INSULATION MONITORING DEVICES

RI
INSULATION MONITORING DEVICES
Continuous monitoring of IT systems from photovoltaic to industrial applications

HRI
MEDICAL INSULATION MONITORING DEVICES
Technology and safety in hospital segment

contrel elettronica
To ensure the operational continuity of an electrical system, IEC 60364-4-41 Standard “Low-voltage electrical installations – Protection for safety – Protection against electric shock” requires the system protection from direct and indirect contacts, according to the methods shown in the table. Among all the protection methods identified by the Standard, only IT distribution systems can guarantee greater operational continuity in case of a first fault to earth: in these systems, the circuit-breaker will not trip because the fault current is limited by the high insulation impedance. The IT distribution systems shall avoid the loss of production and ill service that power supply interruption could cause. The first fault to earth should be immediately recovered, because a second fault to earth would cause the tripping of the protection devices (miniature circuit-breakers or residual current circuit-breakers), interrupting the power supply. The Standard requires the installation of an insulation monitoring device to signal the first fault, in order to avoid a second fault that could compromise the required operational continuity. RI range performs continuous monitoring of IT systems insulation, in order to prevent any faults that may reduce operational continuity and, as a result, the efficiency of the system.

OPERATIONAL CONTINUITY
When installed in an IT network, the insulation monitoring device continuously controls insulation. In case of first fault, it gives warning about the first fault in order to recover it before the miniature circuit breakers interrupt the power supply.

FAULT PREVENTION
RI gives warning when insulation drops below a set value, preventing greater damages to the network.

GREATER EFFICIENCY
Thanks to TRIP and ALARM thresholds the fault can be managed even before it actually occurs, therefore preventing service interruption. In addition, the unit can be tested and reset remotely by means of a pushbutton.

360° MONITORING
RI range controls a wide variety of IT systems, providing protection to photovoltaic installations, industrial installations, supervision systems, data centers and other applications.

CUTTING MAINTENANCE COSTS AND INEFFICIENCIES
Thanks to a continuous and timely monitoring of the system, scheduled maintenance operations can be reduced together with overhead costs.

IMMEDIATE INSTALLATION
Quick fixing thanks to 35 mm DIN rail mounting. The front microswitches are preset on the most commonly used settings.
RI INSULATION MONITORING DEVICES
TECHNICAL FEATURES

AC/DC NETWORKS
RI-F48 | RI-R48 | RI-R48N
IT NETWORKS INSULATION CONTROL 24-48 VAC/DC

DC NETWORKS
RI-R11 | RI-R11D
IT NETWORKS INSULATION CONTROL 110-230 VCC
RI-R15
IT NETWORKS INSULATION CONTROL 600 VDC

AC NETWORKS
RI-F22 | RI-R22
IT NETWORKS INSULATION CONTROL 230 VAC
RI-R38
IT NETWORKS INSULATION CONTROL 440 VAC
RI-R44
IT NETWORKS INSULATION CONTROL 440 VAC, LCD DISPLAY, RS485
RI-R60
IT NETWORKS INSULATION CONTROL 760 VAC

VOLTAGE LESS NETWORKS
RI-SM
VOLTAGELESS NETWORK INSULATION CONTROL
RI-SM485
VOLTAGELESS NETWORK INSULATION CONTROL, RS485

ADAPTER
ARI-R15
IT NETWORKS INSULATION CONTROL 1000 VDC
ARI-R60
IT NETWORKS INSULATION CONTROL 1000 VAC

HRI MEDICAL INSULATION MONITORING DEVICES

HRI-R40
MEDICAL INSULATION MONITORING DEVICE
HRI-R24
MEDICAL INSULATION MONITORING DEVICES FOR SCIALITIC LAMPS
PR-5
REMOTE SIGNALLING PANEL
RMS-24
MULTIROOM MONITORING SYSTEM AND REMOTE MANAGEMENT
**RI - INSULATION MONITORING DEVICES**

**RI** range performs continuous of IT systems insulation, in order to prevent any faults that may reduce operational continuity and, as a result, the efficiency of the system. Allows monitoring and protection in the most demanding application environments.

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<th>DC NETWORKS</th>
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<td>RI-F48</td>
<td>RI-R48</td>
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<td>Technical Characteristics</td>
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<td>Controlled network voltage</td>
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<td>24-48 VAC/DC</td>
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<td>-10 – 60 ºC</td>
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<td>Storage temperature</td>
<td>-20 – 80 ºC</td>
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<td>Max terminal section</td>
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<tr>
<td>Protection degree</td>
<td>IP40 on front</td>
<td>IP20 housing</td>
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<tr>
<td>Insulation test</td>
<td>2.5 kV 60 sec</td>
<td>4 kV imp 1.2/50 μs</td>
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<td>Modules</td>
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<td>Weight</td>
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<td>Standards</td>
<td>EN 61010-1, EN 61557-8, EN 61326-1</td>
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## TECHNICAL FEATURES

### PLANTY OF BENEFITS
- Operational continuity
- Fault prevention
- Greater efficiency
- 360° monitoring
- Cutting maintenance costs and inefficiencies
- Immediate installation

### APPLICATIONS
- Refineries
- Iron, steel and petrochemical companies
- Photovoltaic systems
- Data centers, movie sets, TV or radio installations
- Fire-fighting pumps, safety circuits, UPS
- Elevator control systems
- Mobile generators

### AC NETWORKS

<table>
<thead>
<tr>
<th></th>
<th>RI-F22</th>
<th>RI-R22</th>
<th>RI-R38</th>
<th>RI-R44</th>
<th>RI-R44-V-485</th>
<th>RI-R60</th>
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<td>440 VAC</td>
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<td>IP40 on front</td>
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<td>IP20 housing</td>
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<td>2.5 kV 60 sec</td>
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<td>3 kV 60 sec</td>
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EN 61010-1, EN 61557-8, EN 61326-1
RI-F48 | RI-R48 | RI-R48N
IT NETWORKS INSULATION CONTROL 24-48 VAC/DC

General Characteristics

These devices allow the insulation monitoring to earth of electric networks in alternate and direct current 24-48 VAC/DC isolated (IT systems). These devices measure the potential variation of two polarity on earth reference, to signal when the insulation decreasing under a fixed value. Auxiliary supply is taken from under-control network. On the frontal panel there is the signaling of device ON, a TEST and a RESET (versions RI-R48 and RI-R48N) pushbuttons and LEDs to the signaling of tripping (TRIP) and to indicate the polarity (version RI-R48N) of the line under control that has low insulation. The TRIP threshold is regulated by micro-switches (versions RI-R48 and RI-R48N). It’s available a changeover contact relay to use the low insulation signaling in a remote panel.

