



# HRI-R40 series HRI-R40W series

INSULATION MONITORING  
VERSIONS FOR USE IN MEDICAL ROOMS

## GENERAL



### HRI-R40 series

This device allows insulation monitoring to earth of supply network and thermal and electric overcharge monitoring of transformer. This works in order to serve everything requested in specific standard regulation for these applications.

Insulation's resistance monitoring is carried out applying a measure's signalling between isolated network and earth.

Surveying leakage generated to earth it's possible to measure insulation's level.

Modern and sophisticated measure's techniques integrated allow correct measure of insulation's resistance level also in case of strong obstructions, with high harmonic and direct-current components.

HRI-R40 model uses a monitoring signalling with direct-current component. For reducing problems caused by the presence of direct-current components on network (rectifiers), device has a digital filter which is able to divide the majority of direct-current from eventual direct-current components in network.

HRI-R40 could set a large number of programming possibilities with frontal button and 3 digit digital display for visualising measuring and programming parameters.

### HRI-R40W series

HRI-R40W version has same fundamental characteristics of previous model but it uses particular measuring technique applying a measure's signal codified and varying, in order to guarantee a correct measure of insulation independently from under-control network type.

Device has two input of temperature's measure (one is optional) for temperature's probe PT100 or PTC (DIN 44081) for monitoring thermal overcharge of insulation's transformer.

There is also a input of current's measure of current transformer for monitoring overcharge on network.

Signalling output are apt for coupling with specific panels of signalling and remote monitoring PR5 (max 2 panels, on request 4 panels).

There is also a output for relay voltage-free with functions adjustable by the user.

Optionally it's available a serial output RS485 for bidirectional communication with monitoring system (PLC, PC, and so on).

Communication's protocol used is MODBUS-RTU.

Specific characteristics make these devices conform to standard regulation:

EN 61557-8

IEC 60364-7-710

VDE 0100 part 710

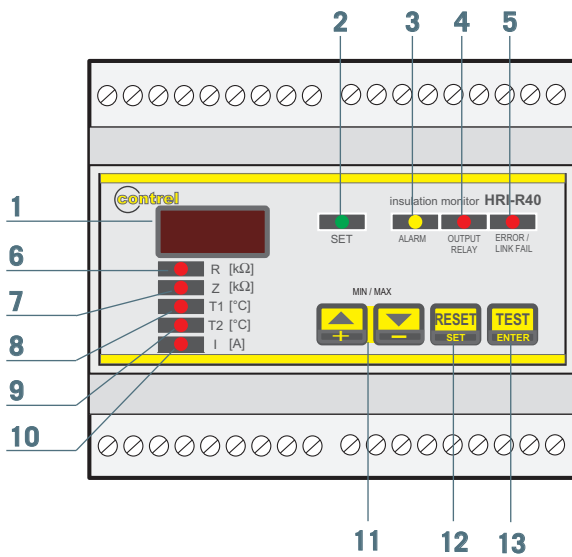
CEI 64.8/7-710 V2

UNE 20615.

Actually presence in network of strong distortions with high harmonic components (sub harmonic) and direct-current components could cause measure's problems to others techniques.

