



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



INSULATION MONITORING DEVICE

Continuous monitoring of IT systems from photovoltaic to industrial applications

ENSURING OPERATIONAL CONTINUITY

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.

PLENTY OF BENEFITS

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.

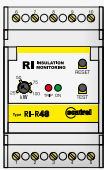
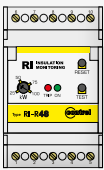

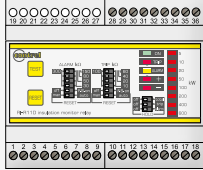
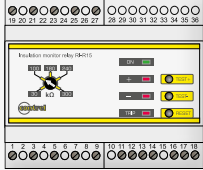


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RI - INSULATION MONITORING DEVICES

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.

TYPE	AC NETWORKS			DC NETWORKS	
	RI-F48	RI-R48	RI-R48N	RI-R11 RI-R11D	RI-R15
Technical Characteristics					
Controlled network voltage	24-48 VAC/DC	24-48 VAC/DC	24-48 VAC/DC	100-144 VDC version RI-R11 115 230 VDC version RI-R11 230	280-340 VDC version RI-R15 300 400-600 VDC version RI-R15 500 1000 VDC (1000 VDC with ADAPTER)
Power consumption	3 VA	3 VA	3 VA	4 VA	6 VA
ALARM threshold setting	-	-	-	30÷300 kΩ	-
TRIP threshold setting	10÷60 kΩ	10÷60 kΩ	10÷60 kΩ	10÷100 kΩ	30÷300 kΩ
Tripping delay	< 5 sec			< 5 sec	
Max measuring current	0.5 mA	0.5 mA	0.5 mA	1.8 mA	1.5 mA
Max measuring voltage	-	-	-	-	-
Internal impedance	50 kΩ	50 kΩ	50 kΩ	100 kΩ L/PE version RI-R11 115 200 kΩ L/PE version RI-R11 230	450 L/PE kΩ
TRIP Relay number NO-C-NC	1	1	1	2	1
ALARM Relay number NO-C-NC	-	-	-	2	-
Max relay contact capacity	250V - 5A			250V - 5A	
RS485 Serial Interface	-	-	-	-	-
Operating temperature	-10 ÷ 60 °C			-10 ÷ 60 °C	
Storage temperature	-20 ÷ 80 °C			-20 ÷ 80 °C	
Relative humidity	≤95%			≤95%	
Max terminal section	4 mm ²	4 mm ²	4 mm ²	2.5 mm ²	2.5 mm ²
Protection degree	IP40 on front IP20 housing			IP40 on front IP20 housing	
Insulation test	2.5 kV 60 sec 4 kV imp 1.2/50 μs			2.5 kV 60 sec 4 kV imp 1.2/50 μs	
Modules	3	3	3	6	6
Weight	200 g	200 g	200 g	400 g	400 g
Standards	EN 61010-1, EN 61557-8, EN 61326-1				

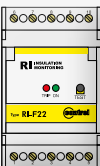
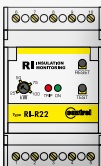
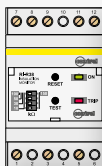
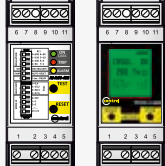
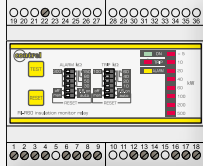


TECHNICAL FEATURES

PLANTY OF BENEFITS

- OPERATIONAL CONTINUITY
- FAULT PREVENTION
- GREATER EFFICIENCY
- 360° MONITORING
- CUTTING MAINTENANCE COSTS AND INEFFICIENCIES
- IMMEDIATE INSTALLATION

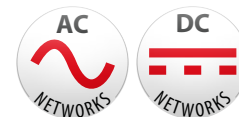
APPLICATIONS

- 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					VOLTAGE LESS NETWORKS	
RI-F22	RI-R22	RI-R38	RI-R44 RI-R44-V-485	RI-R60	RI-SM	RI-SM-485
						
230 VAC	230 VAC	440 VAC	440 VAC	500-760 VAC 1000 VAC with ADAPTER	-	-
3 VA	3 VA	3 VA	2 VA	5 VA	3 VA	2 VA
-	-	-	-	30÷300 kΩ	-	-
100 kΩ	100 kΩ	10÷150 kΩ	1÷300 kΩ	10÷100 kΩ	100÷10000 kΩ	100÷15000 kΩ
< 5 sec	< 5 sec	< 2.5 sec	< 3 sec	< 5 sec	< 2.5 sec	< 3 sec
0.1 mA	0.1 mA	0.1 mA	0.015 mA	0.240 mA	0.015 mA	0.015 mA
12 VAC	12 VAC	12 VAC	13 VAC	48 VAC	20 VDC	13 VDC
250 kΩ	250 kΩ	250 kΩ	1500 kΩ dc 1000 kΩ ac	200 kΩ	1500 kΩ dc 1000 kΩ ac	1500 kΩ dc 1000 kΩ ac
1	1	1	1	1	1	1
-	-	-	-	1	-	-
250V - 5A					250V - 5A	
-	-	-	Modbus RTU	-	-	Modbus RTU
-10 ÷ 60 °C					-10 ÷ 60 °C	
-20 ÷ 80 °C					-20 ÷ 80 °C	
≤95%					≤95%	
4 mm ²	4 mm ²	4 mm ²	2.5 mm ²	2.5 mm ²	4 mm ²	2.5 mm ²
IP40 on front IP20 housing					IP40 on front IP20 housing	
2.5 kV 60 sec 4 kV imp 1.2/50 μs				3 kV 60 sec 4 kV imp 1.2/50 μs	2.5 kV 60 sec 4 kV imp 1.2/50 μs	
3	3	3	2	6	3	2
200 g	200 g	200 g	200 g	500 g	200 g	200 g
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 PUSHBUTTON

TRIP THRESHOLD SETTING (VERSIONS RI-R48 AND RI-R48N)

Technical characteristics

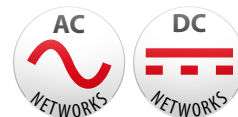
Controlled network voltage	24-48 VAC/DC
Power consumption	3 VA
ALARM threshold setting	-
TRIP threshold setting	10÷60 k Ω (version RI-R48 and version RI-R48N) 100k Ω (version RI-F48)
Tripping delay	< 5 sec
Max measuring current	0.5 mA
Max measuring voltage	-
Internal impedance	50 k Ω
TRIP Relay number NO-C-NC	1
ALARM Relay number NO-C-NC	-

Max relay contact capacity	250V - 5A
Operating temperature	-10 ÷ 60 °C
Storage temperature	-20 ÷ 80 °C
Relative humidity	≤95%
Max terminal section	4 mm ²
Protection degree	IP40 front IP20 housing
Insulation test	2.5 kV 60 sec. / 4 kV imp 1.2/50 μ s
Modules	3
Weight	200 g
Standards	EN 61010-1, EN 61557-8, EN 61326-1

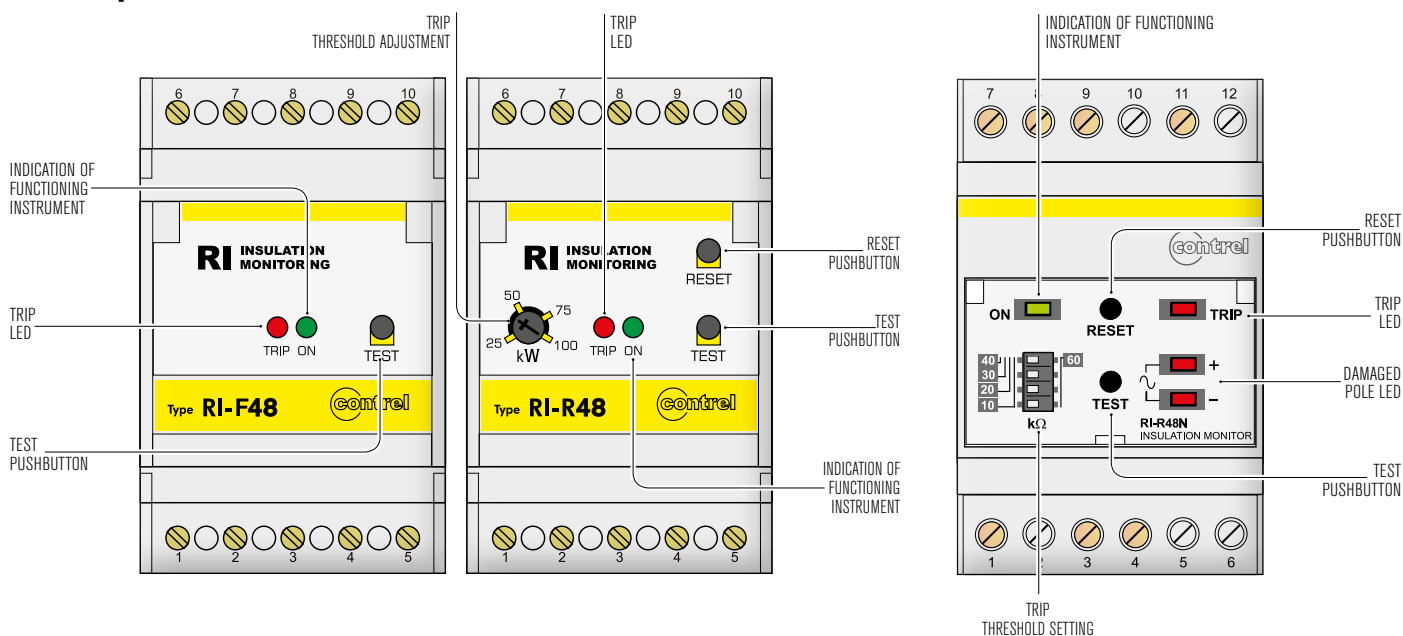
ORDER CODE	VERSION	Vaux	DESCRIPTION	CONTROLLED NETWORK VOLTAGE	MODULES
RI-F48	TRIP threshold fixed 100k Ω	24-48 VAC/DC	IT networks insulation control 24-48 VAC/DC	24-48 VAC/DC	3
RI-R48	TRIP threshold adjustment	24-48 VAC/DC	IT networks insulation control 24-48 VAC/DC	24-48 VAC/DC	3
RI-R48N	TRIP threshold adjustment Damaged pole LED	24-48 VAC/DC	IT networks insulation control 24-48 VAC/DC	24-48 VAC/DC	3

RI-F48 | RI-R48 | RI-R48N

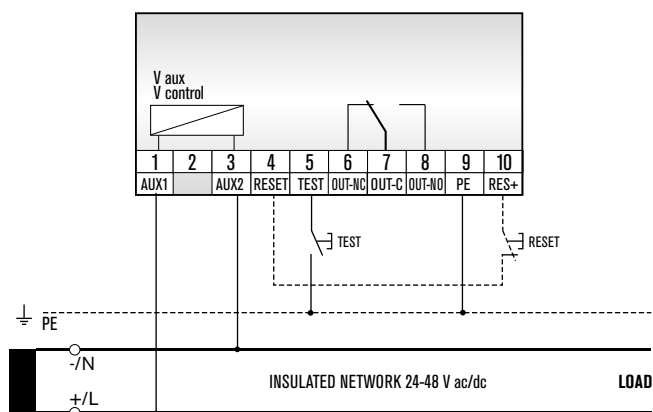
IT NETWORKS INSULATION CONTROL 24-48 VAC/DC