Features

- INSULATION MONITORING OF IT SYSTEMS 24-48 VAC/DC
- TRIP MANUAL RESET (VERSIONS RI-R48 AND RI-R48N)
- LOW INSULATION LED
- DAMAGED POLE LED (VERSION RI-R48N)
- TEST PUSHDUTTON
- TRIP THRESHOLD SETTING (VERSIONS RI-R48 AND RI-R48N)

Technical characteristics

<table>
<thead>
<tr>
<th>Controlled network voltage</th>
<th>24-48 VAC/DC</th>
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<tbody>
<tr>
<td>Power consumption</td>
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<tr>
<td>ALARM Threshold setting</td>
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<tr>
<td>TRIP Threshold setting</td>
<td>10÷60 kΩ (version RI-R48 and version RI-R48N) 100 kΩ (version RI-F48)</td>
</tr>
<tr>
<td>Tripping delay</td>
<td>&lt; 5 sec</td>
</tr>
<tr>
<td>Max measuring current</td>
<td>0.5 mA</td>
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<tr>
<td>Max measuring voltage</td>
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<tr>
<td>Internal impedance</td>
<td>50 kΩ</td>
</tr>
<tr>
<td>TRIP Relay number NO-C-NC</td>
<td>1</td>
</tr>
<tr>
<td>ALARM Relay number NO-C-NC</td>
<td>-</td>
</tr>
<tr>
<td>Max relay contact capacity</td>
<td>250V - 5A</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-10 – 60 °C</td>
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<td>Storage temperature</td>
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<td>Relative humidity</td>
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<td>Max terminal section</td>
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<tr>
<td>Protection degree</td>
<td>IP40 front</td>
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<tr>
<td>Insulation test</td>
<td>2.5 kV 60 sec. / 4 kV imp 1.2/50 μs</td>
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<td>Modules</td>
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<td>Weight</td>
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<td>Standards</td>
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ORDER CODE | VERSION | Vaux | DESCRIPTION | CONTROLLED NETWORK VOLTAGE | MODULES |
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<td>RI-F48</td>
<td>TRIP threshold fixed 100 kΩ</td>
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<tr>
<td>RI-R48</td>
<td>TRIP threshold adjustment</td>
<td>24-48 VAC/DC</td>
<td>IT networks insulation control 24-48 VAC/DC</td>
<td>24-48 VAC/DC</td>
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<tr>
<td>RI-R48N</td>
<td>TRIP threshold adjustment Damaged pole LED</td>
<td>24-48 VAC/DC</td>
<td>IT networks insulation control 24-48 VAC/DC</td>
<td>24-48 VAC/DC</td>
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</table>
**Operators**

**Wiring diagrams**

**Mechanical dimensions (mm)**
The RI-R11-115 and RI-R11-230 devices allow the permanent insulation monitoring to earth of electric networks in direct current isolated (IT systems). Insulation resistance monitoring is carried out measuring the potential variation of two polarity on ground reference. Auxiliary supply is taken from under-control network. The threshold of trip is regulated by a series of micro-switches. On the frontal panel there is the signaling of device ON, a TEST and a RESET push-buttons and three red LED to signal the tripping (TRIP) and to indicate the polarity of the line under control that has low insulation. It’s available a changeover contact relay to use the low insulation signaling in a remote panel.

### Features

- **INSULATION MONITORING OF IT SYSTEMS UP TO 230 VDC**
- **TRIP AND ALARM LED**
- **INSULATION LEVEL**
- **DAMAGED POLE LED**
- **TRIP AND ALARM THRESHOLD SETTING**
- **TEST AND RESET PUSHBUTTON**

### Technical characteristics

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<th>Controlled network voltage</th>
<th>100-144 VDC (version RI-R11 115) 230 VDC (version RI-R11 230)</th>
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<td>Max relay contact capacity</td>
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<td>Max terminal section</td>
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<td>Protection degree</td>
<td>IP40 front</td>
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<tr>
<td>Insulation test</td>
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### ORDER CODE

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<td>ALARM and TRIP threshold setting, Damaged pole LED</td>
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<td>IT networks insulation control 115 VDC</td>
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<td>80-180 VDC</td>
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<td>RI-R11 230</td>
<td>ALARM and TRIP threshold setting, Damaged pole LED</td>
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<td>RI-R11D 230</td>
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**RI-R11 | RI-R11D**

**IT NETWORKS INSULATION CONTROL 110-230 VCC**

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**Operators**

- **INDICATION OF FUNCTIONING INSTRUMENT**
- **TEST PUSHDUTTON**
- **RESET PUSHDUTTON**
- **ALARM THRESHOLD SETTING**

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**Wiring diagrams**

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**Mechanical dimensions** (mm)

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INDICATION OF FUNCTIONING INSTRUMENT
- **TRIP LED**
- **ALARM LED**
- **DAMAGED POLE LED**
- **INSULATION LEVEL**
- **TRIP THRESHOLD SETTING**

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**Operators**

1. **19 20 21 22 23 24 25 26 27**
2. **28 29 30 31 32 33 34 35 36**

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**Wiring diagrams**

---

**Mechanical dimensions** (mm)

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RI-R15
IT NETWORKS INSULATION CONTROL 600 VDC

General Characteristics

The RI-R15 device allows the permanent insulation monitoring to earth of electric networks in direct current isolated (IT systems). Insulation resistance monitoring is carried out measuring the potential variation of two polarity on ground reference. Auxiliary supply is taken from under-control network.

The threshold of trip is regulated by a frontal potentiometer. On the frontal panel there is the signaling of device ON, and three red LED to signal the tripping (TRIP) and to indicate the polarity of the line under control that has low insulation. It’s available a changeover contact relay to use the low insulation signaling in a remote panel. The relay can be set as FAIL SAFE function. On front panel there are a TEST and a RESET push-buttons.

The test can be activated locally while the reset can be set in automatic or manual, with local or external push-button.

Features

INSULATION MONITORING OF IT SYSTEMS UP TO 600 VDC

WIDE TRIPPING THRESHOLD ADJUSTMENT

FAIL SAFE RELAY FOR TIMELY MONITORING, EVEN IN CASE OF SUPPLY FAILURE

TEST AND RESET CAN BE REMOTELY OPERATED BY A PUSHBUTTON

VISUAL INDICATION OF THE NETWORK STATUS AND INDICATION OF THE FAULTY POLARITY

Technical characteristics

<table>
<thead>
<tr>
<th>Controlled network voltage</th>
<th>280-340 VDC (version RI-R15 300) 400-600 VDC (version RI-R15 500)</th>
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<td>Power consumption</td>
<td>6 VA</td>
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<td>ALARM threshold setting</td>
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<tr>
<td>TRIP threshold setting</td>
<td>30÷300 kΩ</td>
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<tr>
<td>Tripping delay</td>
<td>&lt; 5 sec</td>
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<tr>
<td>Max measuring current</td>
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</tr>
<tr>
<td>Max measuring voltage</td>
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<tr>
<td>Internal impedance</td>
<td>450 kΩ L/PE</td>
</tr>
<tr>
<td>TRIP Relay number NO-C-NC</td>
<td>1</td>
</tr>
<tr>
<td>ALARM Relay number NO-C-NC</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max relay contact capacity</th>
<th>250V - 5A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>-10 ÷ 60 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20 ÷ 80 °C</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>≈ 95%</td>
</tr>
<tr>
<td>Max terminal section</td>
<td>2.5 mm²</td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP40 front</td>
</tr>
<tr>
<td>Insulation test</td>
<td>2.5 kV 60 sec. / 4 kV imp 1.2/50 μs</td>
</tr>
<tr>
<td>Modules</td>
<td>6</td>
</tr>
<tr>
<td>Weight</td>
<td>400 g</td>
</tr>
<tr>
<td>Standards</td>
<td>EN 61010-1, EN 61557-8, EN 61326-1</td>
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ORDER CODE | VERSION | Vaux | DESCRIPTION | CONTROLLED NETWORK VOLTAGE | MODULES |
<table>
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<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RI-R15 300</td>
<td>TRIP threshold adjustment, damaged pole LED</td>
<td>280-340 VDC</td>
<td>IT networks insulation control 340 VDC</td>
<td>280-340 VDC</td>
<td>6</td>
</tr>
<tr>
<td>RI-R15 500</td>
<td>TRIP threshold adjustment, damaged pole LED</td>
<td>400-600 VDC</td>
<td>IT networks insulation control 600 VDC</td>
<td>400-600 VDC</td>
<td>6</td>
</tr>
<tr>
<td>RI-R15 1000</td>
<td>TRIP threshold adjustment, damaged pole LED</td>
<td>600-1000 VDC</td>
<td>IT networks insulation control 1000 VDC (with ARI-R15 adapter)</td>
<td>600-1000 VDC</td>
<td>6</td>
</tr>
</tbody>
</table>
RI-R15
IT NETWORKS INSULATION CONTROL 600 VDC