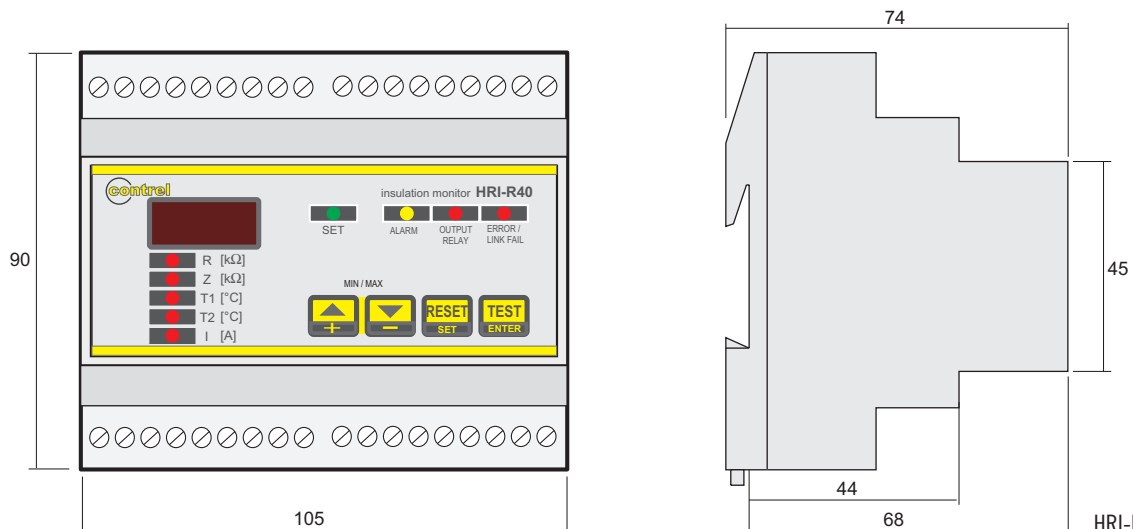
This solution allow the using of HRI-R40W in network with rectifiers, power's electronics, variable-speed drive and so on.

## FUNCTIONS AND OPERATORS - LEGEND



- 1 display for visualising under-control parameters' degree and for visualising settings
- 2 green LED SET for indication of programming status
- 3 yellow LED ALARM for indication alarm for parameter's degree out-threshold
- 4 red LED OUTPUT RELAY for indication status of auxiliary relay output
- 5 red LED ERROR / LINK FAIL for indication alarm of internal failure, lack connection to under-control network, temperature's probe PT100 open or short circuit
- 6 red LED R for indication visualisation of insulation's resistance parameter; flashing light for out-threshold parameter
- 7 red LED Z for indication visualisation of insulation's impedance parameter; flashing light for out-threshold parameter.
- 8 red LED T1 for indication visualisation parameter of transformer's temperature; flashing light for out-threshold parameter.
- 9 red LED T2 for indication visualisation parameter of second sensor temperature; flashing light for out-threshold parameter.
- 10 red LED I for indication visualisation current of network parameter; flashing light for out-threshold parameter.
- 11 button +/- UP/DOWN for selecting parameter that has to be visualised, for regulating device's setting and for visualising maximum and minimum memorized degrees
- 12 button RESET / SET for entering device's programming, for stopping alarms and memorized degrees resetting
- 13 button TEST / ENTER for testing device and remote signalling panels and for confirming SETUP settings

