1 Information about using this user manual

1.1 General information

This user manual is intended exclusively for use by trained specialist electrical personnel.

This user manual is part of the product and makes reference to other devices from Janitza electronics GmbH. Only the text of the instruction section is a contract between Janitza electronics GmbH and the user.

Observe safety requirements and warnings. Failure to observe the instructions can lead to personal injury and damage to the product.

Keep this user manual through the entire service life of the product so it is available for all users.

For the quick start, please also note further documentation on our homepage, such as:
- User manual and safety instructions

NOTE

Further information - e.g. the manual - can be found in the download area at www.janitza.com.

2 Safety instructions

2.1 Symbols used

WARNING

These symbols and the word “warning” are used when there is possible danger to life and limb.

Symbols are also used in these instructions that refer directly to the source of danger.

ATTENTION

This symbol and the word “attention” are used when there is the possibility of property damage.

Observe the user manual!

This symbol and “Observe the user manual!” are used when reference must be made to the user manual or other documentation.

NOTE

These symbols and the word “Note” are used to make reference to additional information necessary for device use.

2.2 General safety instructions

The following safety instructions must be observed for work on and with the RCM 202-AB. Specific safety instructions are also listed in the respective chapters.

WARNING

All work necessary for the connection, assembly, commissioning and operation of the device may only be performed by well trained and instructed specialist personnel. The specialist personnel must observe and comply with the relevant applicable standards and directives for work on electrical systems (e.g. DIN 410010 and 61, directives and regulations of professional associations in Germany).

ATTENTION

Use of the device requires sufficient knowledge of the product as well as knowledge and the correct device and systems. Changes to the product must be undertaken by Janitza electronics GmbH. Unauthorized changes will void the warranty on any residual current measurement device. Therefore changes to the connection settings as well as the replacement of devices may only be carried out upon agreement with Janitza electronics GmbH.

Changes carried out to are documented in the system documentation!

Observe the user manual!

This user manual is as well as the device-specific user manual for connected devices must be strictly observed.

NOTE

The RCM 202-AB is supplied as a component of a residual and operating current monitoring system. Upon commissioning/retailing of a monitoring system, all system-specific settings and control commands for the RCM 202-AB shall be parameterized and documented by Janitza electronics GmbH.

3 Purpose - Intended use

The RCM 202-AB is a two-channel residual current measurement device for the measurement and monitoring of main distribution boards to a maximum residual current of 20 A.

With connected current measurement transformers (also current sensors), the RCM 202-AB allows for the measurement and monitoring of residual currents in TN and TT systems (grounded AC systems).

With additional devices of the RCM series, display devices or devices for data coupling to third-party systems, it forms a complete residual and operating current monitoring system. This monitoring system increases system and operational safety.

The RCM 202-AB is configured according to the connected transformers (break or short circuit per channel).

5 Functions

5.1 Basic functionality

The main functions of the RCM 202-AB are:
- Residual current measurement via a connected current measurement transformer (break or short circuit per channel)
- Effective value measurement (true RMS)
- Parallel measurement recording
- Detection of sinusoidal residual fault currents with frequencies up to 20 kHz (type C)
- Measured value and extreme value storage with stamp
- Parameterizable alarm threshold for alarm messages per channel
- Parameterizable relay delays: Delay time for warning and alarm messages, delay time for warning and alarm messages
- Operating and error messages shown on the display
- Communication via Modbus (RS485 interface / Modbus-RTU)
- Evaluation possibility with the help of the GridVis® monitoring system or a display and evaluation device.

5.1.1 Residual current monitoring principle

The fault currents (residual currents) flowing to ground or other paths are recorded via the connected current measurement transformers.

For example:
- Overload-related residual currents (consumers and systems)
- Streak currents in TN systems (RCM and RCM calculation)

ATTENTION

Do not route the PE conductor through the current measurement transformer!

5.1.2 Current measurement transformer monitoring

The RCM 202-AB evaluates currents flowing to two current measurement transformers at the same time. For each active channel, the RCM 202-AB continuously checks the connected transformer for short circuit or wire breaks. If a short circuit or wire break occurs on the transformer, an error message is output on the display as well as on the communication interfaces and the LED status flashes red.