Operators

- Damaged Pole LED
- Trip
- Threshold Adjustment
- LED

Wiring diagrams

- Insulation monitor relay RI-R15
- DAMAGED POLE LED
- INDICATION OF FUNCTIONING INSTRUMENT
- TEST PUSHBUTTON
- RESET PUSHBUTTON

Mechanical dimensions (mm)

- Insulated Network VDC
- Load
- 50
- 105

INSULATION MONITORING DEVICES | 9
**RI-F22 | RI-R22**

**IT NETWORKS INSULATION CONTROL 230 VAC**

---

### General Characteristics

These devices allow the insulation monitoring to earth of electric networks in alternate current up to 230 VAC isolated (IT systems). Insulation resistance monitoring is carried out applying a measure’s signaling in direct-current between isolated network and heart. Surveying electric leakage set up on earth it’s possible to measure insulation level. It’s available a changeover contact relay to use the low insulation signaling in a remote panel. On frontal panel, devices have signal for activity ON, for TRIP (low insulation), a test button. The TRIP threshold is fixed to 100 kΩ (version RI-F22), or can be regulate by a frontal potentiometer (version RI-R22).

### Features

- **INSULATION MONITORING UP TO 230 VAC**
- **RESET PUSHBUTTON (ONLY FOR RI-R22)**
- **INDICATION OF FUNCTIONING INSTRUMENT**
- **LOW INSULATION LED**
- **TEST PUSHBUTTON**
- **TRIP THRESHOLD SETTING (ONLY FOR RI-R22)**

### Technical characteristics

<table>
<thead>
<tr>
<th>Controlled network voltage</th>
<th>230 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>3 VA</td>
</tr>
<tr>
<td>ALARM threshold setting</td>
<td>-</td>
</tr>
<tr>
<td>TRIP threshold setting</td>
<td>100 kΩ (RI-F22)</td>
</tr>
<tr>
<td>Tripping delay</td>
<td>&lt; 5 sec</td>
</tr>
<tr>
<td>Max measuring current</td>
<td>0.1 mA</td>
</tr>
<tr>
<td>Max measuring voltage</td>
<td>12 VDC</td>
</tr>
<tr>
<td>Internal impedance</td>
<td>250 kΩ</td>
</tr>
</tbody>
</table>

- **Max relay contact capacity** 250V - 5A
- **Operating temperature** -10 – 60 °C
- **Storage temperature** -20 – 80 °C
- **Relative humidity** ≤ 95%
- **Max terminal section** 4 mm²
- **Protection degree** IP40 front | IP20 housing
- **Insulation test** 2.5 kV 60 sec | 4 kV imp 1.2/50 μs
- **Modules** 3
- **Weight** 200 g
- **Standards** EN 61010-1, EN 61557-8, EN 61326-1

### ORDER CODE

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<thead>
<tr>
<th>CODE</th>
<th>VERSION</th>
<th>VAux</th>
<th>DESCRIPTION</th>
<th>CONTROLLED NETWORK VOLTAGE</th>
<th>MODULES</th>
</tr>
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<tbody>
<tr>
<td>RI-F22 115</td>
<td>ALARM and TRIP threshold setting, damaged pole LED</td>
<td>115 VAC</td>
<td>IT networks insulation control 230 VAC</td>
<td>220-240 VAC</td>
<td>3</td>
</tr>
<tr>
<td>RI-F22 230</td>
<td>ALARM and TRIP threshold setting, damaged pole LED, insulation level display</td>
<td>230 VAC</td>
<td>IT networks insulation control 230 VAC</td>
<td>220-240 VAC</td>
<td>3</td>
</tr>
<tr>
<td>RI-R22 24</td>
<td>ALARM and TRIP threshold setting, damaged pole LED</td>
<td>24 VDC</td>
<td>IT networks insulation control 230 VAC</td>
<td>220-240 VAC</td>
<td>3</td>
</tr>
<tr>
<td>RI-R22 115</td>
<td>ALARM and TRIP threshold setting, damaged pole LED, insulation level display</td>
<td>115 VAC</td>
<td>IT networks insulation control 230 VAC</td>
<td>220-240 VAC</td>
<td>3</td>
</tr>
<tr>
<td>RI-R22 230</td>
<td>ALARM and TRIP threshold setting, damaged pole LED, insulation level display</td>
<td>230 VAC</td>
<td>IT networks insulation control 230 VAC</td>
<td>220-240 VAC</td>
<td>3</td>
</tr>
<tr>
<td>RI-R22 1000</td>
<td>ALARM and TRIP threshold setting, damaged pole LED, insulation level display</td>
<td>115 or 230 VCA</td>
<td>IT networks insulation control 1000 VAC (with ADAPTER)</td>
<td>max 1000 VAC</td>
<td>3</td>
</tr>
</tbody>
</table>
RI-F22 | RI-R22
IT NETWORKS INSULATION CONTROL 230 VAC

--- Operators ---

**Operators**

- **Test Pushbutton**
- **Trip LED**
- **Indication of Functioning Instrument**

--- Wiring diagrams ---

**Wiring diagrams**

--- Mechanical dimensions (mm) ---

**Mechanical dimensions**

- **Max 230 V L-N**
- **LOAD**
- **PE**
- **Vaux**
- **Vaux Control**
- **Vaux Test**
- **Vaux Reset**
- **Vaux Pushbutton**

--- Dimensions ---

- **52.5 mm**
- **52.5 mm**
- **64 mm**
- **68 mm**
RI-R38
IT NETWORKS INSULATION CONTROL 440 VAC

General Characteristics

The RI-R38 is a device that allows to control the insulation to earth in alternating neutral networks up to 440 VAC (IT systems). Putting a continuous component measure signal between the insulated line and earth it’s possible to control the insulation resistance reading the dispersion current generated to earth.

On the frontal panel of RI-R38 there is the signaling of device ON, the signaling of tripping TRIP (low insulation), a test and a reset push-buttons and a series of micro-switches to regulated the threshold of trip.

It’s available a changeover contact relay to use the low insulation signaling in a remote panel.