## DIMENSIONS



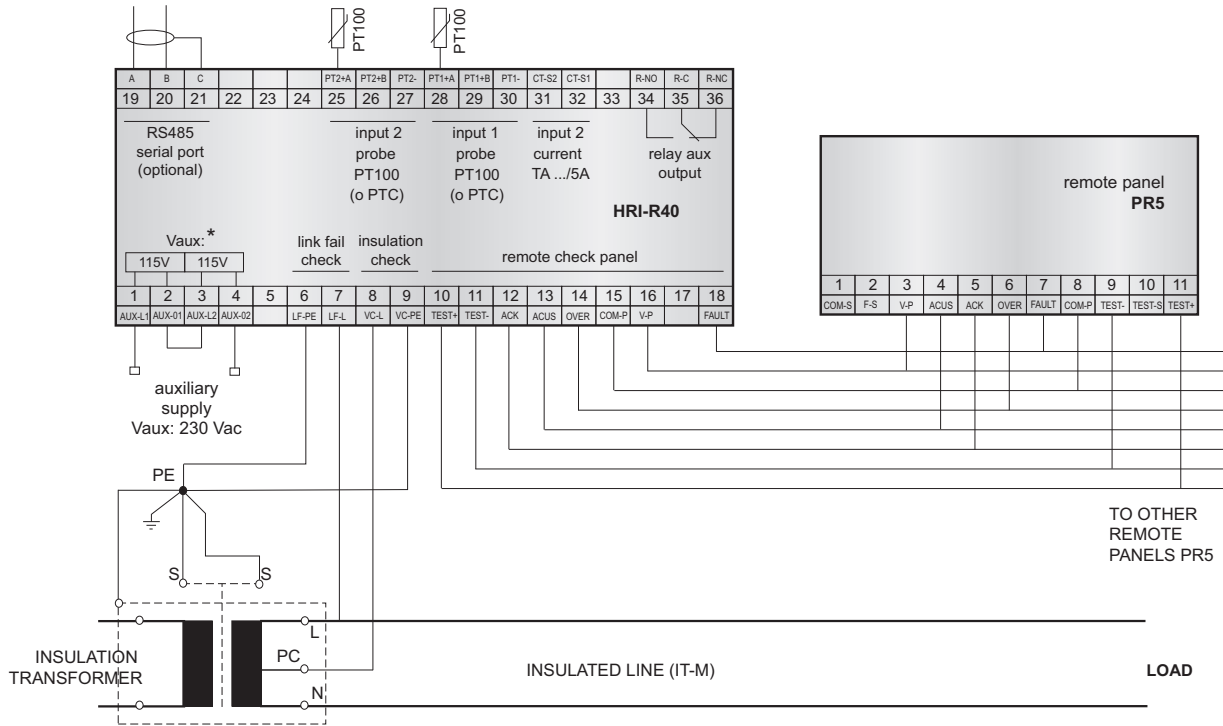
## ELECTRIC CHARACTERISTICS

| TYPE                                     | HRI-R40  | HRI-R40W                        |
|--|--|---------------------------------|
| Auxiliary supply                         | 110 - 230 V $\pm$ 20%  | 110 - 230 V $\pm$ 20%           |
| Frequency                                | 50 $\div$ 60 Hz  | 50 $\div$ 60 Hz                 |
| Self-consumption                         | 5 VA   | 5 VA                            |
| Unde-control network voltage             | 24 $\div$ 230 V 50 $\div$ 60 Hz  | 24 $\div$ 230 V 50 $\div$ 60 Hz |
| Voltage's measure                        | 24 V   | 24 V                            |
| Current's measure                        | 1 mA   | 1 mA                            |
| Internal impedance for resistive measure | 200 kohm   | 200 kohm                        |
| Selectable trip threshold                | 50 $\div$ 500 kohm (low insulation)<br>hysteresis 10 % 20 $\div$ 180 °C (over-temperature)<br>precision 2 % - 1 $\div$ 99.9 A (over-current)<br>precision 2 % - delay 1 $\div$ 60 sec  |                                 |
| Visualisation                            | insulation and impedance's degree by three digits display 1 $\div$ 999 kohm<br>temperature's degree 0 $\div$ 200 °C (1st and 2nd probe) by display<br>current's value 0 $\div$ 99.9 A by display<br>parameters' configuration<br>output status:<br>- signalling alarms' led<br>- led of signalling output of active relays<br>- led of failed insertion signalling |                                 |
| Output                                   | for PR5 (max 5) panel + 1 contact NO-C-NC 5 A - 250 V<br>low insulation, overload<br>+ option serial RS485 MODBUS-RTU  |                                 |
| Input                                    | from isolated network 230 Vac (insulation measure)<br>1st probe PT100 2 or 3 wires (temperature measure) 30 $\div$ 200 °C $\pm$ 2%<br>2nd probe PT100 2 or 3 wires (temperature measure) (OPTIONAL) 30 $\div$ 200 °C $\pm$ 2%<br>CT (overload current' measure max 5 A precision 2 %<br>current transformer ratio selectable 1 $\div$ 40                           |                                 |
| Voltage of signal circuit                | < 24 Vdc   | < 24 Vdc                        |
| Measure's method                         | signalling dc  | codified and varying signal     |
| Insulation's test                        | 2.5 KV 60 sec  |                                 |
| Working temperature                      | -10 $\div$ 60 °C   |                                 |
| Storing temperature                      | -20 $\div$ 80 °C   |                                 |
| Relative humidity                        | MAX 90 %   |                                 |
| Standard regulation                      | CEI-EN 61010-1 / CEI-EN 61557-8 / VDE 0413 part.8 / CEI 64.8/7-710 V2<br>IEC 60364-7-710 / VDE 0100 part.710 / UNE 20615 / CEI-EN 61326-1  |                                 |
| Assembling according to DIN 50022        | snap on DIN rail 35 mm   |                                 |
| Dimensions                               | 6 modules DIN 17.5 mm  |                                 |
| Protection's degree                      | IP50 frontal - IP20 case   |                                 |
| Connections                              | by screw terminals max 2.5 mm <sup>2</sup>   |                                 |