5.2 RS485 Interface (Modbus)

The RCM 202-AB has a Modbus interface (RS485) and works with the Modbus RTU protocol as a slave. The device can address 1 and the baud rate of 9600 baud is factory-set.

For more information, see the user manual at www.janitza.com.

5.3 Digital outputs

ATTENTION

External signal circuitry must be secondary current circuits if the RCM 202-AB is integrated in a monitoring system.

The digital outputs are not short-circuit-proof.

- The digital outputs switch direct current or alternating current loads.
- The digital outputs switch loads independently of the polarity of the supply voltage.

5.4 Analog outputs (interfaces 4 … 20 mA)

The RCM 202-AB has two analogue outputs (interface 4 … 20 mA). The analogue outputs output the effective value of the measured total current. Both analogue outputs require a separate power supply (DC 12 – 24 V).

Further information can be found in the user manual at www.janitza.de.

6 Connection assignment

Tab. 1: Connection assignment RCM 202-AB

<table>
<thead>
<tr>
<th>No.</th>
<th>Pin</th>
<th>Description</th>
<th>I max</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>GND</td>
<td>20 A</td>
<td>Power supply connection</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>GND</td>
<td>20 A</td>
<td>Power supply connection</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>Analog output (AO1)</td>
<td>20 mA</td>
<td>* * *</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>Analog output (AO2)</td>
<td>20 mA</td>
<td>* * *</td>
</tr>
</tbody>
</table>

* Can be connected with fixed connection cables without contacts k and l

7 Application example

7.1 Application example RCM 202-AB in stand-alone mode

Tab. 2: Connection assignment RCM 202-AB

<table>
<thead>
<tr>
<th>No.</th>
<th>Pin</th>
<th>Description</th>
<th>I max</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
<td>3</td>
<td>C</td>
<td>Analog output (AO1)</td>
<td>20 mA</td>
<td>* * *</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>Analog output (AO2)</td>
<td>20 mA</td>
<td>* * *</td>
</tr>
</tbody>
</table>

* Can be connected with fixed connection cables without contacts k and l

8) Overview of the RCM 202-AB
7.3 Application example analog outputs and UMG 56RM-E

The analog output signals (4...20 mA) may only be operated on galvanically isolated inputs/outputs. Use a maximum of 4xNc analog output modules per measurement channel (e.g. UMG 56RM-E) for the RCM 202-AB. Using TWIN analog output modules between the RCM 202-AB and a device without galvanically isolated inputs/outputs leads to measurement errors (cf. Fig. 10).

7.5 Commissioning

NOTE
The housing of the RCM 202-AB aways runs during operation.

1. Connect the plug for the power supply to the NO connection. The status LED flashes green, RCM 202-AB initialization takes place. ‘11’ and ‘12’ appear on the display.
2. Wait until initialization is completed. Initialization can take up to 60 seconds. Initialization will take longer if the transformer measures residual currents already during initialization.
3. The status LED lights up green and the measured values for the activated measurement channels are shown at the display. The RCM 202-AB is ready for operation.
4. If necessary, configure the RCM 202-AB (see chapter Executing measurements in the user manual) according to the system to be monitored and depending on the circuit of its connections.

Observe the user manual!

The system documentation must be observed for the parameterization of the RCM 202-AB.

7.9 Technical data

7.9.1 General technical data

Operating data
Supply voltage in Modbus-Konfiguration (slave)
AC 80...250 V, 50/60 Hz
Operating voltage
AC 230 V
Operating mode
Continuous operation
Power consumption (total consumption) max. 8 W
Relay contact 0 V
Rated voltage DC 12 ... 24 V
Rated voltage AC 230 V / 50 - 60 Hz