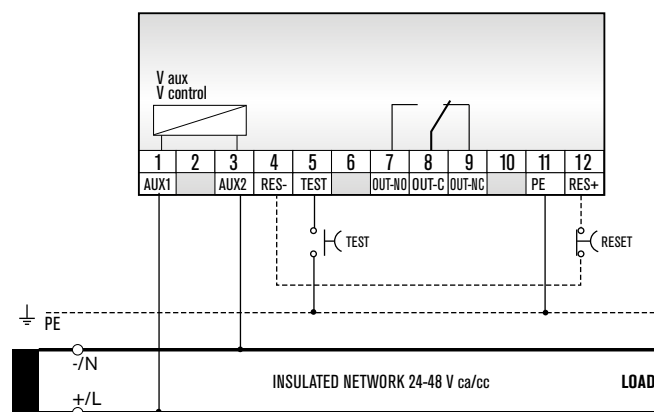
Operators



Wiring diagrams

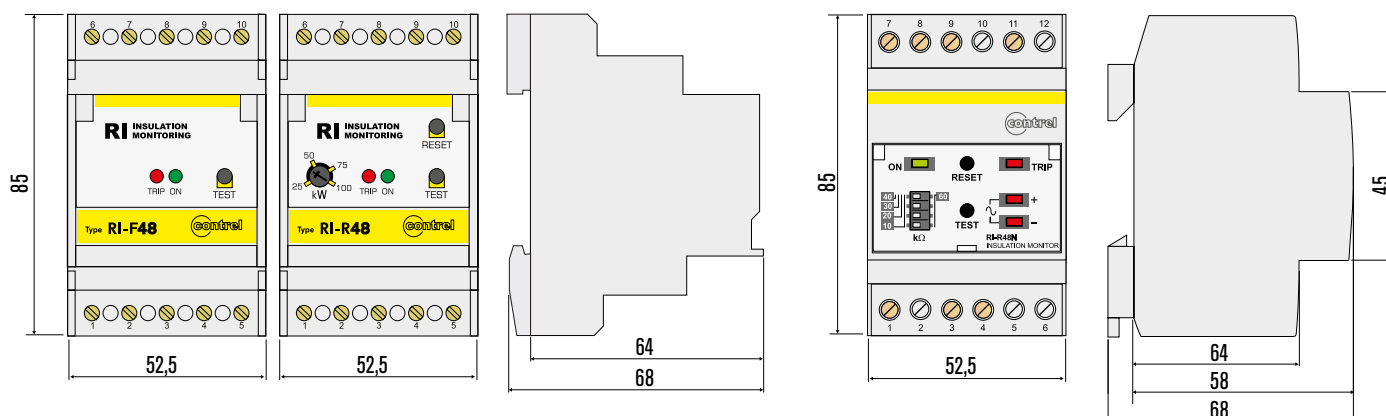


RI-F48 | RI-R48



RI-R48N

Mechanical dimensions (mm)



General Characteristics



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

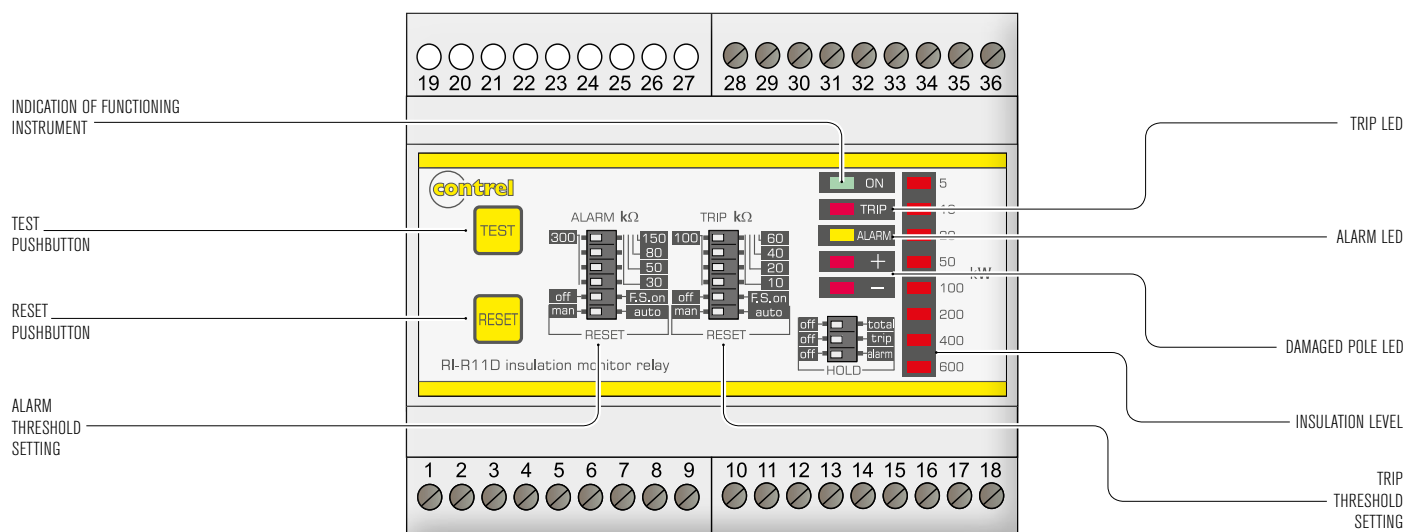
Technical characteristics

Controlled network voltage	100-144 VDC (version RI-R11 115) 230 VDC (version RI-R11 230)
Power consumption	4 VA
ALARM threshold setting	30÷300 kΩ
TRIP threshold setting	10÷100 kΩ
Tripping delay	< 5 sec
Max measuring current	1.8 mA
Max measuring voltage	-
Internal impedance	100 kΩ L/PE 200 kΩ L/PE
TRIP Relay number NO-C-NC	2
ALARM Relay number NO-C-NC	2

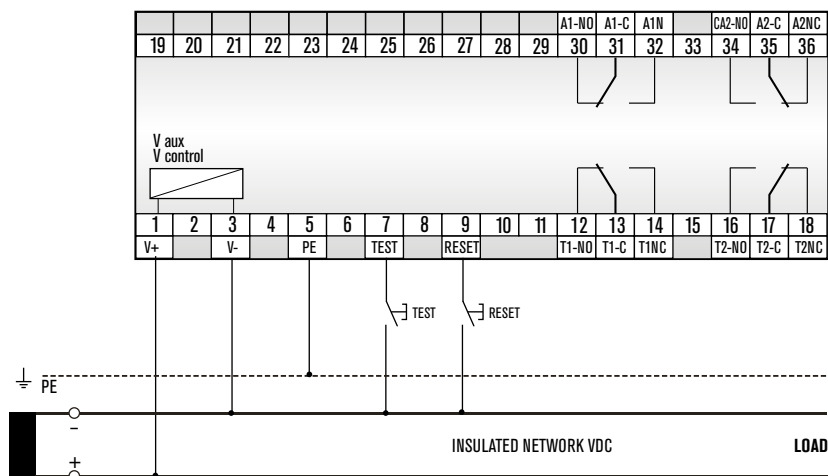
Max relay contact capacity	250V - 5A
Operating temperature	-10 ÷ 60 °C
Storage temperature	-20 ÷ 80 °C
Relative humidity	≤ 95%
Max terminal section	2.5 mm ²
Protection degree	IP40 front IP20 housing
Insulation test	2.5 kV 60 sec. / 4 kV imp 1.2/50 μs
Modules	6
Weight	400 g
Standards	EN 61010-1, EN 61557-8, EN 61326-1

ORDER CODE	VERSION	Vaux	DESCRIPTION	CONTROLLED NETWORK VOLTAGE	MODULES
RI-R11 115	ALARM and TRIP threshold setting Damaged pole LED	80-180 VDC	IT networks insulation control 115 VDC	100-144 VDC	6
RI-R11D 115	ALARM and TRIP threshold setting, damaged pole LED, insulation level display	80-180 VDC	IT networks insulation control 115 VDC	100-144 VDC	6
RI-R11 230	ALARM and TRIP threshold setting Damaged pole LED	185-275 VDC	IT networks insulation control 230 VDC	230 VDC	6
RI-R11D 230	ALARM and TRIP threshold setting, damaged pole LED, insulation level display	185-275 VDC	IT networks insulation control 230 VDC	230 VDC	6

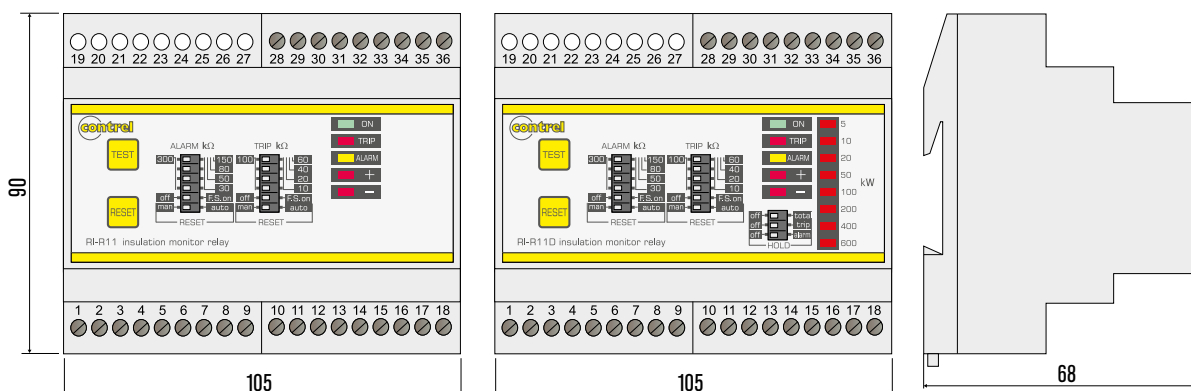
Operators



Wiring diagrams



Mechanical dimensions (mm)



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

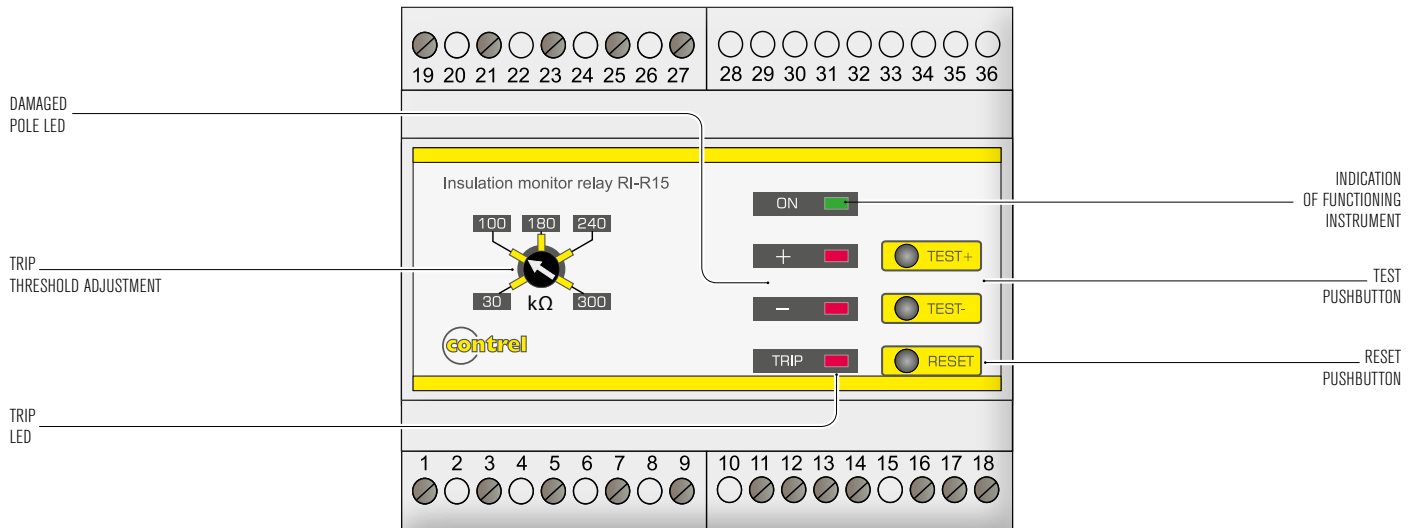
Technical characteristics

Controlled network voltage	280-340 VDC (version RI-R15 300) 400-600 VDC (version RI-R15 500)
Power consumption	6 VA
ALARM threshold setting	-
TRIP threshold setting	30÷300 kΩ
Tripping delay	< 5 sec
Max measuring current	1.5 mA
Max measuring voltage	-
Internal impedance	450 kΩ L/PE
TRIP Relay number NO-C-NC	1
ALARM Relay number NO-C-NC	-

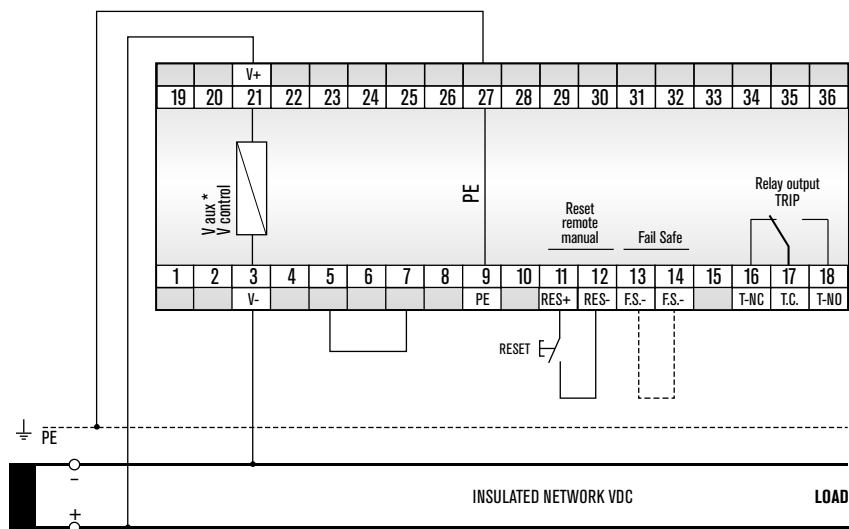
Max relay contact capacity	250V - 5A
Operating temperature	-10 ÷ 60 °C
Storage temperature	-20 ÷ 80 °C
Relative humidity	≤ 95%
Max terminal section	2.5 mm ²
Protection degree	IP40 front IP20 housing
Insulation test	2.5 kV 60 sec. / 4 kV imp 1.2/50 μs
Modules	6
Weight	400 g
Standards	EN 61010-1, EN 61557-8, EN 61326-1

