

Residual current monitoring module RCC718

Residual current monitoring module
for TN and TT systems



Features

- Ready-to-connect, pre-parameterized monitoring module for fault and residual current monitoring
- Version for 12 circuits (optional 24) with / without built-in circuit breaker for each circuit
- AC and pulsed DC sensitive measurement (Type A acc. to IEC 60755), 6 mA...20 A (42...2000 Hz)
- Screwless-type connection technique
- True r.m.s. value measurement
- Adjustable time delays
- Adjustable frequency behaviour for protection of persons, fire protection and plant protection
- History memory with date and time stamp for 300 data records
- Data logger for 300 data records / channel
- Analysis of the harmonics, DC, THD
- Communication module for the connection to Ethernet / TCP / IP networks (OPC)
- E-mail notification in case of alarm and fault messages
- Remote maintenance / diagnosis per LAN / WAN or Internet
- Suitable for all common DIN rail systems

Product description

The factory-built module of the RCC series are designed for fault and residual current monitoring of earthed power supply systems (TN / TT systems). The modules are designed for 12, (optional 24) circuits, where depending on the type each circuit provides one single pole circuit breaker. The connection between the module and external residual current monitors or alarm and monitoring relays is implemented with bus technology. The module is suitable for mounting onto all common DIN rail systems (equipment racks have to be provided).

Applications

- Residual and fault currents of loads and systems
- Monitoring of currents regarded as fire hazards in flammable atmospheres.
- Monitoring of TN-S systems for stray currents and additional N-PE connections
- Monitoring of stationary electrical systems and equipment for residual currents

Function

The RCC modules consist of a residual current evaluator of the RCMS460-D type range, 12 measuring current transformers and 12 single-pole circuit breakers (RCC718-12-B16).

Currents are detected and evaluated as true r.m.s. values in the frequency range of 42...2000 Hz. All channels are scanned within 180 ms. The current values of all channels are shown on the LC display in bar graph format. If one of the two response values is exceeded, the response delay begins. When the response delay time has elapsed, the alarm relays "Alarm 1 / 2" switch and the Alarm LEDs 1 / 2 light up. Two response values / common alarm relays, which can be set separately, allow a distinction to be made between "prewarning" and "alarm". The faulty channel(s) and the associated measuring current transformers are indicated on the display. When the current falls below the release value (response value plus hysteresis), the delay on release begins. When the delay time has elapsed, the alarm relays switch back to their initial position. With the fault memory activated, the alarm relays remain in alarm state until the reset button is pressed or until a reset command is sent via the BMS bus. The device function can be tested using the TEST button. The parameterization of the device can be carried out via the LC display and the function keys integrated in the front plate, or via the gateway FTC470XET. The preset function can be used to adjust all channels to the device-specific residual current plus a selectable factor.

History memory in RCMS460-D

The residual current evaluator RCMS460-D utilizes an alarm history for failsafe storing of up to 300 data records (date, time, channel, event code, measured value), so that all data about an outgoing circuits 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 item in RCMS460-D. There, the current value of the harmonics (1...40 at 50 / 60 Hz, 1...5 at 400 Hz) is displayed numerically and graphically.

Device variants

RCC718-12-B16

This module is designed to be used in new installations. It includes 12 circuit-breakers (for 12 outgoing circuits) which share one power supply infeed (3 / NAC / AC).

RCC718-12

This version is designed to be used for retrofitting. This module is designed so that existing outgoing circuits can easily be connected through.

Communication

The transfer of alarm messages from the RCMS.. to external alarm indicator and operator panels takes place via bus technology. For connection to Ethernet networks (TCP / IP), the module includes an FTC470XET protocol converter. This protocol converter also provides the functions of a Web browser, so that the following functions are possible:

Easy to operate and central administration

- via LAN network and PC with standard browsers;
- Display of all operational status messages, alarms and measured values;
- Fast parameterization of the RCMS... system;
- System overview indication;
- Failure detection;
- E-mail notification in case of alarms and system faults;
- Use of the existing communication architecture;

