



EARTH LEAKAGE RELAY

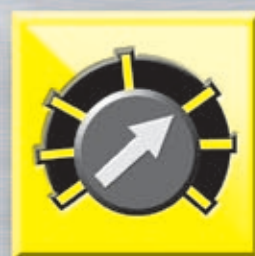
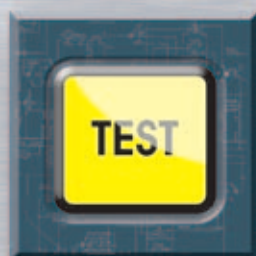
ELR series

**RELAY FOR PERMANENT CONTROL
OF THE MCCB'S TRIPPING CIRCUIT
AND ACTUATOR FOR SAFETY CIRCUITS**

TCS series

**STATIC RELAY FOR
MOTOR RE-START
AND REACCELERATION**

RSR series



MICROENER



ELR

Multi-range Earth Leakage Relays for DIN rail or Flush mounting.

ELRC

Compact ELR with Built-in Toroid Transformer, for DIN rail or surface mounting.

CT-1 / CTA-1

Toroidal current transformers

TCS

Relay for permanent control of the MCCB'S tripping circuit and actuator for safety circuits

RSR

Static relay for motor re-start



Certified Quality

PRODUCTS

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DIN RAIL MOUNTING. WITH AUTOMATIC TRIP AND RECLOSING FOR CONTROLLING THE EARTH LEAKAGE IN PUBLIC LIGHTING, REFRIGERATION ROOMS, TRAFFIC LIGHTS AND SIMILAR UNATTENDED INSTALLATIONS

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■ STATIC RELAY FOR MOTOR RE-START AND REACCELERATION

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ELR-3C

EARTH LEAKAGE RELAY DIN RAIL MOUNTING VERSION

GENERALITY



The **ELR-3C**, maintain all the basic characteristics of the DIN 96x96 mm series, although its reduced dimensions. It is one of the relays series, built in a modular enclosure, according with DIN 43880 Standard, with a three modules module base 17.5 mm.

Its wide setting ranges allows to select the tripping current, in order that the contact voltage values are maintained below 50V as required by the CEI 64-8 Standard.

This is also the suitable answer for a proper selectivity, whenever there are other ELR's or/and RCD's downstream or upstream in the line to be protected.

MODELS

ELR-3C	110Vac/dc - 230 - 400 Vac
ELR-3C	24 - 48 Vac/dc
ELR-3C	12 Vac/dc

OPTIONS

T	tropicalisation
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An outstanding characteristic of the present relays, is the permanent control of the Toroidal - ELR circuit.

Its interruption brings along the immediate trip of the protection. This allows to identify the anomaly, without waiting to the periodical control, made with the Test push button.

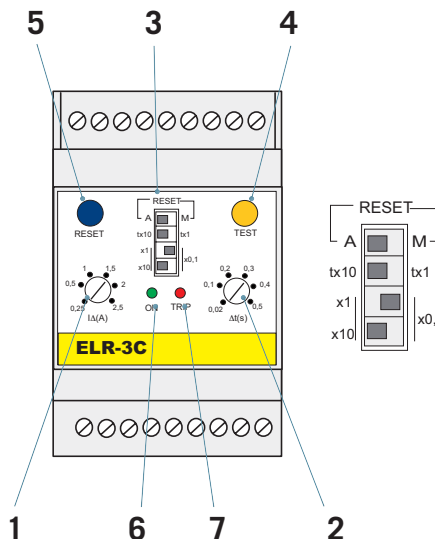
The instrument, fitted with filters at the input circuits, is practically immune to external disturbances, so as the pulse currents with dc components, complying with the requirements of VDE 0664 and project IEC 23 Standards.

The ELR-3C has the possibility of an automatic or manual reset, selectable by a micro switch and to protect the settings by its sealable transparent front cover.

This relay accepts also the possibility of a remote test.

It may also be coupled to any of our CT-1 Toroidal Transformers.

LEGEND



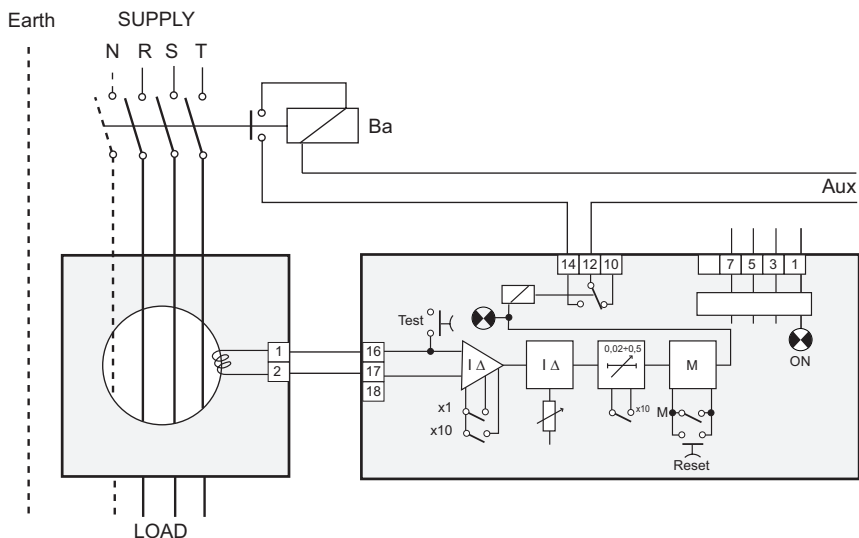
1	Current tripping setting potentiometer
2	Tripping time setting potentiometer
3	Micro switches for programming: a In position 1 automatic reset; In position 0 manual reset b Selection of the multiplying constant Tripping time, in position 1 K=10; in position 0 K=1 c,d Selection of the multiplying constant of tripping current: With c, d in position 0 K=0.1 With c in position 1, d in position 0 K=1 . With c, d in position 1 K=10
4	Push button for Test
5	Push button for manual reset
6	Signalling green LED for Aux. Supply presence
7	Signalling red LED for relay tripped

