Functions and characteristics

Description
RH10M, RH21M and RH99M relays

Relay marking
1 Type of relay.
4 Customer marking zone (circuit identification).
11 Sensitivity (RH10M).
14 Relay class.

Controls
7 Press and hold the Reset button, then press the Test button to test the device without actuating the output contacts.
12 Test button.
13 Reset button.

Indications
5 Green voltage-presence LED (on).
6 Red insulation-fault LED (fault).

LED status
<table>
<thead>
<tr>
<th>on</th>
<th>fault</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="on" alt="Green LED" /></td>
<td>Normal operation</td>
</tr>
<tr>
<td><img src="fault" alt="Red LED" /></td>
<td>Fault current detected</td>
</tr>
<tr>
<td><img src="on" alt="Green LED" /> <img src="fault" alt="Red LED" /></td>
<td>Relay/sensor link fault</td>
</tr>
<tr>
<td><img src="on" alt="Green LED" /></td>
<td>No voltage or device not in service</td>
</tr>
<tr>
<td><img src="fault" alt="Red LED" /></td>
<td>Malfunction detected</td>
</tr>
</tbody>
</table>

Key:
- ![Green LED](on): off
- ![Green LED](on) ![Red LED](fault): green (or red)
- ![Green LED](on) ![Red LED](fault): flashing.

Settings
15 Threshold and time-delay selectors (RH21)
Three possible settings:
- 0.03 A sensitivity, instantaneous
- 0.3 A sensitivity, instantaneous
- 0.3 A sensitivity, 0.06 s delay

16 Time-delay selector (RH99)
Nine possible settings (instantaneous – 0.06 s – 0.15 s – 0.25 s – 0.31 s – 0.5 s – 0.8 s – 1 s – 4.5 s).

17 Threshold selector (RH99)
Nine possible settings (0.03 A – 0.1 A – 0.3 A – 0.5 A – 1 A – 3 A – 5 A – 10 A – 30 A).

Connection
2 Sensor.
3 Plug-in supply.
8 Fault contact.
9 Voltage-presence contact.
10 Remote reset/test.
Functions and characteristics

**RH10P, RH21P and RH99P relays**

**Description (cont.)**

**Relay marking**
1. Type of relay.
2. Customer marking zone (circuit identification).
4. Relay class.

**Controls**
5. Test button.
6. Reset button.
7. Press and hold the Reset button, then press the Test button to test the device without actuating the output contacts.

**Indications**
2. Green voltage-presence LED (on).

<table>
<thead>
<tr>
<th>LED status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>on</td>
<td>Normal operation</td>
</tr>
<tr>
<td>fault</td>
<td>Fault current detected</td>
</tr>
<tr>
<td></td>
<td>Relay/sensor link fault</td>
</tr>
<tr>
<td></td>
<td>No voltage or device not in service</td>
</tr>
<tr>
<td></td>
<td>Malfunction detected</td>
</tr>
</tbody>
</table>

**Key:**
- **off**
- ( ) green (or red)
- flashing.

**Settings**
10. Threshold and time-delay selectors (RH21)
   - Three possible settings:
     - 0.03 A sensitivity, instantaneous
     - 0.3 A sensitivity, instantaneous
     - 0.3 A sensitivity, 0.06 s delay

11. Time-delay selector (RH99)
   - Nine possible settings (instantaneous – 0.06 s – 0.15 s – 0.25 s – 0.31 s – 0.5 s – 0.8 s – 1 s – 4.5 s).

12. Threshold selector (RH99)
   - Nine possible settings (0.03 A – 0.1 A – 0.3 A – 0.5 A – 1 A – 3 A – 5 A – 10 A – 30 A).

**Connection**
All connections for front-panel mount relays are of the plug-in type.
13. Fault contact.
15. Plug-in supply.
16. Voltage-presence contact.

Connections on the back of the relay.
Functions and characteristics

Description (cont.)

RHUs and RHU relays

Relay marking
1. Type of relay.
13. Relay class.