ORDER CODE	VERSION	Vaux	DESCRIPTION	CONTROLLED NETWORK VOLTAGE	MODULES
RI-R15 300	TRIP threshold adjustment, damaged pole LED	280-340 VDC	IT networks insulation control 340 VDC	280-340 VDC	6
RI-R15 500	TRIP threshold adjustment, damaged pole LED	400-600 VDC	IT networks insulation control 600 VDC	400-600 VDC	6
RI-R15 1000	TRIP threshold adjustment, damaged pole LED	600-1000 VDC	IT networks insulation control 1000 VDC (with ARI-R15 adapter)	600-1000 VDC	6

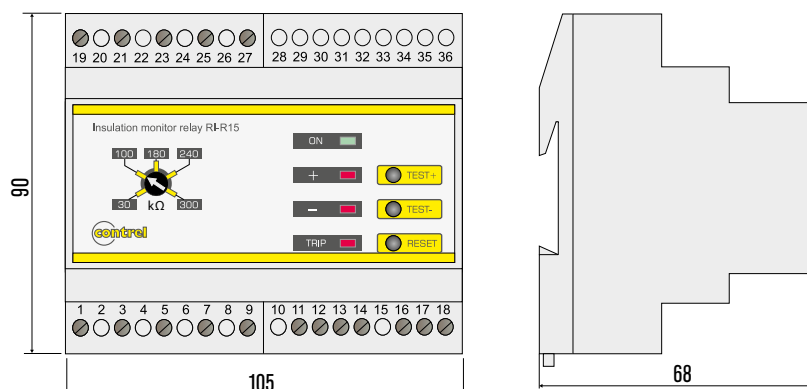
Operators



Wiring diagrams



Mechanical dimensions (mm)



General Characteristics



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)

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 kΩhm (version RI-F22), or can be regulate by a frontal potentiometer (version RI-R22).

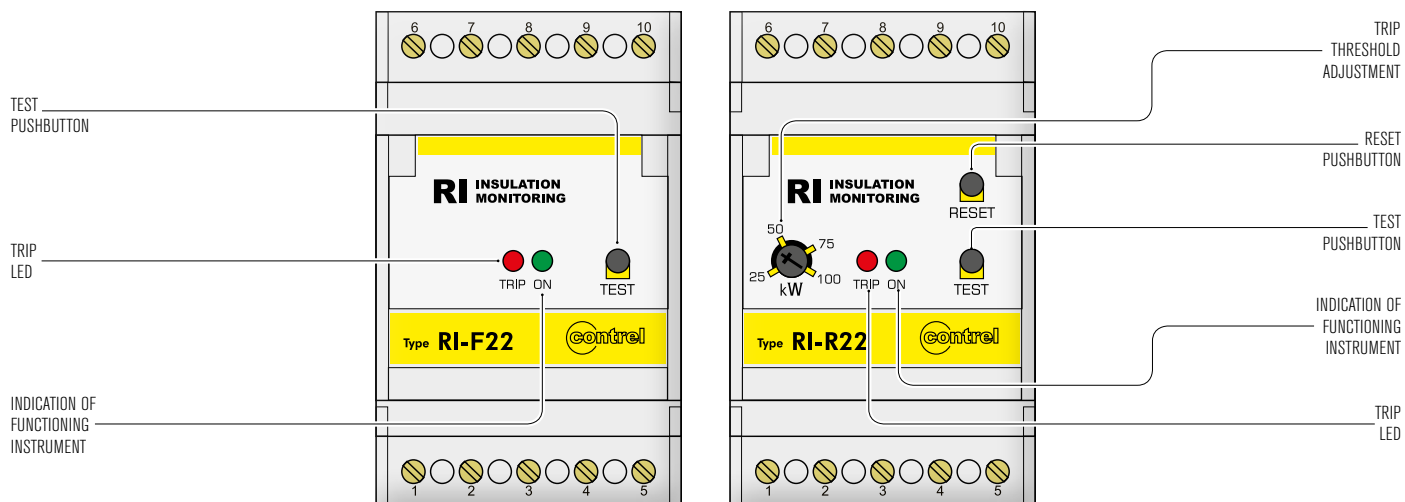
Technical characteristics

Controlled network voltage	230 VAC
Power consumption	3 VA
ALARM threshold setting	-
TRIP threshold setting	100 kΩ (RI-F22) 25÷100 kΩ (RI-R22)
Tripping delay	< 5 sec
Max measuring current	0.1 mA
Max measuring voltage	12 VDC
Internal impedance	250 kΩ
TRIP Relay number NO-C-NC	1
ALARM Relay number NO-C-NC	-

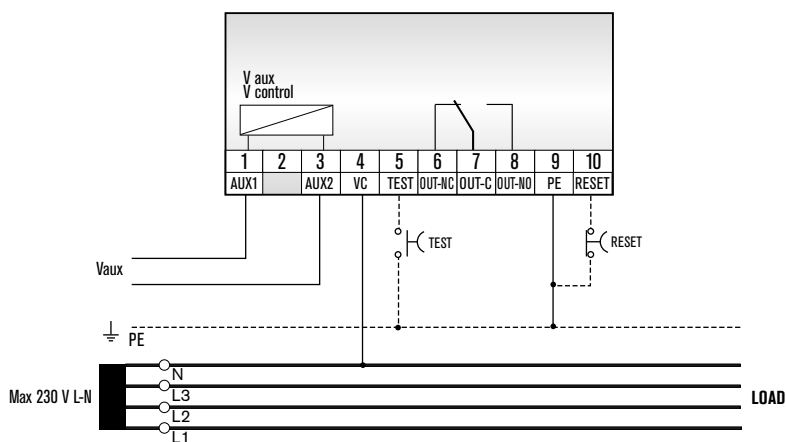
Max relay contact capacity	250V - 5A
Operating temperature	-10 ÷ 60 °C
Storage temperature	-20 ÷ 80 °C
Relative humidity	≤ 95%
Max terminal section	4 mm ²
Protection degree	IP40 front IP20 housing
Insulation test	2.5 kV 60 sec 4 kV imp 1.2/50 μs
Modules	3
Weight	200 g
Standards	EN 61010-1, EN 61557-8, EN 61326-1

ORDER CODE	VERSION	Vaux	DESCRIPTION	CONTROLLED NETWORK VOLTAGE	MODULES
RI-F22 115	ALARM and TRIP threshold setting Damaged pole LED	115 VAC	IT networks insulation control 230 VAC	220-240 VAC	3
RI-F22 230	ALARM and TRIP threshold setting, damaged pole LED, insulation level display	230 VAC	IT networks insulation control 230 VAC	220-240 VAC	3
RI-R22 24	ALARM and TRIP threshold setting Damaged pole LED	24 VDC	IT networks insulation control 230 VAC	220-240 VAC	3
RI-R22 115	ALARM and TRIP threshold setting, damaged pole LED, insulation level display	115 VAC	IT networks insulation control 230 VAC	220-240 VAC	3
RI-R22 230	ALARM and TRIP threshold setting, damaged pole LED, insulation level display	230 VAC	IT networks insulation control 230 VAC	220-240 VAC	3
RI-R22 1000	ALARM and TRIP threshold setting, damaged pole LED, insulation level display	115 or 230 VCA	IT networks insulation control 1000 VAC (whith ADAPTER)	max 1000 VAC	3

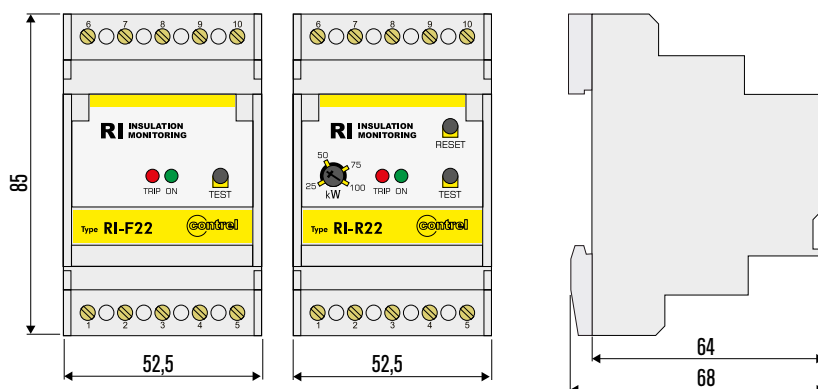
Operators



Wiring diagrams



Mechanical dimensions (mm)



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

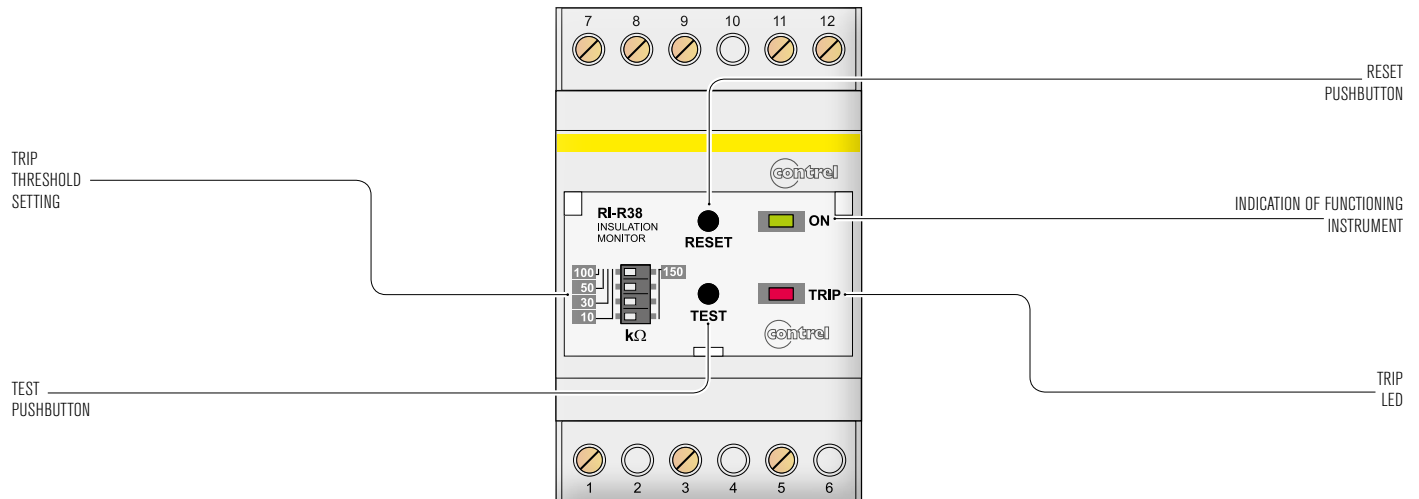
Technical characteristics

Controlled network voltage	380-415 VAC
Power consumption	3 VA
ALARM threshold setting	-
TRIP threshold setting	10÷150 kΩ
Tripping delay	< 5 sec
Max measuring current	0.1 mA
Max measuring voltage	12 VDC
Internal impedance	250 kΩ
TRIP Relay number NO-C-NC	1
ALARM Relay number NO-C-NC	-

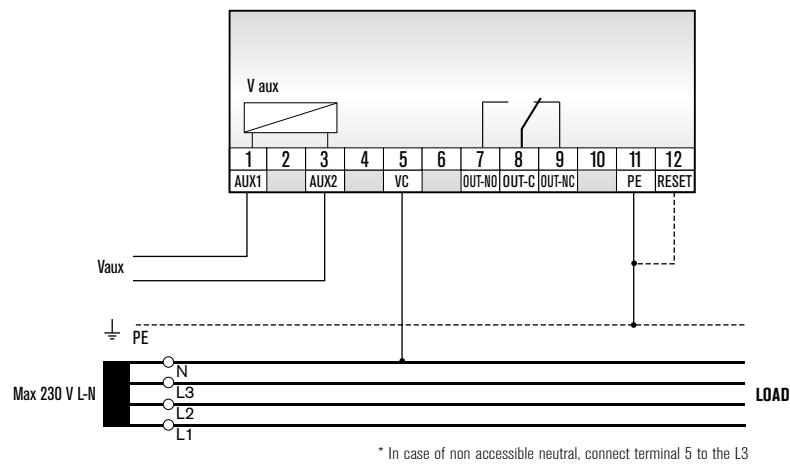
Max relay contact capacity	250V - 5A
Operating temperature	-10 ÷ 60 °C
Storage temperature	-20 ÷ 80 °C
Relative humidity	≤ 95%
Max terminal section	4 mm ²
Protection degree	IP40 front IP20 housing
Insulation test	2.5 kV 60 sec 4 kV imp 1.2/50 μs
Modules	3
Weight	200 g
Standards	EN 61010-1, EN 61557-8, 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 (whith ADAPTER)	max 1000 VCA	3

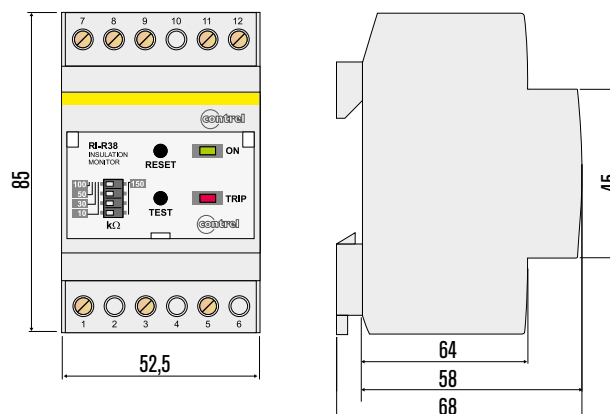
Operators



Wiring diagrams



Mechanical dimensions (mm)



RI-R44

IT NETWORKS INSULATION CONTROL 440 VAC LCD DISPLAY, RS485



General Characteristics



RI-R44-485

RI-R44-V-485



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.

