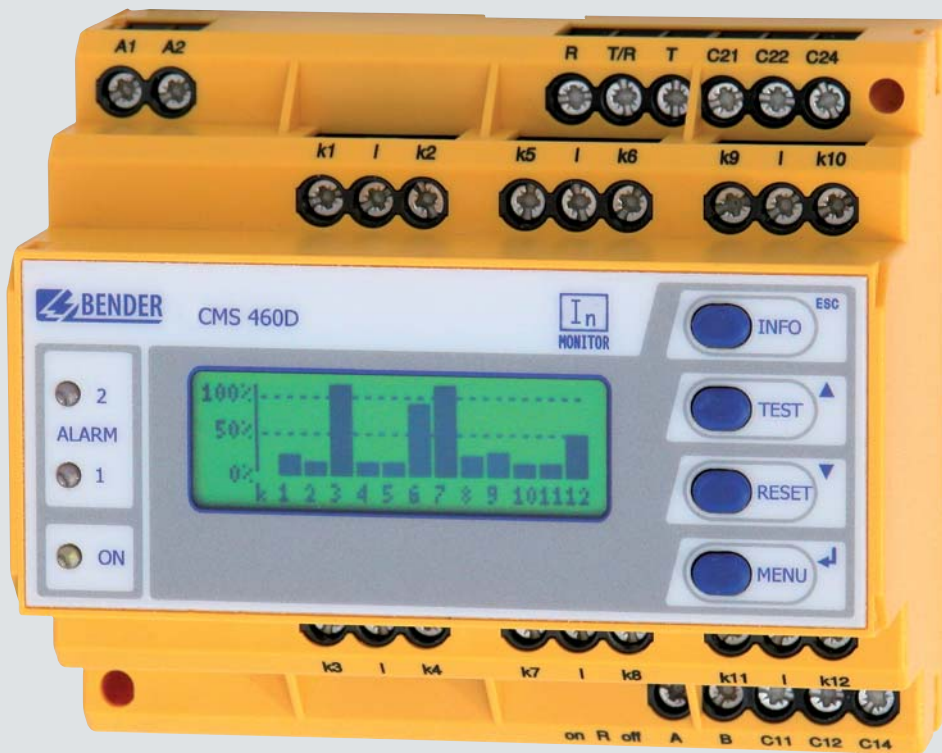


Load current evaluators CMS460-D

Multi-channel AC, pulsed DC sensitive load current evaluator
for AC systems (TN, TT and IT systems)



Load current evaluators

CMS460-D

Multi-channel AC and pulsed DC sensitive load current evaluators for AC systems (TN, TT and IT systems)



CMS460-D

Device features

- Optional AC, pulsed DC sensitive measurements for each channel
- r.m.s. value measurement
- 12 measuring channels per single device for load current
- Up to 90 evaluators CMS460-D in the system (1080 measuring channels)
- Fast parallel scanning for all channels
- Response ranges
100 mA...125 A (42...2000 Hz)
- Preset function
- Adjustable time delays
- Adjustable frequency behaviour (e.g. fire and plant protection)
- History memory with date and time stamp for 300 data records/channel
- Data logger for 300 data records/channel
- Analysis of the harmonics, THD
- Two alarm relays with one changeover contact each
- N/O or N/C operation and fault memory selectable
- Connection external test and reset button
- Backlit graphical display (7-segment display) and alarm LEDs
- Data exchange via BMS bus
- Password protection for device setting
- RoHS compliant

Product description

The CMS460 system consists of one or several CMS460-D load current evaluators which are able to detect load currents in earthed and unearthed power supplies via the associated measuring current transformers. The maximum voltage of the system to be monitored depends on the nominal insulation voltage of the measuring current transformer used in the case of busbar systems, resp. depends on the cables or conductors that are routed through.

W... (closed), WR... (rectangular), WS... (split-core) and WF... (flexible) series measuring current transformers are used for alternating and pulsating currents (42...2000 Hz). Any combination of the various measuring current transformer series can be connected to the evaluator measuring channels. Each CMS460-D utilises 12 measuring channels. Up to 90 load current evaluators can be connected via a BMS bus (RS-485 interface with BMS protocol), thereby up to 1080 measuring channels (sub-circuits) can be monitored.

