMT2-A2-10/48	2CSG411040R4001			1
48	I	SCL-A2	550907	AMT2-A2/48	2CSG421270R4001			1

Energy efficiency

Front-panel analogue instruments

AMT2-A2 72

Size	Insertion	Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
mm		A d.c.	EAN	Type code	Order code	piece	kg	pc.
72	D	0,5	552208	AMT2-A2-0,5/72	2CSG412010R4001			1
72	D	1	552307	AMT2-A2-1/72	2CSG412020R4001			1
72	D	5	552406	AMT2-A2-5/72	2CSG412030R4001			1
72	D	10	552505	AMT2-A2-10/72	2CSG412040R4001			1
72	I	SCL-A2	552604	AMT2-A2/72	2CSG422270R4001			1

AMT2-A2 96

Size	Insertion	Scale	Bbn 8012542	Order details		Price 1 piece	Weight 1 piece	Pack unit
mm		A d.c.	EAN	Type code	Order code		kg	pc.
96	D	0,5	553908	AMT2-A2-0,5/96	2CSG413010R4001			1
96	D	1	554004	AMT2-A2-1/96	2CSG413020R4001			1
96	D	5	554103	AMT2-A2-5/96	2CSG413030R4001			1
96	D	10	554202	AMT2-A2-10/96	2CSG413040R4001			1
96	I	SCL-A2	554301	AMT2-A2/96	2CSG423270R4001			1

D: direct connection
I: indirect connection with VT, CT and shunt, according to the type

Front-panel analogue frequency meters

FRZ 48

Size	Insertion	Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
mm			EAN	Type code	Order code	piece	kg	pc.
48	D	90°	555605	FRZ-90/48	2CSG811310R4001			1

FRZ 72

Size	Insertion	Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
mm			EAN	Type code	Order code	piece	kg	pc.
72	D	90°	555704	FRZ-90/72	2CSG812310R4001			1
72	D	240°	555902	FRZ-240/72	2CSG812320R4001			1

FRZ 96

Size	Insertion	Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
mm			EAN	Type code	Order code	piece	kg	pc.
96	D	90°	555803	FRZ-90/96	2CSG813310R4001			1
96	D	240°	556008	FRZ-240/96	2CSG813320R4001			1

D: direct connection
I: indirect connection with VT, CT and shunt, according to the type

Energy efficiency

Scales for front-panel analogue instrument

SCL

Scales for front-panel analogue ammeters

Scales 48 x 48 mm: SCL-A1 for AMT1-A1/48 a.c. ammeters						
Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
A a.c.	EAN	Type code	Order code	piece	kg	pc.
1	769408	SCL-A1-1/48	2CSG111010R5011		0.010	10
5	769507	SCL-A1-5/48	2CSG111021R5011		0.010	10
10	769606	SCL-A1-10/48	2CSG111032R5011		0.010	10
15	769705	SCL-A1-15/48	2CSG111054R5011		0.010	10
20	769804	SCL-A1-20/48	2CSG111075R5011		0.010	10
25	769903	SCL-A1-25/48	2CSG111096R5011		0.010	10
30	770008	SCL-A1-30/48	2CSG111107R5011		0.010	10
40	770107	SCL-A1-40/48	2CSG111128R5011		0.010	10
50	770206	SCL-A1-50/48	2CSG111149R5011		0.010	10
60	770305	SCL-A1-60/48	2CSG111159R5011		0.010	10
80	770404	SCL-A1-80/48	2CSG111179R5011		0.010	10
100	560500	SCL-A1-100/48	2CSG111189R5011		0.010	10
150	560609	SCL-A1-150/48	2CSG111209R5011		0.010	10
200	560708	SCL-A1-200/48	2CSG111229R5011		0.010	10
250	560807	SCL-A1-250/48	2CSG111249R5011		0.010	10
300	560906	SCL-A1-300/48	2CSG111259R5011		0.010	10
400	561002	SCL-A1-400/48	2CSG111279R5011		0.010	10
500	561101	SCL-A1-500/48	2CSG111299R5011		0.010	10
600	561200	SCL-A1-600/48	2CSG111309R5011		0.010	10
800	561309	SCL-A1-800/48	2CSG111329R5011		0.010	10
1000	561408	SCL-A1-1000/48	2CSG111339R5011		0.010	10
1500	561507	SCL-A1-1500/48	2CSG111359R5011		0.010	10
2000	561606	SCL-A1-2000/48	2CSG111379R5011		0.010	10
2500	561705	SCL-A1-2500/48	2CSG111389R5011		0.010	10
3000	561804	SCL-A1-3000/48	2CSG111399R5011		0.010	10
4000	561903	SCL-A1-4000/48	2CSG111409R5011		0.010	10
5000	562009	SCL-A1-5000/48	2CSG111419R5011		0.010	10
6000	562108	SCL-A1-6000/48	2CSG111429R5011		0.010	10
8000	562207	SCL-A1-8000/48	2CSG111439R5011		0.010	10
10000	562306	SCL-A1-10000/48	2CSG111449R5011		0.010	10

Energy efficiency

Scales for front-panel analogue instrument

SCL

Scales 48 x 48 mm: SCL-A5 for AMT1-A5/48 a.c. ammeters						
Scale	**Bbn 8012542**	**Order details**		**Price 1**	**Weight 1 piece**	**Pack unit**
A a.c.	**EAN**	**Type code**	**Order code**	**piece**	**kg**	**pc.**
1	770503	SCL-A5-1/48	2CSG121010R5011		0.010	10
5	770602	SCL-A5-5/48	2CSG121021R5011		0.010	10
10	770701	SCL-A5-10/48	2CSG121032R5011		0.010	10
15	770800	SCL-A5-15/48	2CSG121054R5011		0.010	10
20	770909	SCL-A5-20/48	2CSG121075R5011		0.010	10
25	771005	SCL-A5-25/48	2CSG121096R5011		0.010	10
30	771104	SCL-A5-30/48	2CSG121107R5011		0.010	10
40	771203	SCL-A5-40/48	2CSG121128R5011		0.010	10
50	771302	SCL-A5-50/48	2CSG121149R5011		0.010	10
60	771401	SCL-A5-60/48	2CSG121159R5011		0.010	10
80	771500	SCL-A5-80/48	2CSG121179R5011		0.010	10
100	562405	SCL-A5-100/48	2CSG121189R5011		0.010	10
150	562504	SCL-A5-150/48	2CSG121209R5011		0.010	10
200	562603	SCL-A5-200/48	2CSG121229R5011		0.010	10
250	562702	SCL-A5-250/48	2CSG121249R5011		0.010	10
300	562801	SCL-A5-300/48	2CSG121259R5011		0.010	10
400	562900	SCL-A5-400/48	2CSG121279R5011		0.010	10
500	563006	SCL-A5-500/48	2CSG121299R5011		0.010	10
600	563105	SCL-A5-600/48	2CSG121309R5011		0.010	10
800	563204	SCL-A5-800/48	2CSG121329R5011		0.010	10
1000	563303	SCL-A5-1000/48	2CSG121339R5011		0.010	10
1500	563402	SCL-A5-1500/48	2CSG121359R5011		0.010	10
2000	563501	SCL-A5-2000/48	2CSG121379R5011		0.010	10
2500	563600	SCL-A5-2500/48	2CSG121389R5011		0.010	10
3000	563709	SCL-A5-3000/48	2CSG121399R5011		0.010	10
4000	563808	SCL-A5-4000/48	2CSG121409R5011		0.010	10
5000	563907	SCL-A5-5000/48	2CSG121419R5011		0.010	10
6000	564003	SCL-A5-6000/48	2CSG121429R5011		0.010	10
8000	564102	SCL-A5-8000/48	2CSG121439R5011		0.010	10
10000	564201	SCL-A5-10000/48	2CSG121449R5011		0.010	10

Energy efficiency

Scales for front-panel analogue instrument

SCL

Scales 72 x 72 mm: SCL-A1 for AMT1-A1/72 a.c. ammeters

Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
A a.c.	EAN	Type code	Order code	piece	kg	pc.
1	771609	SCL-A1-1/72	2CSG112010R5011		0.010	10
5	771708	SCL-A1-5/72	2CSG112021R5011		0.010	10
10	771807	SCL-A1-10/72	2CSG112032R5011		0.010	10
15	771906	SCL-A1-15/72	2CSG112054R5011		0.010	10
20	772002	SCL-A1-20/72	2CSG112075R5011		0.010	10
25	772101	SCL-A1-25/72	2CSG112096R5011		0.010	10
30	772200	SCL-A1-30/72	2CSG112107R5011		0.010	10
40	772309	SCL-A1-40/72	2CSG112128R5011		0.010	10
50	772408	SCL-A1-50/72	2CSG112149R5011		0.010	10
60	772507	SCL-A1-60/72	2CSG112159R5011		0.010	10
80	772606	SCL-A1-80/72	2CSG112179R5011		0.010	10
100	572305	SCL-A1-100/72	2CSG112189R5011		0.010	10
150	572404	SCL-A1-150/72	2CSG112209R5011		0.010	10
200	572503	SCL-A1-200/72	2CSG112229R5011		0.010	10
250	572602	SCL-A1-250/72	2CSG112249R5011		0.010	10
300	572701	SCL-A1-300/72	2CSG112259R5011		0.010	10
400	572800	SCL-A1-400/72	2CSG112279R5011		0.010	10
500	572909	SCL-A1-500/72	2CSG112299R5011		0.010	10
600	573005	SCL-A1-600/72	2CSG112309R5011		0.010	10
800	573104	SCL-A1-800/72	2CSG112329R5011		0.010	10
1000	573203	SCL-A1-1000/72	2CSG112339R5011		0.010	10
1500	573302	SCL-A1-1500/72	2CSG112359R5011		0.010	10
2000	573401	SCL-A1-2000/72	2CSG112379R5011		0.010	10
2500	573500	SCL-A1-2500/72	2CSG112389R5011		0.010	10
3000	573609	SCL-A1-3000/72	2CSG112399R5011		0.010	10
4000	573708	SCL-A1-4000/72	2CSG112409R5011		0.010	10
5000	573807	SCL-A1-5000/72	2CSG112419R5011		0.010	10
6000	573906	SCL-A1-6000/72	2CSG112429R5011		0.010	10
8000	574002	SCL-A1-8000/72	2CSG112439R5011		0.010	10
10000	574101	SCL-A1-10000/72	2CSG112449R5011		0.010	10