Features

- INSULATION MONITORING UP TO 440 VAC
- RESET PUSHBUTTON
- INDICATION OF FUNCTIONING INSTRUMENT
- LOW INSULATION LED
- TEST PUSHBUTTON
- TRIP THRESHOLD SETTING

Technical characteristics

<table>
<thead>
<tr>
<th>Controlled network voltage</th>
<th>380-415 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>3 VA</td>
</tr>
<tr>
<td>ALARM threshold setting</td>
<td>-</td>
</tr>
<tr>
<td>TRIP threshold setting</td>
<td>10÷150 kΩ</td>
</tr>
<tr>
<td>Tripping delay</td>
<td>&lt; 5 sec</td>
</tr>
<tr>
<td>Max measuring current</td>
<td>0.1 mA</td>
</tr>
<tr>
<td>Max measuring voltage</td>
<td>12 VDC</td>
</tr>
<tr>
<td>Internal impedance</td>
<td>250 kΩ</td>
</tr>
<tr>
<td>TRIP Relay number NO-C-NC</td>
<td>1</td>
</tr>
<tr>
<td>ALARM Relay number NO-C-NC</td>
<td>-</td>
</tr>
</tbody>
</table>

Max relay contact capacity 250V - 5A
Operating temperature -10 – 60 °C
Storage temperature -20 – 80 °C
Relative humidity ≤ 95%
Max terminal section 4 mm²
Protection degree IP40 front | IP20 housing
Insulation test 2.5 kV 60 sec | 4 kV imp 1.2/50 μs
Modules 3
Weight 200 g
Standards EN 61010-1, EN 61557-8, EN 61326-1

ORDER CODE | VERSION | Vaux | DESCRIPTION | CONTROLLED NETWORK VOLTAGE | MODULES
--- | --- | --- | --- | --- | ---
RI-R38 115 | TRIP threshold adjustment | 115 VAC | IT networks insulation control 440 VAC | 380-415 VAC | 3
RI-R38 230 | TRIP threshold adjustment | 230 VAC | IT networks insulation control 440 VAC | 380-415 VAC | 3
RI-R38 1000 | TRIP threshold adjustment | 115 or 230 VCA | IT networks insulation control 1000 VAC (with ADAPTER) | max 1000 VCA | 3
RI-R38
IT NETWORKS INSULATION CONTROL 440 VAC

Operators

Wiring diagrams

Mechanical dimensions (mm)
RI-R44 is a device that allows the insulation monitoring to earth of AC networks up to 440V isolated (IT systems). By applying a DC component measure signal between the insulated line and earth it's possible to control the insulation resistance by detecting the generated leakage current.

Thanks to the LCD display, the device allows the visualization of the instantaneous insulation value. Configurable automatic or manual resetting. It has a TRIP changeover contact configurable normally de-energised or energised.

The RI-R44 is also provided with a RS-485 interface with Modbus protocol to consent the integration in supervision systems.

### Features

**INSULATION MONITORING OF IT SYSTEMS UP TO 440 VAC**

**LCD DISPLAY** (Alarm or prealarm indicating events)

**LOW INSULATION LED**

**CONFIGURABLE AUTOMATIC OR MANUAL RESETTING**

**TEST PUSHBUTTON**

**TRIP THRESHOLD SETTING**

**TRIP OUTPUT RELAY**

**RS485 SERIAL INTERFACE (MODBUS RTU)**

---

**General Characteristics**

Instantaneous display

LCD display that enables quick alarm viewing of the insulation value. Incorporates illuminated status change for instantaneous detection of the status of the installation.

---

**Technical characteristics**

<table>
<thead>
<tr>
<th>Controlled network voltage</th>
<th>440 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>2 VA</td>
</tr>
<tr>
<td>ALARM threshold setting</td>
<td>-</td>
</tr>
<tr>
<td>TRIP threshold setting</td>
<td>1÷300 kΩ</td>
</tr>
<tr>
<td>Tripping delay</td>
<td>&lt; 2.5 sec</td>
</tr>
<tr>
<td>Max measuring current</td>
<td>0.015 mA</td>
</tr>
<tr>
<td>Max measuring voltage</td>
<td>13 VDC</td>
</tr>
<tr>
<td>Internal impedance</td>
<td>1.5 MΩ for DC</td>
</tr>
<tr>
<td>TRIP Relay number NO-C-NC</td>
<td>1</td>
</tr>
<tr>
<td>ALARM Relay number NO-C-NC</td>
<td>-</td>
</tr>
</tbody>
</table>

Max relay contact capacity: 250V - 5A

Operating temperature: -10 – 60 °C

Storage temperature: -20 – 80 °C

Relative humidity: ≤ 95%

Max terminal section: 2.5 mm²

Protection degree: IP40 front | IP20 housing

Insulation test: 2.5 kV 60 sec | 4 kV imp 1.2/50 μs

Modules: 2

Weight: 200 g

Standards: EN 61010-1, EN 61557-8, EN 61326-1

---

**ORDER CODE**

<table>
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<tr>
<th>ORDER CODE</th>
<th>VERSION</th>
<th>VAUX</th>
<th>DESCRIPTION</th>
<th>CONTROLLED NETWORK VOLTAGE</th>
<th>MODULES</th>
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<tbody>
<tr>
<td>RI-R44</td>
<td>TRIP threshold adjustment</td>
<td>230 VAC</td>
<td>IT networks insulation control 440 VAC</td>
<td>440 VAC</td>
<td>2</td>
</tr>
<tr>
<td>RI-R44-485</td>
<td>TRIP threshold adjustment, RS485 serial interface</td>
<td>230 VAC</td>
<td>IT networks insulation control 440 VAC</td>
<td>440 VAC</td>
<td>2</td>
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<tr>
<td>RI-R44-V</td>
<td>TRIP threshold adjustment, LCD display</td>
<td>230 VAC</td>
<td>IT networks insulation control 440 VAC</td>
<td>440 VAC</td>
<td>2</td>
</tr>
<tr>
<td>RI-R44-V-485</td>
<td>TRIP threshold adjustment, LCD display, RS485 serial interface</td>
<td>230 VAC</td>
<td>IT networks insulation control 440 VAC</td>
<td>440 VAC</td>
<td>2</td>
</tr>
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</table>
RI-R44
IT NETWORKS INSULATION CONTROL 440 VAC
LCD DISPLAY, RS485

Operators

Wiring diagrams

Mechanical dimensions (mm)
RI-R60 is a device that allows to control the insulation to earth in alternating neutral networks up to 760 V (IT systems).

Putting a continuous component measure signal between the insulated line and earth it’s possible to control the insulation resistance reading the dispersion current generated to earth.

These devices have two trip thresholds (ALARM and TRIP) adjustable using the frontal micro-switches to signal when the insulation go under the threshold level.

The frontal LED signaling the trip. Two free voltage changeover contacts relays allow the remote trip signaling. The relays can be programmed with the fail safe (normally excited).

The device is supplied on the front panel of a TEST and a RESET push-buttons. The test can be activated thanks to the push-button on the device or to external push-button while the reset that can be set in manual or in automatic and activated, as the test, with the local or remote push-button.

The level of the insulation resistance is displayed on the bar LED on the front panel.

---

**General Characteristics**

RI-R60 is a device that allows to control the insulation to earth in alternating neutral networks up to 760 V (IT systems).

Putting a continuous component measure signal between the insulated line and earth it’s possible to control the insulation resistance reading the dispersion current generated to earth.

These devices have two trip thresholds (ALARM and TRIP) adjustable using the frontal micro-switches to signal when the insulation go under the threshold level.

The frontal LED signaling the trip. Two free voltage changeover contacts relays allow the remote trip signaling. The relays can be programmed with the fail safe (normally excited).

The device is supplied on the front panel of a TEST and a RESET push-buttons. The test can be activated thanks to the push-button on the device or to external push-button while the reset that can be set in manual or in automatic and activated, as the test, with the local or remote push-button.

The level of the insulation resistance is displayed on the bar LED on the front panel.