If this product is to be used for fire and plant protection, the frequency response can be set accordingly. The measured currents can be analysed for harmonics.

Typical applications

- Monitoring of loads and installations for load currents in the frequency range of 42...2000 Hz (measuring current transformers W..., WR..., WS..., WF...)
- Monitoring of currents regarded as fire hazards in flammable atmospheres
- Monitoring of TN systems for stray currents and additional N-PE connections
- Monitoring of N conductors for overload caused by harmonics
- Monitoring of PE and equipotential bonding conductors to ensure they are free of current

Function

The load currents are detected and evaluated as true r.m.s. values in the frequency range of 42...2000 Hz.

All channels are scanned simultaneously so that the maximum scanning time for all channels is 180 ms if 1x the response value is exceeded and 30 ms if 5x the response value is exceeded. The current values of all channels are shown on the LC display. If one of the two set response values is exceeded, the response delay begins. Once the response delay has expired, the common alarm relays "K1/K2" switch and the alarm LEDs 1/2 light up. Two response values/alarm relays, which can be set separately, allow a distinction to be made between a "prewarning" and an "alarm". The faulty channel(s) and the associated measured value are shown on the LC display. If the current exceeds or falls below the release value (response value plus hysteresis), the release delay "t_{off}" begins. Once the delay has elapsed, the alarm relays return to their initial position. With the fault memory activated, the alarm relays remain in alarm state until the reset button is pressed or a reset command is sent via the BMS bus. The device function can be tested using the test button. Parameters are assigned to the device via the LCD and the control keys on the front of one of the connected CMS460-D devices or via connected panels and protocol converters (e.g. FTC470XET). The preset function allows all channels to be simultaneously set to the fault current in each channel.

The CMS460-D utilises a backlit graphical display where detailed information of all devices connected to the bus are displayed. The device is capable of assigning parameters to all CMS460-D devices connected to the bus (e.g. RCMS460-D/-L, RCMS-490-D/-L, CMS460-D) and displaying all measurement details. Several devices can be used in one system.

History memory

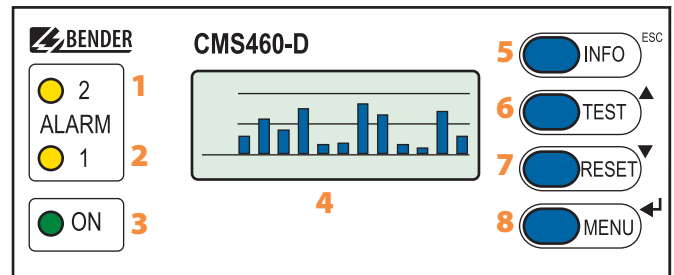
The load current evaluator utilises an history memory for failsafe storing of up to 300 data records (date, time, channel, event code, measured value), so that all data about an outgoing circuit or an area can be traced back at any time (what happened when).

Analysis of harmonics

The analysis of the harmonics of the measured currents can be selected via a menu option in CMS460-D. There the THD factor and the current value of the harmonics (1...40 at 50/60 Hz, 1...5 at 400 Hz) is displayed numerically and graphically.

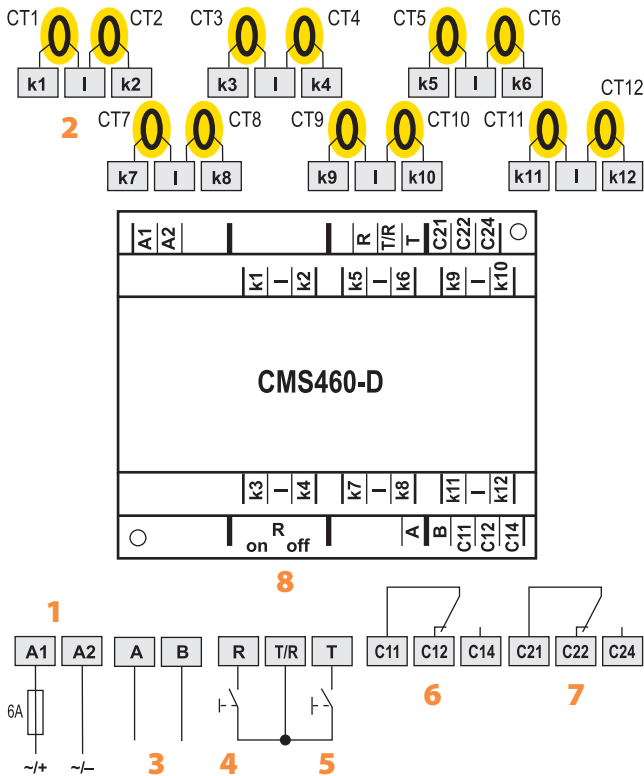
Overview of device features	
Distinctive device features	CMS460-D
Rated operating current pulsed DC sensitive Type A	100 mA...125 A
Backlit graphics display	×
Parameter setting function	×
Password	×
Error code indication	×
Address range	1...90
Master / slave	×
Internal clock	×
Common alarm relay for all channels	2 x 1 changeover contact
Analysis of the harmonics I _Δ , THD	×
History memory 300 data records	×
Data logger for 300 data records/ channel	×
PRESET	×
Number of measuring channels	12
Enclosure	XM460