Energy efficiency

Scales for front-panel analogue instrument

SCL

Scales 72 x 72 mm: SCL-A5 for AMT1-A5/72 a.c. ammeters

Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
A a.c.	EAN	Type code	Order code	piece	kg	pc.
1	772705	SCL-A5-1/72	2CSG122010R5011		0.010	10
5	772804	SCL-A5-5/72	2CSG122021R5011		0.010	10
10	772903	SCL-A5-10/72	2CSG122032R5011		0.010	10
15	773009	SCL-A5-15/72	2CSG122054R5011		0.010	10
20	773108	SCL-A5-20/72	2CSG122075R5011		0.010	10
25	773207	SCL-A5-25/72	2CSG122096R5011		0.010	10
30	773306	SCL-A5-30/72	2CSG122107R5011		0.010	10
40	773405	SCL-A5-40/72	2CSG122128R5011		0.010	10
50	773504	SCL-A5-50/72	2CSG122149R5011		0.010	10
60	773603	SCL-A5-60/72	2CSG122159R5011		0.010	10
80	773702	SCL-A5-80/72	2CSG122179R5011		0.010	10
100	574200	SCL-A5-100/72	2CSG122189R5011		0.010	10
150	574309	SCL-A5-150/72	2CSG122209R5011		0.010	10
200	574408	SCL-A5-200/72	2CSG122229R5011		0.010	10
250	574507	SCL-A5-250/72	2CSG122249R5011		0.010	10
300	574606	SCL-A5-300/72	2CSG122259R5011		0.010	10
400	574705	SCL-A5-400/72	2CSG122279R5011		0.010	10
500	574804	SCL-A5-500/72	2CSG122299R5011		0.010	10
600	574903	SCL-A5-600/72	2CSG122309R5011		0.010	10
800	575009	SCL-A5-800/72	2CSG122329R5011		0.010	10
1000	575108	SCL-A5-1000/72	2CSG122339R5011		0.010	10
1500	575207	SCL-A5-1500/72	2CSG122359R5011		0.010	10
2000	575306	SCL-A5-2000/72	2CSG122379R5011		0.010	10
2500	575405	SCL-A5-2500/72	2CSG122389R5011		0.010	10
3000	575504	SCL-A5-3000/72	2CSG122399R5011		0.010	10
4000	575603	SCL-A5-4000/72	2CSG122409R5011		0.010	10
5000	575702	SCL-A5-5000/72	2CSG122419R5011		0.010	10
6000	575801	SCL-A5-6000/72	2CSG122429R5011		0.010	10
8000	575900	SCL-A5-8000/72	2CSG122439R5011		0.010	10
10000	576006	SCL-A5-10000/72	2CSG122449R5011		0.010	10

Energy efficiency

Scales for front-panel analogue instrument

SCL

Scales 96 x 96 mm: SCL-A1 for AMT1-A1/96 a.c. ammeters

Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
A a.c.	**EAN**	**Type code**	**Order code**	**piece**	**kg**	**pc.**
1	773801	SCL-A1-1/96	2CSG113010R5011		0.010	10
5	773900	SCL-A1-5/96	2CSG113021R5011		0.010	10
10	774006	SCL-A1-10/96	2CSG113032R5011		0.010	10
15	774105	SCL-A1-15/96	2CSG113054R5011		0.010	10
20	774204	SCL-A1-20/96	2CSG113075R5011		0.010	10
25	774303	SCL-A1-25/96	2CSG113096R5011		0.010	10
30	774402	SCL-A1-30/96	2CSG113107R5011		0.010	10
40	774501	SCL-A1-40/96	2CSG113128R5011		0.010	10
50	774600	SCL-A1-50/96	2CSG113149R5011		0.010	10
60	774709	SCL-A1-60/96	2CSG113159R5011		0.010	10
80	774808	SCL-A1-80/96	2CSG113179R5011		0.010	10
100	584100	SCL-A1-100/96	2CSG113189R5011		0.010	10
150	584209	SCL-A1-150/96	2CSG113209R5011		0.010	10
200	584308	SCL-A1-200/96	2CSG113229R5011		0.010	10
250	584407	SCL-A1-250/96	2CSG113249R5011		0.010	10
300	584506	SCL-A1-300/96	2CSG113259R5011		0.010	10
400	584605	SCL-A1-400/96	2CSG113279R5011		0.010	10
500	584704	SCL-A1-500/96	2CSG113299R5011		0.010	10
600	584803	SCL-A1-600/96	2CSG113309R5011		0.010	10
800	584902	SCL-A1-800/96	2CSG113329R5011		0.010	10
1000	585008	SCL-A1-1000/96	2CSG113339R5011		0.010	10
1500	585107	SCL-A1-1500/96	2CSG113359R5011		0.010	10
2000	585206	SCL-A1-2000/96	2CSG113379R5011		0.010	10
2500	585305	SCL-A1-2500/96	2CSG113389R5011		0.010	10
3000	585404	SCL-A1-3000/96	2CSG113399R5011		0.010	10
4000	585503	SCL-A1-4000/96	2CSG113409R5011		0.010	10
5000	585602	SCL-A1-5000/96	2CSG113419R5011		0.010	10
6000	585701	SCL-A1-6000/96	2CSG113429R5011		0.010	10
8000	585800	SCL-A1-8000/96	2CSG113439R5011		0.010	10
10000	585909	SCL-A1-10000/96	2CSG113449R5011		0.010	10

Energy efficiency

Scales for front-panel analogue instrument

SCL

Scales 96 x 96 mm: SCL-A5 for AMT1-A5/96 a.c. ammeters						
Scale	**Bbn 8012542**	**Order details**		**Price 1**	**Weight 1 piece**	**Pack unit**
A a.c.	**EAN**	**Type code**	**Order code**	**piece**	**kg**	**pc.**
1	774907	SCL-A5-1/96	2CSG123010R5011		0.010	10
5	775003	SCL-A5-5/96	2CSG123021R5011		0.010	10
10	775102	SCL-A5-10/96	2CSG123032R5011		0.010	10
15	775201	SCL-A5-15/96	2CSG123054R5011		0.010	10
20	775300	SCL-A5-20/96	2CSG123075R5011		0.010	10
25	775409	SCL-A5-25/96	2CSG123096R5011		0.010	10
30	775508	SCL-A5-30/96	2CSG123107R5011		0.010	10
40	775607	SCL-A5-40/96	2CSG123128R5011		0.010	10
50	775706	SCL-A5-50/96	2CSG123149R5011		0.010	10
60	775805	SCL-A5-60/96	2CSG123159R5011		0.010	10
80	775904	SCL-A5-80/96	2CSG123179R5011		0.010	10
100	586005	SCL-A5-100/96	2CSG123189R5011		0.010	10
150	586104	SCL-A5-150/96	2CSG123209R5011		0.010	10
200	586203	SCL-A5-200/96	2CSG123229R5011		0.010	10
250	586302	SCL-A5-250/96	2CSG123249R5011		0.010	10
300	586401	SCL-A5-300/96	2CSG123259R5011		0.010	10
400	586500	SCL-A5-400/96	2CSG123279R5011		0.010	10
500	586609	SCL-A5-500/96	2CSG123299R5011		0.010	10
600	586708	SCL-A5-600/96	2CSG123309R5011		0.010	10
800	586807	SCL-A5-800/96	2CSG123329R5011		0.010	10
1000	586906	SCL-A5-1000/96	2CSG123339R5011		0.010	10
1500	587002	SCL-A5-1500/96	2CSG123359R5011		0.010	10
2000	587101	SCL-A5-2000/96	2CSG123379R5011		0.010	10
2500	587200	SCL-A5-2500/96	2CSG123389R5011		0.010	10
3000	587309	SCL-A5-3000/96	2CSG123399R5011		0.010	10
4000	587408	SCL-A5-4000/96	2CSG123409R5011		0.010	10
5000	587507	SCL-A5-5000/96	2CSG123419R5011		0.010	10
6000	587606	SCL-A5-6000/96	2CSG123429R5011		0.010	10
8000	587705	SCL-A5-8000/96	2CSG123439R5011		0.010	10
10000	587804	SCL-A5-10000/96	2CSG123449R5011		0.010	10

Energy efficiency

Scales for front-panel analogue instrument

SCL

Scales 48 x 48 mm: SCL-A2 for AMT2-A2/48 d.c. ammeters

Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
A d.c.	EAN	Type code	Order code	piece	kg	pc.
20	595908	SCL-A2-20/48	2CSG231075R5011		0.010	10
100	596004	SCL-A2-100/48	2CSG231189R5011		0.010	10
150	596103	SCL-A2-150/48	2CSG231209R5011		0.010	10
200	596202	SCL-A2-200/48	2CSG231229R5011		0.010	10
250	596301	SCL-A2-250/48	2CSG231249R5011		0.010	10
300	596400	SCL-A2-300/48	2CSG231259R5011		0.010	10
400	596509	SCL-A2-400/48	2CSG231279R5011		0.010	10
500	596608	SCL-A2-500/48	2CSG231299R5011		0.010	10
600	596707	SCL-A2-600/48	2CSG231309R5011		0.010	10
800	596806	SCL-A2-800/48	2CSG231329R5011		0.010	10
1000	596905	SCL-A2-1000/48	2CSG231339R5011		0.010	10

Scales 72 x 72 mm: SCL-A2 for AMT2-A2/72 d.c. ammeters

Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
A d.c.	EAN	Type code	Order code	piece	kg	pc.
20	597001	SCL-A2-20/72	2CSG232075R5011		0.010	10
100	597100	SCL-A2-100/72	2CSG232189R5011		0.010	10
150	597209	SCL-A2-150/72	2CSG232209R5011		0.010	10
200	597308	SCL-A2-200/72	2CSG232229R5011		0.010	10
250	597407	SCL-A2-250/72	2CSG232249R5011		0.010	10
300	597506	SCL-A2-300/72	2CSG232259R5011		0.010	10
400	597605	SCL-A2-400/72	2CSG232279R5011		0.010	10
500	597704	SCL-A2-500/72	2CSG232299R5011		0.010	10
600	597803	SCL-A2-600/72	2CSG232309R5011		0.010	10
800	597902	SCL-A2-800/72	2CSG232329R5011		0.010	10
1000	598008	SCL-A2-1000/72	2CSG232339R5011		0.010	10

Scales 96 x 96 mm: SCL-A2 for AMT2-A2/96 d.c. ammeters

Scale	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
A d.c.	EAN	Type code	Order code	piece	kg	pc.
20	598107	SCL-A2-20/96	2CSG233075R5011		0.010	10
100	598206	SCL-A2-100/96	2CSG233189R5011		0.010	10
150	598305	SCL-A2-150/96	2CSG233209R5011		0.010	10
200	598404	SCL-A2-200/96	2CSG233229R5011		0.010	10
250	598503	SCL-A2-250/96	2CSG233249R5011		0.010	10
300	598602	SCL-A2-300/96	2CSG233259R5011		0.010	10
400	598701	SCL-A2-400/96	2CSG233279R5011		0.010	10
500	598800	SCL-A2-500/96	2CSG233299R5011		0.010	10
600	598909	SCL-A2-600/96	2CSG233309R5011		0.010	10
800	599005	SCL-A2-800/96	2CSG233329R5011		0.010	10
1000	599104	SCL-A2-1000/96	2CSG233339R5011		0.010	10

Energy efficiency

Voltmetric and current switches

MCV

Technical features		
Insulation voltage	[V]	600
Rated thermal current	[A]	12
Mechanic operations	[No.]	1000000
Power consumption	[VA]	0.23
Modules	[No.]	3

MCV - MCA voltmetric and current switches

Cam rotary switches are suitable for mounting on EN 50022 rail. In three-phase systems they enable the use of a single measurement instrument (single-phase) for viewing the current or voltage value set through the switch itself.