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 RESETTNG

TEST PUSHBUTTON

TRIP THRESHOLD SETTING

TRIP OUTPUT RELAY

RS485 SERIAL INTERFACE (MODBUS RTU)

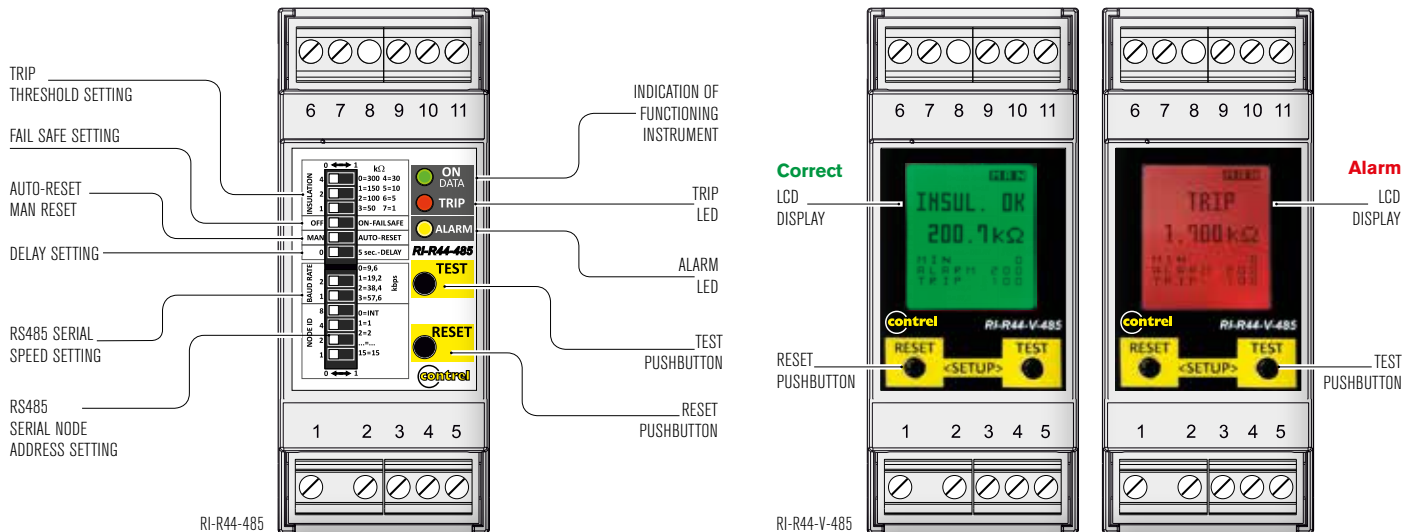
Technical characteristics

Controlled network voltage	440 VAC
Power consumption	2 VA
ALARM threshold setting	-
TRIP threshold setting	1÷300 kΩ
Tripping delay	< 2.5 sec
Max measuring current	0.015 mA
Max measuring voltage	13 VDC
Internal impedance	1.5 MΩ for DC 1 MΩ for AC
TRIP Relay number NO-C-NC	1
ALARM Relay number NO-C-NC	-

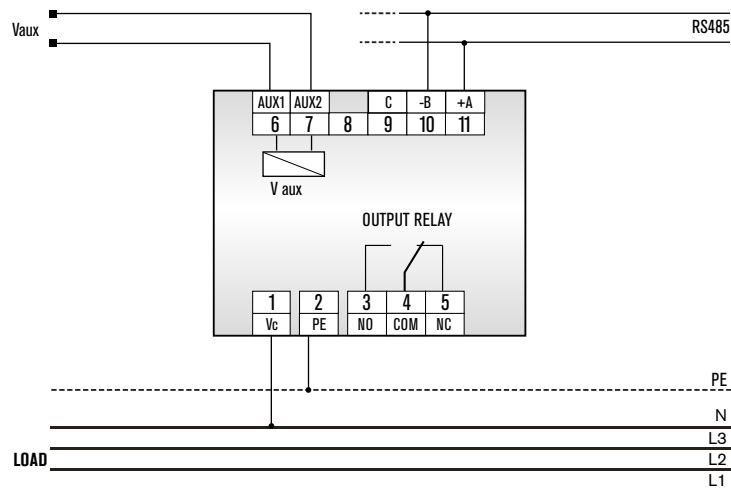
Max relay contact capacity	250V - 5A
Operating temperature	-10 ÷ 60 °C
Storage temperature	-20 ÷ 80 °C
Relative humidity	≤ 95%
Max terminal section	2.5 mm ²
Protection degree	IP40 front IP20 housing
Insulation test	2.5 kV 60 sec 4 kV imp 1.2/50 μs
Modules	2
Weight	200 g
Standards	EN 61010-1, EN 61557-8, EN 61326-1

ORDER CODE	VERSION	Vaux	DESCRIPTION	CONTROLLED NETWORK VOLTAGE	MODULES
RI-R44	TRIP threshold adjustment	230 VAC	IT networks insulation control 440 VAC	440 VAC	2
RI-R44-485	TRIP threshold adjustment, RS485 serial interface	230 VAC	IT networks insulation control 440 VAC	440 VAC	2
RI-R44-V	TRIP threshold adjustment, LCD display	230 VAC	IT networks insulation control 440 VAC	440 VAC	2
RI-R44-V-485	TRIP threshold adjustment, LCD display, RS485 serial interface	230 VAC	IT networks insulation control 440 VAC	440 VAC	2

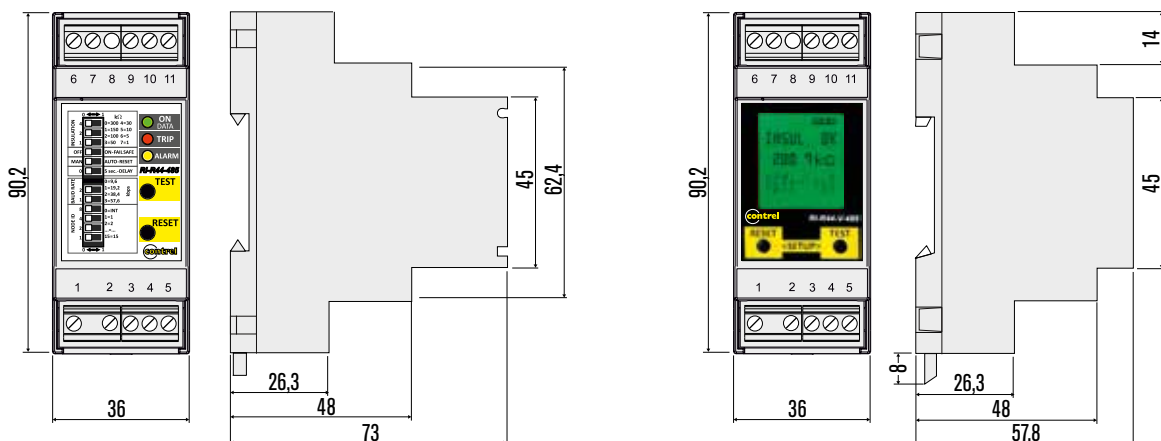
Operators



Wiring diagrams



Mechanical dimensions (mm)



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

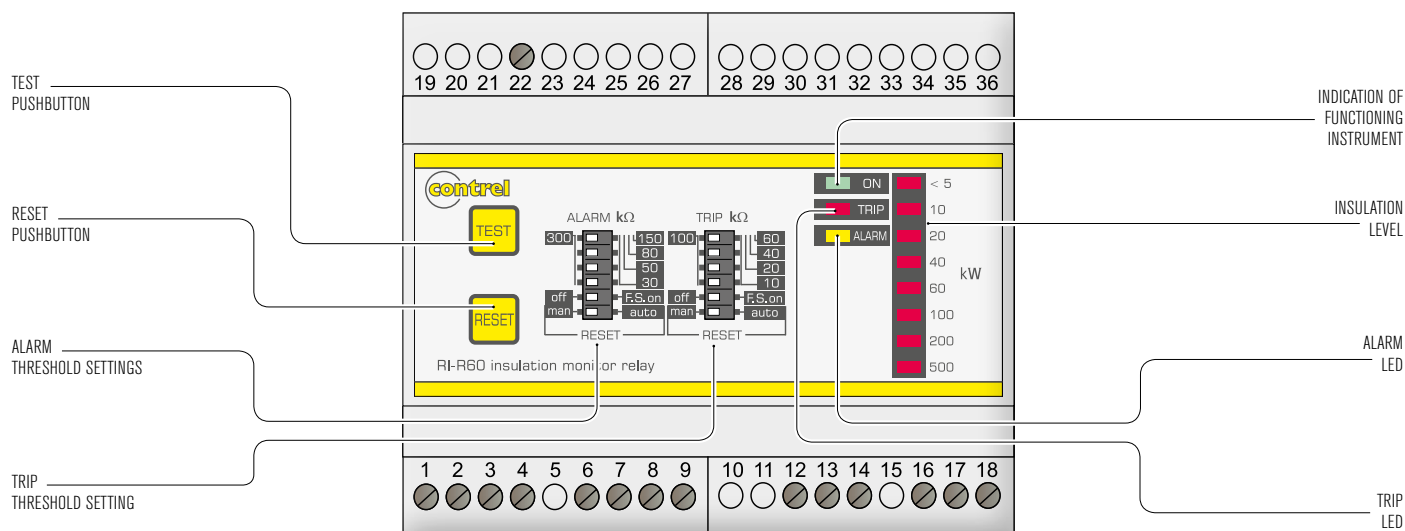
Technical characteristics

Controlled network voltage	500-760 VAC
Power consumption	5
ALARM threshold setting	30÷300 kΩ
TRIP threshold setting	10÷100 kΩ
Tripping delay	< 5 sec
Max measuring current	0.240 mA
Max measuring voltage	48 VDC
Internal impedance	200 kΩ
TRIP Relay number NO-C-NC	1
ALARM Relay number NO-C-NC	1