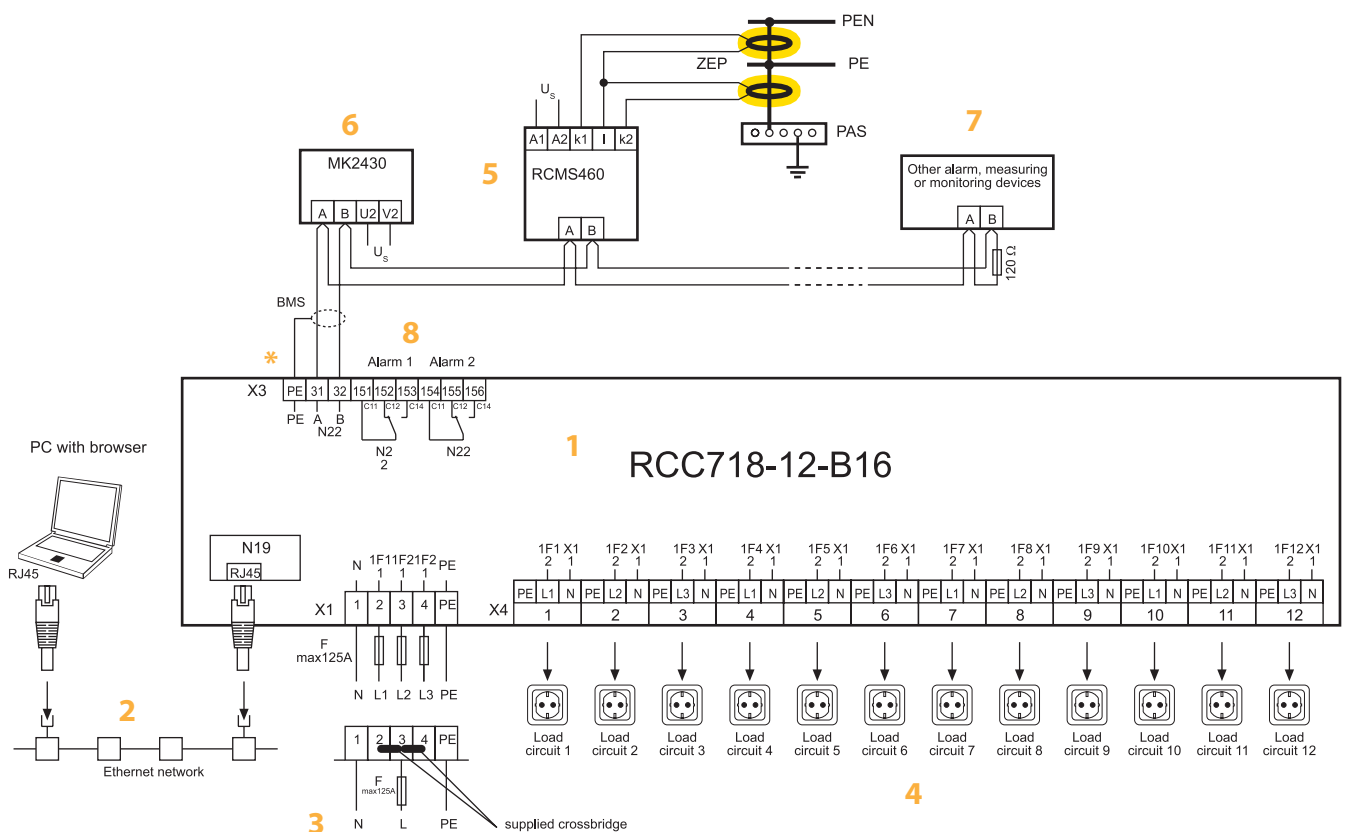
Individual alarm text messages and descriptions:

- Description of the individual measuring points as required;
- Alarm text messages as required.