MCA

Voltmeter switches

Range	Power loss	Bbn 7392696	Order details		Price 1	Weight 1 piece	Pack unit
	W	EAN	Type code	Order code	piece	kg	pc.
L1, L2, L3	0.5	52246 9	MCV 4	1SCA022404R4740		0.095	1
L1, L2, L3, N	0.5	52243 8	MCV 7	1SCA022647R7840		0.110	1

Current switches

Range	Power loss	Bbn 7392696	Order details		Price 1	Weight 1 piece	Pack unit
	W	EAN	Type code	Order code	piece	kg	pc.
0-1-2-3	0.5	52245 2	MCA 4	1SCA022404R4821		0.110	1

QCA 48

Front panel QCV - QCA voltage and current switches

For use in three-phase systems, to allow a single device to measure the voltage and current settings adjusted by the switches.

Measure	Position	Bbn 7392696	Order details		Price 1	Weight 1 piece	Pack unit
		EAN	Type code	Order code	piece	kg	pc.
Voltage	4	527990	QCV-4/48	1SCA022780R0770		0.150	1
Current	4	528003	QCA-4/48	1SCA022780R0690		0.150	1
Voltage	7	527983	QCV-7/48	1SCA022780R0850		0.150	1

QCV 48

Energy efficiency

E 233 hour counters

E 233

Technical features		
	AC equipment	DC equipment
Rated voltage	50 Hz: 24 V, 230 V 60 Hz: 24 V, 120 V, 240 V	DC 12 V ... 48 V
Voltage tolerance	±15 %	±10 %
Power consumption	1.5 VA	ca. 20 mW (at 12 V DC)
Ambient temperature	–15 °C/5 °F... +50 °C/122 °F	–10 °C/14 °F ... +50 °C/122 °F
Counting capacity	99.999 h	99.999 h
Reading accuracy	0.01 h	0.1 h
Operation display	fast running	LED blinking
Protection against electric shock	according to DIN VDE 0106 Part 100 (BGV A2)	according to DIN VDE 0106 Part 100 (BGV A2)
Terminal size	up to 10 mm^2	up to 10 mm^2

E 233 electro-mechanical hour counters

Hour counters are used to record operating times as well as to determine idle times and off times of industrial machinery and plant, for commercial purposes or in domestic installations. No reset functionality.

Rated voltage	Bbn 4012233	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
AC 230 V/50 Hz	63000 4	E 233-230	2CDE100000R1601		0.05	10
AC 24 V/50 Hz	63010 3	E 233-24	2CDE400000R1601		0.05	10
DC 12 V ... 48 V	63020 2	E 233-12/48	2CDE300010R1601		0.05	10
AC 240 V/60 Hz	36590 1 ①	E 233-240/60 Hz	2CDE100021R1601		0.05	10
AC 120 V/60 Hz	36600 7 ①	E 233-120/60 Hz	2CDE600021R1601		0.05	10
AC 24 V/60 Hz	36610 6 ①	E 233- 24/60 Hz	2CDE400021R1601		0.05	10

① Bbn No. 4016779

Energy efficiency

HMT hour counters

HMT

Technical features		
Rated voltage Un	[V]	a.c. 24 a.c. 110 a.c. 230
Displayed digits (in hours)	[n°]	99,999.9 (for HMT1 and HMT11)
Accuracy class	[%]	0.5
Frequency	[Hz]	50
Power consumption	[W]	1.1...2.2
Modules	[No.]	2

HMT electro-mechanical hour counters

Equipped with 7-digit indicator (99.999,99) and available in two modules.
They cannot be reset.

Rated voltage	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
V AC	EAN	Type code	Order code	piece	kg	pc.
24	030300	HMT 1/24	2CSM111000R1601		0.200	6
110	030409	HMT 1/110	2CSM121000R1601		0.200	6
220	030508	HMT 1/220	2CSM131000R1601		0.200	6
230	030607	HMT 11	2CSM133000R1601		0.200	1

Energy efficiency

TMD temperature control units

TMD

Technical features			
Auxiliary supply	Alternating current	[V]	20÷250 ±15%
	Direct current	[Hz]	115-230-400 50-60
Power consumption		[VA]	4 max
Input	Sensor		PT100 RTD (not included)
	Type		3 wires (2 and 4 wires types are also supported)
	Error		1 degree every 0,39 Ω
	Measure range	[°C]	0...220 ± 2
	Compensation	[Ω]	20 max
	Trip delay/hysteresis	[s/°C]	5/2
Output	Number		4
	Type		NO-CO-NC
	Vmax	[V]	12 d.c.
	Imaxww	[A]	8 (resistive load)
	Functions		Alarm, trip, cooling, auto-test
	Programmable functions		Alarm, tip, hold, fan, temp. max
Display			7 segments LED
Connections	Terminals		removable screw
	Max section	[mm²]	2.5
Insulation voltage		[V]	2500/50 Hz - 1 min
Protection degree	Front		IP52
	Rear		IP20
Operation temperature		[°C]	-10...+55, relative humidity max 90%
Storage temperature		[°C]	-25...+80
Reference			IEC EN 50081-2, IEC EN 50082-2, IEC EN 60255

Temperature control units

TMD are used measure and control the temperature levels and efficiency of electric machines, power transformers, motors, etc.
The temperature is measured by four PT100 type sensors. Each measuring channel has two programmable alarm thresholds which trip two output relays to remotely signal that a critical temperature has been reached.
The measured values and any alarm conditions are shown on the dual 3-digit display on the front of the device, which also has five programming keys for configuring its operation.
The control unit is also able to store in memory maximum values and a log of all trip-events.

Temperature measured	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
	EAN	Type code	Order code	piece	kg	pc.
4	560203	TMD-4/96	2CSG524000R2021		0.8	1

Energy efficiency

Current transformers selection table

Breaker choice							
Modular	S200, S280, S290, S700, S750DR, S800						
Tmax	XT1, XT2, XT3, XT4, T4320					T5	
Emax							

Installation choice							
Fixing system	DIN rail	DIN rail	DIN rail, cable or bus bar		Bus bar	DIN rail, cable or bus bar, base mounted with feet	
							
Rated current (A)	CTA	TRF M	CT PRO XT		CT30	CT MAX	
			Standard	SELV version		Standard	SELV version
5	2CS-G111020R1141 CTA/5						
10	2CS-G111030R1141 CTA/10						
15	2CS-G111040R1141 CTA/15						
20	2CS-G111050R1141 CTA/20						
25	2CS-G111060R1141 CTA/25						
40	2CS-G111080R1141 CTA/40 (cl. 0.5)	2CS-M100050R1111 TRFM/40	2CSG225745R1101 CT PRO XT 40	2CSG225845R1101 CT PRO XT 40 SELV			
50	2CS-G111090R1141 CTA/50 (cl. 0.5)		2CSG225755R1101 CT PRO XT 50	2CSG225855R1101 CT PRO XT 50 SELV			
60	2CSG111100R1141 CTA/60 (cl. 0.5)	2CS-M100070R1111 TRFM/60 (cl. 1)	2CSG225765R1101 CT PRO XT 60	2CSG225865R1101 CT PRO XT 60 SELV			
80	2CSG111110R1141 CTA/80 (cl. 0.5)		2CSG225775R1101 CT PRO XT 80	2CSG225875R1101 CT PRO XT 80 SELV			
100	2CSG111120R1141 CTA/100 (cl. 0.5)	2CS-M100090R1111 TRFM/100	2CSG225785R1101 CT PRO XT 100	2CSG225885R1101 CT PRO XT 100 SELV	2CS-G101100R1101 CT30/100 (cl. 3)		
150		2CSM100100R1111 TRFM/150	2CSG225795R1101 CT PRO XT 150	2CSG225895R1101 CT PRO XT 150 SELV	2CS-G101110R1101 CT30/150 (cl. 3)		
200			2CSG225805R1101 CT PRO XT 200	2CSG225905R1101 CT PRO XT 200 SELV			
250		2CSM100120R1111 TRFM/250	2CSG225815R1101 CT PRO XT 250	2CSG225915R1101 CT PRO XT 250 SELV	2CS-G101130R1101 CT30/250		
300			2CSG225825R1101 CT PRO XT 300	2CSG225925R1101 CT PRO XT 300 SELV		2CSG225945R1101 CT MAX 300	2CSG226005R1101 CT MAX 300 SELV

	T6,T7		T6,T7					
	E1.2, E2.2, E4.2			E2, E3, E4, E6	E2.2, E4.2, E6.2	E2.2, E4.2	E1.2	
				Bus bar	DIN rail, cable or bus bar, base mounted with feet		Bus bar	
								
	CT6	CT8	CT8V	CT80	CT12	CT12V	CT120	Class
								0,5
								0,5
								0,5
								0,5
								0,5
								3
								3
								3
								3
								1
								0,5
								0,5
	2CSG421130R1101 CT6/250			2CSG201130R1101 CT80/250				0,5
	2CSG421140R1101 CT6/300	2CSG521140R1101 CT8/300						0,5

Energy efficiency

Current transformers selection table

Breaker choice							
Modular	S200, S280, S290, S700, S750DR, S800						
Tmax	XT1, XT2, XT3, XT4, T4320					T5	
Emax							

Installation choice							
Fixing system	DIN rail	DIN rail	DIN rail, cable or bus bar		Bus bar	DIN rail, cable or bus bar, base mounted with feet	




Rated current (A)	CTA	TRF M	CT PRO XT		CT30	CT MAX	
			Standard	SELV version		Standard	SELV version
400		2CSM100140R1111 TRFM/400	2CSG225835R1101 CT PRO XT 400	2CSG225935R1101 CT PRO XT 400 SELV	2CS-G101150R1101 CT30/400	2CSG225955R1101 CT MAX 400	2CSG226015R1101 CT MAX 400 SELV
500						2CSG225965R1101 CT MAX 500	2CSG226025R1101 CT MAX 500 SELV
600		2CSM100160R1111 TRFM/600				2CSG225975R1101 CT MAX 600	2CSG226035R1101 CT MAX 600 SELV
800						2CSG225985R1101 CT MAX 800	2CSG226045R1101 CT MAX 800 SELV
1000						2CSG225995R1101 CT MAX 1000	2CSG226055R1101 CT MAX 1000 SELV
1200							
1250							
1500							
2000							
2500							
3000							
4000							
5000							
6000							

Primary choice							
	CTA	TRF M	CT PRO XT		CT30	CT MAX	
	Wound primary	Through primary			Split core trough primary	Through primary	
Through	8	29	18	18	–	30	30
primary max	–	–	20x10	20x10	–	30x15; 40x10	30x15; 40x10
section [mm]	–	–	–	–	3x80x10	–	–

T6,T7		T6,T7					
E1.2, E2.2, E4.2			E2, E3, E4, E6	E2.2, E4.2, E6.2	E2.2, E4.2	E1.2	
			Bus bar	DIN rail, cable or bus bar, base mounted with feet		Bus bar	
							
