MONITORIZAÇÃO DE DEFEITOS DE ISOLAMENTO

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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

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 continuityin 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.

RI-R60

IT NETWORKS INSULATION CONTROL **760 VAC**

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

Technical characteristics

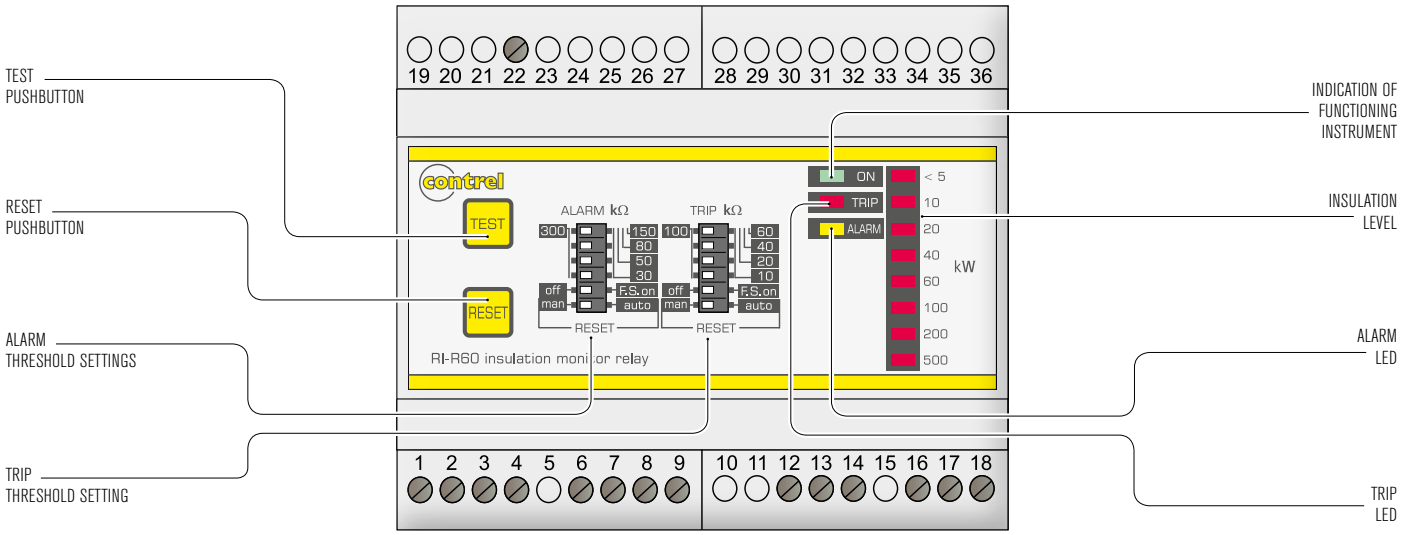
Controlled network voltage	500-760 VAC	**Max relay contact capacity**	250V - 5A
Power consumption	5	**Operating temperature**	-10 ÷ 60 °C
ALARM threshold setting	30÷300 **kΩ**	**Storage temperature**	-20 ÷ 80 °C
TRIP threshold setting	10÷100 **kΩ**	**Relative humidity**	≤ 95%
Tripping delay	< 5 sec	**Max terminal section**	2.5 mm²
Max measuring current	0.240 mA	**Protection degree**	IP40 front | IP20 housing
Max measuring voltage	48 VDC	**Insulation test**	3 kV 60 sec. / 4 kV imp 1.2/50 µs
Internal impedance	200 kΩ	**Modules**	6
TRIP Relay number NO-C-NC	1	**Weight**	500 g
ALARM Relay number NO-C-NC	1	**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