Measuring system
Measurement transformer type/transformer ratio
See Tab. 3 on page 19
Correct measurement transformer/capacitance
AC 20...70 V
Correct measurement transformer/capacitance (for phase measurement)
0...20 mF
Correct measurement transformer/capacitance (for residual current measurement)
0...20 mF
Measurement channels
Number of measuring channels 2
Number of adjustable channel parameters 4
Measurement scale recording
Possible, adjustable measurement scale (see RMS)
Inclusion
Permissible, but limited!
Inclusion measurement inclusive current to the Modbus-Konfiguration
The separate relay of this warning and alarm messages is
Reset delay time
Permissible, max. 0.5 s
Transformer connections
Connection to the current measurement transformer
As indicated on the transformer
Usage
Single-wire (0.7 to 1.5 mm²) Max. 1 m
Terminal connection (15 x 5 mm²) Max. 10 m

Displays, messages and memory
Full graphic display, 80 x 48 pixels with backlight
128 x 64 pixel with backlight
3 keys

Interface
RS485 interface
RS485 interface

Electrical data
Connection type/cable
Series terminal/copper
Weight

Connections K and L (see also Tab. 1 on page 10).

NOTE
The shield may be applied only on one side!

The ground terminals of all RS485 connections of multiple RCM 202-AB must be grounded in one point. The second wire pair of the bus cable is used as the ground wire. Both wires of the pair are parallel connected.

The device address 1 and the baud rate of 19200 baud are factory-set.

NOTE
The connection type/cable Series terminal/copper

(0 to 0.5 m)
(0.5 to 3 m)
(3 to 10 m)

Max. 10 m

Environmental conditions
Bus failure
Bus failure
Bus failure

Supply voltage of the analog outputs
DC 12 ... 24 V

Digital inputs
Number of digital inputs
2
Switching voltage
max. DC 30 V, AC 30 V

Electromagnetic compatibility (EMC)

Ambient conditions
Ambient temperature during operation
-40 °C...+70°C (-40 °F...+158°F)
Ambient temperature during storage
-25 °C...+70°C (-13°C...+158°F)
Ambient temperature during transport
-25 °C...+70°C (-13°C...+158°F)

Installation conditions

Type: A and B according to IEC 62020

Tab. 3: Current measurement transformers to be connected to the RCM 202-AB

<table>
<thead>
<tr>
<th>Transformer type</th>
<th>Inner window size</th>
<th>Bore</th>
<th>Bore size</th>
<th>Max. primary cur- rent [A]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT-AC RCM 210N</td>
<td>20</td>
<td>80</td>
<td>600:1</td>
<td>20000</td>
</tr>
<tr>
<td>CT-AC RCM 35N</td>
<td>12</td>
<td>80</td>
<td>600:1</td>
<td>20000</td>
</tr>
<tr>
<td>CT-AC RCM 80N</td>
<td>6</td>
<td>80</td>
<td>600:1</td>
<td>20000</td>
</tr>
<tr>
<td>CT-AC RCM 120N</td>
<td>4</td>
<td>80</td>
<td>600:1</td>
<td>20000</td>
</tr>
<tr>
<td>CT-AC RCM 180N</td>
<td>3</td>
<td>80</td>
<td>600:1</td>
<td>20000</td>
</tr>
<tr>
<td>CT-AC RCM 240N</td>
<td>2</td>
<td>80</td>
<td>600:1</td>
<td>20000</td>
</tr>
</tbody>
</table>

CT-AC RCM 80N 80 - 700:1 20000
CT-AC RCM 120N 120 - 700:1 20000
CT-AC RCM 180N 180 - 700:1 20000
CT-AC RCM 240N 240 - 700:1 20000
CT-AC RCM 300N 300 - 700:1 20000
CT-AC RCM 350N 350 - 700:1 20000
CT-AC RCM 500N 500 - 700:1 20000
CT-AC RCM 600N 600 - 700:1 20000
CT-AC RCM 700N 700 - 700:1 20000
CT-AC RCM 800N 800 - 700:1 20000
CT-AC RCM 1000N 1000 - 700:1 20000
CT-AC RCM 1200N 1200 - 700:1 20000
CT-AC RCM 1500N 1500 - 700:1 20000
CT-AC RCM 2000N 2000 - 700:1 20000

NOTE
Further information – e.g. the manuals – can be found in the download area of www.janitza.com.