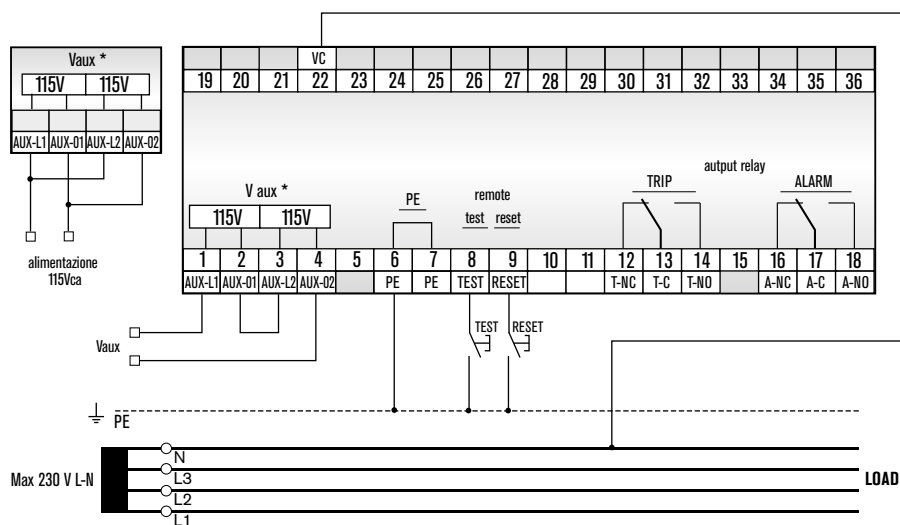
Max relay contact capacity	250V - 5A
Operating temperature	-10 ÷ 60 °C
Storage temperature	-20 ÷ 80 °C
Relative humidity	≤ 95%
Max terminal section	2.5 mm ²
Protection degree	IP40 front IP20 housing
Insulation test	3 kV 60 sec. / 4 kV imp 1.2/50 μs
Modules	6
Weight	500 g
Standards	EN 61010-1, EN 61557-8, EN 61326-1

ORDER CODE	VERSION	Vaux	DESCRIPTION	CONTROLLED NETWORK VOLTAGE	MODULES
RI-R60	ALARM and TRIP threshold setting, insulation level display	110-230 VAC	IT networks insulation control up to 760 VAC	500-760 VAC	6
RI-R60 1000	ALARM and TRIP threshold setting, insulation level display	110-230 VAC	IT networks insulation control up to 1000 VAC (with ARI-R60 adapter)	1000 VAC	6

Operators

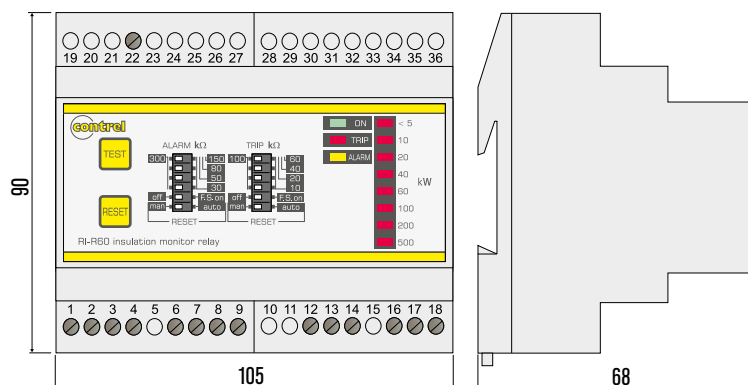


Wiring diagrams



* In case of non accessible neutral, connect terminal 22 to the L1

Mechanical dimensions (mm)



General Characteristics



Features

INDICATION OF FUNCTIONING INSTRUMENT

TEST PUSHBUTTON

LOW INSULATION LED

FAIL SAFE SETTING

TRIP THRESHOLD SETTING

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.

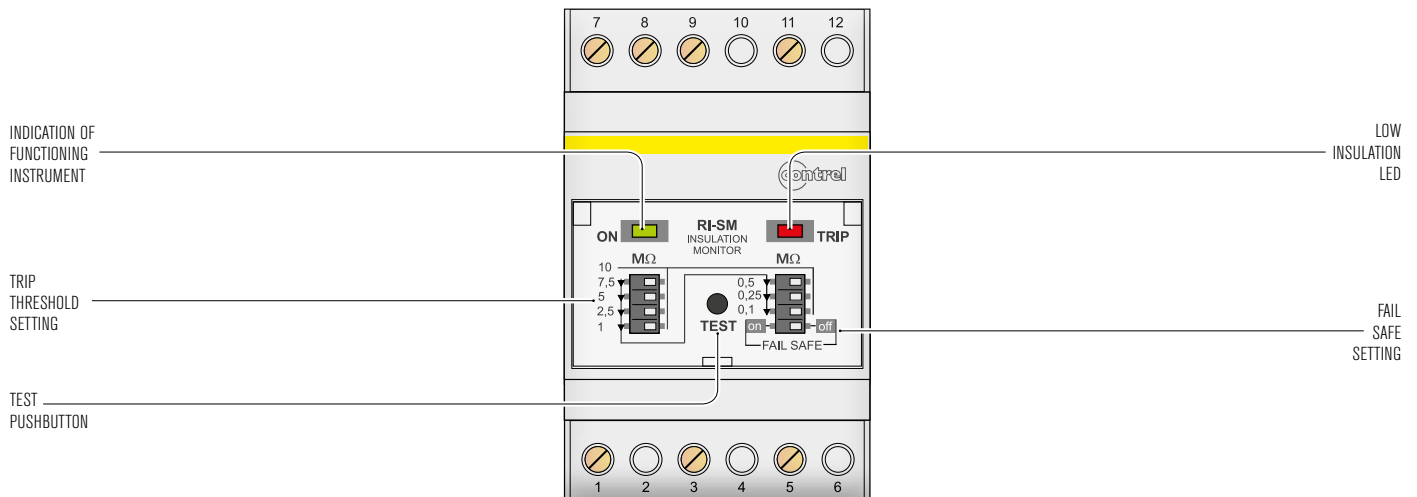
Technical characteristics

Power consumption	3 VA
ALARM threshold setting	-
TRIP threshold setting	0,1÷1000 kΩ
Tripping delay	< 5 sec
Max measuring current	0,015 mA
Max measuring voltage	20 VDC
Internal impedance	1.5 MΩ DC 1 MΩ AC
TRIP Relay number NO-C-NC	1
ALARM Relay number NO-C-NC	-
Max relay contact capacity	250V - 5A

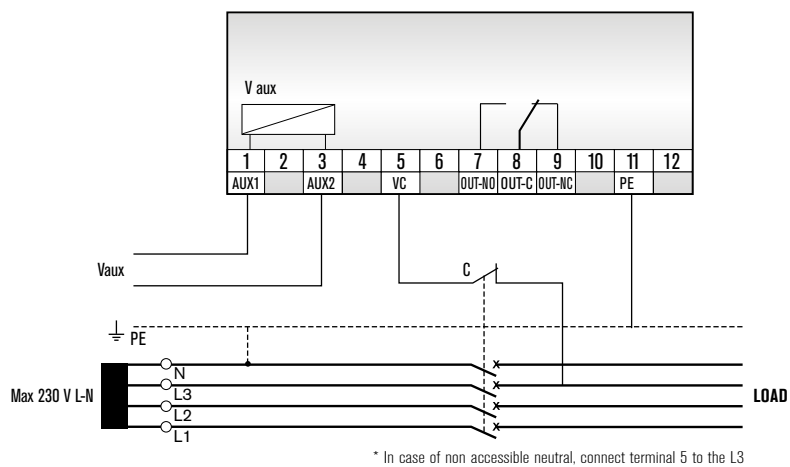
Operating temperature	-10 ÷ 60 °C
Storage temperature	-20 ÷ 80 °C
Relative humidity	≤ 95%
Max terminal section	4 mm ²
Protection degree	IP40 front IP20 housing
Insulation test	2.5 kV 60 sec 4 kV imp 1.2/50 μs
Modules	3
Weight	200 g
Standards	EN 61010-1, EN 61557-8, EN 61326-1

ORDER CODE	VERSION	Vaux	DESCRIPTION	MODULES
RI-SM 24	TRIP threshold setting, FAIL SAFE setting	24 VDC	Voltageless networks insulation control	3
RI-SM 115	TRIP threshold setting, FAIL SAFE setting	115 VAC	Voltageless networks insulation control	3
RI-SM 230	TRIP threshold setting, FAIL SAFE setting	230 VAC	Voltageless networks insulation control	3

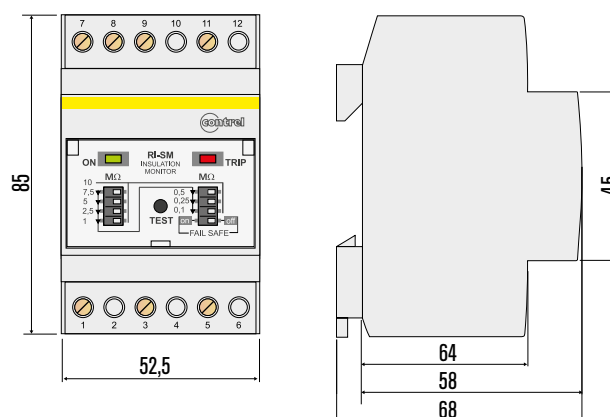
Operators



Wiring diagrams



Mechanical dimensions (mm)



General Characteristics



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)

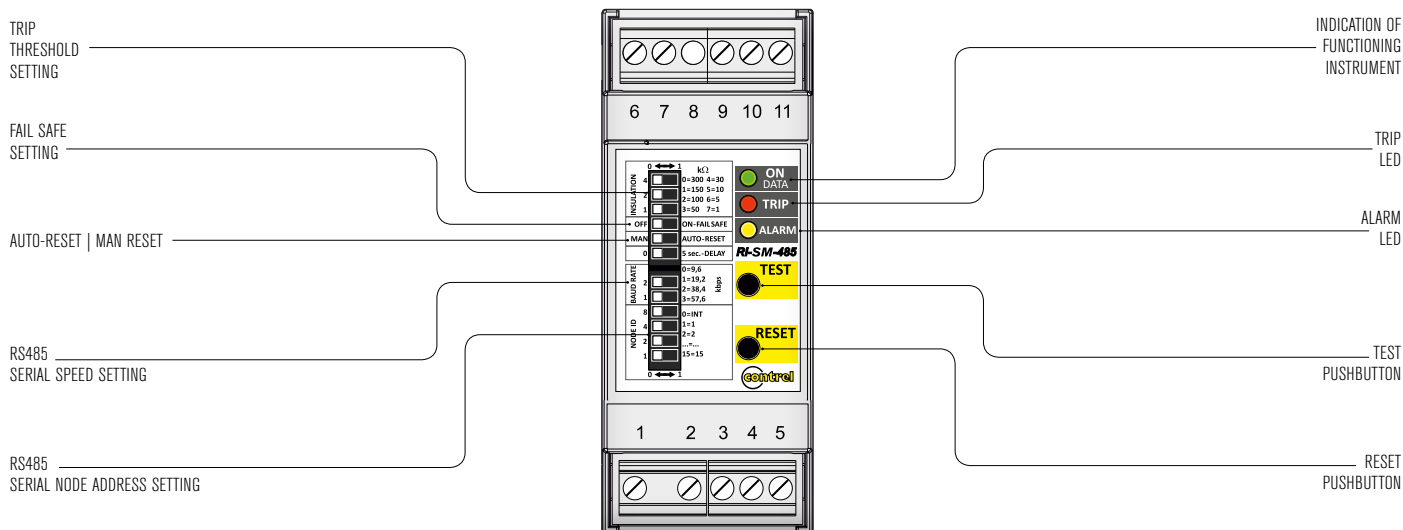
Technical characteristics

Power consumption	2 VA
ALARM threshold setting	-
TRIP threshold setting	0,1÷1500 k Ω
Tripping delay	< 2,5 sec
Max measuring current	0.015 mA
Max measuring voltage	13 VDC
Internal impedance	1.5 M Ω DC 1 M Ω AC
TRIP Relay number NO-C-NC	1
ALARM Relay number NO-C-NC	-
Max relay contact capacity	250V - 5A

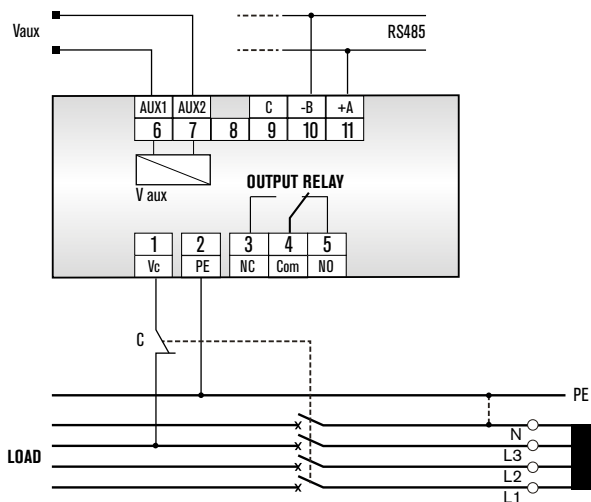
Operating temperature	-10 ÷ 60 °C
Storage temperature	-20 ÷ 80 °C
Relative humidity	≤ 95%
Max terminal section	2,5 mm ²
Protection degree	IP40 front IP20 housing
Insulation test	2.5 kV 60 sec 4 kV imp 1.2/50 μ s
Modules	2
Weight	200 g
Standards	EN 61010-1, EN 61557-8, EN 61326-1