CT6	CT8	CT8V	CT80	CT12	CT12V	CT120	Class
2CSG421150R1101 CT6/400	2CSG521150R1101 CT8/400	2CSG631150R1101 CT8-V/400	2CSG201150R1101 CT80/400			2CSG401150R1101 CT120/400	0,5
2CSG421160R1101 CT6/500	2CSG521160R1101 CT8/500	2CSG631160R1101 CT8-V/500	2CSG201160R1101 CT80/500	2CSG721160R1101 CT12/500		2CSG401160R1101 CT120/500	0,5
2CSG421170R1101 CT6/600	2CSG521170R1101 CT8/600	2CSG631170R1101 CT8-V/600	2CSG201170R1101 CT80/600	2CSG721170R1101 CT12/600		2CSG401170R1101 CT120/600	0,5
2CSG421180R1101 CT6/800	2CSG521180R1101 CT8/800	2CSG631180R1101 CT8-V/800	2CSG201180R1101 CT80/800	2CSG721180R1101 CT12/800	2CSG831180R1101 CT12-V/800	2CSG401180R1101 CT120/800	0,5
2CSG421190R1101 CT6/1000	2CSG521190R1101 CT8/1000	2CSG631190R1101 CT8-V/1000	2CSG201190R1101 CT80/1000	2CSG721190R1101 CT12/1000	2CSG831190R1101 CT12-V/1000	2CSG401190R1101 CT120/1000	0,5
2CSG421200R1101 CT6/1200	2CSG521200R1101 CT8/1200	2CSG631200R1101 CT8-V/1200		2CSG721200R1101 CT12/1200	2CSG831200R1101 CT12-V/1200	2CSG401200R1101 CT120/1200	0,5
					2CSG831210R1101 CT12-V/1250		0,5
2CSG421220R1101 CT6/1500	2CSG521220R1101 CT8/1500	2CSG631220R1101 CT8-V/1500		2CSG721220R1101 CT12/1500	2CSG831220R1101 CT12-V/1500	2CSG401220R1101 CT120/1500	0,5
2CSG421230R1101 CT6/2000	2CSG521230R1101 CT8/2000	2CSG631230R1101 CT8-V/2000	2CSG301230R1101 CT80/2000	2CSG721230R1101 CT12/2000	2CSG831230R1101 CT12-V/2000		0,5
2CSG421240R1101 CT6/2500	2CSG521240R1101 CT8/2500	2CSG631240R1101 CT8-V/2500	2CSG301240R1101 CT80/2500	2CSG721240R1101 CT12/2500	2CSG831240R1101 CT12-V/2500		0,5
	2CSG521250R1101 CT8/3000			2CSG721250R1101 CT12/3000	2CSG831250R1101 CT12-V/3000		0,5
				2CSG721260R1101 CT12/4000	2CSG831260R1101 CT12-V/4000		0,5
				2CSG721270R1101 CT12/5000			0,5
				2CSG721280R1101 CT12/6000			0,5

CT6	CT8	CT8V	CT80	CT12	CT12V	CT120
Through primary			Split core trough primary	Through primary		Split core trough primary
50	2x30	2x35	–	2x50	3x35	–
60x20	80x30	–	–	80x50; 100x50; 125x50	–	–
–	–	80x30; 3x80x5	2x30x10	–	125x30, 3x100x10, 4x100x5, 4x125x5	4x120x10

Energy efficiency

CT measurement current transformers with through primary

CT

Technical features				
		CT...	CTO	TRFM
Standard secondary current	[A]	5 A		
Max. voltage for operation	[kV]	1,2		
Test voltage	[kV]	3 a 50 Hz/1min		
Residual current voltage at secundary terminals when security circuit intervenes (only SELV versions)		< 25 V rms		
Short circuit rated thermal current	[IpN]	40 per 1 sec.	60 per 1 sec.	40 per 1 sec.
Short circuit rated dynamic current	[Ith]	2,5 per 1 sec.		
Permanent overload	[IpN]	1,2		
Safety factor	[Fs]	from ≤ 2 to ≤ 10 depending on the type and capacity		
Frequency	[Hz]	50-60		
Air insulation class		Class E	B	E
Terminals		primary P1 - P2 (K - L); secondary s1 - s2 (k - l)		
		P1 (K) primary winding input		
		s1 (k) secondary winding input		
		P2 (L) primary winding output		
		s2 (l) secondary winding output		
Housing		Self-extinguishing thermoplastic resin V0		
Protection degree		IP30	IP20	IP20
Operating temperature	[°C]	-5...+50	-5...+50	-25...+50
Max. temperature on bars	[°C]	70°C		
Storage temperature	[°C]	-20...+80	-20...+80	-40...+80
Relative humidity		80%		
Reference standard		IEC EN 60044-1, IEC EN 61010-1		
Secondary protection circuit reference standards (only SELV versions)		IEC60364; IEC473.1.4; IEC556.3; CEI64-8-4;		
		CEI411.1.4.3; CEI411.5.2; CEI411.2; CEI473.1.4; CEI473.2.3		

CT and CTA current transformers

Used to transform primary currents (max. 6000 A) into .../5 A low secondary currents indirectly supplying power to analogue and digital measurement devices. They are available both with wound and through primary. In the first case they are provided along with the bar or the primary terminal; in the second case they have a hole to insert in the bar or the cable which forms the primary.

The rated current to the secondary windings is 5 A, in line with the offer of measuring devices. CT ../1 are not employable with ABB mono-function and multifunction measuring devices. The use of CT ../1 is needed in case of long wirings from CT secondary windings to the measuring device; nowadays, the wide use of communication protocols doesn't require the instrument to be installed far from the line to measure.

The new SELV versions of the CT PRO XT and CT MAX guarantee maximum safety against overvoltage and switchboard internal overheating thanks to the innovative electronic protection circuit which automatically short-circuit the CT secondary winding in case of accidental disconnection of its secondary terminals.

Energy efficiency

CT measurement current transformers with through primary

CT PRO XT

Standard type current transformers .../5 A with through primary

CT PRO XT .../5 A series, through primary								
Primary rated current Iprim	Accurancy class	Rated power	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
A		VA	EAN	Type code	Order code	piece	kg	pc.
40	3	2	257455	CT PRO XT 40	2CSG225745R1101		0.32	1
50	3	2	257554	CT PRO XT 50	2CSG225755R1101		0.32	1
60	3	2	257653	CT PRO XT 60	2CSG225765R1101		0.32	1
80	3	2	257752	CT PRO XT 80	2CSG225775R1101		0.32	1
100	1	3	257851	CT PRO XT 100	2CSG225785R1101		0.32	1
150	1	5	257950	CT PRO XT 150	2CSG225795R1101		0.32	1
200	1	5	258056	CT PRO XT 200	2CSG225805R1101		0.32	1
250	0.5	5	258155	CT PRO XT 250	2CSG225815R1101		0.32	1
300	0.5	5	258155	CT PRO XT 300	2CSG225825R1101		0.32	1
400	0.5	5	258353	CT PRO XT 400	2CSG225835R1101		0.32	1

CT PRO XT SELV .../5 A series, through primary								
Primary rated current Iprim	Accurancy class	Rated power	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
A		VA	EAN	Type code	Order code	piece	kg	pc.
40	3	2	258452	CT PRO XT 40 SELV	2CSG225845R1101		0.37	1
50	3	2	258551	CT PRO XT 50 SELV	2CSG225855R1101		0.37	1
60	3	2	258650	CT PRO XT 60 SELV	2CSG225865R1101		0.37	1
80	3	2	258650	CT PRO XT 80 SELV	2CSG225875R1101		0.37	1
100	1	3	258858	CT PRO XT 100 SELV	2CSG225885R1101		0.37	1
150	1	5	258957	CT PRO XT 150 SELV	2CSG225895R1101		0.37	1
200	1	5	259053	CT PRO XT 200 SELV	2CSG225905R1101		0.37	1
250	0.5	5	259152	CT PRO XT 250 SELV	2CSG225915R1101		0.37	1
300	0.5	5	259251	CT PRO XT 300 SELV	2CSG225925R1101		0.37	1
400	0.5	5	259350	CT PRO XT 400 SELV	2CSG225935R1101		0.37	1

CT PRO XT series		
Through primary		max section [mm]
cable	○	18
horizontal bar	▭	20x10
vertical bar	▯	-

Energy efficiency

CT measurement current transformers with through primary

CT MAX

CT MAX .../5 A series, through primary

Primary rated current Iprim A	Accurancy class	Rated power VA	Bbn 8012542 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
300	0,5	4	259459	CT MAX 300	2CSG225945R1101		0,32	1
400	0,5	5	259558	CT MAX 400	2CSG225955R1101		0,32	1
500	0,5	6	259558	CT MAX 500	2CSG225965R1101		0,32	1
600	0,5	10	259657	CT MAX 600	2CSG225975R1101		0,32	1
800	0,5	10	259657	CT MAX 800	2CSG225985R1101		0,32	1
1000	0,5	10	259954	CT MAX 1000	2CSG225995R1101		0,32	1

CT MAX SELV .../5 A series, through primary

Primary rated current Iprim A	Accurancy class	Rated power VA	Bbn 8012542 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
300	0,5	4	260059	CT MAX 300 SELV	2CSG226005R1101		0,37	1
400	0,5	5	260158	CT MAX 400 SELV	2CSG226015R1101		0,37	1
500	0,5	6	260257	CT MAX 500 SELV	2CSG226025R1101		0,37	1
600	0,5	10	260356	CT MAX 600 SELV	2CSG226035R1101		0,37	1
800	0,5	10	260455	CT MAX 800 SELV	2CSG226045R1101		0,37	1
1000	0,5	10	260554	CT MAX 1000 SELV	2CSG226055R1101		0,37	1

CT MAX series

Through primary		max section [mm]
cable	◯	30
horizontal bar	▭	30x15, 40x10
vertical bar	▯	-

Energy efficiency

CT measurement current transformers with through primary

CT6

CT8

CT8/V

CT6 .../5 A series, through primary

Primary rated current Iprim A	Accurancy class	Rated power VA	Bbn 8012542 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
250	0.5	5	605508	CT6/250	2CSG421130R1101		1.000	1
300	0.5	5	605607	CT6/300	2CSG421140R1101		1.000	1
400	0.5	6	605706	CT6/400	2CSG421150R1101		1.000	1
500	0.5	6	605805	CT6/500	2CSG421160R1101		1.000	1
600	0.5	10	605904	CT6/600	2CSG421170R1101		1.000	1
800	0.5	10	606000	CT6/800	2CSG421180R1101		1.000	1
1000	0.5	20	606109	CT6/1000	2CSG421190R1101		1.000	1
1200	0.5	20	606208	CT6/1200	2CSG421200R1101		1.000	1
1500	0.5	30	606307	CT6/1500	2CSG421220R1101		1.000	1
2000	0.5	30	606406	CT6/2000	2CSG421230R1101		1.000	1
2500	0.5	30	606505	CT6/2500	2CSG421240R1101		1.000	1

CT8 .../5 A series, through primary

Primary rated current Iprim A	Accurancy class	Rated power VA	Bbn 8012542 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
300	0.5	5	606604	CT8/300	2CSG521140R1101		1.000	1
400	0.5	6	606703	CT8/400	2CSG521150R1101		1.000	1
500	0.5	10	606802	CT8/500	2CSG521160R1101		1.000	1
600	0.5	10	606901	CT8/600	2CSG521170R1101		1.000	1
800	0.5	10	607007	CT8/800	2CSG521180R1101		1.000	1
1000	0.5	10	607106	CT8/1000	2CSG521190R1101		1.000	1
1200	0.5	15	607205	CT8/1200	2CSG521200R1101		1.000	1
1500	0.5	20	607304	CT8/1500	2CSG521220R1101		1.000	1
2000	0.5	20	607403	CT8/2000	2CSG521230R1101		1.000	1
2500	0.5	20	607502	CT8/2500	2CSG521240R1101		1.000	1
3000	0.5	20	607601	CT8/3000	2CSG521250R1101		1.000	1