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## WIRING DIAGRAMS - LEGENDA HRI-R40 AND HRI-R40W



### AUXILIARY SUPPLY - TERMINALS 1-2-3-4

supply's section is carried out with double input 115 V nominal  
for device supplying with 230 V, it is required to connect both sections in series  
for device supplying with 115 V, it is required to connect both sections in parallel

### LINK-FAIL MONITORING - TERMINALS 6-7

both terminals have to be connected between a isolated network's phase and unipotential node (PE)  
Maximum applicable voltage is 250 V (see insulation's monitoring)

### INSULATION'S MONITORING - TERMINALS 8-9

both terminals have to be connected between centre tap of secondary transformer or a isolated network's phase and unipotential node (PE)  
Maximum applicable voltage is 230 Vca so single phase networks could have max voltage of 230 V, three phase networks three wires could have max voltage of 230 V phase-phase; but three phase networks four wires could have max voltage of 230 V phase-neutral

### REMOTE PANEL'S CONNECTIONS PR5 - TERMINALS 10-11-12-13-14-15-16-18

connections for linking to remote panels PR5, Max voltage on these conductors is 24 V

### SERIAL PORT RS485 (OPTIONAL) - TERMINALS 19-20-21

terminals A-B (19-20) head to serial bus, terminal C (21) is a mass' reference that could be connected to eventual screen of cable RS485  
Standard protocol used is modbus-rtu, documented in a specific handbook [IM833-U]

### INPUT TEMPERATURE PROBE 2 (OPTIONAL) - TERMINALS 25-26-27

connections for linking to a temperature's sensor - PT100 (EN 60751) or PTC (DIN 44081) sensor could be used.  
In case of PT100 probes three wires, it is required to connect compensation's conductor to the same terminal of correspondent conductor.  
In case of PTC, it is necessary external resistor of 120 ohm min 1/4 W

### INPUT TEMPERATURE PROBE 1 - TERMINALS 28-29-30

connections for linking to a temperature's sensor - PT100 (EN 60751) or PTC (DIN 44081) sensor could be used.  
In case of PT100 probes three wires, it is required to connect compensation conductor to the same terminal of correspondent conductor.  
In case of PTC, it is necessary external resistor of 120 kohm min 1/4 W

### INPUT FOR CURRENT MEASURE - TERMINALS 31-32

connection for external current transformer with secondary 5 A (current transformer ratio is programmable); if there is 3-phase network must be used the special adapter type TSA-03 for 3 current transformer to permit to monitor in the insulation relay the highest value of the 3-phase currents.  
Only the module of the current value is measured (i.e. it is not important S1-S2 connection sequence).

### OUTPUT AUXILIARY RELAY - TERMINALS 34-35-36

switch contact free from voltage and with programmable functions. Contact's performance MAX 250 V 5 A resistive load