Operating and display elements CMS460-D



- 1 - LED "ALARM 2" lights up if the measured value falls below or exceeds the "Alarm" response value in a measuring channel.
- 2 - LED "ALARM 1" lights up if the measured value falls below or exceeds the "Alarm" response value in a measuring channel. In the event of a device error, the LED lights up.
- 3 - The LED "ON" lights up when the device is switched on or flashes during power on until the device is ready for operation.
- 4 - Backlit graphics display
- 5 - "INFO" key: to call up standard information
ESC key: to exit the menu function without changing parameters
- 6 - "TEST" button: to call up the automatic self test
Up key: parameter change, scroll
- 7 - "RESET" button: to delete alarm and fault messages
Down key: parameter change, scroll
- 8 - MENU key: to toggle between the standard display, MENU and alarm display
Enter key: to confirm parameter change

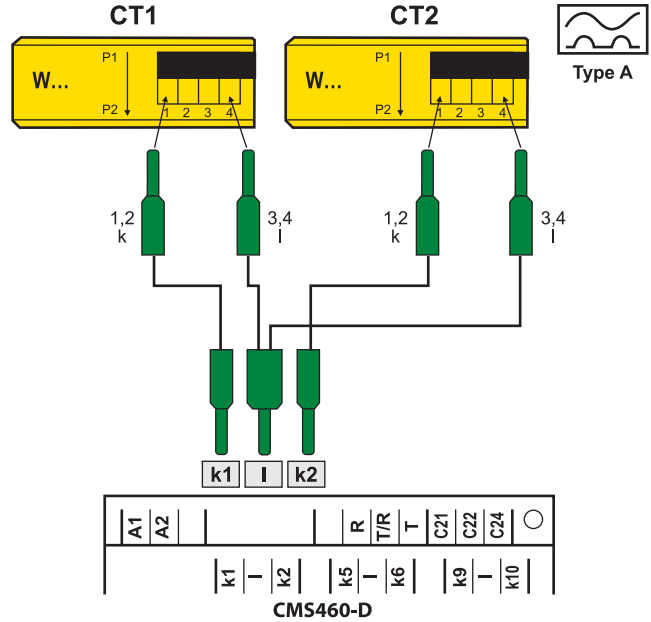
Wiring diagram



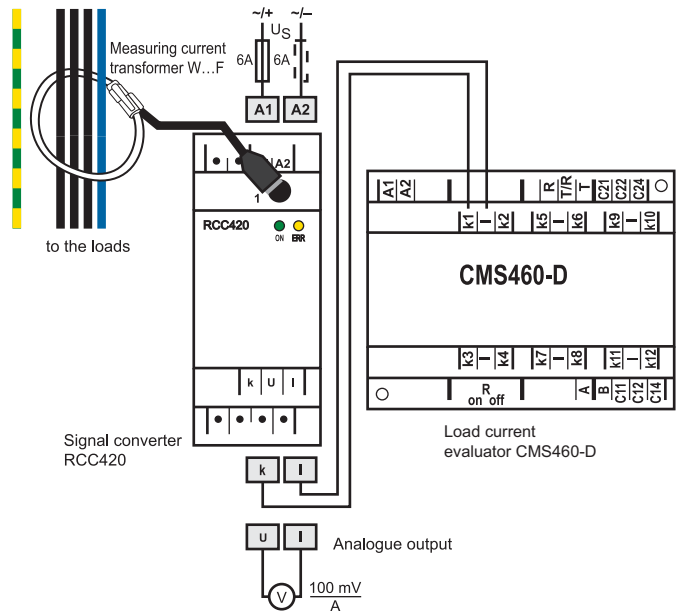
- 1 - Connection of supply voltage US (see ordering information), 6 A fuse recommended
- 2 - Connection of measuring current transformers CT1...CT12