---

**Features**

- INSULATION MONITORING UP TO 1000 VAC
- DOUBLE MONITORING THRESHOLD FOR MORE EFFECTIVE FAULT PREVENTION
- FAIL SAFE DOUBLE RELAY FOR EFFECTIVE SYSTEM CONTROL AND TIMELY MONITORING, EVEN IN CASE OF SUPPLY FAILURE
- INSTANT DISPLAY OF INSULATION LEVEL
- TEST AND RESET CAN BE REMOTELY OPERATED BY A PUSHBUTTON
- VISUAL INDICATION OF THE NETWORK STATUS

---

**Technical characteristics**

<table>
<thead>
<tr>
<th>Controlled network voltage</th>
<th>500-760 VAC</th>
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</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>5</td>
</tr>
<tr>
<td>ALARM threshold setting</td>
<td>30–300 kΩ</td>
</tr>
<tr>
<td>TRIP threshold setting</td>
<td>10–100 kΩ</td>
</tr>
<tr>
<td>Tripping delay</td>
<td>&lt; 5 sec</td>
</tr>
<tr>
<td>Max measuring current</td>
<td>0.240 mA</td>
</tr>
<tr>
<td>Max measuring voltage</td>
<td>48 VDC</td>
</tr>
<tr>
<td>Internal impedance</td>
<td>200 kΩ</td>
</tr>
<tr>
<td>TRIP Relay number NO-C-NC</td>
<td>1</td>
</tr>
<tr>
<td>ALARM Relay number NO-C-NC</td>
<td>1</td>
</tr>
<tr>
<td>Max relay contact capacity</td>
<td>250V - 5A</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-10 – 60 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20 – 80 °C</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>≤ 95%</td>
</tr>
<tr>
<td>Max terminal section</td>
<td>2.5 mm²</td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP40 front</td>
</tr>
<tr>
<td></td>
<td>IP20 housing</td>
</tr>
<tr>
<td>Insulation test</td>
<td>3 kV 60 sec. / 4 kV imp 1.2/50 μs</td>
</tr>
<tr>
<td>Modules</td>
<td>6</td>
</tr>
<tr>
<td>Weight</td>
<td>500 g</td>
</tr>
<tr>
<td>Standards</td>
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<th>CONTROLLED NETWORK VOLTAGE</th>
<th>MODULES</th>
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</thead>
<tbody>
<tr>
<td>RI-R60</td>
<td>ALARM and TRIP threshold setting, insulation level display</td>
<td>110-230 VAC</td>
<td>IT networks insulation control up to 760 VAC</td>
<td>500-760 VAC</td>
<td>6</td>
</tr>
<tr>
<td>RI-R60 1000</td>
<td>ALARM and TRIP threshold setting, insulation level display</td>
<td>110-230 VAC</td>
<td>IT networks insulation control up to 1000 VAC (with ARI-R60 adapter)</td>
<td>1000 VAC</td>
<td>6</td>
</tr>
</tbody>
</table>
RI-R60
IT NETWORKS INSULATION CONTROL 760 VAC

--- Operators

TEST PUSHBUTTON
RESET PUSHBUTTON
ALARM THRESHOLD SETTINGS
TRIP THRESHOLD SETTING

--- Wiring diagrams

Vaux *

19 20 21 22 23 24 25 26 27
18 20 21 22 23 24 25 26 27
115 V

--- Mechanical dimensions (mm)

Max 230 V L-N

* In case of non-accessible neutral, connect terminal 22 to the L1
RI-SM
VOLTAGELESS NETWORK INSULATION CONTROL

General Characteristics

The RI-SM allows insulation monitoring to earth of out-voltage networks. This device must carry-out a preventive check of the insulation level for out-voltage devices, not used permanently, in the way to avoid damage when they start to function (ex. fire-engines, lift, etc.).

Insulation resistance’s monitoring is carried out applying a measure’s signaling in direct current component between out-voltage isolated network and earth.

Surveying leakage current to earth it’s possible to measure the insulation’s level.

The instrument is useful for networks and devices from 20 to 700 VAC/DC. A changeover contact relay is available to signal the low insulation to a remote panel.

On front panel there is the signaling of device ON, the signaling of TRIP for low insulation, the TEST push-button and the micro-switches to select the tripping threshold and FAIL SAFE function.

The RESET of the device is automatic when the condition of low insulation disappears.

The device must be connected to the network to survey using a normally closet contact in the way to disconnect from the network when it’s turning on.

The output relay can be used to signal the alarm or to avoid the insertion of the load.

Features

INDICATION OF FUNCTIONING INSTRUMENT
TEST PUSHBUTTON
LOW INSULATION LED
FAIL SAFE SETTING
TRIP THRESHOLD SETTING

Technical characteristics

<table>
<thead>
<tr>
<th>Power consumption</th>
<th>3 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALARM threshold setting</td>
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<tr>
<td>TRIP threshold setting</td>
<td>0.1÷1000 kΩ</td>
</tr>
<tr>
<td>Tripping delay</td>
<td>&lt; 5 sec</td>
</tr>
<tr>
<td>Max measuring current</td>
<td>0.015 mA</td>
</tr>
<tr>
<td>Max measuring voltage</td>
<td>20 VDC</td>
</tr>
<tr>
<td>Internal impedance</td>
<td>1.5 MΩ DC</td>
</tr>
<tr>
<td>TRIP Relay number NO-C-NC</td>
<td>1</td>
</tr>
<tr>
<td>ALARM Relay number NO-C-NC</td>
<td>-</td>
</tr>
<tr>
<td>Max relay contact capacity</td>
<td>250V - 5A</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-10 – 60 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20 – 80 °C</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>≤ 95%</td>
</tr>
<tr>
<td>Max terminal section</td>
<td>4 mm²</td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP40 front</td>
</tr>
<tr>
<td>Insulation test</td>
<td>2.5 kV 60 sec</td>
</tr>
<tr>
<td>Modules</td>
<td>3</td>
</tr>
<tr>
<td>Weight</td>
<td>200 g</td>
</tr>
<tr>
<td>Standards</td>
<td>EN 61010-1, EN 61557-8, EN 61326-1</td>
</tr>
</tbody>
</table>

ORDER CODE | VERSION | VAUX | DESCRIPTION | MODULES |
<table>
<thead>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RI-SM 24</td>
<td>TRIP threshold setting, FAIL SAFE setting</td>
<td>24 VDC</td>
<td>Voltageless networks insulation control</td>
<td>3</td>
</tr>
<tr>
<td>RI-SM 115</td>
<td>TRIP threshold setting, FAIL SAFE setting</td>
<td>115 VAC</td>
<td>Voltageless networks insulation control</td>
<td>3</td>
</tr>
<tr>
<td>RI-SM 230</td>
<td>TRIP threshold setting, FAIL SAFE setting</td>
<td>230 VAC</td>
<td>Voltageless networks insulation control</td>
<td>3</td>
</tr>
</tbody>
</table>
RI-SM

VOLTAGELESS NETWORK INSULATION CONTROL

--- Operators ---

**INDICATION OF FUNCTIONING INSTRUMENT**

**TRIP THRESHOLD SETTING**

**TEST PUSHBUTTON**

--- Wiring diagrams ---

**V aux**

Max 230 V L-N

* In case of non-accessible neutral, connect terminal 5 to the L3

--- Mechanical dimensions (mm) ---

52.5

68

45

64

58

68
The devices allow insulation monitoring to earth of out-voltage networks in order to carry out a preventive monitoring on insulation level of device. Preventive monitoring is really important in case of applications which are not used permanently (for example: motors, fire-engines, and so on). In these applications, humidity and condensate can cause a serious decrease in insulation’s level and obstruct correct functioning at the moment of application’s activation. Insulation resistance’s monitoring is carried out applying a measure’s signaling in direct-current component between isolated network and earth. Surveying leakage current to earth it’s possible to measure insulation’s level. A very compact housing allows you to place the RI-SM485 in small spaces, optimizing the layout of the installation.