CT8-V .../5 A series, through primary

Primary rated current Iprim A	Accurancy class	Rated power VA	Bbn 8012542 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
400	0.5	6	608707	CT8-V/400	2CSG631150R1101		0.800	1
500	0.5	10	608806	CT8-V/500	2CSG631160R1101		0.800	1
600	0.5	10	608905	CT8-V/600	2CSG631170R1101		0.800	1
800	0.5	10	609001	CT8-V/800	2CSG631180R1101		0.800	1
1000	0.5	10	609100	CT8-V/1000	2CSG631190R1101		0.800	1
1200	0.5	10	609209	CT8-V/1200	2CSG631200R1101		0.800	1
1500	0.5	10	609308	CT8-V/1500	2CSG631220R1101		0.800	1
2000	0.5	20	609407	CT8-V/2000	2CSG631230R1101		0.800	1
2500	0.5	20	609506	CT8-V/2500	2CSG631240R1101		0.800	1

CT6 series

Through primary		max section [mm]
cable	○	50
horizontal bar	▭	60x20
vertical bar	▯	-

CT8 series

Through primary		max section [mm]
cable	○	2x30
horizontal bar	▭	80x30
vertical bar	▯	-

CT8-V series

Through primary		max section [mm]
cable	○	2x35
horizontal bar	▭	-
vertical bar	▯	80x30 3x80x5

Energy efficiency

CT measurement current transformers with through primary

CT12

CT12/V

CT12 .../5 A series, through primary

Primary rated current Iprim A	Accurancy class	Rated power VA	Bbn 8012542 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
500	0.5	10	607700	CT12/500	2CSG721160R1101		1.600	1
600	0.5	10	607809	CT12/600	2CSG721170R1101		1.600	1
800	0.5	15	607908	CT12/800	2CSG721180R1101		1.600	1
1000	0.5	20	608004	CT12/1000	2CSG721190R1101		1.600	1
1200	0.5	20	608103	CT12/1200	2CSG721200R1101		1.600	1
1500	0.5	20	608202	CT12/1500	2CSG721220R1101		1.600	1
2000	0.5	30	608301	CT12/2000	2CSG721230R1101		1.600	1
2500	0.5	40	608400	CT12/2500	2CSG721240R1101		1.600	1
3000	0.5	40	608509	CT12/3000	2CSG721250R1101		1.600	1
4000	0.5	50	608608	CT12/4000	2CSG721260R1101		2.000	1
5000	0.5	50	745600	CT12/5000	2CSG721270R1101		3.000	1
6000	0.5	50	745709	CT12/6000	2CSG721280R1101		3.000	1

CT12-V .../5 A series, through primary

Primary rated current Iprim A	Accurancy class	Rated power VA	Bbn 8012542 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
800	0.5	10	609605	CT12-V/800	2CSG831180R1101		0.700	1
1000	0.5	10	609704	CT12-V/1000	2CSG831190R1101		0.700	1
1200	0.5	10	609803	CT12-V/1200	2CSG831200R1101		0.700	1
1250	0.5	10	609902	CT12-V/1250	2CSG831210R1101		0.700	1
1500	0.5	12	610007	CT12-V/1500	2CSG831220R1101		0.700	1
2000	0.5	15	610106	CT12-V/2000	2CSG831230R1101		1.000	1
2500	0.5	20	610205	CT12-V/2500	2CSG831240R1101		1.000	1
3000	0.5	20	610304	CT12-V/3000	2CSG831250R1101		1.000	1
4000	0.5	20	745808	CT12-V/4000*	2CSG831260R1101		1.000	1

* Air insulation class: Class B

CT12 series

Through primary		max section [mm] up to 4000A	max section [mm] 5000 and 6000 A
cable	○	2x50	-
horizontal bar	▭	125x50	120x10, 2x120x10, 3x120x10
vertical bar	▯	-	200x10, 2x200x10, 3x200x10

CT12-V series

Through primary		max section [mm]
cable	○	3x35
horizontal bar	▭	-
vertical bar	▯	125x30, 3x100x10, 4x125x5

Energy efficiency

CTA measurement current transformers with wound primary

CTA/25

Standard type current transformers .../5 A with wound primary

CTA .../5 A series, wound primary with insertion on Ø8 MA bolt								
Primary rated current Iprim	Accurancy class	Rated power	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
A		VA	EAN	Type code	Order code	piece	kg	pc.
5	0.5	5	661306	CTA/5	2CSG111020R1141		0.290	1
10	0.5	5	661405	CTA/10	2CSG111030R1141		0.290	1
15	0.5	5	661504	CTA/15	2CSG111040R1141		0.290	1
20	0.5	5	661603	CTA/20	2CSG111050R1141		0.290	1
25	0.5	5	661702	CTA/25	2CSG111060R1141		0.290	1
40	0.5	5	661801	CTA/40	2CSG111080R1141		0.290	1
50	0.5	5	661900	CTA/50	2CSG111090R1141		0.290	1
60	0.5	5	662006	CTA/60	2CSG111100R1141		0.290	1
80	0.5	5	662105	CTA/80	2CSG111110R1141		0.290	1
100	0.5	5	662204	CTA/100	2CSG111120R1141		0.290	1

CTA series

Wound primary		max section [mm]
cable	○	8
horizontal bar	▭	-
vertical bar	▯	-

Energy efficiency

CTO split core measurement current transformers

CT30

CT80

CT120

Split core measurement current transformers with throug primary

Split core measurement current transformers are used in distribution panels or power c enters for maintenance or system expansion. They can be installed easily and they allows to save a lot of time, avoiding bar disconnection. All transformers are complete with terminal caps and fastening accessories, both on bar and on wall.

CT30/...5 A Split core current transformers

Primary rated current Iprim A	Accurancy class	Rated power VA	Bbn 8012542 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
100	3	1.5	887805	CT30/100	2CSG101100R1101		0.85	1
150	3	2	887904	CT30/150	2CSG101110R1101		0.85	1
250	0.5	1.5	888109	CT30/250	2CSG101130R1101		0.85	1
400	0.5	2.5	888000	CT30/400	2CSG101150R1101		0.85	1

CT80/...5 A Split core current transformers

Primary rated current Iprim A	Accurancy class	Rated power VA	Bbn 8012542 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
250	0.5	1	888208	CT80/250	2CSG201130R1101		1.1	1
400	0.5	1.5	888307	CT80/400	2CSG201150R1101		1.1	1
500	0.5	2.5	888406	CT80/500	2CSG201160R1101		1.1	1
600	0.5	2.5	888505	CT80/600	2CSG201170R1101		1.1	1
800	0.5	3	888604	CT80/800	2CSG201180R1101		1.1	1
1000	0.5	5	888703	CT80/1000	2CSG201190R1101		1.1	1

CT120/...5 A Split core current transformers

Primary rated current Iprim A	Accurancy class	Rated power VA	Bbn 8012542 EAN	Order details Type code	Order code	Price 1 piece	Weight 1 piece kg	Pack unit pc.
400	0.5	1.5	889007	CT120/400	2CSG401150R1101		1.3	1
500	0.5	2.5	889106	CT120/500	2CSG401160R1101		1.3	1
600	0.5	2.5	889205	CT120/600	2CSG401170R1101		1.3	1
800	0.5	3	889304	CT120/800	2CSG401180R1101		1.3	1
1000	0.5	5	889403	CT120/1000	2CSG401190R1101		1.3	1
1200	0.5	6	889502	CT120/1200	2CSG401200R1101		1.3	1
1500	0.5	8	889601	CT120/1500	2CSG401220R1101		1.3	1

CT30 series

Through primary
○
▭
▯

CT80 series

Through primary
○
▭
▯

CT120 series

Through primary		max section [mm]
cable	○	
horizontal bar	▭	
vertical bar	▯	4x120x10

Energy efficiency

TRF M measurement modular current transformers

TRF M

Modular current transformers with Ø 29 mm through primary, secondary .../5A
TRF M are modular current transformers with through primary for measuring instruments. Their compact size and quick DIN rail plug allow easy installation along with great measurement precision.

Primary rated current Iprim	Accurancy class	Rated power	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
A		VA	EAN	Type code	Order code	piece	kg	pc.
40	3	1	046912	TRFM/40	2CSM100050R1111		0.250	1
60	1	2	047018	TRFM/60	2CSM100070R1111		0.250	1
100	0.5	2	047117	TRFM/100	2CSM100090R1111		0.250	1
150	0.5	3	047216	TRFM/150	2CSM100100R1111		0.250	1
250	0.5	4	047315	TRFM/250	2CSM100120R1111		0.250	1
400	0.5	6	047407	TRFM/400	2CSM100140R1111		0.250	1
600	0.5	8	047506	TRFM/600	2CSM100160R1111		0.250	1

Energy efficiency

SNT current transformer for d.c. applications

SNT

Technical features		
Voltage	[mV]	60
Current rating	[A]	from 5 to 1000
Accuracy class		0.5 (from 10 to 30 °C)
Max. load	[Ω]	0.25
Overload for 5 sec.		from 10 to 500 A : 1xIn
		from 600 to 1000 A: 5xIn

Shunts

Shunts have 60 mV voltage and must be used with a maximum load of 0.25 Ω in combination with measurement instruments in d.c.

For an appropriate operation:

- both horizontal and vertical mounting are possible (the horizontal position enables a greater heat consumption)
- the faying surface must be completely used and clean; cover with specific grease after the connection
- screws and bolts must be perfectly tight
- shunts must be sufficiently ventilated; as they are not insulated, it is a good rule to protect them against accidental contacts.

60 mV shunts						
Rated current	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
A	EAN	Type code	Order code	piece	kg	pc.
5	047605	SNT 1/5	2CSM100010R1121		1.300	1
6	047704	SNT 1/6	2CSM100020R1121		1.800	1
10	047803	SNT 1/10	2CSM100030R1121		1.800	1
15	047902	SNT 1/15	2CSM100040R1121		1.800	1
20	048008	SNT 1/20	2CSM100050R1121		1.800	1
25	048107	SNT 1/25	2CSM100060R1121		1.800	1
30	048206	SNT 1/30	2CSM100070R1121		1.300	1
40	048305	SNT 1/40	2CSM100080R1121		1.300	1
50	048404	SNT 1/50	2CSM100090R1121		2.200	1
60	048503	SNT 1/60	2CSM100100R1121		2.200	1
80	048602	SNT 1/80	2CSM100110R1121		1.300	1
100	048701	SNT 1/100	2CSM100120R1121		1.300	1
150	048800	SNT 1/150	2CSM100130R1121		1.300	1
200	048909	SNT 1/200	2CSM100140R1121		1.300	1
250	049005	SNT 1/250	2CSM100150R1121		1.900	1
400	049104	SNT 1/400	2CSM100160R1121		1.900	1
500	049203	SNT 1/500	2CSM100170R1121		1.900	1
600	049302	SNT 1/600	2CSM100180R1121		1.900	1
800	049401	SNT 1/800	2CSM100190R1121		2.200	1
1000	049500	SNT 1/1000	2CSM100200R1121		2.200	1

Energy efficiency

TV voltage transformers

TV2

Technical features		
Case material		Metallic
Operating frequency	[Hz]	50-60
Insulation reference voltage	[kV]	0.72
Test voltage		3 kV x 1' at 50 Hz
Dry insulation in air		class E
Protection degree		IP 30
Rated voltage factor		1.2 continuous
Thermal power		6 times the rated burden
Operating temperature		from -25 °C to + 50 °C
Storage temperature		from -40 °C to +80°C
Standards		IEC/EN 61869-1, IEC/EN 61869-3

Voltage transformers

They are used for transforming primary voltages up to 500 V into secondary voltages of.../100 V max. for indirect supply of analogue as well as digital measurement instruments. R3 voltage transformers are used in three-phase distribution systems with neutral.