- 3 - RS-485 interface (with BMS protocol)
- 4 - External reset button "R" (N/O contact)
- 5 - External test button "T" (N/C contact); The external "T/R" buttons of several devices must not be connected to one another
- 6 - Alarm relay K1: Alarm 1, common alarm for prewarning, alarm, device error, ext. alarm (adjustable)
- 7 - Alarm relay K2: Alarm 2, common alarm for prewarning, alarm, device error, ext. alarm (adjustable)
- 8 - Ron/off: Activate or deactivate the BMS bus terminating resistor (120 Ω)

Connection W..., WR..., WS... series measuring current transformers (pulsed current sensitive)

Example: W...



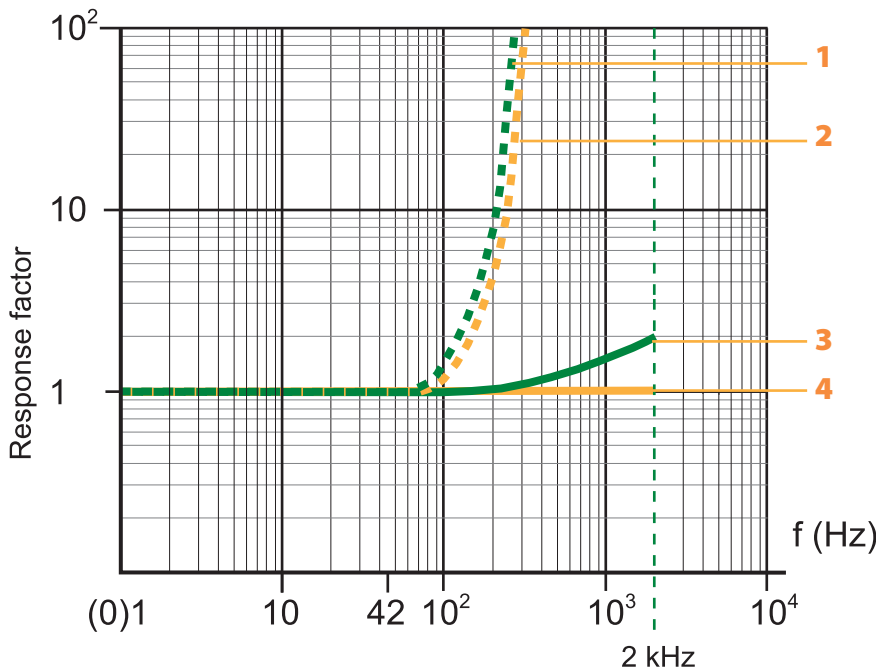
Connection WF... series measuring current transformer (pulsed DC sensitive)



Frequency settings

The frequency response of the equipment can be set for a linear frequency response (up to the maximum frequency of 2000 Hz) if used for fire protection or for a frequency response in accordance with IEC 60990. For plant protection, the load current is measured up to the rated system frequency. The figure below shows the corresponding frequency response.