The RI-SM485 is also provided with a RS-485 interface with Modbus protocol to consent the integration in supervision systems.

### Features

**INDICATION OF FUNCTIONING INSTRUMENT**

- TEST PUSHBUTTON
- LOW INSULATION LED
- FAIL SAFE SETTING
- TRIP THRESHOLD SETTING
- OUTPUT RELAY
- RS485 SERIAL INTERFACE (MODBUS RTU)

### Technical characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>2 VA</td>
</tr>
<tr>
<td>ALARM threshold setting</td>
<td>-</td>
</tr>
<tr>
<td>TRIP threshold setting</td>
<td>0.1–1500 kΩ</td>
</tr>
<tr>
<td>Tripping delay</td>
<td>&lt; 2.5 sec</td>
</tr>
<tr>
<td>Max measuring current</td>
<td>0.015 mA</td>
</tr>
<tr>
<td>Max measuring voltage</td>
<td>13 VDC</td>
</tr>
<tr>
<td>Internal impedance</td>
<td>1.5 MΩ DC</td>
</tr>
<tr>
<td>TRIP Relay number NO-C-NC</td>
<td>1</td>
</tr>
<tr>
<td>ALARM Relay number NO-C-NC</td>
<td>-</td>
</tr>
<tr>
<td>Max relay contact capacity</td>
<td>250 V – 5 A</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-10 – 60 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20 – 80 °C</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>≤ 95%</td>
</tr>
<tr>
<td>Max terminal section</td>
<td>2.5 mm²</td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP40 front</td>
</tr>
<tr>
<td>Insulation test</td>
<td>2.5 kV 60 sec</td>
</tr>
<tr>
<td>Modules</td>
<td>2</td>
</tr>
<tr>
<td>Weight</td>
<td>200 g</td>
</tr>
<tr>
<td>Standards</td>
<td>EN 61010-1, EN 61557-8, EN 61326-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ORDER CODE</th>
<th>VERSION</th>
<th>Vaux</th>
<th>DESCRIPTION</th>
<th>MODULES</th>
</tr>
</thead>
<tbody>
<tr>
<td>RI-SM-485</td>
<td>TRIP threshold setting, FAIL SAFE setting, RS485 serial interface</td>
<td>230 VAC</td>
<td>Voltageless networks insulation control</td>
<td>2</td>
</tr>
</tbody>
</table>
RI-SM485
VOLTAGELESS NETWORKS INSULATION CONTROL, RS485

Operators

- Trip threshold setting
- Fail-safe setting
- Auto-reset/Manual reset
- RS485 serial speed setting
- RS485 serial node address setting
- Indication of functioning instrument
- LED indicators
- Test pushbutton
- Reset pushbutton

Wiring diagrams

Mechanical dimensions (mm)
**General Characteristics**

ARI-R15 ALLOWS INSULATION MONITORING UP TO 1000 VDC.

THE EXTERNAL ADAPTER ARI-R15 MUST BE USED ONLY WITH RI-R15 1000.

THIS ADAPTER MUST BE POSITIONED BETWEEN THE NETWORK TO CONTROL AND THE DEVICE RI-R15 1000.

---

**Mechanical dimensions (mm)**

---

**Wiring diagrams**

---

ISOLED NETWORK Vdc (MAX 700 / 800 / 900 / 1000 V)
**General Characteristics**

ARI-R60 ALLOWS INSULATION MONITORING UP TO 1000 VAC.

THE EXTERNAL ADAPTER ARI-R60 MUST BE USED ONLY WITH RI-R60. THIS ADAPTER MUST BE POSITIONED BETWEEN THE NETWORK TO CONTROL AND THE DEVICE RI-R60.

**Mechanical dimensions (mm)**

**Wiring diagrams**

In case of non-accessible neutral, connect terminal 22 to the L1 phase conductor.
**MEDICAL INSULATION MONITORING DEVICE**

Technology and safety in hospital segment

**HRI medical insulation monitoring** device assuring patients and medical staff safety in intensive care units, operating theatres, first aid and day hospital premises, ambulatoires, nursing homes, dentist’s and vet’s.

**QUALITY**
The recognized standard in hospital insulation control.

**SPECIALIZATION**
Properly designed for hospitals.

**COMPLETENESS**
All electrical and thermal parameters controlled by a single device.

**FLEXIBILITY**
Adjustable intervention thresholds according to all the parameters monitored.

**RELIABILITY**
Safe monitoring under any operational condition, thanks to the codified signal.

**INTEGRATION**
Able to interact with supervising systems through modbus-rtu protocol via rs485 serial port.

**CONTROL**
Complete control of any alarm signalled thanks to the programmable relay.
**HRI-R40**

**MEDICAL INSULATION MONITORING DEVICE**

---

### General Characteristics

**QUALITY**

The recognized standard in hospital insulation control.

**SPECIALIZATION**

Properly designed for hospitals.

**COMPLETENESS**

All electrical and thermal parameters controlled by a single device.

**FLEXIBILITY**

Adjustable intervention thresholds according to all the parameters monitored. Alarms sent up to 4 medical locations attended by medical and healthy staff, thanks to remote signalling panels.

**STRENGTH**

High resistance to network interferences.

**INTEGRATION**

Able to interact with supervising systems through Modbus RTU protocol via RS485 serial port.

**RELIABILITY**

Safe monitoring under any operational condition, thanks to the codified signal.

---

### Features

**FUNCTIONING PRINCIPLE**

Insulation resistance is measured by applying a direct current signal between insulated line and earth and determining the dispersion current generated. Effective measurement is granted thanks to a digital filter integrated in the device even if interferences and harmonic components occur.

**PROGRAMMING**

Through its LCD display and four selection keys, the device offers easy programming possibilities by setting intervention thresholds without making any mistakes.

**COMPLETE MONITORING OF ALL ELECTRICAL PARAMETERS**

HRI-R40 tests the thermal and electrical overload of the medical insulation transformer, managing two temperature thresholds coming from both PT100 and PTC probes. By controlling temperature, the overload of the transformer can be monitored and the automatic circuit-breaker downstream of the secondary can be avoided. All faulty conditions are remotely controlled thanks to PR-5 remote signalling panels, granting a proper prompt technical supervision.

**SELF-TESTING SYSTEM**

Error-Link Fail system checks device proper functioning and controls wiring presence and properness at the end of the terminal blocks: it prevents the possibility to operate in group 2 medical locations when the insulation monitoring device is disconnected.

**FOR HIGHER SAFETY**

Thanks to a codified signal, the HRI-R40 IT networks insulation monitoring device grants absolute reliability of measurement in any operational condition, even if high network interferences occur. Furthermore, it is fitted with a RS485 serial port through which it can be perfectly integrated with communication systems such as PLC/PC by using ModbusRTU protocol. The measurement of network maximum and minimum values enables a wider monitoring and an easier plant checking in case of any fault. Finally, the programmable output relay allows to manage any warning condition signalled in a dedicated way.

HRI-R40 measures the insulation to earth in IT-M network and the thermal and electrical overload of the insulation transformer, in accordance with the international standards: EN 61557-8, IEC EN 64-8/7-710 and UNE 20615.