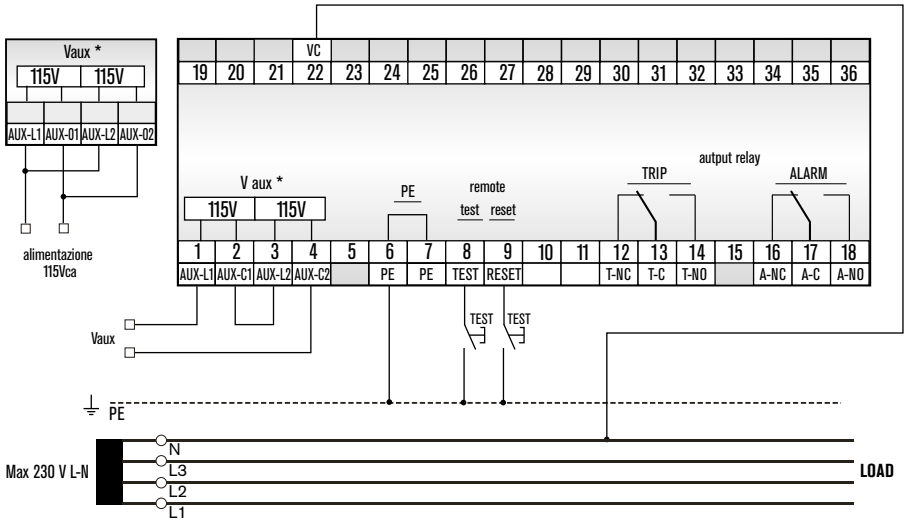
RI-R60

IT NETWORKS INSULATION CONTROL **760 VAC**

Operators

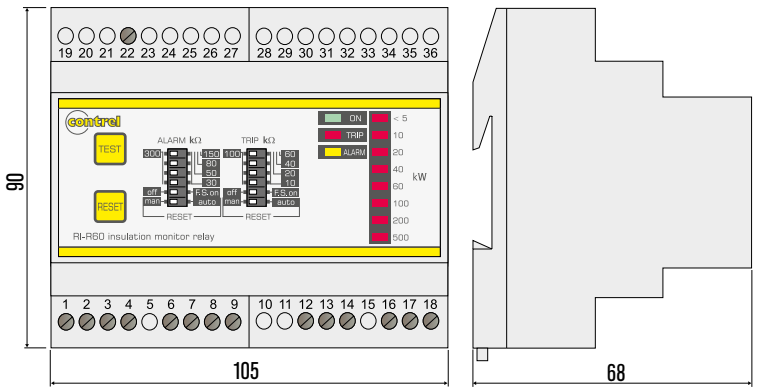


Wiring diagrams



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

Mechanical dimensions (mm)



ARI-R60 *ADAPTER*

IT NETWORKS INSULATION CONTROL **1000 VAC**

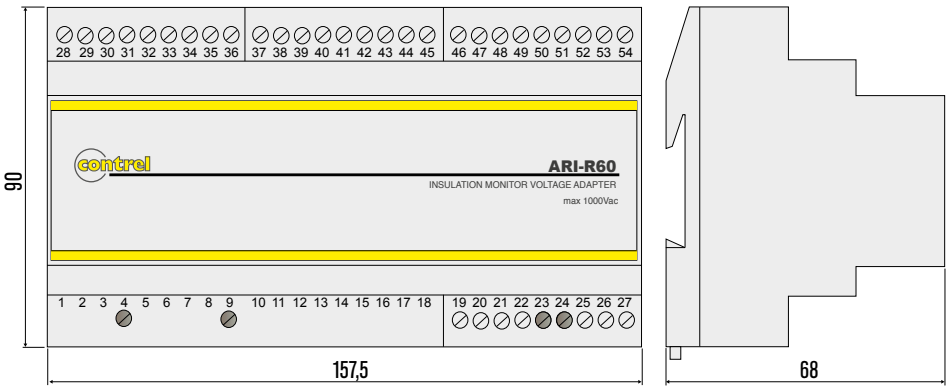
General Characteristics

ARI-R60 ALLOWS INSULATION MONITORING UP TO 1000 VAC.