Frequency curves



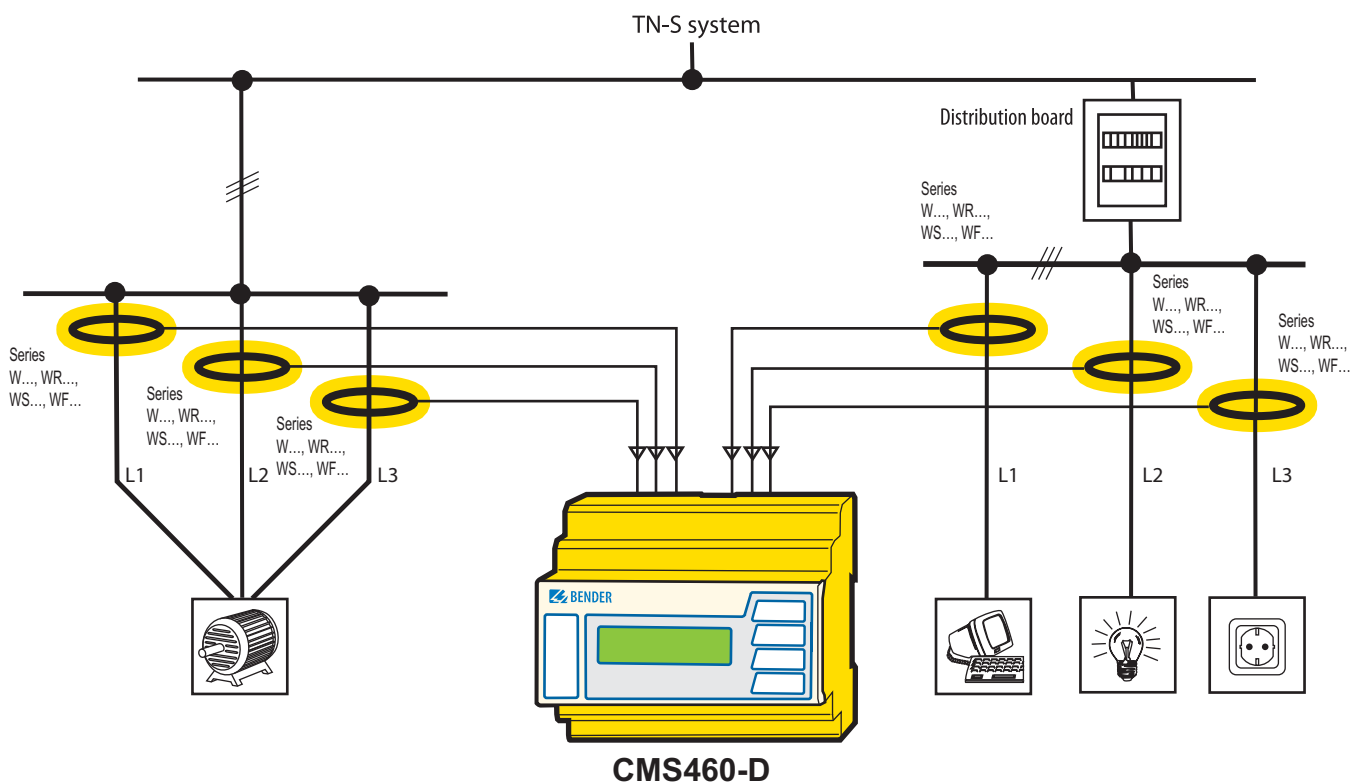
Response factor = $\Delta/I_{\Delta n}$

(I_{Δ}) Response current: Measured value at which the CMS responds.