---

### ORDER CODE

<table>
<thead>
<tr>
<th>ORDER CODE</th>
<th>VERSION</th>
<th>VAUX</th>
<th>DESCRIPTION</th>
<th>CONTROLLED NETWORK VOLTAGE</th>
<th>MODULES</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRI-R40</td>
<td>TRIP threshold setting, 2 temperature sensors, digit display, output relay</td>
<td>110-230 VAC</td>
<td>-</td>
<td>24-230 VAC</td>
<td>6</td>
</tr>
<tr>
<td>HRI-R40-485</td>
<td>TRIP threshold setting, 2 temperature sensors, digit display, output relay, RS485 serial interface</td>
<td>110-230 VAC</td>
<td>-</td>
<td>24-230 VAC</td>
<td>6</td>
</tr>
<tr>
<td>HRI-R40W-485</td>
<td>TRIP threshold setting, 2 temperature sensors, digit display, output relay, RS485 serial interface</td>
<td>110-230 VAC</td>
<td>( * )</td>
<td>24-230 VAC</td>
<td>6</td>
</tr>
</tbody>
</table>

( * ) Use a direct-current component control signal in order to reduce the problems generated by the presence of direct current components in the line. The device is fitted with a digital filter capable to identify the direct current component present in the line.
Wherever it is necessary to guarantee safety and operational continuity and prevent power supply interruptions, such as hospitals and other medical locations, insulation transformers and devices detecting and signalling any first fault to earth have to be used. Risks arising from the use of a traditional insulation monitor:

- **IMPOSSIBILITY TO DISTINGUISH BETWEEN INTERFERENCE AND REAL FAULT**
- **CARELESSNESS OF THE MEDICAL STAFF**
- **UNJUSTIFIED INTERVENTION OF SPECIALIZED TECHNICAL STAFF**

HRI-R40 is the device for insulation monitoring in IT-M networks. It ensures absolute reliability of measurement by means of a codified signal able to detect interferences generated by common equipment in operating theatres and avoid unwanted alarms signalling.

**Mechanical dimensions (mm)**

![Mechanical Dimensions Diagram](image-url)
### Technical characteristics

**Supply voltage** | 110 - 230 V/50-60 Hz
---|---
**Network voltage to be controlled** | 24 – 230 VAC
**Maximum voltage measurement** | 24 V
**Maximum current measurement** | 1 mA
**Insulation voltage** | 2.5 kV/60 seconds
**Control signal type** | Continuous component with digital filter

**Measures**
- Insulation measurement range 0–999 kΩ/HIGH – resolution 1 kΩ
- Temperature measurement by R0 PT100 or 2/3-wire thermal-probe – 0–250°C, accuracy 2%
- Impedance measurement 0–999 kΩ/HIGH – resolution 1 kΩ (test signal 2500 Hz)

**Intervention threshold**
- Low insulation 50–500 kΩ, accuracy 5%, hysteresis 5%, settable delay
- Overtemperature 0 – 200°C, accuracy 2%
- Current overload 1 – 999 A, accuracy 2%
- Low impedance (deactivable)
- Device not connected to the line (Error/Link-Fail)

**Available outputs**
- Programmable auxiliary relay output NA-C-NC, 5A, 250 VAC
- RS 485 serial output, standard ModbusRTU protocol

**Displays**
- Insulation resistance value signalling over full scale and fault to earth
- Measured temperature value 0 – 200°C for channel 1
- Measured temperature value 0 – 200°C for channel 2
- Measured current value 0 – 999 A
- Insulation impedance value

**Connections**
- Maximum linkable section 2.5 mm²
- Operating temperature -10...60 °C
- Storage temperature -25...70 °C, humidity < 90%
- Overall dimensions 6 DIN modules

**Weight**
- 0.5 kg

**Housing**
- Self-extinguishing plastic case to be assembled on 35 mm DIN rail, with transparent lead-sealable protective front cover

**Degree of protection**
- IP20

**Self-consumption**
- 5 VA

**Reference standards**
- IEC EN 60364-7-710, IEC EN 61557-8, EN 60255-6, UNE 20615

### Wiring diagrams

**Wiring diagrams**

![Wiring Diagram](image-url)
**HRI-R24**

**MEDICAL INSULATION MONITORING DEVICES FOR SCIALITIC LAMPS**

---

**General Characteristics**

**HRI-R24** tests the insulation to earth of 24 VAC/DC circuits dedicated to scialitic lamps supply. Scialitic lamps insulation is to be monitored in order to prevent detaching from conductors when being moved. The conductors, by contact with the metal structure of the lamp, may transfer a potential of over 250 V, resulting in damage to equipment and people. **HRI-R24** measures the variation in potential of the two network polarities with reference to earth in order to signal when insulation drops below a set value, through the frontal potentiometer, identifying. The output signal can be connected to PR-5 remote signalling panel. The frontal panel of the device carries test and reset pushbutton, status indicator and TRIP LED for low insulation signalling.

---

**Features**

**Tests the insulation to earth of 24 VAC/DC circuits dedicated to scialitic lamps supply**

**Flexibility:** Programmable alarm threshold

**Compact size:** Fits into just 3 modules

**Practicality:** Extremely easy to install and use

**Integration:** Ideal complement for HRI-R4

---

**Technical characteristics**

**Network voltage and auxiliary supply**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>50-60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum self-consumption</td>
<td>3 VA</td>
</tr>
<tr>
<td>Maximum measurement current</td>
<td>0.5 mA</td>
</tr>
<tr>
<td>Internal impedance</td>
<td>50 kΩ</td>
</tr>
<tr>
<td>Intervention threshold</td>
<td>10 - 50 kΩ (4 levels)</td>
</tr>
<tr>
<td>Intervention delay</td>
<td>1 s</td>
</tr>
<tr>
<td>Signals</td>
<td>LED ON, LED TRIP</td>
</tr>
<tr>
<td>Output</td>
<td>Maximum 24 V 1 A</td>
</tr>
<tr>
<td>Remote signalling panels</td>
<td>Maximum 2 PR-5</td>
</tr>
</tbody>
</table>

**Operating temperature**

| -10 – 60 °C |

**Storage temperature**

| -20 – 70 °C |

**Relative humidity**

| ≤ 95% |

**Insulation test**

| 2.5 kV 60 s / 4 kV imp. 1.2/50 μs |

**Terminal blocks section**

| 4 mm² |

**Degree of protection**

| Front IP40 with cover / IP20 case |

**Modules**

| 3 |

**Weight**

| 200 g |

**Reference standards**

| EN 61010-1; IEC EN 60364-7-710; EN 61326-1 |

---

**ORDER CODE**

<table>
<thead>
<tr>
<th>VERSION</th>
<th>VAUX</th>
<th>CONTROLLED NETWORK VOLTAGE</th>
<th>MODULES</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRI-R24</td>
<td>TRIP threshold adjustment, TEST pushbutton</td>
<td>24 VAC/DC</td>
<td>24 VAC/DC</td>
</tr>
</tbody>
</table>
**HRI-R24**

**MEDICAL INSULATION MONITORING DEVICES FOR SCIALITIC LAMPS**

---

**Frontal operators functioning**

- TRIP LED
- LOW INSULATION LED

- TRIP
- THRESHOLD ADJUSTMENT

- GREEN LED, ON AUXILIARY RELAY STATUS

- TEST PUSHBUTTON

---

**Wiring diagrams**

- **HRI-R24**
- **REMOTE PANEL PR5**

---

**Mechanical dimensions (mm)**

- 65
- 52.5
- 64
- 58
PR-5
REMOTE SIGNALLING PANEL

---

**General Characteristics**

PR-5 remote signalling panel enables to send alarm signals from the insulation monitoring devices to all the medical locations attended by medical staff, as laid down by reference standards. PR-5 panel provides an acoustic and luminous signal in case of low insulation or thermal and electrical overload. Moreover, it is provided with a TEST pushbutton to periodically check its operating status and a pushbutton for disconnecting the acoustic signal. It is assembled in universal 3-modules flush-mounted boxes.