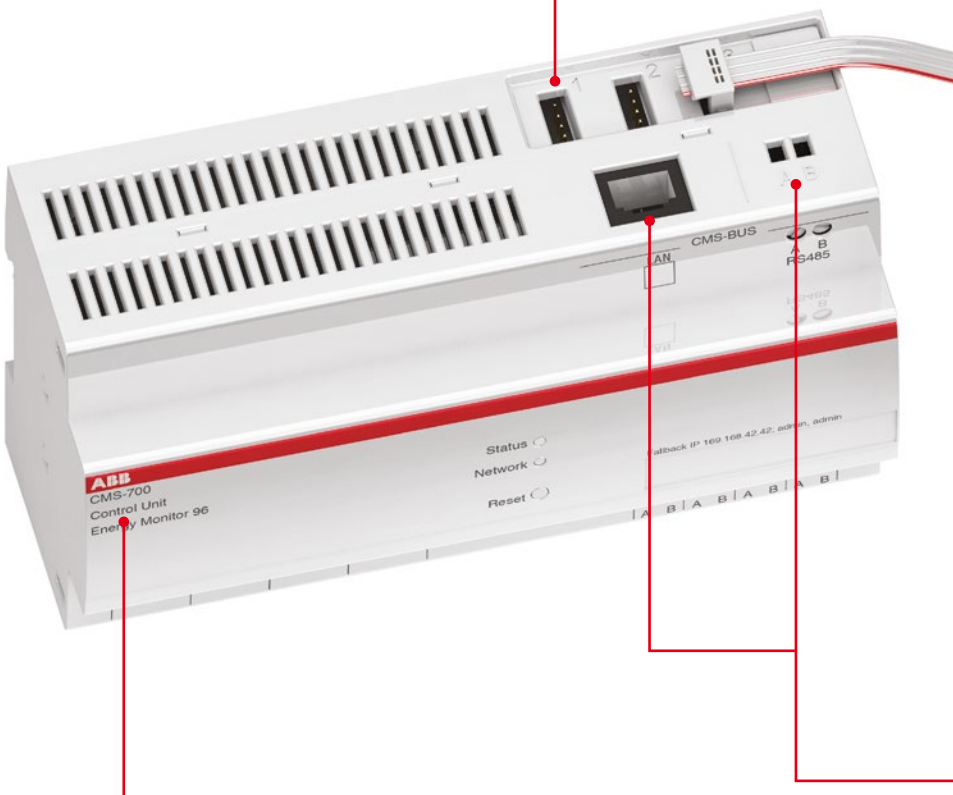
Voltage transformers with metallic housing, precision class 0.5							
Primary/ secondary voltage	Power	Bbn 8012542	Order details		Price 1	Weight 1 piece	Pack unit
V/V	VA	EAN	Type code	Order code	piece	kg	pc.
230/100	10	730101	TV2-230/100	2CSG324070R5021		2.100	1
380/100	10	730200	TV2-380/100	2CSG324090R5021		2.100	1
400/100	10	730309	TV2-400/100	2CSG324110R5021		2.100	1
440/100	10	730408	TV2-440/100	2CSG324130R5021		2.100	1
500/100	10	730507	TV2-500/100	2CSG324150R5021		2.100	1
600/100	10	730606	TV2-600/100	2CSG324170R5021		2.100	1
(230/√3)/100	5	731009	TV2-230R3/100	2CSG323080R5021		2.100	1
(380/√3)/100	5	731108	TV2-380R3/100	2CSG323100R5021		2.100	1
(400/√3)/100	5	731207	TV2-400R3/100	2CSG323120R5021		2.100	1
(440/√3)/100	5	731306	TV2-440R3/100	2CSG323140R5021		2.100	1
(500/√3)/100	5	731405	TV2-500R3/100	2CSG323160R5021		2.100	1
(600/√3)/100	5	731504	TV2-600R3/100	2CSG323180R5021		2.100	1

Energy efficiency
CMS – Circuit Monitoring System overview

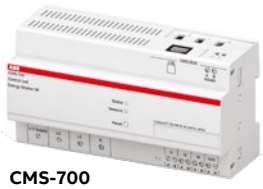
The quality of a Circuit Monitoring System is dependent on the strengths of the individual components and how well they interact. ABB's new CMS sets new and high standards. Compactness, technology, measurement results, user friendliness and flexibility - every component and every feature of the CMS has been fully optimized in terms of practicality and functionality.

CMS bus interface
Each bus interface allows up to 32 sensors connected to the Control Unit:
CMS-700: up to 96 sensors (3×32)
CMS-600: up to 64 sensors (2×32)
CMS-660: up to 32 sensors (1×32)

Example illustration:
Control Unit CMS-700 in combination with CMS open-core sensors



CMS-600



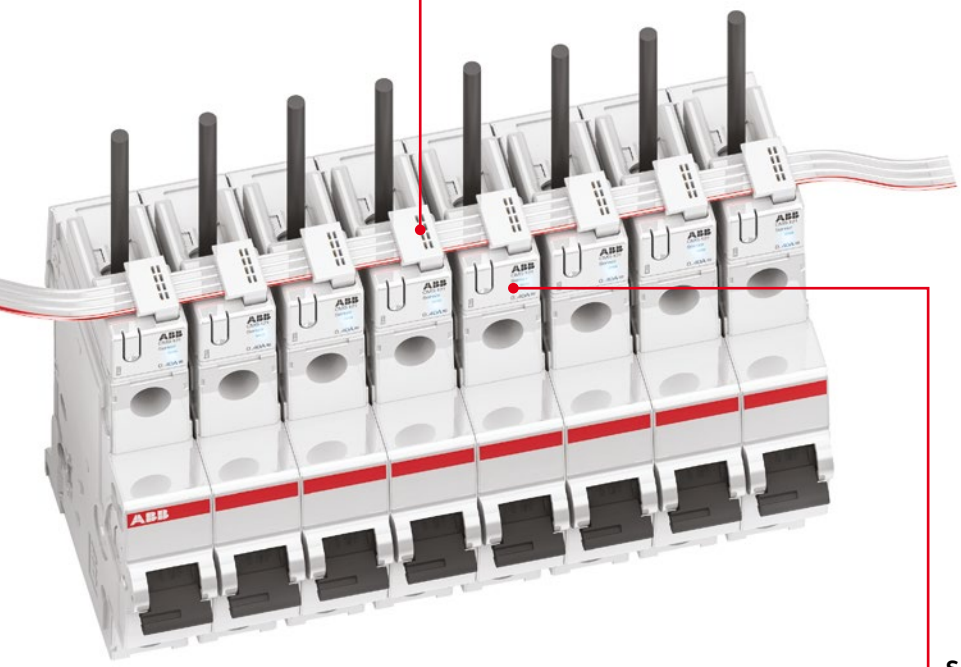
CMS-700

CMS-660

Control Units
The control unit evaluates the measurement data picked up by the sensors, and makes it available via the provided interfaces.

Three different units are available depending on the application: CMS-700, CMS-660 and CMS-600.

Connection technology
Connecting the sensors to the Control Unit is extremely simple and requires no special tools. All sensors are connected to the Control Unit by means of a flexible flat cable and insulation displacement connectors. The positioning of sensors is fully customizable so that they sit exactly where a measurement is required.



Sensors
CMS sensors can be placed anywhere in the system, without any limitation. Easy initializing is guaranteed by the unique ID assigned to each sensors via Control Unit in just a few simple steps.
All measurement functions are available right after commissioning.

Serial interfaces
Depending on the selected control unit, the following communication interfaces are available: RS485 (Modbus RTU), LAN (TCP/IP and Modbus TCP), SNMP v1/v2 and v3 encrypted.

The web server integrated in the CMS-700 makes it possible to display the values via any Internet browser and to automatically export the files (via e-mail or FTP server).

Energy efficiency
Circuit Monitoring System

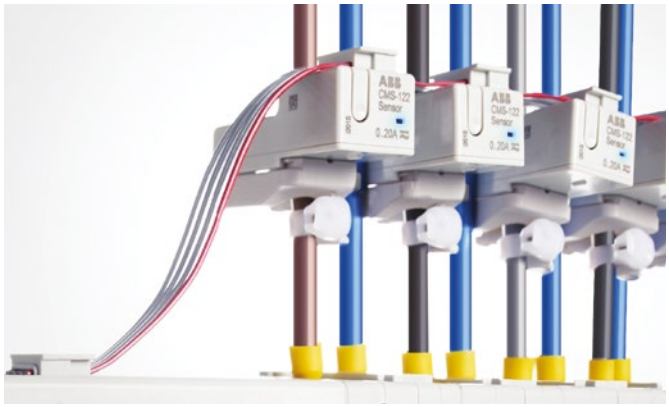
Integrate however you want thanks to multiple mounting options.
Depending on the application, you can choose between two sets of sensors - one specifically designed for ABB installation devices, the other with an universal design to be installed on cables or DIN-rail.

Sensors for ABB devices

System pro M installation, SMISSLINE
The sensors of the CMS-120LA and CMS-120FH series allow easy retrofit installation on S200 MCBs, SMISSLINE devices and E90 fuseholders (1000VDC).

Installation on S800 installation devices
CMS-100S8 and CMS-200S8 series sensors can be mounted on all S800 high performance circuit breakers with cage terminals.

Universally usable sensor designs



Mounting on a DIN rail
CMS-120DR, CMS-100DR, and CMS-200DR series sensors can be mounted on all DIN rails with the aid of a DIN rail mounting.

Cable tie mounting
If space is at a real premium, CMS-120CA, CMS-100CA, and CMS-200CA series sensors can be secured directly to the cable(s) to be measured by means of cable ties.

Energy efficiency
Circuit Monitoring System

Tangible value added for you
ABB circuit monitoring pays off twofold

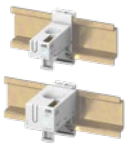
Early warning system (predictive maintenance) for increasing the availability of critical consumers
Continuous monitoring of the current flow at the circuit breaker makes it possible to detect overloaded lines before they lead to a service interruption. Apart from this, monitoring individual circuits indicates whether the loads are in the desired operating mode or not. In this way, system deviations can be ascertained instantaneously. What's more, the CMS can be used to detect unbalanced loads before they result in failure of the neutral conductor and consequently load failure.