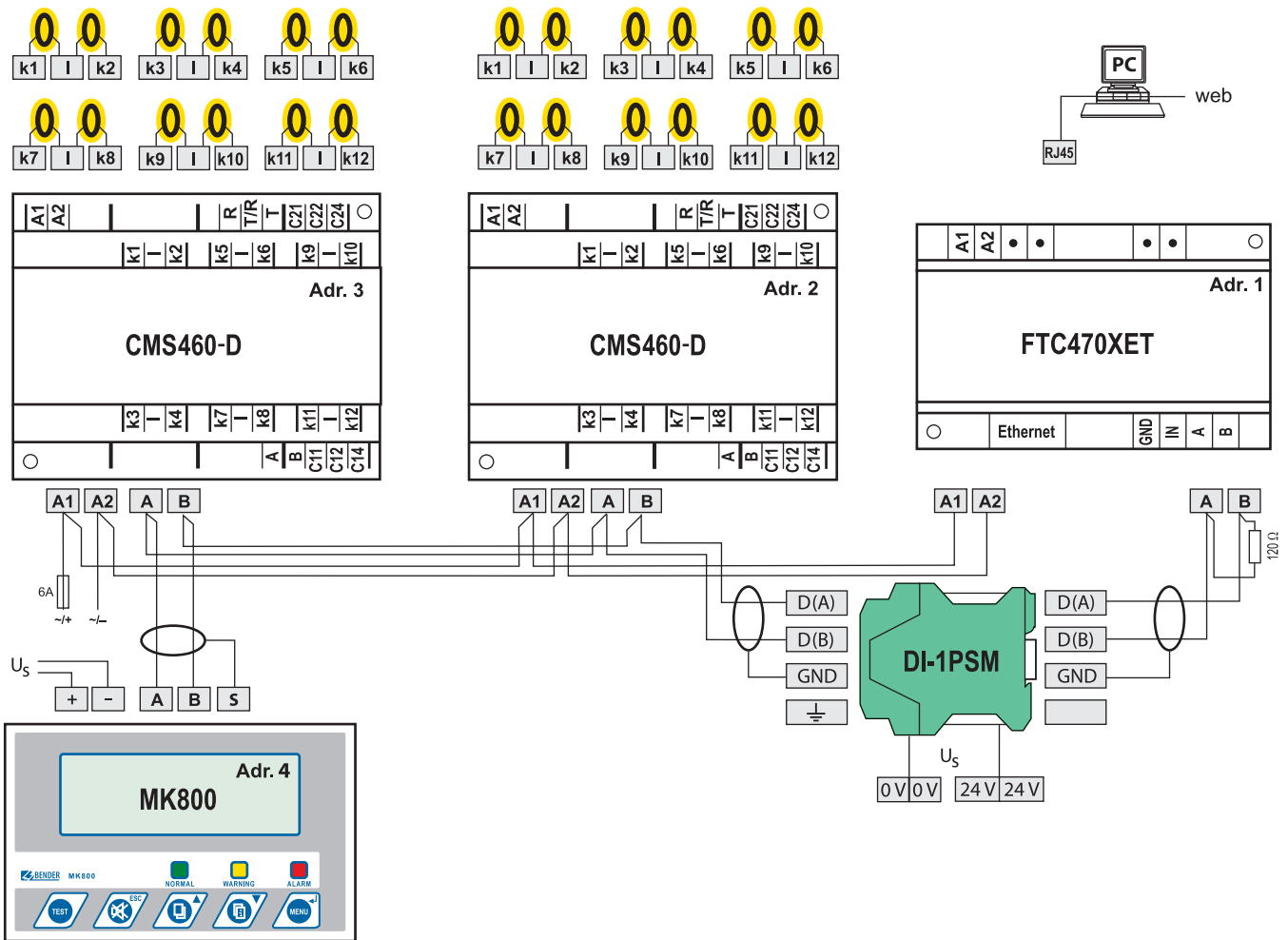
($I_{\Delta n}$) Rated operating current: Set response value

- 1 - Menu option "50 Hz"
- plant protection: Only evaluates the fundamental component of the current.
- 2 - Menu option "60 Hz"
- plant protection: Only evaluates the fundamental component of the current.
- 3 - Menu option "IEC" Touch current for let go in accordance with IEC 60990
- 4 - Menu option "None"
- fire protection: Response factor remains the same over the entire frequency range.

Example for the design of a standard system consisting of an CMS460-D with up to 12 measuring points



Example for the design of a standard system consisting of two CMS460-D and an FTC470XET protocol converter



Technical data
Insulation coordination acc. to IEC 60664-1 / IEC 60664-3

Rated insulation voltage	250 V
Rated impulse voltage/pollution degree	4 kV / III
Protective separation (reinforced insulation) between: (A1, A2) - (k1/I...k12/R/RT /T, AB) - (11, 12, 14) - (21, 22, 24)	
Voltage test according to IEC 61010-1	2.21 kV

Supply voltage

Supply voltage U_s	see ordering information
Frequency range U_s	see ordering information
Power consumption	≤ 10 VA

