

## 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

#### Modular digital instruments

The wide range of modular digital instruments starts with single-phase mono-function measurement devices for measuring voltage, current.

The range is composed by a voltmeter for a.c./d.c. voltage monitoring, one ammeter for a.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	Order details		Price 1 piece	Weight 1 piece kg	Pack unit pc.
	8012542	EAN	Type code			
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



AMTD

#### Modular digital instruments with alarm relay

The range is widened by two additional devices with extended features: 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	Order details		Price 1 piece	Weight 1 piece kg	Pack unit pc.
	8012542	EAN	Type code			
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



FRZ

## 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 one ammeter for a.c. Ammeters measure in indirect insertion thanks to measuring accessories, like current transformer for a.c.

The full-scale value is programmable by the user, according to the current flow on the primary windings.

Version	Bbn	Order details		Price 1 piece	Weight 1 piece kg	Pack unit pc.
	8012542	EAN	Type code			
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



AMTD-1 P

#### Front-panel digital instruments with alarm relay

The range is widened by one additional devices with extended features: one 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	Order details		Price 1 piece	Weight 1 piece kg	Pack unit pc.
	8012542	EAN	Type code			
a.c. digital ammeter with alarm relay	136453	AMTD-1-R P	2CSG213645R4011		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 
Front-panel	a.c.	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.	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, 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	Order details		Price 1 piece	Weight 1 piece kg	Pack unit pc.
	8012542	EAN	Type code			
300 V	007906	VLM1/300	2CSM110190R1001	0.200	1	
500 V	000006	VLM1/500	2CSM110220R1001	0.200	1	

#### Ammeters: direct connection

Scale	Bbn	Order details		Price 1 piece	Weight 1 piece kg	Pack unit pc.
	8012542	EAN	Type code			
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

#### Ammeters without scale: connection using CT.../5

Scale	Bbn 8012542	Order details		Price 1 piece	Weight 1 piece kg	Pack unit pc.
	EAN	Type code	Order code			
A1	000600	AMT1/A1	2CSM320250R1001		0.200	1

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AMT2

#### Ammeters: direct connection

Scale	Bbn 8012542	Order details		Price 1 piece	Weight 1 piece kg	Pack unit pc.
	EAN	Type code	Order code			
10 mA	028307	AMT2/0.01	2CSM410330R1001		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 piece	Weight 1 piece kg	Pack unit pc.
	EAN	Type code	Order code			
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

## 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 $I_n \times 10 / <$ sec. up to $I_n \times 2$ /permanent
- voltmetric windings		up to $U_n \times 2 / <$ 5 sec. up to $U_n \times 1.2$ /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		
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

Available in both alternating current and direct current versions, the front-panel mono-function measurement devices come in two standard sizes, 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 ammeters for a.c. and d.c. applications, and voltmeters 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	Insertion	Scale	VT type	Bbn 8012542	Order details		Price 1 piece	Weight 1 piece	Pack unit
mm	V a.c.	EAN	Type code	Order code	Order code	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		

## Energy efficiency

### Front-panel analogue instruments



VLM

Size	Insertion	Scale	VT type	Bbn	Order details		Price 1 piece	Weight 1 piece kg	Pack unit pc
				8012542	EAN	Type code			
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

D: direct connection

## Energy efficiency

Front-panel analogue ammeters for alternating current



AMT1-A1 72



AMT1-A1 96

Size	Insertion	Scale	Bbn 8012542	Order details		Price 1 piece	Weight 1 piece	Pack unit
				A a.c.	EAN			
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

Size	Insertion	Scale	Bbn 8012542	Order details		Price 1 piece	Weight 1 piece	Pack unit
				A a.c.	EAN			
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

## Energy efficiency

### Front-panel analogue instruments



FRZ 72



FRZ 96

#### Front-panel analogue frequency meters

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

Size	Insertion	Scale	Bbn 8012542	Order details		Price 1 piece	Weight 1 piece	Pack unit
mm			EAN	Type code	Order code		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 72 x 72 mm: SCL-A1 for AMT1-A1/72 a.c. ammeters						
Scale	Bbn 8012542	Order details		Price 1 piece	Weight 1 piece	Pack unit
A a.c.	EAN	Type code	Order code		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 piece	Weight 1 piece	Pack unit
A a.c.	EAN	Type code	Order code	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 piece	Weight 1 piece	Pack unit
A a.c.	EAN	Type code	Order code		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 piece	Weight 1 piece kg	Pack unit pc.
A a.c.	EAN	Type code	Order code			
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 96 x 96 mm: SCL-A2 for AMT2-A2/96 d.c. ammeters						
Scale	Bbn 8012542	Order details		Price 1 piece	Weight 1 piece	Pack unit
A a.c.	EAN	Type code	Order code		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	Order details			Price 1 piece	Weight 1 piece	Pack unit
		Bbn 7392696	Type code	Order code			
	W	EAN			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	Order details			Price 1 piece	Weight 1 piece	Pack unit
		Bbn 7392696	Type code	Order code			
	W	EAN			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.



QCV 48

Measure	Position	Order details			Price 1 piece	Weight 1 piece	Pack unit
		Bbn 7392696	Type code	Order code			
		EAN			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	

## 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 <sup>2</sup>	up to 10 mm <sup>2</sup>

#### 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 piece	Weight 1 piece kg	Pack unit pc.
		EAN	Type code			
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 <sup>①</sup>	E 233-240/60 Hz	2CDE100021R1601	0.05	10	
AC 120 V/60 Hz	36600 7 <sup>①</sup>	E 233-120/60 Hz	2CDE600021R1601	0.05	10	
AC 24 V/60 Hz	36610 6 <sup>①</sup>	E 233- 24/60 Hz	2CDE400021R1601	0.05	10	

<sup>①</sup> 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 piece	Weight 1 piece kg	Pack unit pc.
		EAN	Type code			
V AC						
24	030300	HMT 1/24	2CSM111000R1601		0.200	6
110	030409	HMT 1/110	2CSM121000R1601		0.200	6
230	030508	HMT 1/220	2CSM131000R1601		0.200	6
230	030607	HMT 11	2CSM133000R1601		0.200	1

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