Cost analysis to reduce and assign energy costs
The cost of energy will rise continuously. In order to cut costs, you first have to know where they arise. The Control Unit helps illustrate and analyze the instantaneous energy consumption levels. Furthermore, the calculated active energy can be used to roughly allocate the costs at the output level.

Energy efficiency

Circuit Monitoring System

Sensors overview

		System Pro M, SMISSLINE		S800	DIN rail	Cable tie
						
Mounting method	for all MCBs, RCDs, RCBOs with twin terminals	for MCBs (S200, SMISSLINE) and RCBOs (SMISSLINE)	for fuse holders E90	for all S800 devices with cage terminals	universally usable	universally usable
Open-core sensors						
AC accuracy* of ≤ ± 1.0% The laying method influences the accuracy.						
18-mm overall width						
CMS-120xx (80 A)	CMS-120PS	CMS-120LA	-		CMS-120DR	CMS-120CA
CMS-121xx (40 A)	CMS-121PS	CMS-121LA	CMS-121FH		CMS-121DR	CMS-121CA
CMS-122xx (20 A)	CMS-122PS	CMS-122LA	CMS-122FH		CMS-122DR	CMS-122CA
Solid-core sensors						
AC accuracy* of ≤ ± 0.5%						
18-mm overall width						
CMS-100xx (80 A)	CMS-100PS			CMS-100S8	CMS-100DR	CMS-100CA
CMS-101xx (40 A)	CMS-101PS			CMS-101S8	CMS-101DR	CMS-101CA
CMS-102xx (20 A)	CMS-102PS			CMS-102S8	CMS-102DR	CMS-102CA
25-mm overall width						
CMS-200xx (160 A)				CMS-200S8	CMS-200DR	CMS-200CA
CMS-201xx (80 A)				CMS-201S8	CMS-201DR	CMS-201CA
CMS-202xx (40 A)				CMS-202S8	CMS-202DR	CMS-202CA

* All accuracy specifications refer to the relevant full scale value and apply to 25°C

Energy efficiency

Circuit Monitoring System

Control units		
Characteristics	**Control Unit CMS-700**	**Control Unit CMS-600**
CMS Sensors		
Sensors	96 (3x32)	64 (2x32)
Control Unit		
Integrated power supply	•	
Voltage measurement	•	
Current (External CTs are required) measurement	•	
Active, reactive and appearent power (External CTs are required) measurement	•	
Calculated values for the branches		
Energy (Using branch currents, mains voltage and power factor over time)	•	
Power (Using branch currents, mains voltage and power factor)	•	
Interfaces		
RS485	•	•
LAN	•	
Protocols		
Modbus RTU	•	•
Modbus TCP	•	
SNMP (v1, v2 and encrypted v3)	•	
Visualization		
Built-in web server	•	
Touch display		•
CSV data export	•	
Approvals		
IEC 61010-1	•	•
UL 508 / CSA C22.2 No. 14	•	•

Energy efficiency
Control units

CMS-700

CMS-700
User Manual

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 ... 115200
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]	161.5 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%

CMS-600

CMS-600
User Manual

Control Unit CMS-600 – Modbus RTU		
Supply voltage	[VDC]	24 (±10%)
Power input	[W]	4 – 24 (dep. on number of sensors)
Interface		RS485 2-wire
Protocol		Modbus RTU
Data rate	[Baud]	2400 ... 115200
Refresh time		≤1 sec with max. 64 sensors
Insulation strength	[VAC]	400
Screw-type terminals		0.5 ... 2.5 mm², max. 0.6 Nm
Mounting method		35 mm DIN rail (DIN 50022) or SMISSLINE TP plug base
Dimensions	[mm]	71.8 x 87.0 x 64.9 (4 WM)
Operating temperature	[°C]	-25 ... +70
Bearing temperature	[°C]	-40 ... +85
Standards		IEC 61010-1 UL 508/ CSA C22.2 No. 14

Energy efficiency
Control units

CMS-700

CMS-700
User Manual

CMS-700

The CMS-700 measures the AC and DC currents in the outgoing circuits via up to 3 x 32 sensors and calculates the energy and output data (line-side active and reactive power) of up to 96 sensors simultaneously.

Remotely monitoring of the system is made possible by a digital communication that supports different protocols: Modbus RTU, TCP or SNMP v1 and v2 and the encrypted v3. The Control Unit CMS-700 stands out thanks to its built-in web server that offers easy access not only to the measured data but also to the system parameters. The two interfaces – LAN (TCP/IP or Modbus TCP) and RS485 (Modbus RTU) – guarantee straight¬forward integration into any IT infrastructure. What's more, the data can be read out by means of an encrypted SNMP protocol.

The Control Unit CMS-700 has been developed specifically to meet the requirements of critical power applications, such as tho¬se of computing centers. In addition, however, professional energy monitoring is becoming ever more important when it comes to identifying savings potentials in functional buildings such as office buildings.

CMS-600

CMS-600
User Manual

CMS-600

The CMS-600 system enables you to measure AC and DC currents in up to 64 branches. For simple and fast operation, the Control Unit is equipped with an illuminated touch display that makes not only initialization but also control of the sensors extremely simple.

A 2-wire RS485 Modbus RTU interface enables users to remotely query and process the measurement data. As such, the CMS-600 Control Unit can be very easily integrated into an existing Modbus architecture. As an option, the measured values can also be visualized and processed by me¬ans of a programmable logic control (PLC).

CMS-600 is equipped with an integrated CMS software for which great care has been taken to ensure that the navigation concept is highly intuitive

The Control Unit CMS-600 are put to use in the critical power systems of hospitals and in similar industrial applica¬tions, too. Furthermore, these devices can also be found in functio¬nal buildings such as airports, hotels, office buildings, universities/ colleges and museums or in industrial photovoltaics.

Description	GTIN 7612271 EAN	Ordering details		Unit price	Weight of 1 unit (kg)	Packaging unit (pce.)
		Brief description	Product no.			
Control units						
Control Unit CMS-700	453138	CMS-700	2CCA880700R0001		0.329	1
Control Unit CMS-600	418700	CMS-600	2CCA880000R0001		0.153	1

Energy efficiency

Sensors and Accessories

CMS-120LA

CMS-120FH

CMS-120PS

CMS-120DR

CMS-120CA

Open core sensors 18 mm

Sensor type			CMS-120xx	CMS-121xx	CMS-122xx
Measurement range		[A]	80	40	20
Measurement method			TRMS, AC 50 / 60 Hz, DC		
Peak value of the distorted wave-form			≤ 1.5	≤ 3	≤ 6
AC accuracy (TA = 25 °C)*			≤ ± 1 %		
AC* temperature coefficient			≤ ± 0.04 %		
AC accuracy (TA = 25 °C)*			≤ ± 1.2 %	≤ ± 1.4 %	≤ ± 1.8 %
DC* temperature coefficient			≤ ± 0.14 %	≤ ± 0.24 %	≤ ± 0.44 %
Resolution		[A]	0.01		
Internal sampling rate		[Hz]	5000		
Respond time (±1 %)		[sec]	Type 0.34		
Max. diameter of the cable		[mm]	9.6		
Insulation			690 V AC /1500 V DC		
Operating temperature		[°C]	– 25 ... +70 / – 40 ... +85		
Size	CMS-120PS series	[mm]	17.4 x 41.0 x 26.5		
	CMS-120CA series	[mm]	17.4 x 41.0 x 29.0		
	CMS-120DR series	[mm]	17.4 x 51.5 x 43.2		
	CMS-120LA series	[mm]	17.4 x 41.0 x 38.9		
	CMS-120FH series	[mm]	17.4 x 41.0 x 38.9		
Reference standard			IEC 61010-1 | UL508 / CSA C22.2 No 14		

* All accuracy specifications refer to full scale value and apply at 25° C.
In the case of open-core sensors, the position of the cable affects accuracy.

CMS-120PS

CMS-120PS

CMS-120DR

CMS-120CA

Solid-core sensors 18 mm

Sensor type			CMS-100xx	CMS-101xx	CMS-102xx
Measurement range		[A]	80	40	20
Measurement method			TRMS, AC 50 / 60 Hz, DC		
Peak value of the distorted wave-form			≤ 1.5	≤ 3	≤ 6
AC accuracy (TA = 25 °C)*			≤ ± 0.5 %		
AC* temperature coefficient			≤ ± 0.036 %		
AC accuracy (TA = 25 °C)*			≤ ± 0.7 %	≤ ± 1.0 %	≤ ± 1.7 %
DC* temperature coefficient			≤ ± 0.047 %	≤ ± 0.059 %	≤ ± 0.084 %
Resolution		[A]	0.01		
Internal sampling rate		[Hz]	5000		
Respond time (±1 %)		[sec]	Type 0.25		
Max. diameter of the cable		[mm]	10		
Insulation		[V]	690 V AC /1500 V DC		
Operating temperature		[°C]	– 25 ... +70 / – 40 ... +85		
Size	CMS-100PS series	[mm]	17.4 x 41.0 x 26.5		
	CMS-100S8 series	[mm]	26.5 x 45.5 x 31.8		
	CMS-100DR series	[mm]	17.4 x 51.5 x 43.2		
	CMS-100CA series	[mm]	17.4 x 41.0 x 29.0		
Reference standard			IEC 61010-1 | UL508 / CSA C22.2 No 14		

* All accuracy specifications refer to the relevant full scale value and apply at 25° C.

CMS-120PS

CMS-120DR

CMS-120CA

Solid-core sensors 25 mm

Sensor type			**CMS-200xx**	**CMS-201xx**	**CMS-202xx**
Measurement range		[A]	160	80	40
Measurement method			TRMS, AC 50 / 60 Hz, DC		
Peak value of the distorted wave-form			≤ 1.5	≤ 3	≤ 6
AC accuracy (TA = +25°C)*			≤ ± 0.5 %		
AC* temperature coefficient			≤ ± 0.036 %		
AC accuracy (TA = +25°C)*			≤ ± 0.7 %	≤ ± 1.0 %	≤ ± 1.7 %
DC* temperature coefficient			≤ ± 0.047 %	≤ ± 0.059 %	≤ ± 0.084 %
Resolution		[A]	0.01		
Internal sampling rate		[Hz]	5000		
Respond time (±1 %)		[sec]	Type 0.25		
Max. diameter of the cable		[mm]	15		
Insulation		[V]	690 V AC / 1500 V DC		
Operating temperature		[°C]	– 25 ... +70 / – 40 ... +85		
Size	CMS-200S8 series	[mm]	26.5 x 43.0 x 38.5		
	CMS-200DR series	[mm]	25.4 x 43.0 x 43.2		
	CMS-200CA series	[mm]	25.4 x 43.0 x 35.7		
Reference standard			IEC 61010-1 | UL508 / CSA C22.2 No 14		

* All accuracy specifications refer to the relevant full scale value and apply at 25 °C.

Energy efficiency

Sensors and Accessories

Open-core sensors Installation manual

Open-core sensors

The open-core sensors are able to measure all types of current, whether AC, DC or mixed, up to 80 A in TRMS, enabling exact and effective measurements. As each sensor is equipped with its own microprocessor for processing the signal, the measurement data is transmitted digitally to the Control Unit via bus interface, maximizing data reliability. Disturbances like those experienced with analog data now most definitely belong to the past.