Measuring circuit

External measuring current transformer	W..., WR..., WS..., WF... series (Type A)
Load	1 Ω
Rated insulation voltage (measuring current transformer)	800 V
Operating characteristic acc. to IEC 60755	Type A
	depending on measuring current transformer series (Type A)*
Rated frequency	42...2000 Hz (Type A)
Cut-off frequency	none, IEC, 50 Hz, 60 Hz (none)*
Measuring range	100 mA...125 A (measuring current transformer Type A) 100 mA...30 A (measuring current transformer Flex) Crest factor up to 10 A = 4, up to 20 A = 2
Rated operating current $I_{\Delta n2}$ (alarm)	100 mA...125 A (16 A overcurrent)*
Rated operating current $I_{\Delta n1}$ (prewarning)	10...100 % $\times I_{\Delta n2}$
PRESET for alarm	I_{Δ} x factor 1...99 (3)* Offset 0...20 A (30 mA)*
Relative uncertainty	0...-20 %
Hysteresis	2...40 % (20 %)*
Factor for additional CT	/2...10; x 1...10 (x 1)*
Number of measuring channels (per device/system)	12 / 1080

Specified time

Start-up delay t (startup) per device	0...99 s (0 ms)*
Response delay t_{on} per channel	0...999 s (200 ms)*
Delay on release t_{off} per channel	0...999 s (200 ms)*
Operating time t_{ae} at $I_{\Delta n} = 1 \times I_{\Delta n1/2}$	≤ 180 ms
Operating time t_{ae} at $I_{\Delta n} = 5 \times I_{\Delta n1/2}$	≤ 30 ms
Response time t_{an} for current measurement	$t_{an} = t_{ae} + t_{on1/2}$
Scanning time for all measuring channels (current measurement)	≤ 180 ms
Recovery time t_b	500...600 ms

Displays, memory

Measured value display range	< 10 mA...125 A (measuring current transformer Type A) < 10 mA...30 A (measuring current transformer Flex)
Operating uncertainty	± 10 %
LEDs	ON/ALARM
LC display	backlit graphical display
History memory	300 data records
Data logger	300 data records per measuring channel
Password	off / 0...999 (off)*
Language	D, GB, F (GB)*
Fault memory alarm relay	on / off (off)*

Inputs/outputs

Test/reset button	internal / external
Cable length for external test/reset button	0...10 m

Interface

Interface/protocol	RS-485 / BMS
Baud rate	9.6 kBit / s
Cable length	0...1200 m
Recommended cable (shielded, shield on one side connected to PE)	J-Y(St)Y min. 2 x 0.8
Terminating resistor	120 Ω (0.25 W) can be connected via DIP switch
Device address, BMS bus	1...90 (2)*

Cable length for W..., WR..., WS..., WF... series measuring current transformers

Single wire $\geq 0.75 \text{ mm}^2$	0...1 m
Single wire, twisted $\geq 0.75 \text{ mm}^2$	0...10 m
Shielded cable $\geq 0.5 \text{ mm}^2$	0...40 m
Recommended cable (shielded, shield connected to terminal I at one end, not earthed)	J-Y(St)Y min. 2 x 0.8

Switching elements

Number of switching elements	2 x 1 changeover contact
Operating principle	NC / N/O operation (N/O operation)*
Electrical endurance	10.000 cycles
Contact data acc. to IEC 60947-5-1	
Utilisation category	AC-13 AC-14 DC-12 DC-12 DC-12
Rated operational voltage	230 V 230 V 24 V 110 V 220 V
Rated operational current	5 A 3 A 1 A 0.2 A 0.1 A
Minimum contact rating	1 mA at AC / DC $\geq 10 \text{ V}$

Environment / EMC

EMC	IEC 62020:2003-11**
Operating temperature	-25 °C...+ 55 °C
Climatic class acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3K5 (except condensation and formation of ice)
Transportation (IEC 60721-3-2)	2K3 (except condensation and formation of ice)
Storage (IEC 60721-3-1)	1K4 (except condensation and formation of ice)
Classification of mechanical conditions acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3M4
Transport (IEC 60721-3-2)	2M2
Long-time storage (IEC 60721-3-1)	1M3

Connection screw-type terminals

Connection properties:	
rigid/ flexible / conductor sizes	0.2...4 / 0.2...2.5 mm ² / AWG 24...12
Multi-conductor connection (2 conductors with the same cross section):	
rigid, flexible	0.2...1.5 / 0.2...1.5 mm ²
Stripping length	8...9 mm
Tightening torque	0.5...0.6 Nm

