

Operating Manual

RCMA423-DM RCMA423-DM1C RCMA423-DM2C RCMA423-DM3C



Residual current monitor
with one analogue output signal
for monitoring AC-, DC- and pulsed DC currents
in TN- and TT systems
Software version: D330 V1.0x



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1. Effective use of this manual

1.1 Notes for the user

This manual is intended for electrically skilled persons in electrical engineering and electronics!

In order to make it easier for you to find specific text passages or references in this manual and for reasons of comprehensibility, important information is emphasised by symbols. The meaning of these symbols is explained below:



Information calling attention to hazards are marked with this warning symbol.



Information intended to assist the user to make optimum use of the product are marked with the Info symbol.

1.2 Intended use

The AC/DC sensitive residual current monitor RCMA423-DMx is designed for use in earthed systems (TN and TT systems) where DC and AC fault currents may occur. These are in particular loads containing six-pulse rectifiers or one way rectifiers with smoothing, such as converters, battery chargers, construction site equipment with frequency-controlled drives.

Two separately adjustable response ranges allow to distinguish between pre-warning ($I_{\Delta n1} = 50 \dots 100$ % of the set response value $I_{\Delta n2}$) and alarm ($I_{\Delta n2}$). Since the values are measured with measuring current transformers, the residual current monitor is nearly independent of the nominal voltage and the current of the system being monitored.

1.3 Information about factory setting

Page 40 provides a summary of all factory settings.

If you want to reset the residual current monitor to factory settings, refer to page 39.

2. Safety instructions

2.1 General safety instructions

In addition to this data sheet, the documentation of the device includes a sheet entitled "Important safety instructions for Bender products".

2.2 Work activities on electrical installations

- All work necessary for the installation, commissioning and operation of the equipment or system must be carried out by electrically skilled persons.
- Observe the relevant regulations applying to work on electrical installations, in particular DIN EN 50110 or its subsequent regulations.



Any work on electrical installations which is not carried out properly can lead to death and injury!

- If the equipment is used outside the Federal Republic of Germany, the standards and regulations which apply where the equipment is used must be followed. The European standard EN 50110 can be used for information purposes.

3. Function

3.1 Device features

- AC/DC sensitive residual current monitor Type B according to IEC 62020 and IEC/TR 60755
- Two separately adjustable response ranges (prewarning, alarm)
- Adjustable switching hysteresis
- r.m.s. value measurement
- Start-up delay, response delay and delay on release
- Measured value display via multi-functional LC display
- Alarm indication via LEDs (AL1, AL2) and analogue interface. Device options M1C, M2C, M3C also provide alarm indication via changeover contact K2
- N/C operation or N/O operation selectable
- Password protection against unauthorised parameter changing
- Fault memory function can be switched off
- CT connection monitoring
- Manual device and CT self test using true test current

3.2 Function

Once the supply voltage U_s is applied, the start-up delay is activated. Measured values changing during this time do not influence the switching state of the alarm relay. Residual current measurement takes place via external W20AB...W210AB series measuring current transformers. The currently measured value is shown on the LC display. In this way any changes, for example when circuits are connected to the system, can be recognised easily. When the measured values exceed the response values, the response delay t_{on2} begins.

Once the response delay t_{on2} has elapsed, the alarm relay K2 switches and the alarm LEDs AL1 / AL2 light up. In addition, the analogue output, selected from

the menu (option M), provides a proportional voltage or current signal, also see "chapter 3.2.18 Interface options". If the residual current falls below the release value (response value minus hysteresis), the delay on release toff begins. Once the release delay toff has elapsed, the alarm relay returns to its original state and the alarm LEDs AL1/AL2 go out. If the fault memory is activated, the alarm relay remains in the alarm state and the LEDs light until the reset button R is pressed or until the supply voltage is interrupted. The device function can be tested using the test button T. The parameterisation of the device can be carried out via the LC display and the control keys integrated in the front plate and can be password-protected.

3.2.1 Connection monitoring

The CT connections are continuously monitored. In the event of a fault, the alarm relay K2 switches, the alarm LEDs AL1 / AL2 / ON flash (Error Code E.01). After eliminating the fault, the alarm relay automatically returns to its initial position, provided that the fault memory M is deactivated. With the fault memory activated, K2 returns to its initial position by pressing the reset button R.

3.2.2 Fast response value query

With the display in standard mode, the currently measured response values $I_{\Delta n1}$ and $I_{\Delta n2}$ can be queried pressing the Up and Down keys (< 1.5 s). Switch-over to the Menu mode is not required. The Enter key must be pressed to leave the quick interrogation.

3.2.3 Automatic self test

The device automatically carries out a self test after connecting to the system to be monitored and later every 24 hours. During the self test internal functional faults will be detected and appear in form of an error code on the display. The alarm relay is not checked during this test.

3.2.4 Manual self test

While the test button T is pressed and held down, all device-related display elements appear on the display.

After pressing the test button for > 1.5 s, the device carries out a self test. During this test, internal functional faults are detected and will be displayed in form of an error code.

In addition, a test current is supplied via the CT connection T which exceeds the response value set at the RCMA. When the self test runs correctly, all of the three LEDs light continuously. After successful testing, the yellow LEDs go out. If the test current does not exceed the set response values, the yellow LEDs flash and the fault message E.02 appears on the display.

The alarm relay is switched during the manual self test.

3.2.5 Functional faults

If an internal functional fault occurs, all of the three LEDs flash. An error code will appear on the display (E01...E32). In such a case please contact the Bender Service.

3.2.6 Setting the number of reload cycles

If a fault occurred in the system being monitored, the system would be disconnected by the alarm relay and the alarm relay would switch synchronously to the error status, provided that the fault memory M is deactivated.

RL in the out menu can be used to limit the number of these changeover processes. As soon as the preset number of switching cycles is exceeded, the fault memory will come on and an activated alarm remains stored.

3.2.7 Assigning alarm categories to alarm relay K2

The alarm categories device error, residual current $I_{\Delta n1}$, residual current $I_{\Delta n2}$ or alarm by device test can be assigned to the alarm relay via the out menu.

3.2.8 Time delays t , t_{on} and t_{off}

The times t , t_{on} and t_{off} , described below, delay the output of alarms via LEDs and relays.

3.2.9 Start-up delay t

After connection to the supply voltage U_S , the alarm indication is delayed by the preset time t (0...10 s).

3.2.10 Response delay t_{on2}

If the residual current increases above or falls below the response value, the residual current monitor needs a response time t_{an} before it signals an alarm. A set response delay t_{on2} (0...10 s) adds up to the device-related operating time t_{ae} and delays alarm signalling (total delay time $t_{an} = t_{ae} + t_{on}$).

If the residual current fault changes from a value above the response value to a value below the response value, an alarm will not be signalled.

3.2.11 Delay on release t_{off}

When no alarm exists after deactivating the fault memory, the alarm LEDs go out and the alarm relay switches back to its initial position. After activating the delay on release (0...99 s), the alarm state is continuously maintained for the selected period.

3.2.12 Residual current monitoring in window discriminator mode

Change the measuring principle by selecting the window mode (SEt / In). In the window discriminator mode, the threshold values I1 and I2 represent the upper and the lower value. If the measured value is not within this area, an alarm is initiated by the device. See page 37.