With this solution a faster cabling is guaranteed, since wiring cables are directly inserted in the sensors without the aid of a screwdriver. No special tools are needed for the entire connection process.

Solid-core sensors Installation manual

With AC accuracy* of ≤ ±1.0 %, they can be used in a multitude of applications without any problem: System pro M, DIN rail and Cable tie.

Thanks to their U shape, the open-core sensors can be retrofitted to existing installations, without the need to discon¬nect the cabling or shut down the equipment, being the key for brownfield extension.

Solid-core sensors

Alternating (AC), direct (DC) or mixed (TRMS) currents – the CMS sensors monitor and measure all types of current over a measurement range of up to 160 A (TRMS). They even measure harmonic components in the signal curve. The measurements are digitally transmitted through bus interface, enabling reliability of data and removing disturbance effects.

Maximum secure insertion of wiring cables is guaranteed by this sensors solution.

Everything is built into an 18 or 25 mm wide unit to enable precise and effective measurements. This makes these CMS sensors the most compact and most powerful on the market.

Depending on the application, solid-core sensors are chosen between up to four different mounting options to making this solution as flexible as possible.

The solid-core units feature an enclosed structure and AC measurement accuracy* of ≤ ± 0.5 %, and are therefore suitable for all applications in which maximum-precision measurement is crucial.

* All accuracy specifications refer to the relevant full-scale value and apply to 25 °C.

Accessories

The Control Unit of the circuit monitoring system need a flat cable for receive branches measurements from sensors. The flat cable should be a 4-pin cable, flexible in length. Flat cable are available in several lengths in order to cover the most kind of application. Cables with the greater length are designed with the purpose of being adapted, through cutting, to the various lengths required by the applications.

Energy efficiency
Sensors and Accessories

Open-core sensors

	Description Type	ABB code	Weight of 1 unit (kg)	Unit conf. (Pcs)
Open-core sensors 18 mm for retrofit of MCBs (S200, SMISSLINE) and RCBOs (SMISSLINE)				
80 A	CMS-120LA	2CCA880225R0001	0.012	1
40 A	CMS-121LA	2CCA880226R0001	0.012	1
20 A	CMS-122LA	2CCA880227R0001	0.012	1
Open-core sensors 18 mm for retrofit of E90 fuseholders 1000VDC				
40 A	CMS-121FH	2CCA880216R0001	0.012	1
20 A	CMS-122FH	2CCA880217R0001	0.012	1
Open-core sensors 18 mm for pro M and SMISSLINE devices with twin terminals				
80 A	CMS-120PS	2CCA880210R0001	0.012	1
40 A	CMS-121PS	2CCA880211R0001	0.012	1
20 A	CMS-122PS	2CCA880212R0001	0.012	1
Open-core sensors 18 mm for DIN-rail (universal use)				
80 A	CMS-120DR	2CCA880240R0001	0.015	1
40 A	CMS-121DR	2CCA880241R0001	0.015	1
20 A	CMS-122DR	2CCA880242R0001	0.015	1
Open-core sensors 18 mm for cable tie mounting (universal use)				
80 A	CMS-120CA	2CCA880220R0001	0.011	1
40 A	CMS-121CA	2CCA880221R0001	0.011	1
20 A	CMS-122CA	2CCA880222R0001	0.011	1

Solid-core sensors

	Description Type	ABB code	Weight of 1 unit (kg)	Unit conf. (Pcs)
Solid-core sensors 18 mm for S800 devices with cage terminals				
80 A	CMS-100S8	2CCA880124R0001	0.014	1
40 A	CMS-101S8	2CCA880125R0001	0.014	1
20 A	CMS-102S8	2CCA880126R0001	0.014	1
Solid-core sensors 18 mm for pro M & SMISSLINE installation devices with twin terminals				
80 A	CMS-100PS	2CCA880100R0001	0.012	1
40 A	CMS-101PS	2CCA880101R0001	0.012	1
20 A	CMS-102PS	2CCA880102R0001	0.012	1
Solid-core sensors 18 mm for DIN rail mounting (universally usable)				
80 A	CMS-100DR	2CCA880128R0001	0.015	1
40 A	CMS-101DR	2CCA880129R0001	0.015	1
20 A	CMS-102DR	2CCA880130R0001	0.015	1
Solid-core sensors 18 mm for cable tie mounting (universally usable)				
80 A	CMS-100CA	2CCA880107R0001	0.011	1
40 A	CMS-101CA	2CCA880108R0001	0.011	1
20 A	CMS-102CA	2CCA880109R0001	0.011	1
Solid-core sensors 25 mm for S800 devices with cage terminals				
160 A	CMS-200S8	2CCA880136R0001	0.028	1
80 A	CMS-201S8	2CCA880137R0001	0.028	1
40 A	CMS-202S8	2CCA880138R0001	0.028	1

Energy efficiency

Sensors and Accessories

Solid-core sensors

	Description Type	ABB code	Weight of 1 unit (kg)	Unit conf. (Pcs)
Solid-core sensors 25 mm for DIN-rail mounting (universal use)				
160 A	CMS-200DR	2CCA880132R0001	0.030	1
80 A	CMS-201DR	2CCA880133R0001	0.030	1
40 A	CMS-202DR	2CCA880134R0001	0.030	1
Solid-core sensors 25 mm for cable tie mounting (universal use)				
160 A	CMS-200CA	2CCA880117R0001	0.026	1
80 A	CMS-201CA	2CCA880118R0001	0.026	1
40 A	CMS-202CA	2CCA880119R0001	0.026	1

Control Unit

	Description Type	ABB code	Weight of 1 unit (kg)	Unit conf. (Pcs)
CMS-600 Control Unit	CMS-600	2CCA880000R0001	0.153	1
CMS-700 Control Unit	CMS-700	2CCA880700R0001	0.329	1

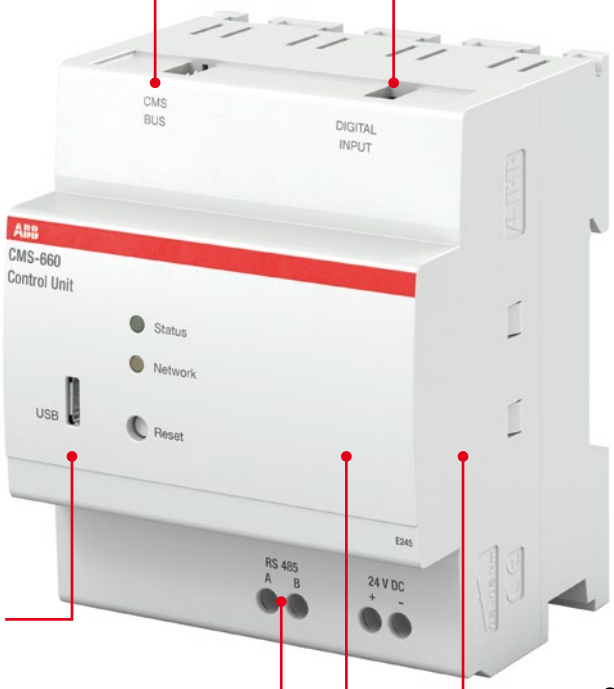
Accessories

	Description Type	ABB code	Weight of 1 unit (kg)	Unit conf. (Pcs)
2 m flat cable	CMS-800	2CCA880148R0001	0.017	1
5 m flat cable	CMS-802	2CCA880331R0001	0.045	1
10 m Flat cable	CMS-803	2CCA880332R0001	0.090	1
30 m Flat cable	CMS-805	2CCA880333R0001	0.270	1
Connector set (35 pcs)	CMS-820	2CCA880145R0001	0.024	35

String monitoring
CMS-660 circuit monitoring system

Extreme flexibility
The number (up to 32) and positioning of the sensors is fully customizable, ensuring the highest flexibility in integration to different system conditions

Up-to-date system status
CMS-660 immediately detects unusual system status (e.g. solar shading, over-voltages, breaker trip, high temperature), facilitating maintenance of the system



User friendliness
Local information, thanks to the LEDs, about network and device status. Reset button to easily set the device.

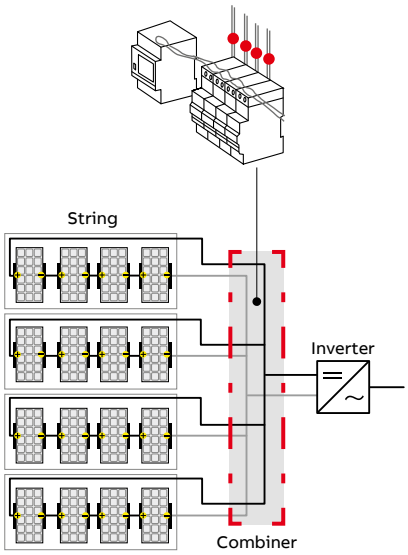
Compatibility
RS485 port to guarantee easy integration with the plant / inverter monitoring systems.

Smart commissioning
Thanks to the intelligent, intuitive configuration, the CMS system can be configured and put into operation in just a few minutes.

One sensor for all currents and strings
Direct, alternating or mixed – in a wide measuring range up to 80A, allowing the combination of two strings into one solid-core sensor.

Energy efficiency

String monitoring CMS-660



Circuit monitoring system for PV applications

The CMS string monitoring increases the efficiency of photovoltaic systems by detecting failures on PV strings. With the easy-to-integrate system you can immediately detect unusual system status, e.g. defective strings, over-voltages, breaker trips or high temperatures, enabling you to quickly implement appropriate countermeasures.

Key features:

- Current and temperature measurement directly from the sensors
- Monitoring of two strings can be combined into one single CMS solid-core sensor
- Integration of SPD and Switch disconnector status via 2 digital inputs
- Up to 32 flexible monitoring points, placed where measurement is required
- LEDs provide local information about network and device status.
- Modbus RTU protocol guarantees easy integration into plant or inverter monitoring systems
- Connection technology is extremely simple and requires no special tools

Control unit – CMS-660

Main technical specification		CMS-660
General data		
Degree of protection		IP20
Operating temperature	[°C]	– 25 .. +70 °C
Storage temperature	[°C]	– 40 .. +85 °C
Dimensions W / H / D	[mm]	71.8 x 87.0 x 64.9 (4 modules)
Screw-type terminals		0.5…2.5 mm², max 0.6 Nm
Altitude	[m]	≤ 2000 m
Insulation strength	[VAC]	400
Installation on DIN-rail		35 mm (DIN EN 50022)
Reference standards		IEC 61010-1 UL | 508/CSA C22.2 No. 14
Supply		
Supply voltage	[VDC]	24 (±10%)
Power Input	[W]	0.5 - 11 (dep. on n. of sensors)
Serial interface (RS-485)		
Serial transmission speed		2.4 … 115. 2 kbps
Cable type		Twisted, shielded
Communication protocol		Modbus RTU
Measuring inputs		
Max. number of sensors		32
Refresh time		≤1 sec with max 32 sensors
Digital inputs		2
Connection method		Push-in spring connection
Cable diameter		max. 0.5mm²
Electrical characteristics		for potential-free contact
Micro USB port		1

Control Unit

	Description Type	ABB code	Weight of 1 unit (kg)	Unit conf. (Pcs)
CMS-660 control unit	CMS-660	2CCA880020R0001	0.153	1