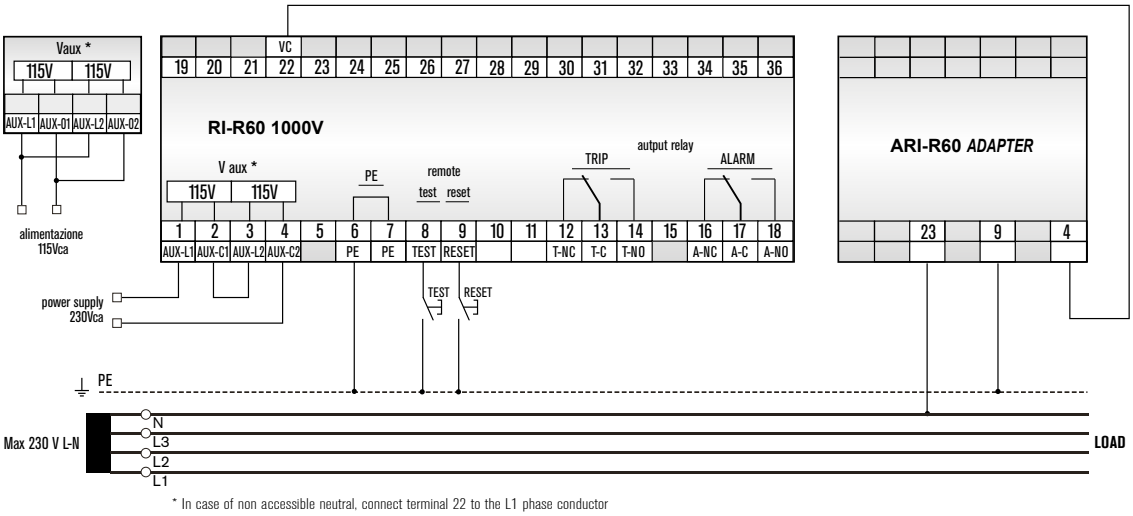
THE EXTERNAL ADAPTER ARI-R60 MUST BE USED ONLY WITH RI-R60.
THIS ADAPTER MUST BE POSITIONED BETWEEN

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.

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

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.

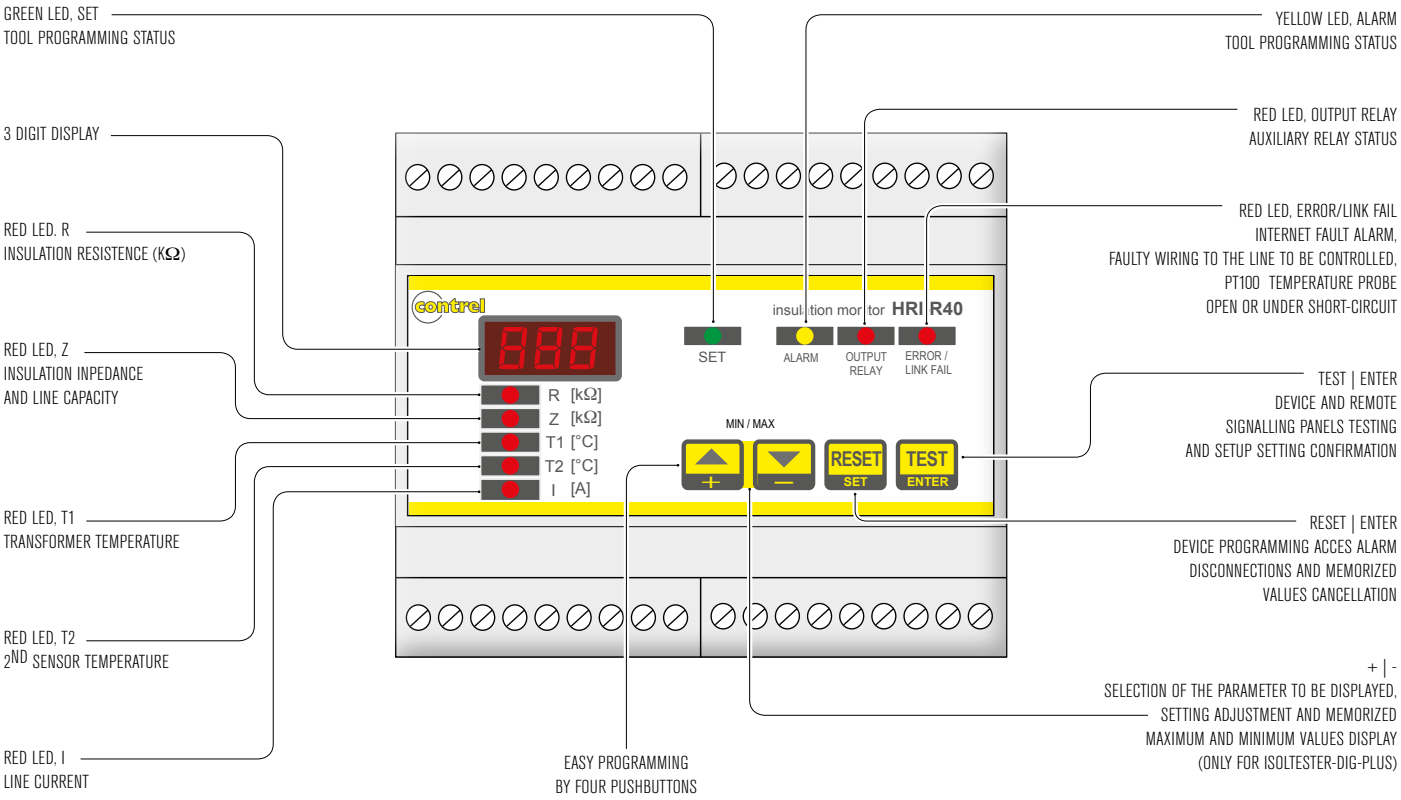
ORDER CODE	VERSION	Vaux	DESCRIPTION	CONTROLLED NETWORK VOLTAGE	MODULES
HRI-R40	TRIP threshold setting, 2 temperature sensors, digit display, output relay	110-230 VAC	-	24-230 VAC	6
HRI-R40-485	TRIP threshold setting, 2 temperature sensors, digit display, output relay, RS485 serial interface	110-230 VAC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