3.2.13 Password protection (on, OFF)

When the password protection is activated (on), settings are only possible after entering the correct password (0...999).

3.2.14 Factory setting FAC

After activating the factory setting, all settings previously changed are reset to delivery status.

3.2.15 Erasable history memory

The first alarm value that occurs will be saved in this memory. The memory can be cleared via the menu HiS.

3.2.16 External, combined test/reset button T/R

Reset= Pressing the external button < 1.5 s

Test= Pressing the external button > 1.5 s

3.2.17 Fault memory

The fault memory can be activated, deactivated or set to continuous mode (con). If the fault memory is set to "con" mode, the alarm parameters remain stored even on failure of the supply voltage. Stored alarms can be reset by means of the reset button R.

3.2.18 Interface options

The device provides the following options:
M, M1C, M2C or M3C.

Factory setting for all device options:

The respective analogue output signal, current or voltage, refers to the factory-set response value $I_2 = 30 \text{ mA}$. Also see "chapter 5.5.8 Setting the 100% reference of the analogue interface"



Device options M1C, M2C and M3C also feature the alarm relay K2 in addition to the analogue interface.

Option M

This option provides an analogue interface with galvanic isolation. One of three output signals can be selected from the associated menu. Only use the output you have selected via the software:

- DC 0...400 μ A
Current output for Bender measuring instruments of the 96.. series.
- DC 0/4...20 mA
Standardised current output with selectable current ranges.
- DC 0...10 V
Standardised voltage signal

Option M1C

This option provides an analogue interface without galvanic isolation:

- DC 0/4...20 mA
Standardised current output with selectable current ranges.

Option M2C

This option provides an analogue interface without galvanic isolation:

- DC 0...400 μ A
Current output for Bender measuring instruments of the 96.. series.

Option M3C

This option provides an analogue interface without galvanic isolation:

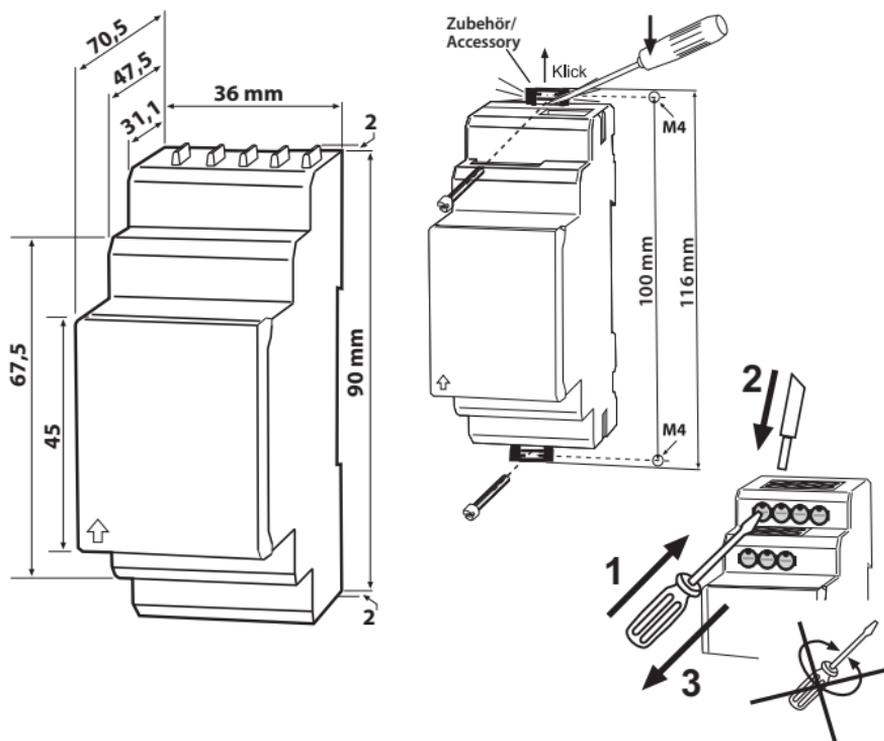
- DC 0...10 V
Standardised voltage signal

4. Installation and connection



Ensure safe isolation from supply in the installation area. Observe the installation rules for live working.

Dimension diagram, drawing for screw mounting, push-wire terminal connection



The front plate cover must be opened up on the underside marked with an arrow.

1. DIN rail mounting:

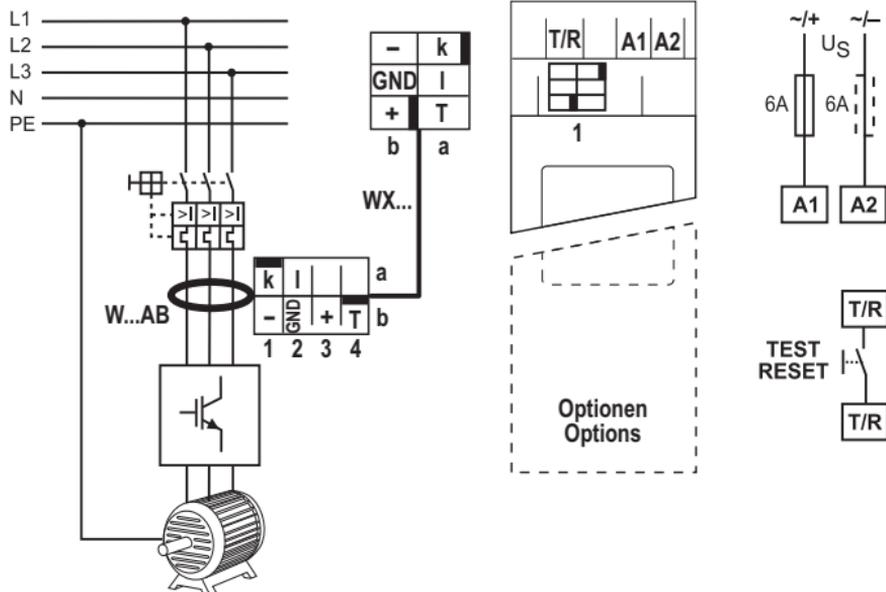
Snap the rear mounting clip of the device into place in such a way that a safe and tight fit is ensured.

Screw mounting:

Use a tool to move the rear mounting clips (a second mounting clip required, see ordering information) to a position that it projects beyond the enclosure. Fix the device using two M4 screws.

2. Wiring

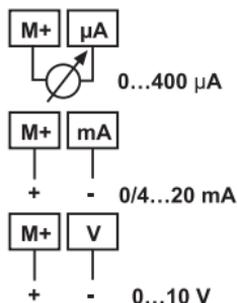
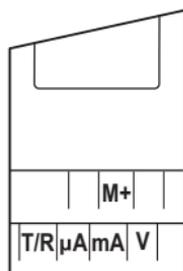
Connect the device according the wiring diagram.



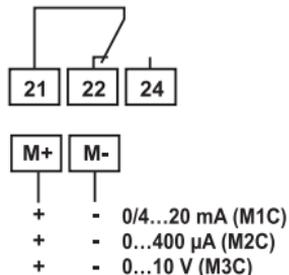
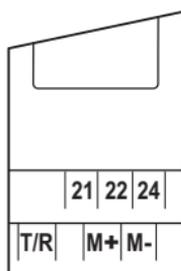
When connecting the device, it is important to consider the respective device variant (interface option).