Controls
6. Setting modification button.
7. Enter button.
8. Test/reset button.
9. Right arrow.
10. Down arrow.

Indications
2. Alarm LED.
3. Fault LED.
4. Digital display (3 digits) for measurements and settings.
5. Unit LEDs for current measurements and settings.
11. LEDs for the type of measurement (leakage current, leakage current as percentage of fault threshold or maximum leakage current measured since last reset).

Connections on the back of the relay.

Connection
All connections for front-panel mount relays are of the plug-in type.
14. Alarm contact.
15. Test/Reset.
16. Voltage-presence contact.
17. Supply.
18. Communication bus (RHU only).
20. Fault-current contact.
Functions and characteristics

Description (cont.)
RMH relay and RM12T multiplexer

Relay marking
1 Type of relay.

Controls
6 Setting modification button.
7 Enter button.
8 Test/reset button.
9 Right arrow.
10 Down arrow.

Indications
2 Pre-alarm LED.
3 Alarm LED.
4 Digital display (3 digits) for measurements and settings.
5 Unit LEDs for current measurements and settings.
11 LEDs indicating displayed settings (pre-alarm current, pre-alarm time delay, alarm current, alarm time delay).
12 LEDs indicating the type of measurement (leakage current, leakage current as percentage of fault threshold or maximum leakage current measured since last reset).
13 Number(s) of concerned channel(s).

<table>
<thead>
<tr>
<th>LEDs</th>
<th>Concerned channel(s)</th>
<th>Measurement LEDs</th>
<th>Digital display (3 digits)</th>
<th>Setting LEDs</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>pre-al.</td>
<td>alarm</td>
<td>I, % (I ∆n), max</td>
<td>units</td>
<td>I pre-al., I pre-al. (s), I alarm, t alarm (s)</td>
<td></td>
</tr>
<tr>
<td>● ●</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>●</td>
<td>30</td>
<td>●</td>
<td>Normal operation</td>
</tr>
<tr>
<td>●</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>No voltage or device not in service</td>
</tr>
<tr>
<td>● ● ●</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>●</td>
<td>80</td>
<td>●</td>
<td>Pre-alarm threshold overrun on one channel</td>
</tr>
<tr>
<td>● ● ●</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>Pre-alarm threshold overrun on a number of channels</td>
</tr>
<tr>
<td>● ● ●</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>●</td>
<td>100</td>
<td>●</td>
<td>Alarm threshold overrun on one channel</td>
</tr>
<tr>
<td>● ● ●</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>Alarm threshold overrun on a number of channels</td>
</tr>
<tr>
<td>● ● ●</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>●</td>
<td>888</td>
<td>●</td>
<td>In test mode, check on the LEDs and display</td>
</tr>
<tr>
<td>●</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>●</td>
<td>TOR</td>
<td>●</td>
<td>Relay/sensor link fault</td>
</tr>
<tr>
<td>●</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>●</td>
<td>Er, Er0, Er1</td>
<td>●</td>
<td>Malfunction detected</td>
</tr>
<tr>
<td>●</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>●</td>
<td>Er2</td>
<td>●</td>
<td>RMH/RM12T link fault</td>
</tr>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>SAT</td>
<td>Leakage current greater than 60 A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>Adr</td>
<td>Connection via internal bus: channel to be addressed flashes No connection via internal bus: message disappears after 30 s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>●</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>●</td>
<td>OFF</td>
<td>●</td>
<td>Alarm-display memory reset</td>
</tr>
<tr>
<td>●</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>●</td>
<td>On</td>
<td>●</td>
<td>Test without actuation of the alarm and pre-alarm output contacts</td>
</tr>
<tr>
<td>●</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>●</td>
<td></td>
<td>●</td>
<td>Test with actuation of the alarm and pre-alarm output contacts</td>
</tr>
</tbody>
</table>

(1) In red.

Key:
● off
● green (or red)
● flashing
● flashing display.
Description
RMH relay and RM12T multiplexer (cont.)