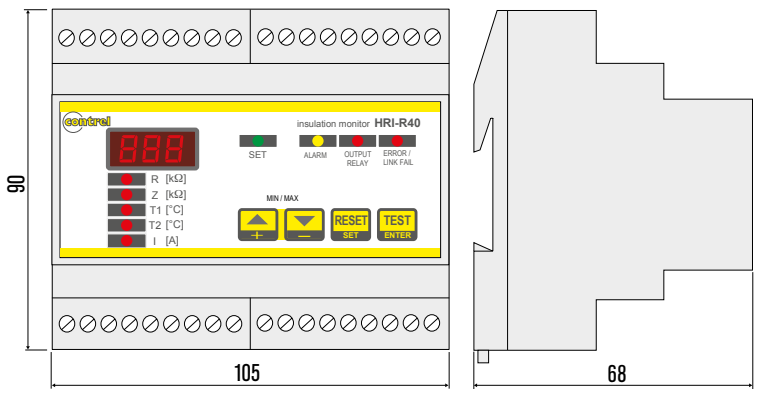


Wherever it is necessary to guarantee safety and operational continuity andprevent power supply interruptions, such as hospitals and other medical locations, insulation transformers and devices detecting and signalling any first fault to earth have to be used. Risks arising from the use of a traditional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