ORDER CODE	VERSION	Vaux	DESCRIPTION	MODULES
RI-SM-485	TRIP threshold setting, FAIL SAFE setting, RS485 serial interface	230 VAC	Voltageless networks insulation control	2

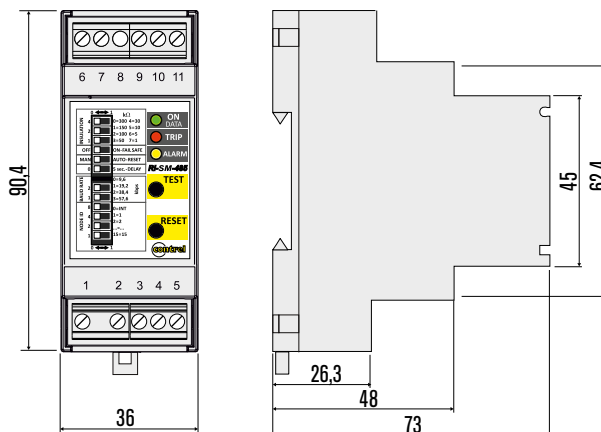
Operators



Wiring diagrams



Mechanical dimensions (mm)



ARI-R15 ADAPTER

IT NETWORKS INSULATION CONTROL 1000 VDC



General Characteristics

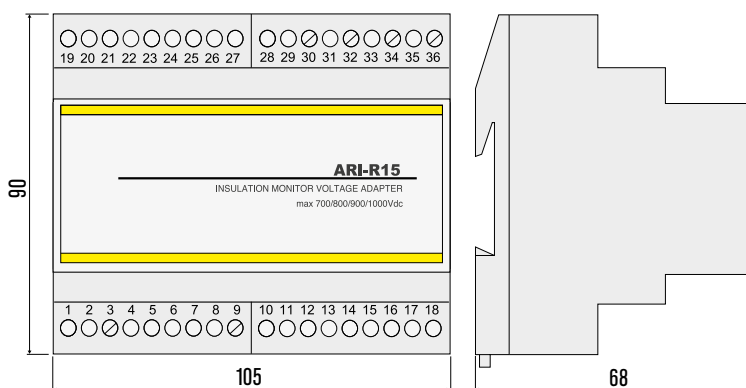


ARI-R15 ALLOWS INSULATION MONITORING UP TO 1000 VDC.

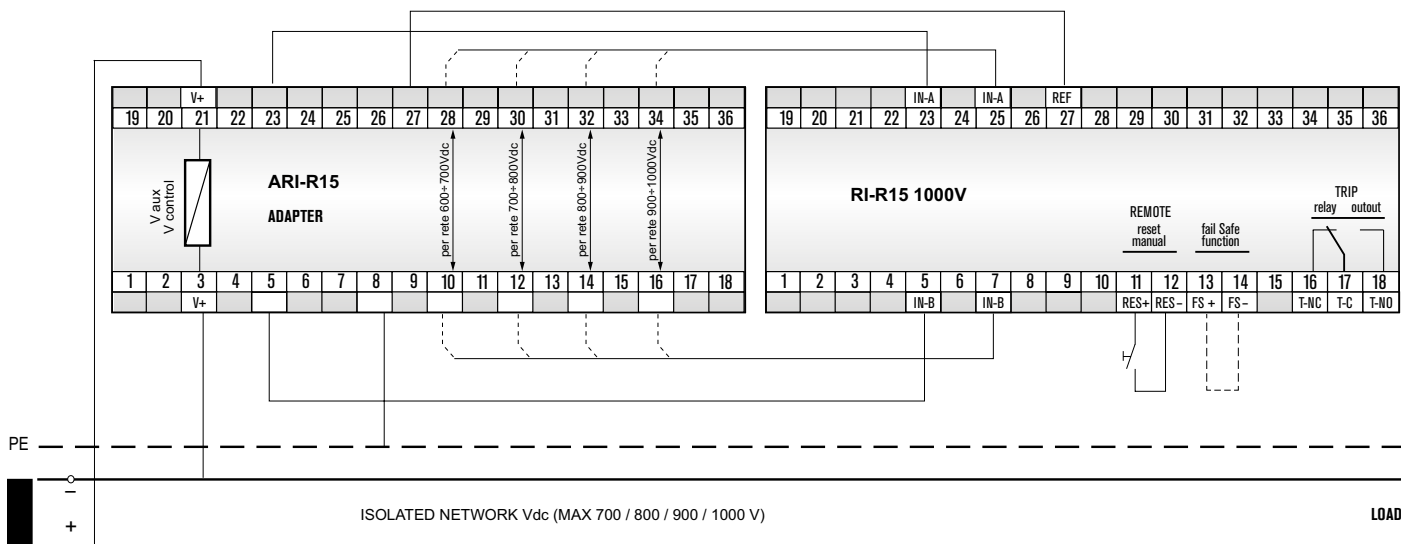
THE EXTERNAL ADAPTER ARI-R15 MUST BE USED ONLY WITH RI-R15 1000.

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

Mechanical dimensions (mm)



Wiring diagrams



ARI-R60 ADAPTER

IT NETWORKS INSULATION CONTROL 1000 VAC



General Characteristics

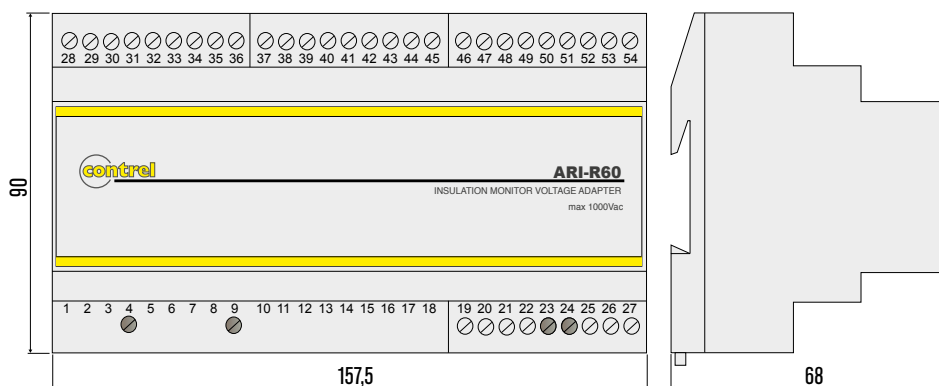


ARI-R60 ALLOWS INSULATION MONITORING UP TO 1000 VAC.

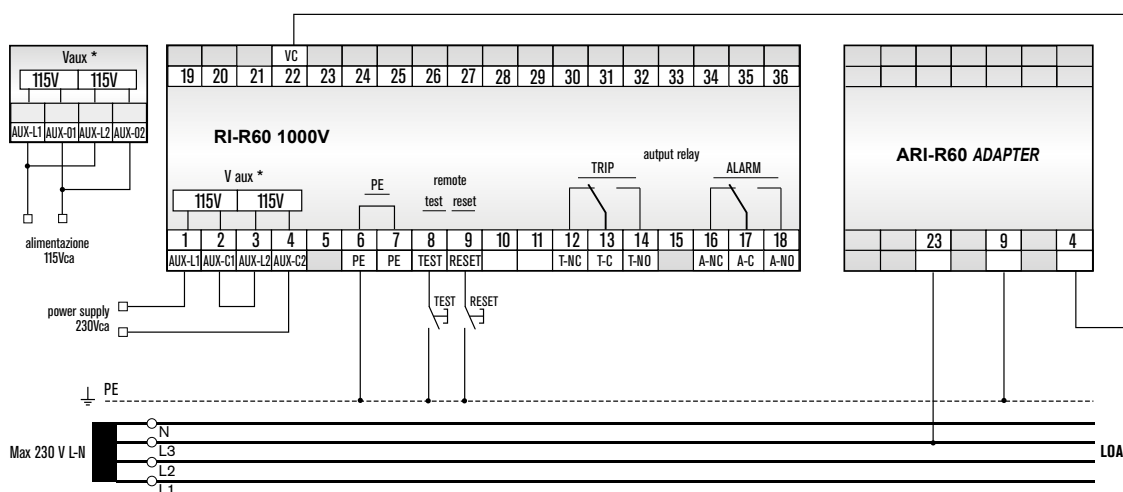
THE EXTERNAL ADAPTER ARI-R60 MUST BE USED ONLY WITH RI-R60. THIS ADAPTER MUST BE POSITIONED BETWEEN

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



MEDICAL INSULATION MONITORING DEVICE

HRI medical insulation monitoring device assuring patients and medical staff safety in intensive care units, operating theatres, first aid and day hospital premises, ambulatories, 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



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.

Features

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

ORDER CODE	VERSION	Vaux	DESCRIPTION	CONTROLLED NETWORK VOLTAGE	MODULES
HRI-R40	TRIP threshold setting, 2 temperature sensors, digit display, output relay	110-230 VAC	-	24-230 VAC	6
HRI-R40-485	TRIP threshold setting, 2 temperature sensors, digit display, output relay, RS485 serial interface	110-230 VAC	-	24-230 VAC	6
HRI-R40W-485	TRIP threshold setting, 2 temperature sensors, digit display, output relay, RS485 serial interface	110-230 VAC	(*)	24-230 VAC	6

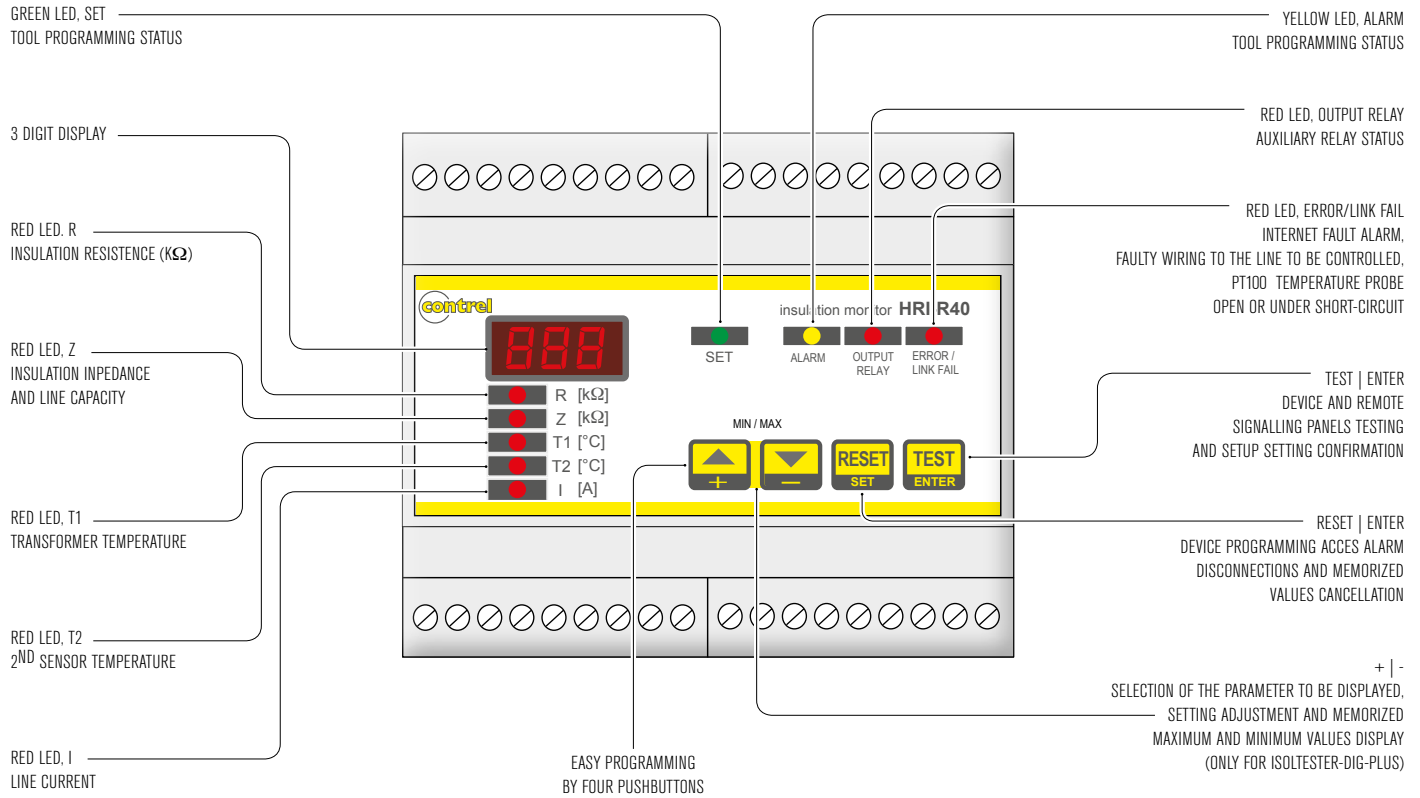
(*) Use a direct-current component control signal in order to reduce the problems generated by the presence of direct current components in the line. The device is fitted with a digital filter capable to identify the direct current component present in the line.