Terminal	Connections
A1, A2	Connection for supply voltage U_s
k, l	Connection for measuring current transformers
T/R	Connection for combined test and reset button
21, 22, 24	Alarm relay K2
M+, M-	(common) positive pole of the analogue interface, negative pole of the analogue interface
μA	Current output 0...400 μA
mA	Current output 0/4...20 mA
V	Voltage output 0...10 V

Option M



Option M1C / M2C / M3C



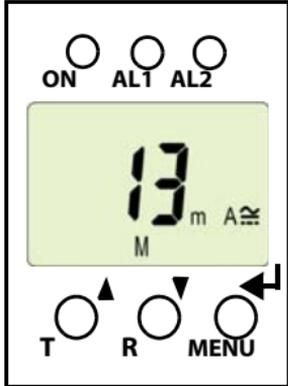
5. Operation and setting

5.1 Display elements in use

The meaning of the display elements in use is listed in detail in the table below.

Display elements in use	Element	Function
	RL	Reload function with memory = off (L = I.)
	I2	Response value $I_{\Delta n2}$ as mA (Alarm 2)
	I1	Response value $I_{\Delta n1}$ as % of $I_{\Delta n2}$ (Alarm 1, prewarning)
	r2, 2	Alarm relay K2
	I Hys, %	Response value hysteresis as %.
	ton2, T, toff	Response delay t_{on2} (K2) Start-up delay t Delay on release t_{off} for K2
	M	Fault memory active
		Relay operating mode K2
		Password protection enabled

5.2 Function of the operating elements

Device front	Element	Function
	ON, green	Lights continuously: Power On LED, flashes: system fault or connection monitoring fault
	AL1, AL2	LED Alarm 1 lights (yellow): Response value 1 reached ($I_{\Delta n1}$) LED Alarm 2 lights (yellow): Response value 2 reached ($I_{\Delta n2}$)
	13 mA M	13 mA flow through the measuring current transformer, fault memory active
	T, ▲	Test button (> 1.5 s): to indicate the display elements in use, to start a self test; Up button (< 1.5 s): Menu items/values
	R, ▼	Reset button (> 1.5 s): Deleting the fault memory; Down button (< 1.5 s): Menu items/values
	MENU, ◀	MENU button (> 1.5 s): To start the menu mode; Enter button (< 1.5 s): Confirm menu item, submenu item and value. Enter button (> 1.5 s): Back to the next higher menu level.

5.3 Menu structure

All adjustable parameters are listed in the columns "menu item" and "adjustable parameters". A display-like representation is used to illustrate the parameters in the column menu item.

5.3.1 Menu structure of the M1C, M2C, M3C options

Different alarm categories can be assigned to the alarm relay K2 via the sub-menu r2. This is done by activation or deactivation of the respective function.

Menu	Sub Menu	Menu item	Activation	Adjustable parameter
AL (response values)	→	> I2	- (Hi)	$I_{\Delta n2}$ (Alarm 2)
		> I1	- (Hi)	$I_{\Delta n1}$ as % of $I_{\Delta n2}$ (Alarm 1, prewarning)
		Hys	-	Hysteresis $I_{\Delta n1} / I_{\Delta n2}$
out (output control)	→	M	-	Fault memory
		 2	-	Operating mode K2 (n.c.)
		RL	-	Reload function (memory = off)
		I	-	Option M1C only: 0...20 or 4...20 mA selectable
	r2 (K2: (assignment alarm category))	2 Err	ON	Device error at K2
		r2 I1	off	Prewarning I1 at K2
		r2 I2	ON	Alarm I2 at K2
		2 tES	ON	Device test
	AnA Analogue outp.: 100% reference	I2 AL	-	100% reference related to response value I2 (Alarm 2)
		I	-	100% reference related to the user-defined current value

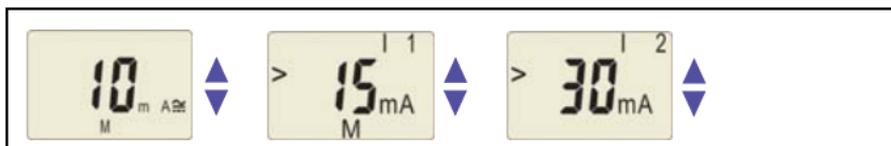
Menu	Sub Menu	Menu item	Activation	Adjustable parameter
t (timing check)	→	t on 2	-	Response delay K2
		T	-	Start-up delay
		t off	-	Delay on release K2
Set (device control)	→	I 12	HI	Selectable parameters: High, window function, low
			off	Parameter setting via password
		FAC	-	Restore factory settings
		SYS	-	Function blocked
InF	→		-	Display hard / software version
HiS	→	Clr	-	History memory for the first alarm value, erasable

5.3.2 Menu structure option M

Menu	Submenu:	Menu item	Activation	Adjustable parameter
AL (response values)	→	> I2	- (Hi)	$I_{\Delta n2}$ (Alarm 2)
		> I1	- (Hi)	$I_{\Delta n1}$ as % of $I_{\Delta n2}$ (Alarm 1, prewarning)
		Hys	-	Hysteresis $I_{\Delta n1} / I_{\Delta n2}$
out (output control)	→	M	-	Fault memory
		RL	-	Reload function (memory = off)
		I, U	-	Selection current / voltage 0...20 or 4...20 mA selectable
	AnA Analogue outp.: 100% reference	I2 AL	-	100% reference related to response value I2 (Alarm 2)
I		-	100% reference related to the user-defined current value I	
t (timing check)	→	T	-	Start-up delay
Set (device control)	→	I 12	HI	Selectable parameters: High, window function, low
			off	Parameter setting via password
		FAC	-	Restore factory settings
		SYS	-	Function blocked
InF	→		-	Display hard / software version
HiS	→	Clr	-	History memory for the first alarm value, erasable

5.4 Display in standard mode

By default, the currently measured residual current is displayed. The current response values I1 (prewarning) and I2 (alarm) can be displayed using the Up and Down button. Press the Enter key to return to the measured value.

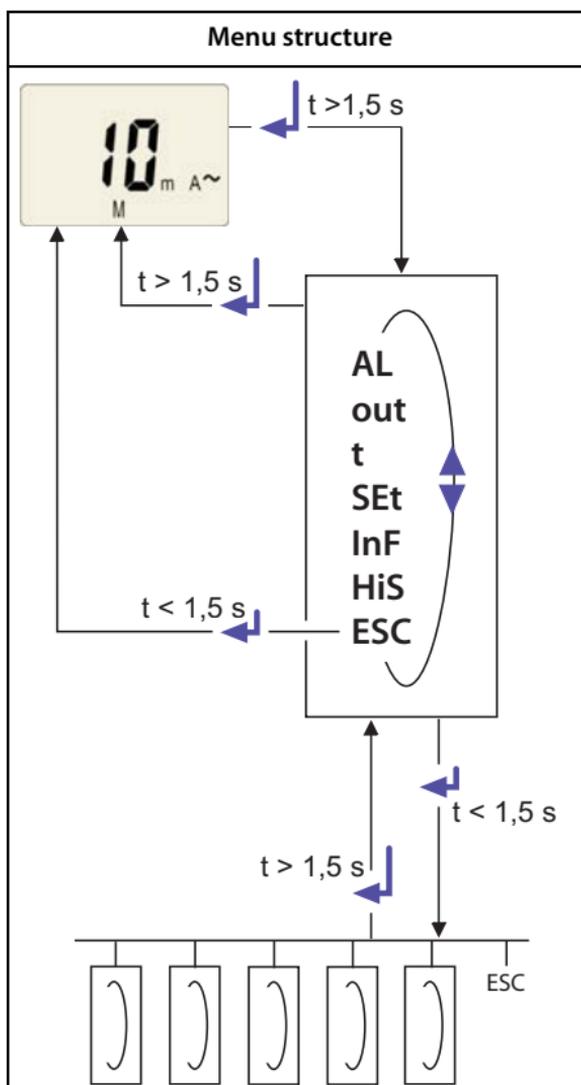


In the standard mode, the currently set response values I1 and I2 can be displayed using the Up and Down keys.