HRI-R40

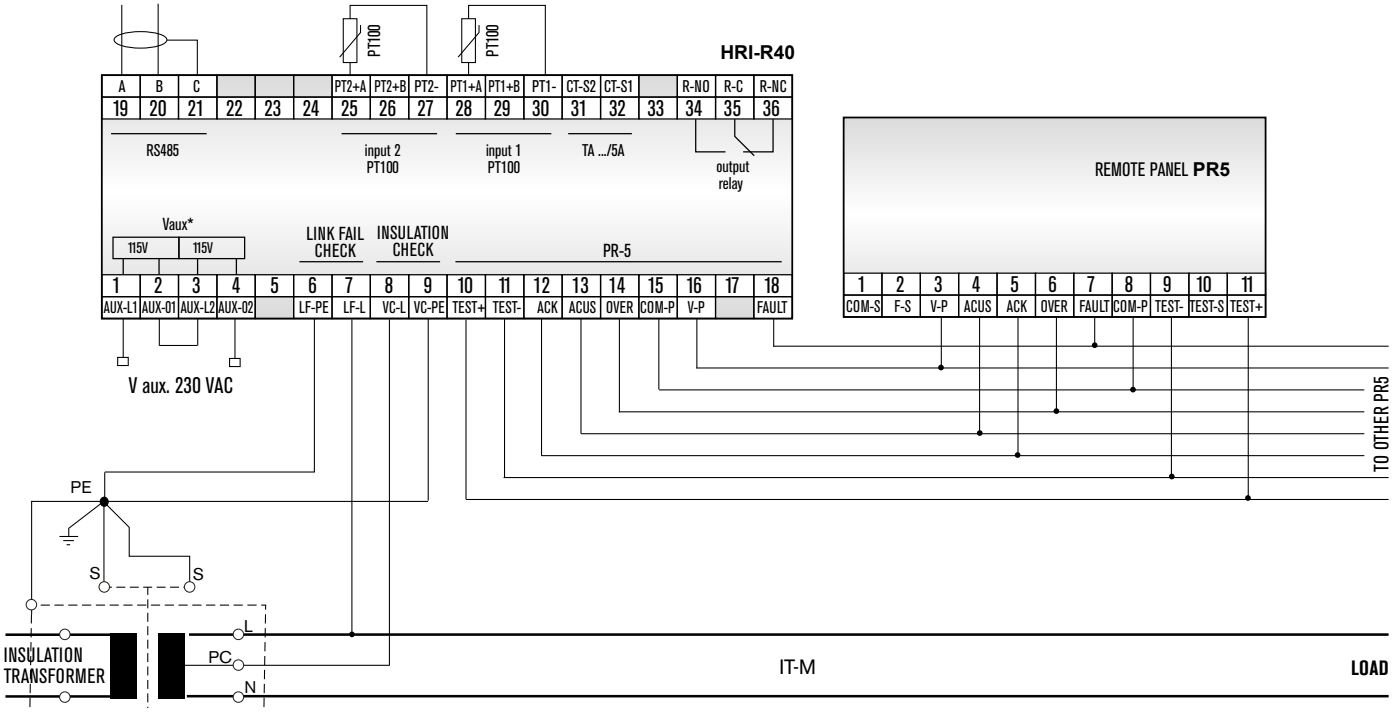
MEDICAL INSULATION MONITORING DEVICE

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 Rd 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	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	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

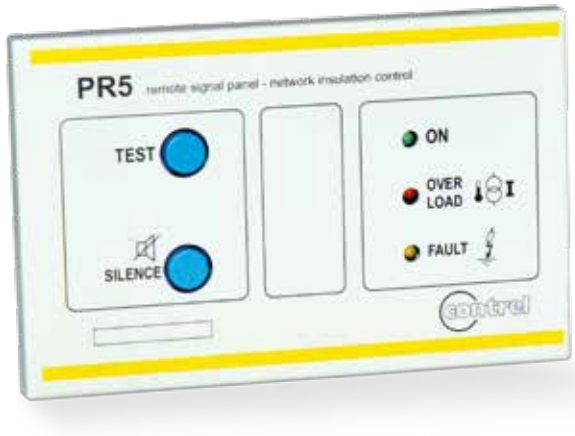
Wiring diagrams



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

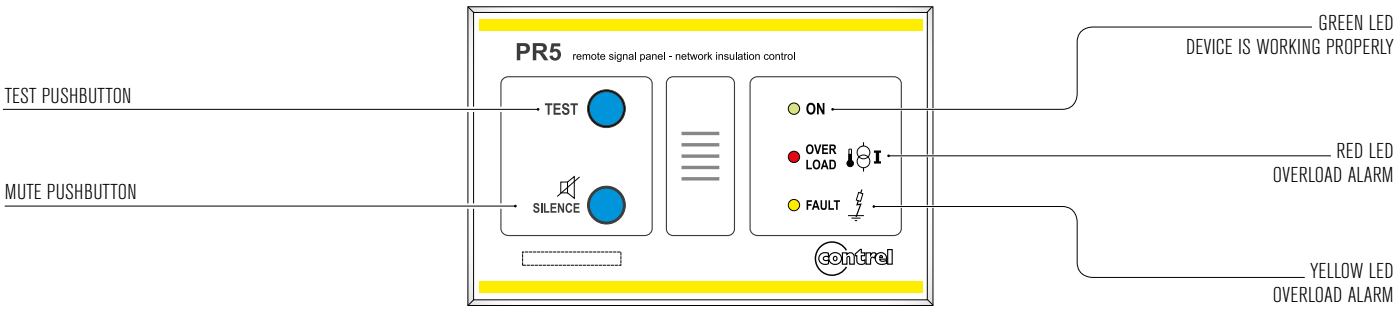
- COMPACT SIZE
- EASY TO INSTALL: INSTALLATION IN A UNIVERSAL 3-MODULE FLUSH-MOUNTED BOX TYPE E503, IN HORIZONTAL OR VERTICAL POSITION
- RELIABILITY: PROMPT FAULT RECOGNITION
- COMFORT: SIMULTANEOUS DISCONNECTION OF MORE SIGNALLING PANELS
- OPERATIONAL EFFICIENCY: BOTH VISUAL AND ACOUSTIC SIGNALLING

