

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 8012542 | Order details | | Price 1 piece | Weight 1 piece kg | Pack unit pc. |
|-------|----------------|---------------|-----------------|---------------------|-------------------------|---------------------|
| | | 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 8012542 | Order details | | Price 1 piece | Weight 1 piece kg | Pack unit pc. |
|-------|----------------|---------------|-----------------|---------------------|-------------------------|---------------------|
| | | 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 $I_n \times 10 / < \text{sec.}$ up to $I_n \times 2 / \text{permanent}$ |
| - voltmetric windings | | up to $U_n \times 2 / < 5 \text{ sec.}$ up to $U_n \times 1.2 / \text{permanent}$ |
| 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 | Weight 1 piece | Pack 1 piece 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 | | | |
| mm | | V a.c. | | | | | | | |
| 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 kg | Pack unit pc. |
|------|-----------|--------|----------------|---------------|-----------------|---------------------|-------------------------|---------------------|
| | | | | 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 kg | Pack unit pc. |
|------|-----------|--------|----------------|---------------|-----------------|---------------------|-------------------------|---------------------|
| | | | | 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 kg | Pack unit pc. |
| A a.c. | EAN | Type code | Order code | | | |
| 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 kg | Pack unit pc. |
| A a.c. | EAN | Type code | Order code | | | |
| 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 kg | Pack unit pc. |
|--------|----------------|-----------------|-----------------|---------------------|-------------------------|---------------------|
| A a.c. | EAN | Type code | Order code | | | |
| 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 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 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 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 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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