5.5 Display in menu mode

5.5.1 Parameter query and setting: Overview

Menu item	Adjustable parameter
AL	Response values query and setting: <ul style="list-style-type: none"> – Residual current $I_{\Delta n2}$ (AL2) – Residual current $I_{\Delta n1}$ (AL1) – Hysteresis of the response values: % Hys
out	Configuration of the fault memory and the alarm relay: <ul style="list-style-type: none"> – Activate/deactivate the fault memory – Select N/O operation (n.o.) or N/C operation (n.c.) for K2 (does not apply to option M) – Specify the number of the reload cycles – Select output signal (does not apply to Op. M2C, M3C) – Assign the alarm category $I_{\Delta n1}$ or $I_{\Delta n2}$, relay test or device error to K2 (2, r2) (does not apply to option M) – Select 100% reference related to the output signal (AnA)
t	Set delays: <ul style="list-style-type: none"> – Response delay t_{on2} (does not apply to option M) – Start-up delay t – Delay on release t_{off} (LED, relay) (doesn't apply to option M)
Set	Device control parameter setting: <ul style="list-style-type: none"> – Select the appropriate parameter for response values: overcurrent mode (HI), undercurrent mode (Lo) or window mode (In) – Enable/disable password protection, change the password – Restore factory settings – Service menu SyS blocked
InF	Query hard and software version
HiS	Query the first stored alarm value
ESC	Move to the next higher menu level (back)



Parameter settings

An example is given here on how to change the alarm response value I1 ($I_{\Delta n1}$). It is presumed that the option overcurrent (HI) has been selected in the SEt/I 12 menu (factory setting). Proceed as follows:

1. Press the MENU/Enter button for more than 1.5 seconds. The flashing short symbol AL appears on the display.
2. Confirm with Enter. The parameter response value > I2 flashes, in addition the associated overcurrent value > 30 mA appears.
3. Use the Down key to select the parameter response value I1. The parameter I1 flashes, in addition the associated percentage value for prewarning 50 % of I2 appears.
4. Confirm with Enter. The current value for prewarning appears on the flashing display.
5. Use the Up or Down button to set the appropriate prewarning value. Confirm with Enter. I1 flashes.
6. You can exit the menu by:
 - Pressing the Enter button for more than 1.5 seconds to reach the next higher level or
 - selecting the menu item ESC and confirming with Enter to reach the next higher level.



The currently active segments are flashing! In the figures below, the segments where device settings can be carried out are highlighted by an oval. The menu mode can be reached by pressing the MENU button for more than 1.5 seconds.

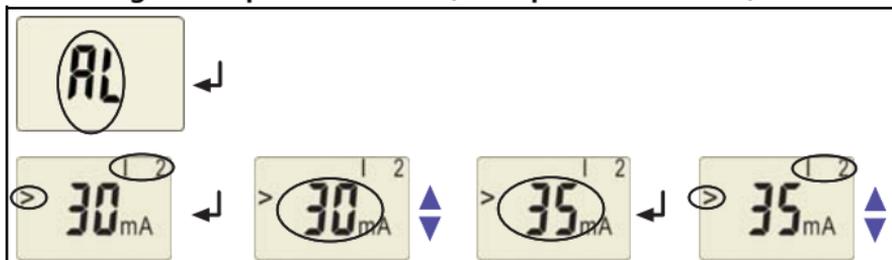
5.5.2 Changeover from overcurrent to undercurrent mode or to window mode

The operating mode can be changed in the SEt/I 12 menu using the parameters HI, Lo and In. By default, overcurrent operation (HI) is set. Refer to page 37 for a detailed description on how to change over to the window mode.

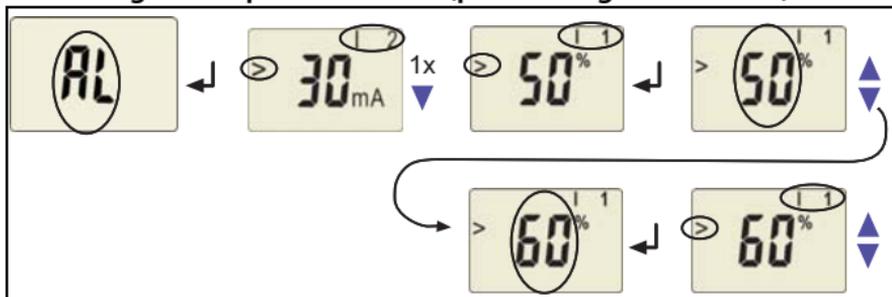
5.5.3 Response value setting for overcurrent:

- Response value I2 (overcurrent)
- Response value I1 (prewarning overcurrent)
- Hysteresis (Hys) of the response values I1, I2

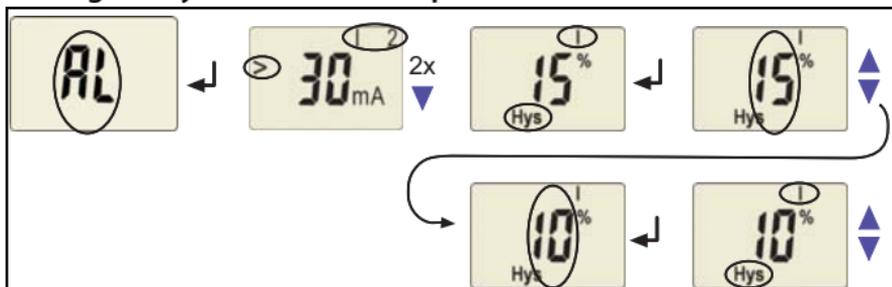
Increasing the response value I2 (Example: overcurrent)



Increasing the response value I1 (prewarning overcurrent)