HRI-R40

MEDICAL INSULATION MONITORING DEVICE



Frontal operators functioning

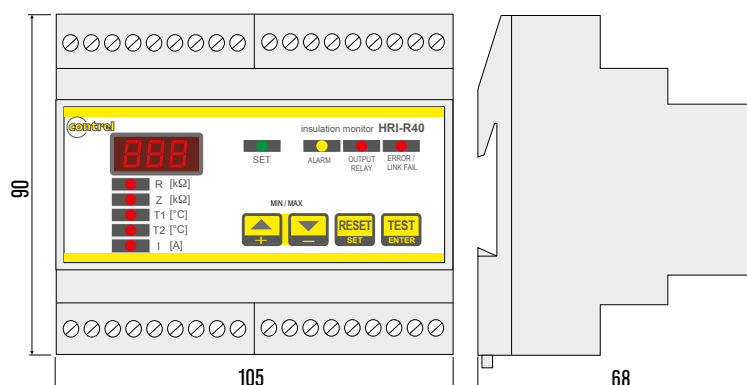


Wherever it is necessary to guarantee safety and operational continuity and prevent power supply interruptions, such as hospitals and other medical locations, insulation transformers and devices detecting and signalling any first fault to earth have to be used. Risks arising from the use of a traditional 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)



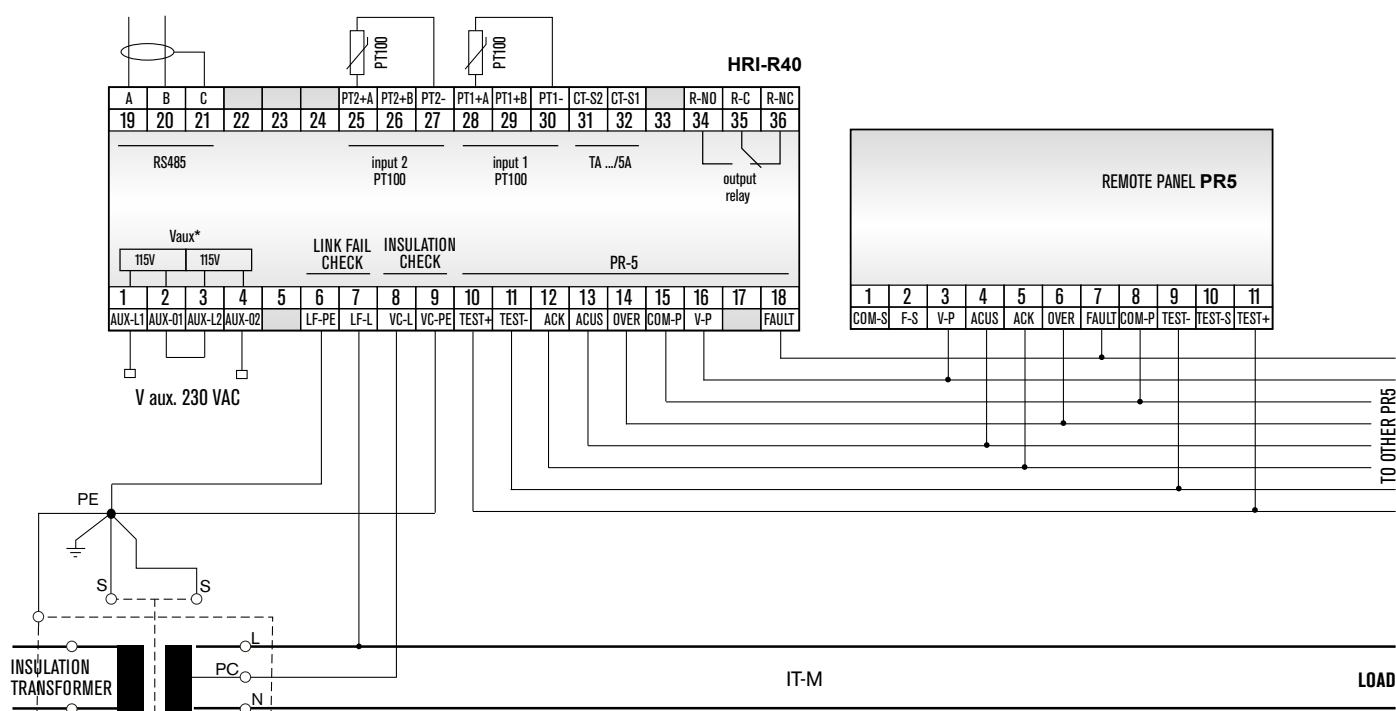
Technical characteristics

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 k Ω /HIGH - resolution 1 k Ω Temperature measurement by Rd PT100 or 2/3-wire thermal-probe - 0÷250°C, accuracy 2% Impedance measurement 0÷999 k Ω /HIGH Resolution 1 k Ω (test signal 2500 Hz)
Intervention threshold	Low insulation 50÷500 k Ω , 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	Up to maximum 4 PR-5 panels for remote signalling Programmable auxiliary relay output NA-C-NC, 5A, 250 VAC RS 485 serial output, standard ModbusRTU protocol

Displays

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
	Setting parameters
	Device failing connection to the line (Error/Link-Fail)
	Relay output status
	Line-to-earth capacity value
	Minimum insulation and maximum temperature and current values
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



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 MODULE

PRACTICALITY: EXTREMELY EASY TO INSTALL AND USE

INTEGRATION: IDEAL COMPLEMENT FOR HRI-R4

Technical characteristics

Network voltage and auxiliary supply	24 V AC/DC
Frequency	50-60 Hz
Maximum self-consumption	3 VA
Maximum measurement current	0,5 mA
Internal impedance	50 k Ω
Intervention threshold	10 ÷ 50 k Ω 4 levels
Intervention delay	1 s
Signals	LED ON, LED TRIP
Output	maximum 24 V 1 A
Remote signalling panels	maximum 2 PR-5

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 μ s
Terminal blocks section	4 mm ²
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

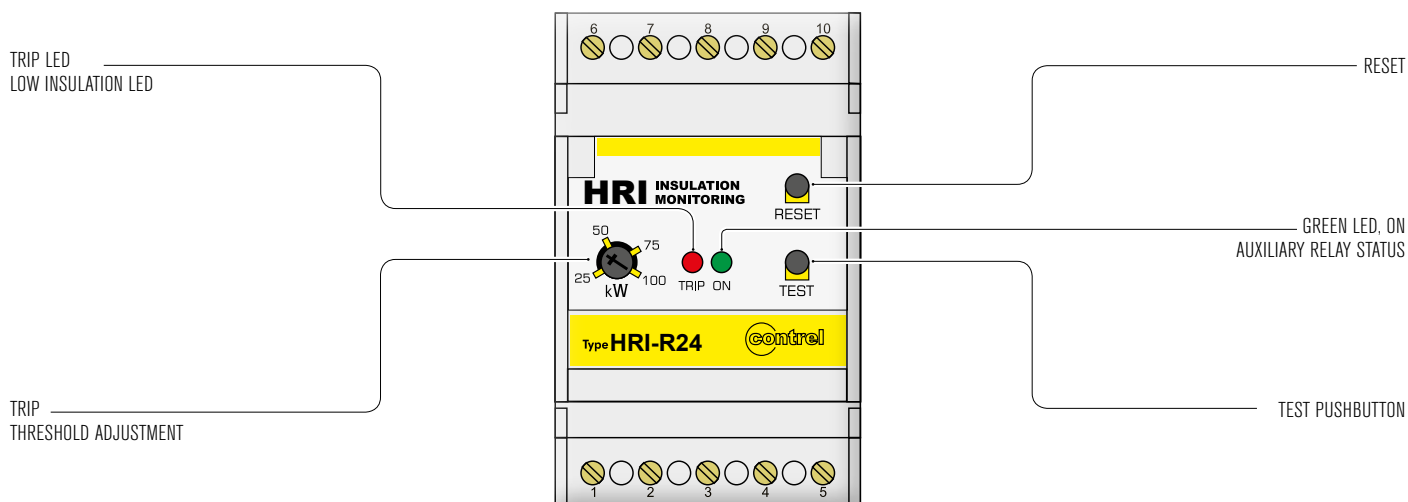
ORDER CODE	VERSION	Vaux	CONTROLLED NETWORK VOLTAGE	MODULES
HRI-R24	TRIP threshold adjustment, TEST pushbutton	24 VAC/DC	24 VAC/DC	3

HRI-R24

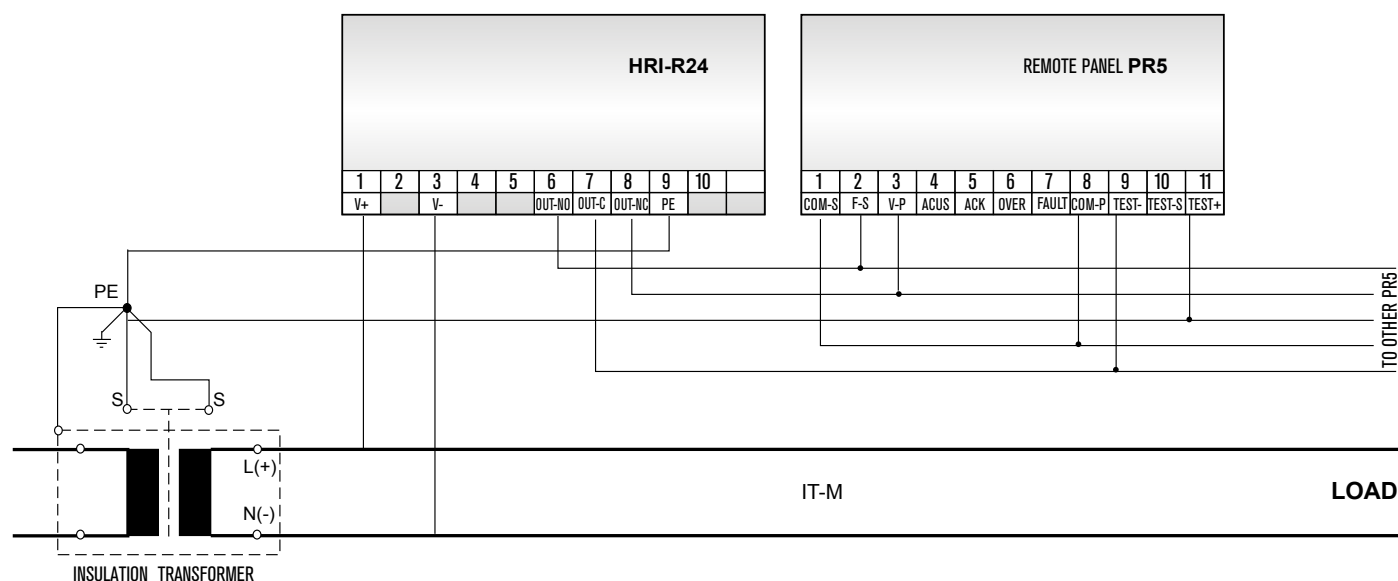
MEDICAL INSULATION MONITORING DEVICES FOR SCIALITIC LAMPS



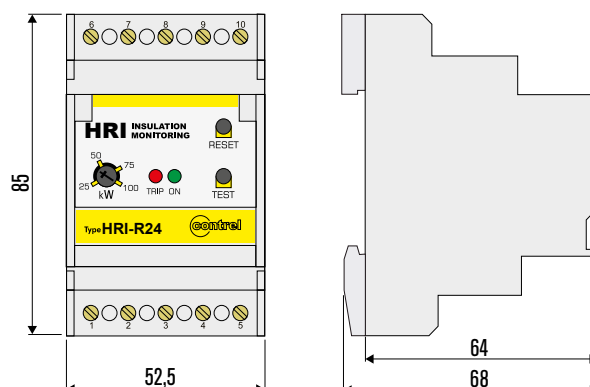
Frontal operators functioning



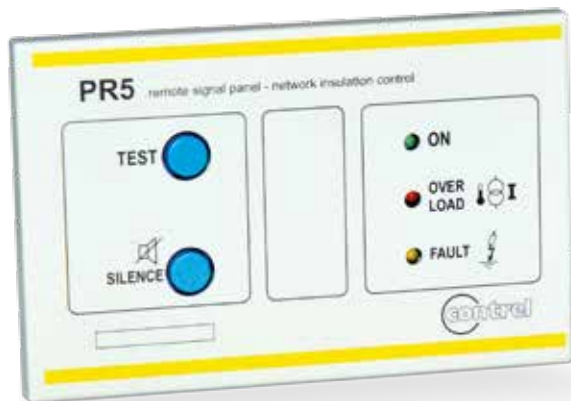
Wiring diagrams



Mechanical dimensions (mm)