Support for service and maintenance:

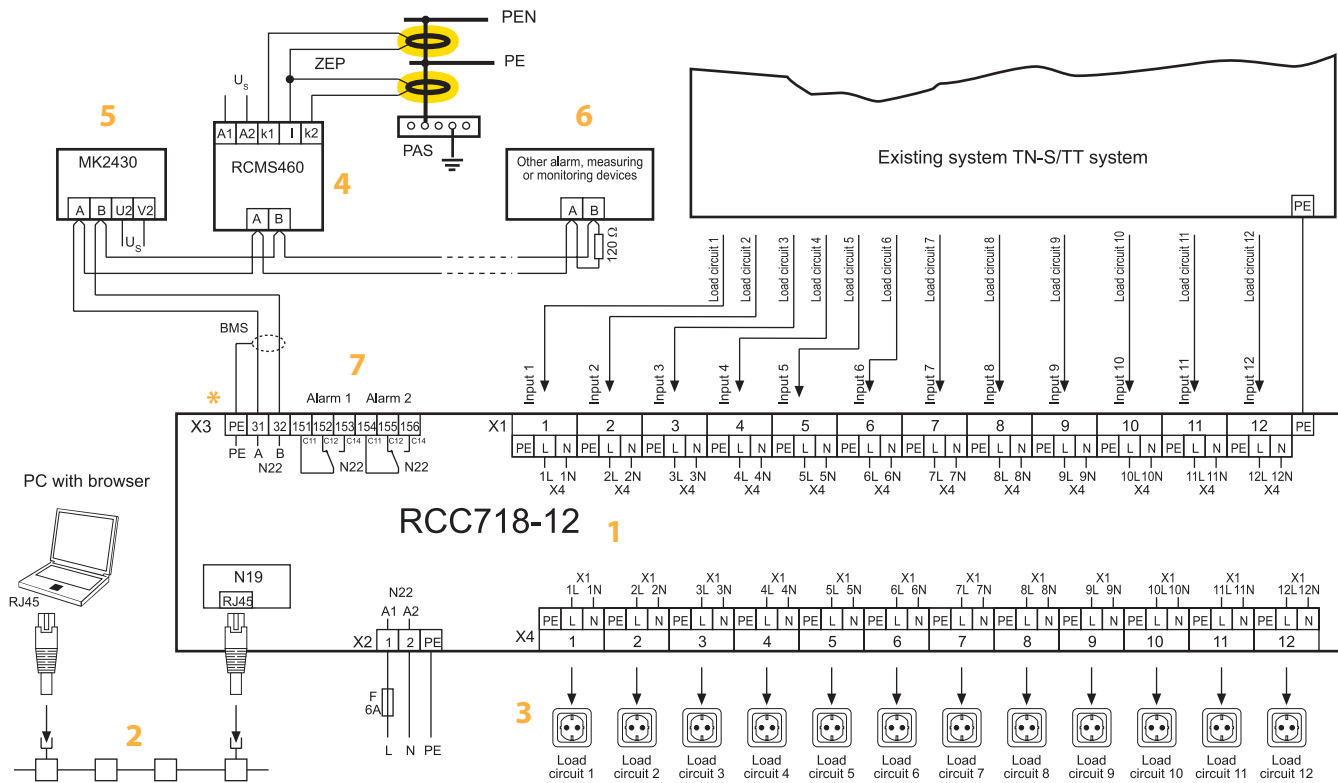
- Precise indication of the location of the fault;
- Storing and display of historical data;
- Data logging of several channels.

Wiring diagram



- 1 - RCC monitoring module
- 2 - Connection to Ethernet network
- 3 - Connection to power supply infeed to a 3NAC 400 V system; connection to AC 230 V systems: connect terminals 2, 3, 4 with the accompanying crossbridge.
- 4 - Connection to load circuits (monitoring $I_{\Delta n}$)
- 5 - Optional: Residual current evaluator RCMS460-D / -L for I_{PEN-PE} and I_{PE-PAS} monitoring at the central earthing point.
- 6 - Optional: Alarm indicator and test combination MK2430 for remote indication.
- 7 - Optional: Other devices with BMS bus.
- 8 - Alarm relay N22: Alarm 1 $I_{\Delta n1}$ (prewarning)
Alarm relay N22: Alarm 2 $I_{\Delta n2}$ (alarm)
- * - If a shielded cable is used, connect the shield on one side to terminal PE.