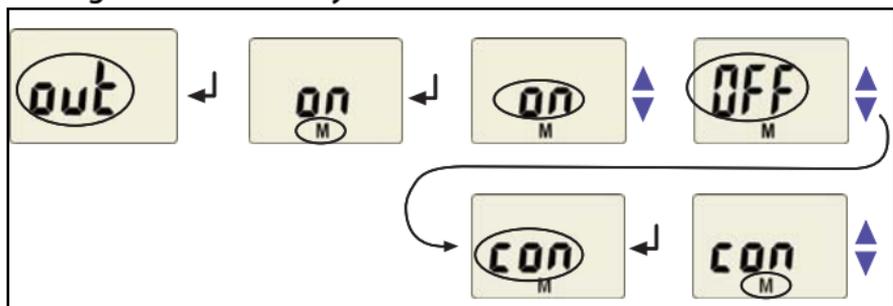


Setting the hysteresis of the response value



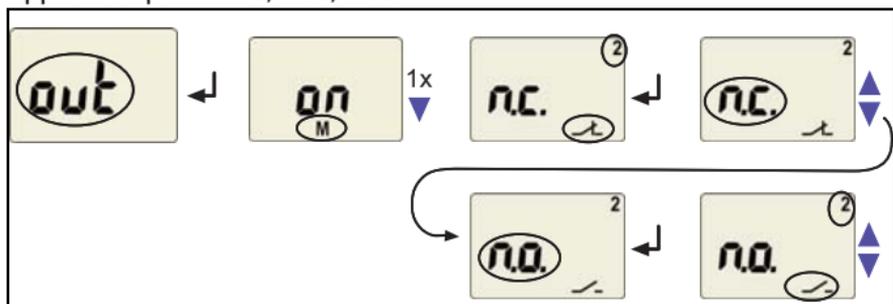
5.5.4 Setting the fault memory and operating principle of the alarm relays

Setting the fault memory to con mode

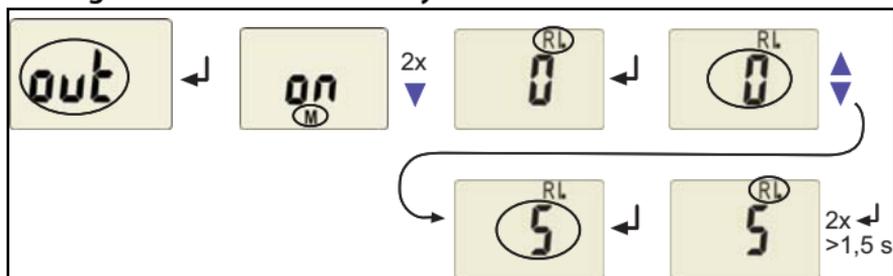


Setting the alarm relay K2 to N/O operation (n.o.)

Applies to option M1C, M2C, M3C

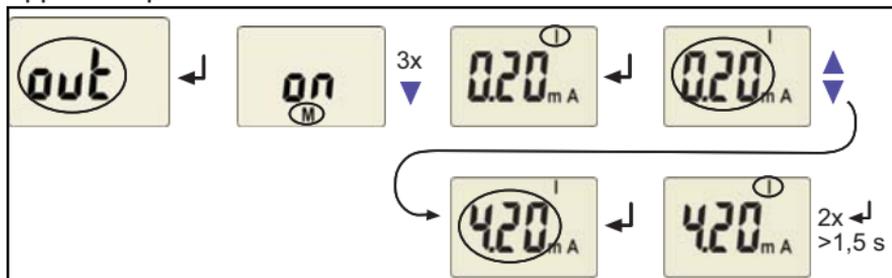


Setting the number of reload cycles



5.5.5 Selecting the output current range of the analogue interface

Applies to option M and M1C

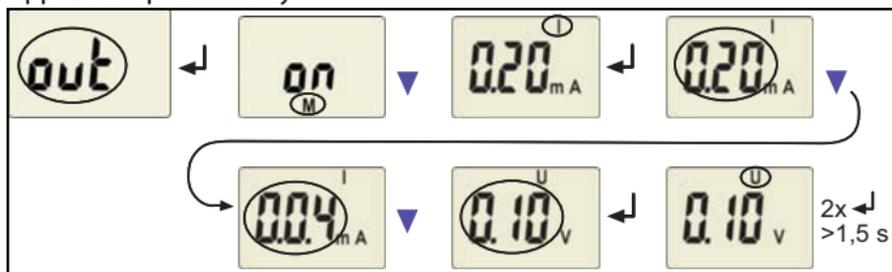


0.20 mA stands for 0...20 mA

4.20 mA stands for 4...20 mA

5.5.6 Select output current and output voltage range of the analogue interface

Applies to option M only.

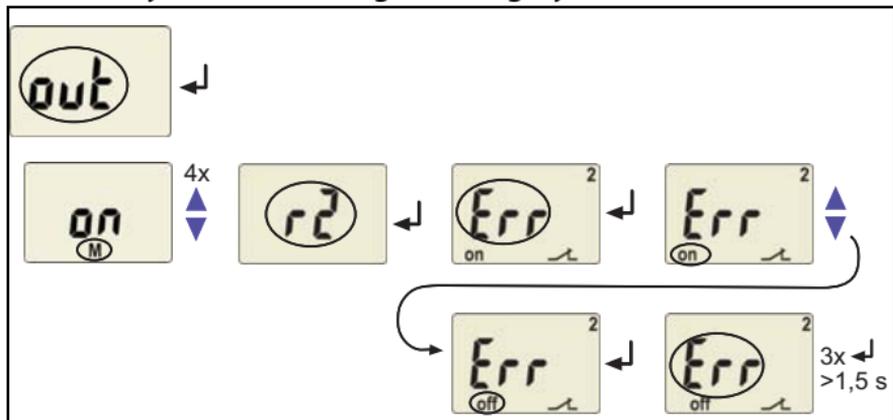


5.5.7 Assigning alarm categories to alarm relay K2

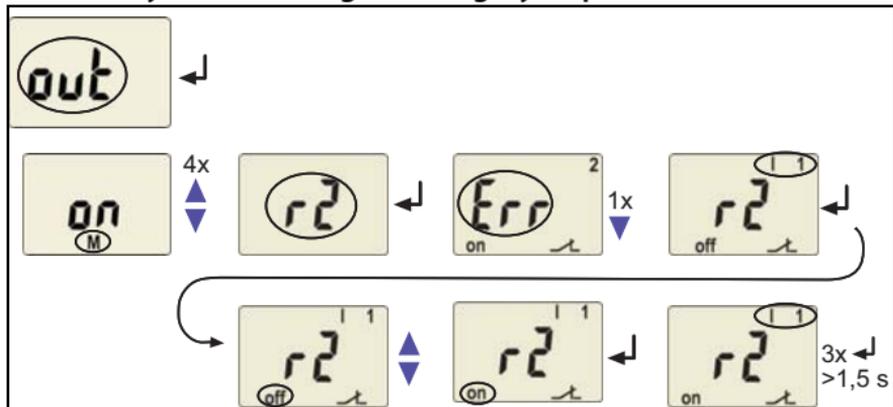
Applies to option M1C, M2C, M3C only.