**RMH connection**
All connections for front-panel mount relays are of the plug-in type.
- 14 Pre-alarm contact.
- 15 Voltage-presence contact.
- 16 Supply.
- 17 RM12T multiplexer.
- 18 Communication bus.
- 19 Alarm contact.

**RM12T multiplexer connection**
- 20 Sensors (12 measurement channels).
- 21 RMH relay.
- 22 Supply.
Vigirex RHU and RMH relays integrate perfectly in the SMS PowerLogic power management system by communicating with Digipact protocols. A communication interface is available for other networks:
- Modbus
- Profibus
- Ethernet, etc.

RHU and RMH relays are equipped for communication via an internal bus to enable remote management via the DC150 data concentrator.
Overview of functions

Communication is the means to:
- identify the device
- indicate status conditions (read)
- control the device (write)
- set up the protection and alarms (read and write)
- analyse the instantaneous and maximum residual currents to assist operation and maintenance (read).

The system transmits data (bits or words).
The information is transmitted:
- in real time
- periodically
- on request.

Note: a complete description of the communication system and the protocol are provided in the manual for the DC150 data concentrator.

<table>
<thead>
<tr>
<th>Remote control</th>
<th>RHU</th>
<th>RMH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Device identification</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Address set by the DC150</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td><strong>Status indications</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RHU alarm / RMH pre-alarm</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>RHU fault / RMH alarm</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td><strong>Controls</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test with actuation of the output contacts</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Test without actuation of the output contacts</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Output-contact reset following a fault</td>
<td>■</td>
<td>-</td>
</tr>
<tr>
<td>Alarm-display memory reset</td>
<td>-</td>
<td>■</td>
</tr>
<tr>
<td><strong>Protection settings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I pre-alarm threshold</td>
<td>-</td>
<td>■</td>
</tr>
<tr>
<td>Pre-alarm time delay</td>
<td>-</td>
<td>■</td>
</tr>
<tr>
<td>Alarm threshold</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Alarm time delay</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Fault threshold</td>
<td>■</td>
<td>-</td>
</tr>
<tr>
<td>Fault time delay</td>
<td>■</td>
<td>-</td>
</tr>
<tr>
<td><strong>Operating and maintenance aids</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leakage current</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Leakage current as percentage of fault threshold</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Maximum leakage current</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Fault readings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malfunction detected</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>RMH/RM12T link fault</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Saturation of fault-current measurements</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Sensor link fault</td>
<td>■</td>
<td>■</td>
</tr>
</tbody>
</table>
Functions and characteristics

Description (cont.)

Sensors

Compatibility with toroids
Vigirex RH10, RH21, RH99, RHU and RMH relays may be used with the following sensors:
- closed or split toroids (A, OA type)
- E type toroids (existing installations):
  - TE (Ø30 mm) and PE (Ø50 mm): total compatibility
  - IE (Ø80 mm), ME (Ø120 mm) and SE (Ø200 mm): the Vigirex sensitivity must be set to a value ≥ 300 mA.

Adaptation to installations
- closed toroids are suitable for new installations up to 630 A. Certain toroids may be mounted on DIN rails, plates or brackets, clipped onto the Vigirex relay or tied to the cables (see page 433E3100.fm/49)
- split toroids facilitate installation in existing systems up to 400 A and may be installed on plates or brackets
- rectangular sensors are for busbars in installations with currents ≤ 4000 A.

Compatibility with rectangular sensors
The RH10, RH21, RH99 relays may be used with rectangular sensors 280 x 115 mm and 470 x 160 mm. The Vigirex sensitivity must be set to ≥ 500 mA.

Withstand capacity for high residual-current faults
Tests guarantee accurate measurements after a high phase-sequence current flowing through the toroid during a short-circuit between a phase and the PE conductor.

Temperature ranges
- the temperature range for toroid operation is:
  - A and OA type toroids: -35° C / +70° C
  - rectangular sensors: -35° C / +80° C
- the temperature range for toroid storage is:
  - A and OA type toroids: -55° C / +85° C
  - rectangular sensors: -55° C / +100° C