Wiring diagram RCC718-12



- 1 - RCC monitoring module
- 2 - Connection to Ethernet network
- 3 - Connection to load circuits (monitoring $I_{\Delta n}$)
- 4 - Optional: Residual current evaluator RCMS460-D/-L for I_{PE-PE} and I_{PE-PAS} monitoring at the central earthing point.
- 5 - Optional: Alarm indicator and test combination MK2430 for remote indication.
- 6 - Other devices with BMS bus.
- 7 - Alarm relay N22: Alarm 1 $I_{\Delta n1}$ (prewarning)
- 8 - Alarm relay N22: Alarm 2 $I_{\Delta n2}$ (alarm)
- * - If a shielded cable is used, connect the shield on one side to terminal PE.

Technical data residual current monitoring module RCC718

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

Rated insulation voltage	AC 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 acc. to IEC 61010-1	2.21 kV

Supply voltage for devices

Supply voltage U_s	AC 230 V
Frequency range U_s	50...60 Hz

Measuring circuit

Measuring current transformer type	W10 / 600
CT monitoring	on / off (on)*
Load	68 Ω
Rated insulation voltage (measuring current transformer)	800 V
Operating characteristic acc. to IEC 60755	Type A
Rated frequency	42...2000 Hz
Measuring range	0...30 A
Rated residual operating current	$I_{\Delta n2}$ (alarm) 6 mA...20 A (300 mA)*
Rated residual operating current	$I_{\Delta n1}$ (prewarning) 10...100 % $\times I_{\Delta n2}$ min 5 mA (50 %)*
Preset	$I_{\Delta x}$ factor 2...99 (3)*
Relative percentage error	0...-20 %
Hysteresis	2...40 % (20 %)*
Factor for additional CT	1...10; $\times 1$...250 ($\times 1$)*
Number of measuring channels	12

Specified time

Starting delay t	0...99 s (0 ms)*
Response delay t_{on}	0...999 s (200 ms)*
Delay on release t_{off}	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}	$t_{an} = t_{ae} + t_{on1/2}$
Scanning time for all channels	≤ 180 ms

Displays, memory

Display range, measuring value	0...30 A
Display accuracy	± 10 %
LEDs	ON / ALARM 1 / 2
LC display	backlit graphical display (RCMS4...-D)
History memory	300 data records
Data logger	300 data records per channel
Password	off / 0...999 (off)*
Language	D, GB, F (GB)*
Fault memory alarm relay	on / off (off)*

Inputs / outputs RCMS460-D

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 $\times$ 0.8
Terminating resistor	120 Ω (0.25 W) can be connected via DIP switch
Device address RCMS460-D	2...90 (2)*
FTC470XET	1...30 (1)*

Switching elements (RCMS460-D)

Number of changeover contacts	2 $\times$ 1 changeover contact
Operating principle	N / C operation / N / O operation (N / O operation)*
Electrical service life under rated operating conditions	10.000 switching operations
Contact data acc. to IEC 60947-5-1	
Utilization 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 load	1 mA at AC / DC > 10 V

Environment / EMC

EMC	IEC 62020: 2003-11
Operating temperature	-25 $^{\circ}$ C...+55 $^{\circ}$ C
Classification of climatic conditions 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
Transportation (IEC 60721-3-2)	2M2
Storage (IEC 60721-3-1)	1M3

Connection

Inputs / load circuits

Connection	cage clamp spring terminal
rigid / flexible / conductor sizes	0.08...2.5 / 4 mm ² / AWG 28-12
Stripping length	8...9 mm

Supply

Connection	cage clamp spring terminal
rigid / flexible / conductor sizes	6...35 mm ² / AWG 8-2
Stripping length	23 mm

Other

Operating mode	continuous operation
Mounting position	vertical
Degree of protection, internal components / terminal (IEC 60529)	IP30 / IP20
Flammability class	UL94V-0
Rows / fields	3 rows / 1 field
Standards	IEC 62020

(*) Factory setting

Ordering information

Type	Load circuits	Circuit breaker	Art. No.
RCC718-12-B16	12	B16	B 9405 4001
RCC718-12	12	--	B 9405 4002

Mounting onto equipment rack. Can optionally be delivered in an enclosure suitable for surface or wall mounting according to customer's specific requirements.