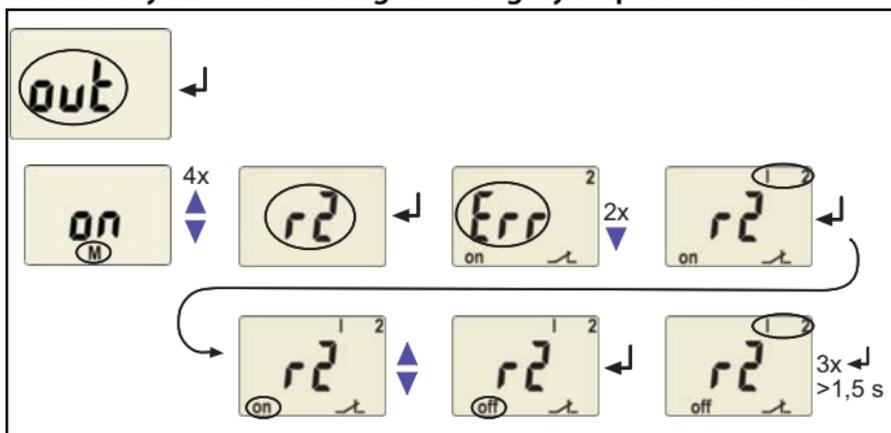
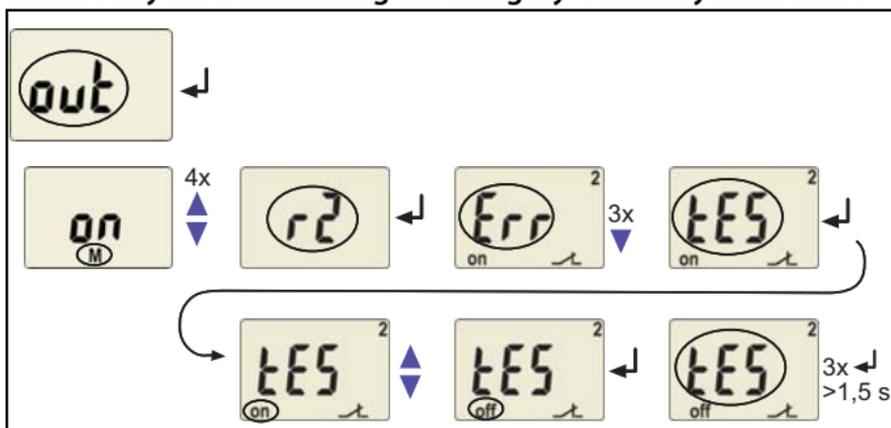
Overcurrent, undercurrent and device-related errors of the residual current monitor can be assigned to the alarm relay K2 (r2, 2). By default, the alarm relay K2 signals in case of overcurrent and device-related errors. An example of how to select the menu option r2 is given below for Option M1C!

Alarm relay K2: Deactivating the category device error



Alarm relay K2: Activating the category response value I1



Alarm relay K2: Deactivating the category response value I2

Alarm relay K2: Deactivating the category "Alarm by device test"


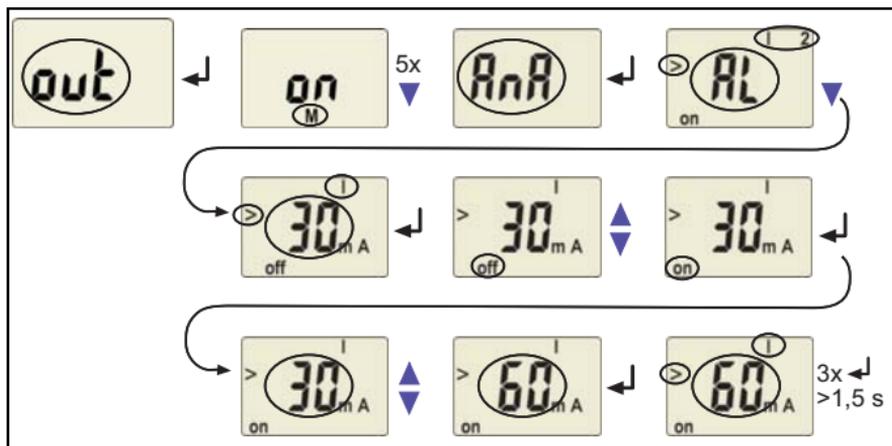
When the alarm relay K2 has been deactivated in the menu, an alarm will not be signalled by the respective changeover contact! An alarm will only be indicated by the respective alarm LED (AL1/AL2)!

5.5.8 Setting the 100% reference of the analogue interface

Set here whether the 100% value of the output signal is to be referred to response value I2 ($I_{\Delta n2}$) (AL) or to a freely configurable value. Select the appropriate value from the range 30 mA...3 A.

Factory setting = related to the response value I2 ($I_{\Delta n2}$) (AL).

The example below shows how to change the 100% reference of AL = related to the response value to a 100% value of 60 mA.



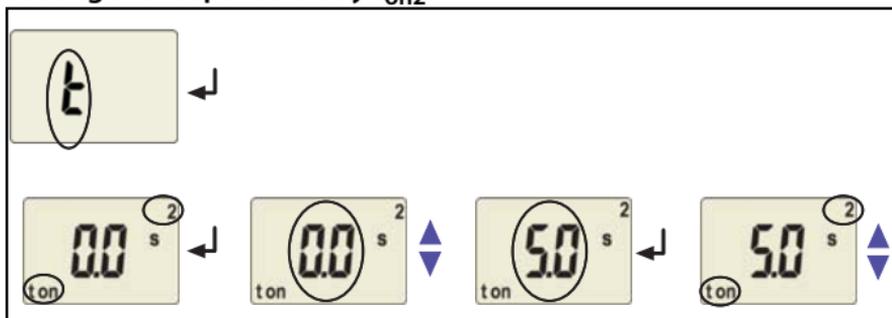
5.5.9 Setting the time delays

The following delays can be set:

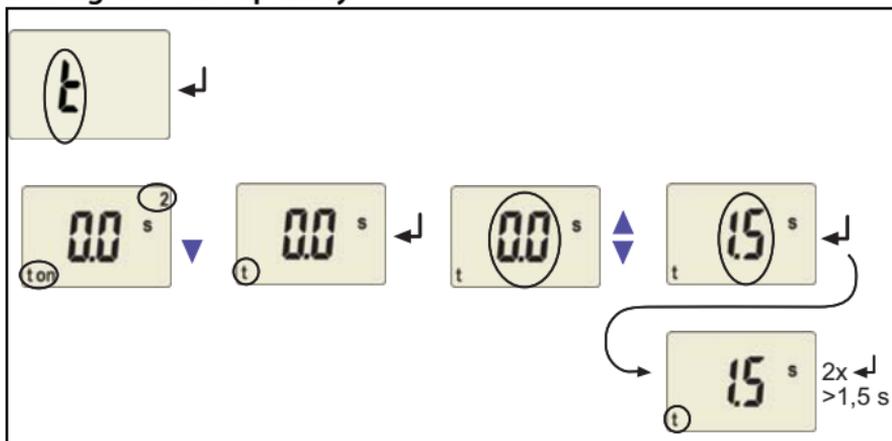
- Response delay t_{on2} (0...10 s) for K2
- Start-up delay t (0...10 s) when the device is being started
- Delay on release t_{off} (0...99 s) for K2. The setting t_{off} is only relevant when the fault memory M is deactivated.

The operating steps for the setting of the response delay t_{on2} and the starting delay t are illustrated by way of example.