Other

Operating mode	continuous operation
Mounting	display-oriented
Degree of protection, internal components (IEC 60529)	IP30
Degree of protection, terminals (IEC 60529)	IP20
Enclosure material	polycarbonate
Flammability class	UL94V-0
Screw mounting	2 x M4
DIN rail mounting acc. to	IEC 60715
Weight	≤ 360 g

(*)* Factory setting

** Test requirements regarding burst and surge to a limited extent

Ordering information		
Type	Supply voltage U _S *	Art. No.
CMS460-D-1	DC 16...94 V / AC 42...460 Hz 16...72 V	B 9405 3017
CMS460-D-2	DC 70...276 V / AC 42...460 Hz 70...276 V	B 9405 3018

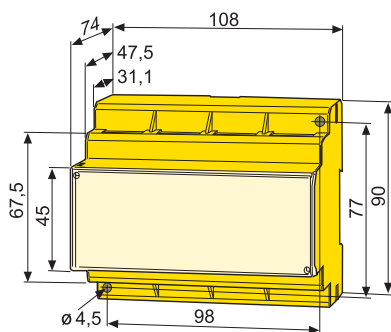
Accessories		
Type	Supply voltage U _S	Art. No.
DI-1 (RS-485 repeater)	DC 10...30 V*	B 9501 2015
DI-1PSM (RS-485 repeater)	AC / DC 24 V ± 20 %	B 9501 2044
AN471 (power supply unit for DI-1)	AC 50...60 Hz 230 V / AC, DC 20 V	B 924 189
XM460 mounting frame, 144 x 72 mm		B 990 995

Protocol converters		
Type	Supply voltage U _S *	Art. No.
FTC470XDP	DC 85...276 V / AC 50...400 Hz 85...276 V	B 9506 1000
FTC470XMB	DC 85...276 V / AC 50...400 Hz 85...276 V	B 9506 1002
FTC470XET	DC 85...276 V / AC 50...400 Hz 85...276 V	B 9506 1001
FTC400XMT	DC 12...48 V	B 9506 1005

* Absolute values

Dimension diagram

Dimensions in mm



Pulsed current sensitive measuring current transformer			
Type	Inside diameter/mm	Type of construction	Art. No.
W20	20	circular	B 9808 0003
W35	35	circular	B 9808 0010
W60	60	circular	B 9808 0018
W120	120	circular	B 9808 0028
W210	210	circular	B 9808 0034
WR70x175	70 x 175	rectangular	B 9808 0609
WR115x305	115 x 305	rectangular	B 9808 0610
WS20x30	20 x 30	split-core	B 9808 0601
WS50x80	50 x 80	split-core	B 9808 0603
WS80x120	80 x 120	split-core	B 9808 0606

Other measuring current transformer types on request

Flexible measuring current transformers (pulsed current sensitive)			
Type	Inside diameter/mm	Supply voltage U _S	Art. No.
WF170-1	170 mm	DC 9.6...94 V / AC 42...460 Hz 16...72 V	B 7808 0201
WF170-2	170 mm	DC 70...300 V / AC 42...460 Hz 70...300 V	B 7808 0202
WF250-1	250 mm	DC 9.6...94 V / AC 42...460 Hz 16...72 V	B 7808 0203
WF250-2	250 mm	DC 70...300 V / AC 42...460 Hz 70...300 V	B 7808 0204
WF500-1	500 mm	DC 9.6...94 V / AC 42...460 Hz 16...72 V	B 7808 0205
WF500-2	500 mm	DC 70...300 V / AC 42...460 Hz 70...300 V	B 7808 0206
WF800-1	800 mm	DC 9.6...94 V / AC 42...460 Hz 16...72 V	B 7808 0207
WF800-2	800 mm	DC 70...300 V / AC 42...460 Hz 70...300 V	B 7808 0208
WF1200-1	1200 mm	DC 9.6...94 V / AC 42...460 Hz 16...72 V	B 7808 0209
WF1200-2	1200 mm	DC 70...300 V / AC 42...460 Hz 70...300 V	B 7808 0210

Measuring current transformers accessories	
Type	Art. No.
Snap-on mounting for W20.../W35...	B 9808 0501
Snap-on mounting for W60...	B 9808 0502



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