Technical characteristics

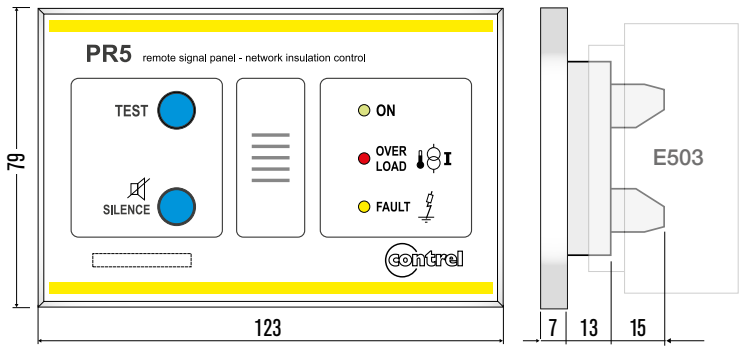
Signals	Green LED NETWORK; Red LED overload ALARM; Yellow LED FAULT ALARM; Low insulation; Acoustic signaller; Emission 2400 Hz; Intermittence 2 Hz dB
Pushbuttons	Testing (TEST), acoustic disconnection (MUTE)
Terminal blocks section	2,5 mm²
Degree of protection	IP 30
Installation	E503universal 3-module 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 functioing



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 extend the potential of HRI-R40 family, providing a data collector function togheter 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/dissapation	<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

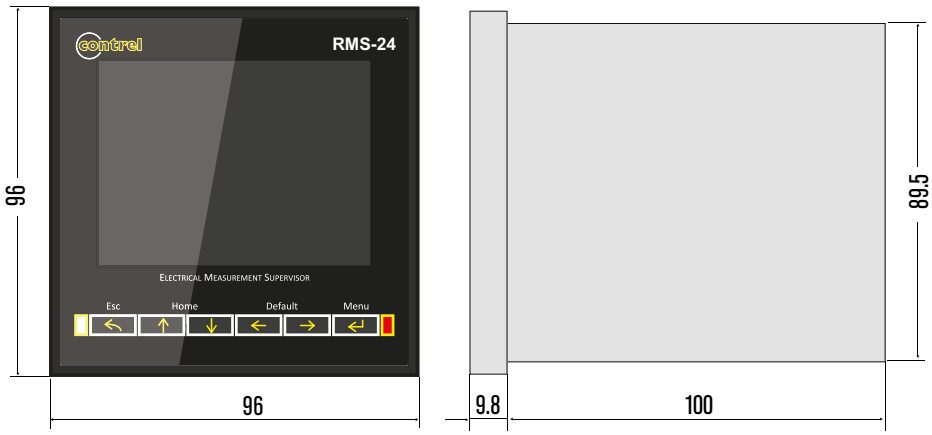
Format	320x240 pixel
Dimension	3.5“
INSULATION	
Insulation voltage	3.7kV for 1 minute
HOUSING	
Mouting	Flush mount
Dimension L x H	96 x 96 x 100 mm
Cutout	92 x 92 mm
Protection degree	IP52 on front | IP20 housing
Weight	450g
AMBIENT CONDITIONS	
Operating temperature	-10...+50 °C
Storage temperature	-15...+70 °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 lentgh 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 thres hold.

COMPLETE MONITORING OF ALL ELECTRICAL PARAMETERS

Free string with a max lentgh 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 continous sound (FIX mode) or alternating (DISCONTINOUS mode).

RMS-24

MULTIROOM MONITORING SYSTEM AND REMOTE MANAGEMENT

Wiring diagrams