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

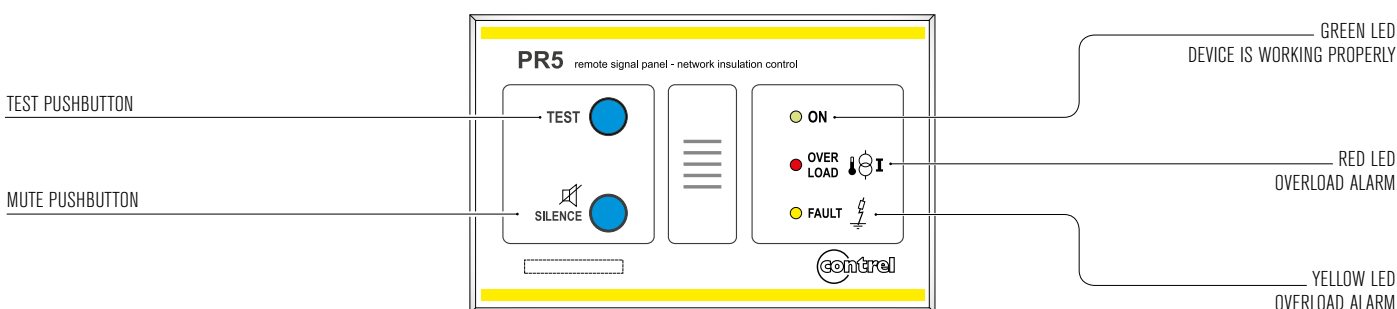
OPERATIONAL EFFICIENCY: BOTH VISUAL AND ACOUSTIC SIGNALLING

Technical characteristics

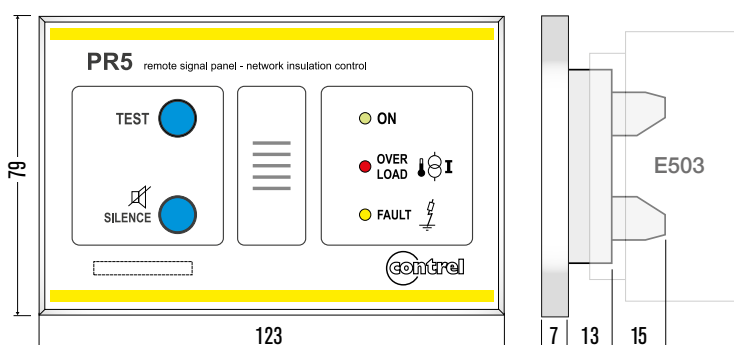
Signals	Green LED NETWORK; Red LED overload ALARM; Yellow LED FAULT ALARM; Low insulation; Acoustic signaller; Emission 2400 Hz; Intermittence 2 Hz dB
Pushbuttons	Testing (TEST), acoustic disconnection (MUTE)
Terminal blocks section	2,5 mm ²
Degree of protection	IP 30
Installation	E503universal 3-module flush-mounted box

Weight	200 g
Operating temperature	-10 ÷ 60 °C, maximum humidity 95%
Storage temperature	-20 ÷ 80 °C
Insulation test	2.500 V rms 50 Hz for 60 s
Terminal blocks section	0,35 mmq (300 m max)
Reference standards	IEC-EN 61010-1, IEC EN 61557-8, IEC EN 60364-7-710, UNE 20615, IEC EN 61326-1

Frontal operators functioning



Mechanical dimensions (mm)



ORDER CODE	DESCRIPTION
PR-5	TEST and RESET pushbuttons, overload and fault LED

RMS-24

MULTIROOM MONITORING SYSTEM AND REMOTE MANAGEMENT

General Characteristics



The RMS-24 data concentrator is a device that extends the potential of the 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

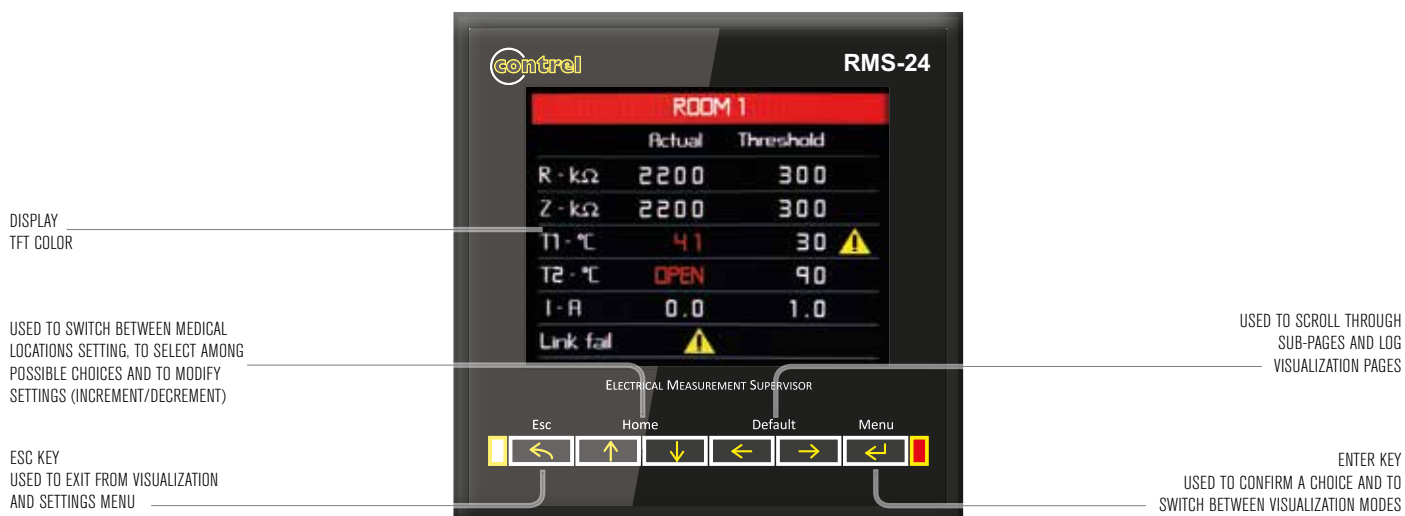
AUXILIARY SUPPLY	
Rated voltage	90 - 250 VAC 20 - 60 VAC/DC
Frequency	45 - 65 Hz
Power consumption/dissipation	<10VA / <3W
RS485 SERIAL INTERFACE COM1	
Baud-rate	Programmable 9600 - 38400 bps
RS485 SERIAL INTERFACE COM2 - OPTIONAL	
Baud-rate	Programmable 9600 - 38400 bps
Protocol supported	Modbus RTU
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
Dimension	3.5"
INSULATION	
Insulation voltage	3.7kV for 1 minute
HOUSING	
Mouting	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

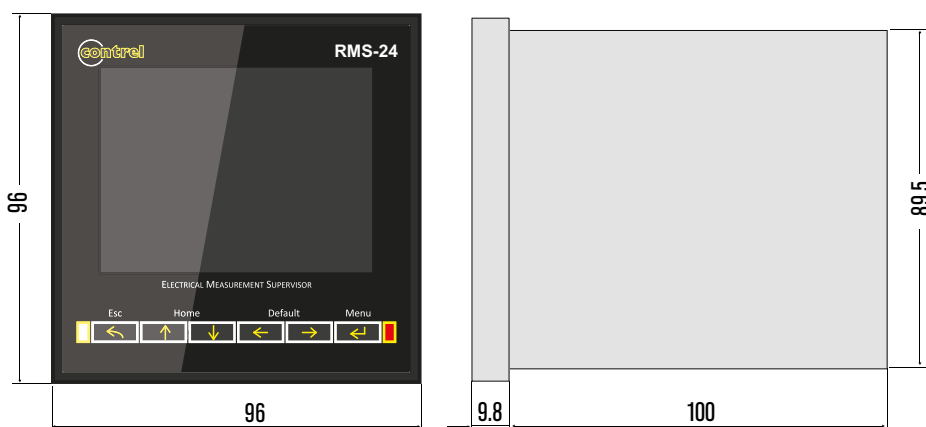
RMS-24

MULTIROOM MONITORING SYSTEM AND REMOTE MANAGEMENT

Operators



Mechanical dimensions (mm)



FUNCTIONS OF THE DATA CONCETRATOR

The RMS-24 can manage up to a maximum of 24 devices for insulation monitoring, called HRI01...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 threshold.



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).



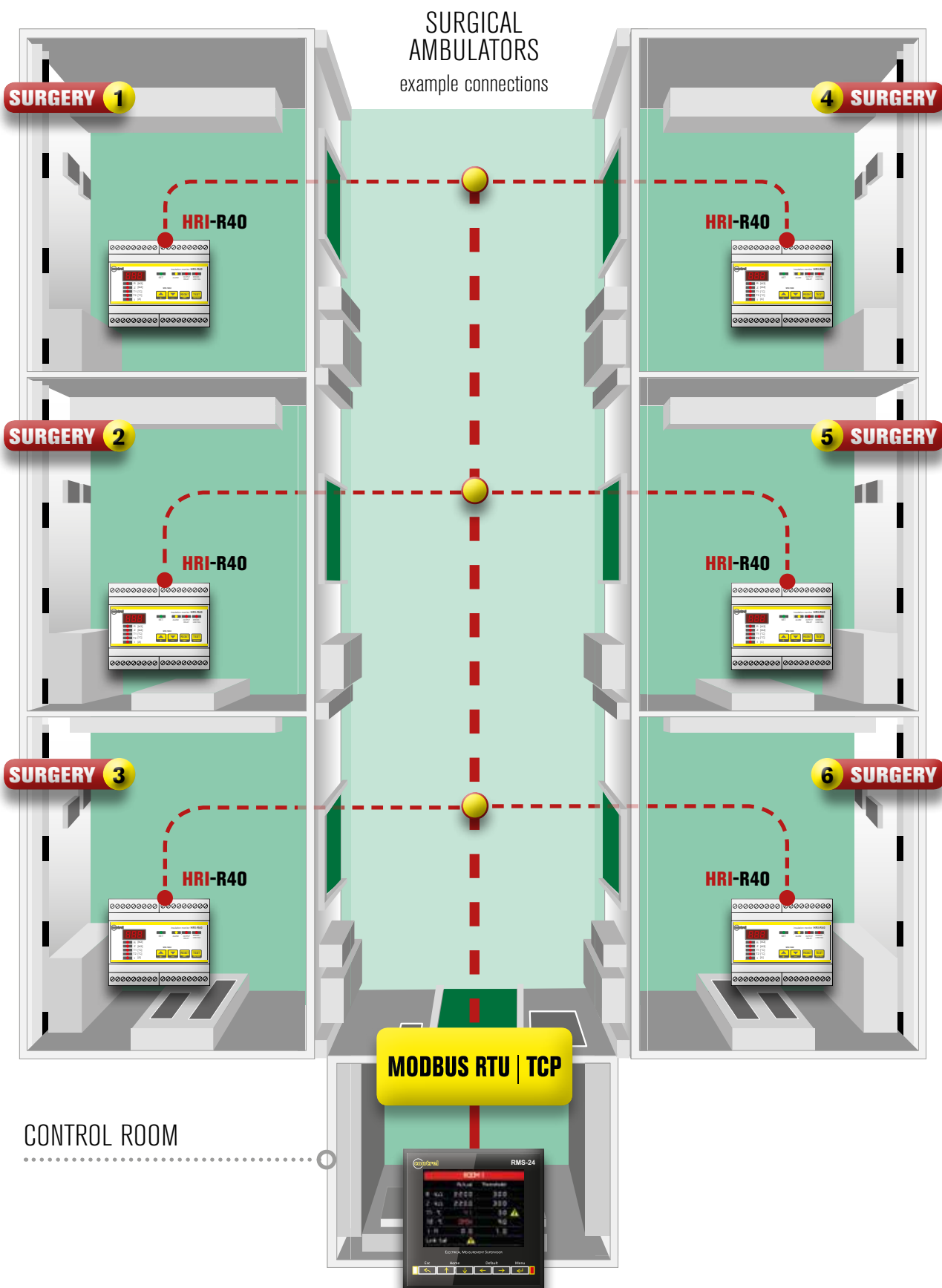
BUZZER BUILT-IN ENABLE

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).

RMS-24

MULTIROOM MONITORING SYSTEM AND REMOTE MANAGEMENT

Wiring diagrams



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