Setting the response delay t_{on2}

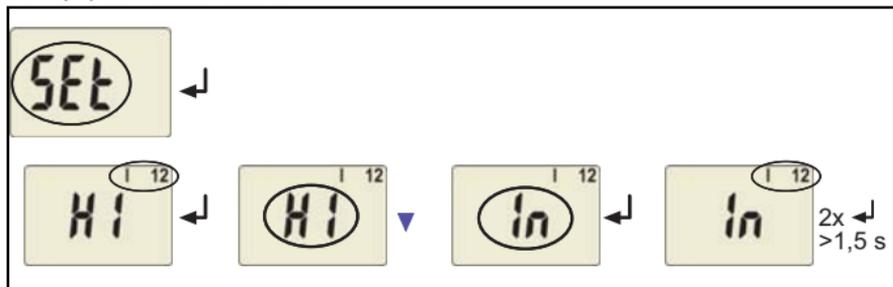


Setting the start-up delay t



5.5.10 Changing from overcurrent operation to window operation

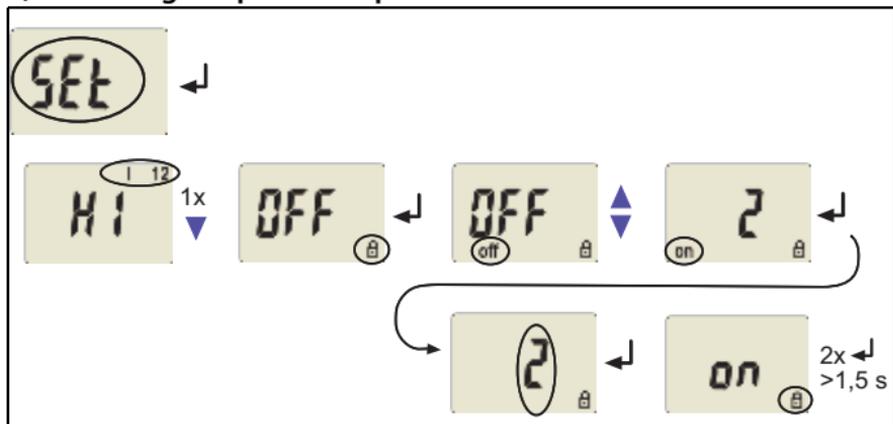
Use this menu item to set whether the response values of the device apply to overcurrent (HI) or undercurrent operation (Lo). In addition, window operation (In) can be selected.



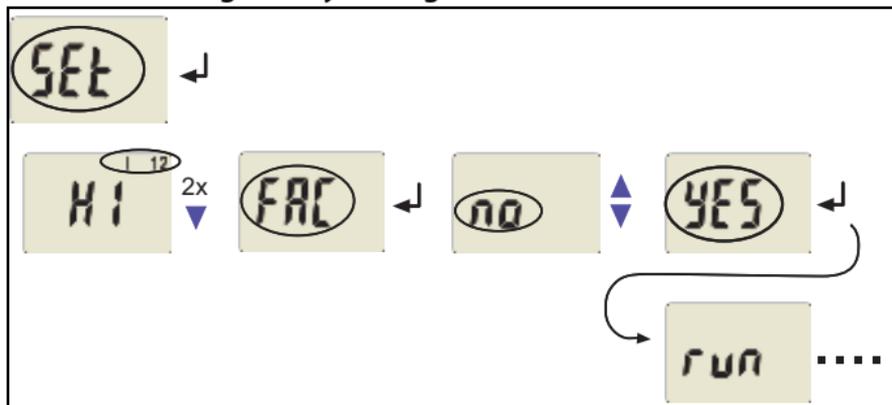
5.5.11 Factory setting and password protection

Use this menu to activate the password protection, to change the password or to deactivate the password protection. In addition, you can reset the device to its factory settings.

a) Activating the password protection



5.5.12 Restoring factory settings



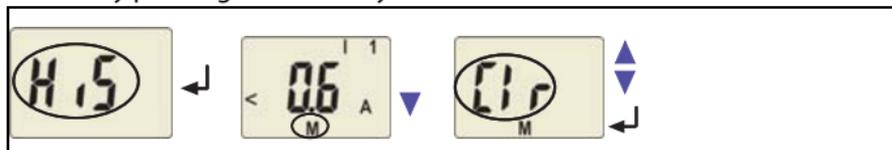
5.5.13 Device information query

This function is used to query the software version (1.xx). After activating this function, data will be displayed as a scrolling text. Once one pass is completed you can select individual data sections using the Up/Down buttons.



5.5.14 History memory query

The history memory can be selected via the menu HiS. Use the Up and Down keys to view the next display. If Clr is flashing, the history memory can be cleared by pressing the Enter key.



5.6 Commissioning

Prior to commissioning, check proper connection of the residual current monitor.

5.7 Factory setting



<i>Response value $I_{\Delta n2}$:</i>	<i>30 mA (I2)</i>
<i>Response value $I_{\Delta n1}$:</i>	<i>50 % (I1)</i>
<i>Hysteresis:</i>	<i>15 %</i>
<i>Fault memory M:</i>	<i>activated (on)</i>
<i>Operating principle K2 (Err, $I_{\Delta n2}$, tES):</i>	<i>N/C operation (n.c.)</i>
<i>RL (Reload function):</i>	<i>0</i>
<i>100% reference related to the analogue interface:</i>	<i>Response value I2</i>
<i>Response delay K2:</i>	<i>$t_{on2} = 0\text{ s}$</i>
<i>Start-up delay:</i>	<i>$t = 0.5\text{ s}$</i>
<i>Delay on release K2:</i>	<i>$t_{off} = 1\text{ s}$</i>
<i>Password:</i>	<i>0, deactivated (Off)</i>

6. Technical data

6.1 Data in tabular form

()* = factory setting

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

Rated insulation voltage	250 V
Rated impulse voltage/pollution degree	2.5 kV / III
Protective separation (reinforced insulation) between:	(A1, A2) - (k/I/T/-/GND/+, T/R) - (21, 22, 24)
Voltage test according to IEC 61010-1	2.21 kV

Supply voltage

RCMA423-DM...-1:

Supply voltage U_s	AC 16...72 V / DC 9.6...94 V
Frequency range U_s	42...460 Hz

RCMA423-DM...-2:

Supply voltage U_s	AC/DC 70...300 V
Frequency range U_s	42...460 Hz
Power consumption	≤ 6.5 VA

Measuring circuit

External measuring current transformer	W20AB, W35AB, W60AB, W120AB, W210AB series
Rated insulation voltage (measuring current transformer)	800 V
Operating characteristic acc. to IEC 62020 and IEC/TR 60755	Type B
Rated frequency	0...2000 Hz
Measuring range AC/DC	3 mA...6 A
Relative uncertainty for $f \leq 2$ Hz or ≥ 16 Hz	0...-35 %
Relative uncertainty for $f = 2$ Hz.. 16 Hz	-35 %...+100 %
Operating uncertainty	0...35 %

Response values

Rated residual operating current $I_{\Delta n1}$ (prewarning, AL2)	50...100 % $\times I_{\Delta n2}$, (50%)*
Rated residual operating current $I_{\Delta n2}$ (alarm, AL2)	30 mA...3 A (30 mA)*

Hysteresis 10...25 % (15%)*

Specified time

Start-up delay t 0...10 s (0.5 s)*

Response delay t_{on2} (alarm) 0...10 s (0 s)*

Delay on release t_{off} 0...99 s (1 s)*

Operating time t_{ae} for $I_{\Delta n} = 1 \times I_{\Delta n1/2}$ ≤ 180 ms

Operating time t_{ae} for $I_{\Delta n} = 5 \times I_{\Delta n1/2}$ ≤ 30 ms

Response time t_{an} $t_{an} = t_{ae} + t_{on2}$

Recovery time t_b ≤ 300 ms

Number of reload cycles 0...100 (0)*

Cable lengths for measuring current transformers

Connection WX... (see ordering information on page 45) 1 m / 2.5 m / 5 m / 10 m
or alternatively: single wire $6 \times 0.75 \text{ mm}^2$ 0...10 m