---

**Features**

**COMPACT SIZE**

**EASY TO INSTALL:** INSTALLATION IN A UNIVERSAL 3-MODULE FLUSH-MOUNTED BOX TYPE E503, IN HORIZONTAL OR VERTICAL POSITION

**RELIABILITY:** PROMPT FAULT RECOGNITION

**COMFORT:** SIMULTANEOUS DISCONNECTION OF MORE SIGNALLING PANELS

**OPERATIONAL EFFICIENCY:** BOTH VISUAL AND ACOUSTIC SIGNALLING

---

**Technical characteristics**

<table>
<thead>
<tr>
<th>Features</th>
<th>Weight</th>
<th>Operating temperature</th>
<th>Storage temperature</th>
<th>Insulation test</th>
<th>Terminal blocks section</th>
<th>Reference standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green LED NETWORK: Red LED overload ALARM</td>
<td>200 g</td>
<td>-10 °C – 60 °C, max. humidity 95%</td>
<td>-20 °C – 80 °C</td>
<td>2.500 V rms 50 Hz for 60 s</td>
<td>0.35 mm² (300 m max)</td>
<td>IEC-EN 61010-1, IEC EN 61557-8, IEC EN 60364-7-710, UNE 20615, IEC EN 61326-1</td>
</tr>
<tr>
<td>Yellow LED FAULT ALARM: Low insulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acoustic signaler: Emission 2400 Hz, Intermittence 2 Hz dB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Frontal operators functioning**

**TEST PUSHBUTTON**

**MUTE PUSHBUTTON**

---

**Mechanical dimensions (mm)**

<table>
<thead>
<tr>
<th>ORDER CODE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR-5</td>
<td>TEST and RESET pushbuttons, overload and fault LED</td>
</tr>
</tbody>
</table>

---

**Signals**

Green LED NETWORK: Red LED overload ALARM; Yellow LED FAULT ALARM; Low insulation; Acoustic signaler; Emission 2400 Hz; Intermittence 2 Hz dB

**Pushbuttons**

Testing (TEST), acoustic disconnection (MUTE)

**Terminal blocks section**

2.5 mm²

**Degree of protection**

IP 30

**Installation**

E503 universal 3-module flush-mounted box
RMS-24
MULTIROOM MONITORING SYSTEM AND REMOTE MANAGEMENT

General Characteristics

The RMS-24 data concentrator is a device that extends the potential of HRI-R40 family, providing a data collector function together with a supervision interface.

Features

- TFT color display 320x240 pixels
- Flush-mount, standard 96x96mm housing
- Visualization and setting through 6 keys
- Built-in buzzer
- Two built-in RS485 interface
- Ethernet interface (optional)
- Easy and fast navigation
- Texts customization by frontal keyboard
- Events storage and management
- Advanced programmable I/O functions
- Programming from front panel
- Password protection for settings

Technical characteristics

**AUXILIARY SUPPLY**
- Rated voltage: 90 – 250 VAC | 20 – 60 VAC/DC
- Frequency: 45 – 65 Hz
- Power consumption/dissipation: ≤10W / ≤3W

**RS485 SERIAL INTERFACE COM1**
- Baud-rate: Programmable 9600 – 38400 bps

**RS485 SERIAL INTERFACE COM2 - OPTIONAL**
- Baud-rate: Programmable 9600 – 38400 bps
- Protocol supported: Modbus RTU

**ETHERNET INTERFACE - OPTIONAL**
- Network Interface: RJ45 Ethernet 10BASE-T or 100BASE-TX (auto-sensing)
- Protocol supported: Modbus TCP

**DIGITAL OUTPUTS**
- Number of outputs: 2
- Type: Solid state (Photo-MOS)
- Solid state output rating: 10–300VDC / 12–250VAC

**DISPLAY**
- Display type: TFT color

**Format**
- 320x240 pixel

**INSULATION**
- Insulation voltage: 3.7kV for 1 minute

**HOUSING**
- Mounting: Flush mount
- Dimension L x H: 96 x 96 x 100 mm
- Cutout: 92 x 92 mm
- Protection degree: IP52 on front | IP20 housing
- Weight: 450g

**AMBIENT CONDITIONS**
- Operating temperature: -10...+50 °C
- Storage temperature: -15...+70 °C
- Relative humidity: 5...90%

**COMPLIANCE**
- Reference standards: EN 50081-1; EN50082-2; EN 61010-1
RMS-24
MULTIROOM MONITORING SYSTEM AND REMOTE MANAGEMENT

---

**Operators**

**FUNCTIONS OF THE DATA CONCATRATOR**
The RMS-24 can manage up to a maximum of 24 devices for insulation monitoring, called HR01...24, each with the possibility to associate with a medical location. For each insulation monitor it is possible to define the following characteristics:
- Medical location alphanumerical description
- Insulation monitor alphanumerical description
- Alarm management on exceeding threshold
- Alarm logger enable
- Buzzer built-in enable

**MEDICAL LOCATION ALPHANUMERICAL DESCRIPTION**
Free string with a max length of 16 characters that describes the medical location where the insulation monitors will be installed.
Example: Intensive care

**ALARM MANAGEMENT ON EXCEEDING THRESHOLD**
If required, it is possible to enable one or two digital outputs to exceed the thresholds.

**COMPLETE MONITORING OF ALL ELECTRICAL PARAMETERS**
Free string with a max length of 16 characters that describes the insulation monitor. This string will be shown as the title of the page that views the measures and thresholds of insulation monitor.
Example: Bed 1

**ALARM LOGGER ENABLE**
For each measure collected from insulation monitors it’s possible to store:
- Measure’s alarm threshold exceeded
- The return of the measure of threshold parameter

Every record is marked with a time stamp taken from the real-time clock of built-in. When the memory is full, the user can choose to stop the recording (STOP mode) or to continue overwriting the oldest records (LOOP mode).

**BUZZER BUILT-IN ENABLE**
If required, when exceeding the alarm threshold, you can activate the built-in buzzer. You can choose the type of continuous sound (FIX mode) or alternating (DISCONTINUOUS mode).

---

**Mechanical dimensions (mm)**

**DISPLAY**
96

**TFT COLOR**
96

**DISPLAY**
80.5

**OPERATORS**
RMS-24
RMS-24

**ESC KEY**
Used to exit from visualization and settings menu

**ENTER KEY**
Used to confirm a choice and to switch between visualization modes

**USED TO SCROLL THROUGH SUB-PAGES AND LOG VISUALIZATION PAGES**

**Used to switch between medical locations setting, to select among possible choices and to modify settings (increment/decrement)**

---

**Mechanical dimensions**

**Mechanical dimensions (mm)**

**Mechanical dimensions (mm)**

---

**Mechanical dimensions**

---

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RMS-24
MULTIROOM MONITORING SYSTEM AND REMOTE MANAGEMENT

Wiring diagrams

SURGICAL AMBULATORS

example connections

CONTROL ROOM
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