Displays, memory

Display range, measured value AC/DC 0...6 A

Error of indication ± 17.5 % / ± 2 digit

Measured-value memory for alarm value data record measured values

Password off / 0...999 (off)*

Fault memory alarm relay on / off (on)*

Inputs/outputs

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

Voltage output:

Open circuit voltage (terminals open) \leq DC 20 V

Voltage output DC 0...10 V

Burden $\geq 1 \text{ k}\Omega$

Current outputs:

Short-circuit current ≤ 30 mA, short-circuit proof

Current output DC 0/4...20 mA

Burden $\leq 500 \Omega$

Current output DC 0...400 μ A

Burden $\leq 12.5 \text{ k}\Omega$

Switching elements

Switching elements 1 changeover contact (K2)

Operating principle	N/C operation n.c. / N/O operation n.o. (N/C operation n.c.)*
Electrical endurance, number of cycles	10000
Contact data acc. to IEC 60947-5-1:	
Utilisation category	AC-13 AC-14 DC-12 DC-12 DC-12
Rated operational voltage	230V 230V 24V 110V 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 ≥ 10 V

Environment / EMC

EMC	IEC 62020
Operating temperature	-25 °C...+55 °C
Classification of climatic conditions acc. to IEC 60721:	
Stationary use (IEC 60721-3-3)	3K5 (except condensation and formation of ice)
Transport (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

Connection type	screw-type terminals
Connection properties:	
Rigid/ flexible	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
Connection type	push-wire terminals
Connection properties:	
Rigid	0.2...2.5 mm ² (AWG 24...14)
Flexible without ferrules	0.2...2.5 mm ² (AWG 24...14)
Flexible with ferrules	0.2...1.5 mm ² (AWG 24...16)
Stripping length	10 mm
Opening force	50 N
Test opening, diameter	2.1 mm

Other

Operating mode	continuous operation
Mounting position	display oriented
Degree of protection, internal components (IEC 60529)	IP30
Degree of protection, terminals (IEC 60529)	IP20
Enclosure material	polycarbonate
Flammability class	UL94 V-0
DIN rail mounting acc. to	IEC 60715
Screw mounting	2 x M4 with mounting clip
Software version	D330 V1.0x
Weight	≤ 160 g

() * = factory setting

Residual operating current ranges of the different measuring current transformers

Residual operating current ranges	Art. No.
30 mA...500 mA	W20AB
30 mA...3 A	W35AB W60AB W120AB
300 mA...3 A	W210AB

6.2 Standards, approvals and certifications

The device was designed under consideration of the following standards:

- IEC 62020
- IEC/TR 60755



6.3 Ordering information

	RCMA423-DM...-1	RCMA423-DM...-2
Response range $I_{\Delta n}$	30 mA...3A	30 mA...3A
Rated frequency	0...2000 Hz	0...2000 Hz
Supply voltage U_s^*	DC 9.6 V...94 V / AC 42...460 Hz, 16...72 V	DC 70...300 V / AC 42...460 Hz, 70...300 V
Art. No.		
- Option M	B 7404 3026 B 9404 3026	B 7404 3030 B 9404 3030
- Option M1C	B 7404 3027 B 9404 3027	B 7404 3031 B 9404 3031
- Option M2C	B 7404 3028 B 9404 3028	B 7404 3032 B 9404 3032
- Option M3C	B 7404 3029 B 9404 3029	B 7404 3033 B 9404 3033
*Absolute values of the voltage range		

External measuring current transformers

Type	Inside diameter (mm)	Art. No.
W20AB	20	B 9808 0008
W35AB	35	B 9808 0016
W60AB	60	B 9808 0026
W120AB	120	B 9808 0041
W210AB	210	B 9808 0040

Measuring current transformer connecting cable

Type	Length (m)	Art. No.
WX-100	1	B 9808 0503
WX-250	2,5	B 9808 0504
WX-500	5	B 9808 0505
WX-1000	10	B 9808 0506

RCMA423-DMx accessories

Mounting clip for screw mounting (1 piece per device) B 9806 0008

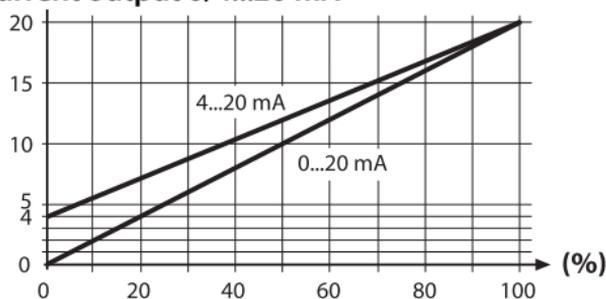
Measuring current transformers accessories

Snap-on mounting for DIN rail: W20AB /W35AB B 9808 0501

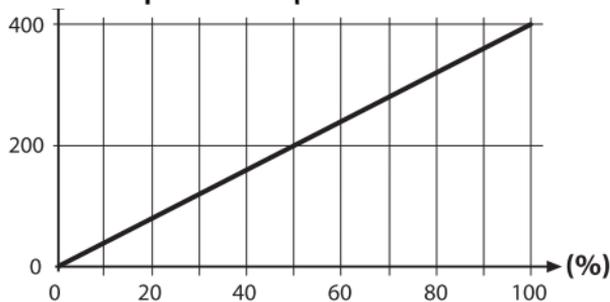
Snap-on mounting for DIN rail: W60AB B 9808 0502

6.4 Current and voltage curves of the analogue interface

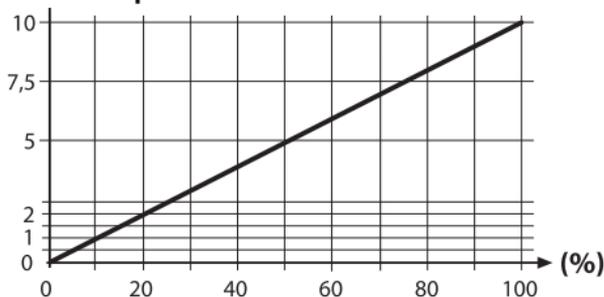
Current output 0/4...20 mA



Current output 0...400 μ A



Current output 0...10 V



6.5 Error codes

Should, contrary to all expectations, a device error occur, error codes will appear on the display. Typical error codes are described below:

Error code	Meaning
E.01	Fault CT connection monitoring Appropriate action: Check CT connection for short-circuit or interruption. After eliminating the fault, the error code will be automatically deleted.
E.02	Fault CT connection monitoring during manual self test. Appropriate action: Check CT connection for short-circuit or interruption. After eliminating the fault, the error code will be automatically deleted.
E....	Appropriate action when error codes > 02 occur: Appropriate action: Carry out a reset. Reset the device to factory setting. After eliminating the fault, the error code will be automatically deleted. If the fault continues to exist, please contact the Bender Service.

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