ELECTRICAL CHARACTERISTICS

models and value	ELR - 3C	
Auxiliary Voltage supply	24÷48 Vac/dc	110 Vac/dc 230 - 400 Vac ± 20% (standard)
Frequency	50 ÷ 60 Hz	
Maximum consumption	3 VA	
Current tripping ajustment range IΔN	0,025÷0,25A K=0,1 - 0,25÷2,5A K=1 - 2,5÷25A K=10 25÷250A*	
Tripping time adjustment range t	0,02 ÷ 0,5 sec. K=1 - 0,2 ÷ 5 sec. K=10	
Output: 1 changeover contact	5A 250V	
Working Temperature	-10 + 60°C	
Storing Temperature	-20 + 80°C	
Relative humidity	<90%	
Insulation Test	2,5 kV 60 seg.	
Standards	CEI 41-1/IEC 255/VDE 0664/IEC 755/CEI 64.8/ EN 61008-1(1999-11)/EN 62020 (1999-09) / EN 61543 (1996-09) /EN61326-1(1998-04) / EN 61326/A1 (1999-05)-IEC 60947-2 ANNEX M	
Wiring method	Screw terminals for cross section wires 2,5 mm2	
Mounting according DIN 50022	Snap on DIN rail 35 mm	
Protection degree according DIN 40050	IP 20	

* By means of external multiplier (see page 40)

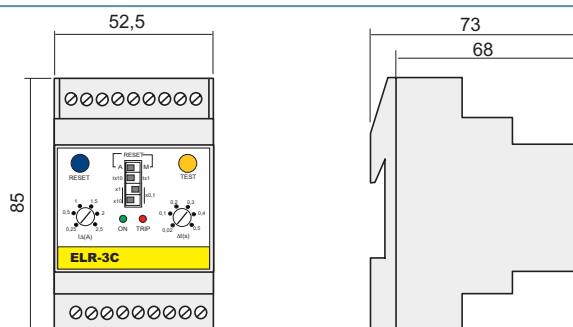
WIRING DIAGRAM



LEGEND

- 7-5 = 12 V ca/cc
- 7-1 = 380 V ca/cc
- 7-3 = 220 V ca/cc
- 7-5 = 110 V ca/cc - ac/dc
- 7-3 = 48 V ca/cc - ac/dc
- 7-5 = 24 V ca/cc - ac/dc

DIMENSIONS



ELR-3F

EARTH LEAKAGE RELAY DIN RAIL MOUNTING VERSION

GENERALITY



The **ELR-3F**, maintains all the basic characteristics of the ELR-3C type relay, with its reduced dimensions even. It is the most simple of a series of relays, built in a modular enclosure, according with DIN 43880 Standard, with a three modules width (module base 17.5 mm) Its two setting ranges (current 0,03 or 0,5A / time 0,02 or 0,5 seconds) allow to select the tripping current, in order that the contact voltage values are maintained below 50V as required by the CEI 64-8Standard. This is also the suitable answer in many of the industrial requirements for a proper selectivity, whenever there are other ELR's or/and RCD's down-

MODELS

ELR-3F	110Vca/cc-230-400Vca I Δ 0,03- 0,5A Δ t 0,02 - 5 sec.
ELR-3F	24-48Vca/cc I Δ 0,03- 0,5A Δ t 0,02 - 5 sec.

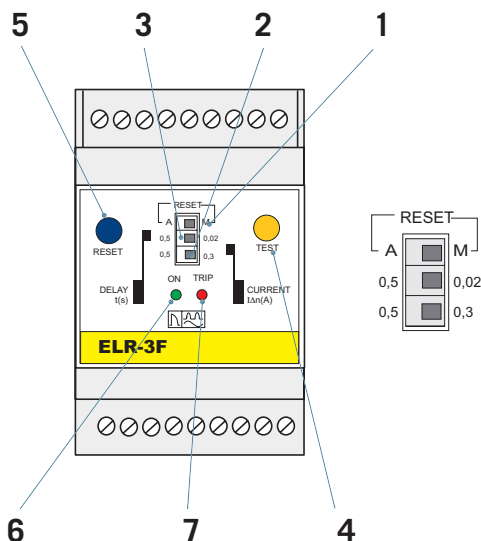
OPTIONS

T	tropicalisation
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stream or upstream in the line to be protected. An outstanding characteristic of the present relays, is the permanent control of the Toroidal - ELR circuit. Its interruption brings along the immediate trip of the protection. This allows to identify the anomaly, without waiting to the periodical control, made with the Test push button. The instrument, fitted with filters at the input circuits, is practically immune to external disturbances, so as the pulse currents with dc components, complying with the requirements of VDE 0664 and project IEC 23 Standards.

The ELR-3F has the possibility of an automatic or manual reset, selectable by a micro switch and to protect the settings by its sealable transparent front cover.

LEGEND

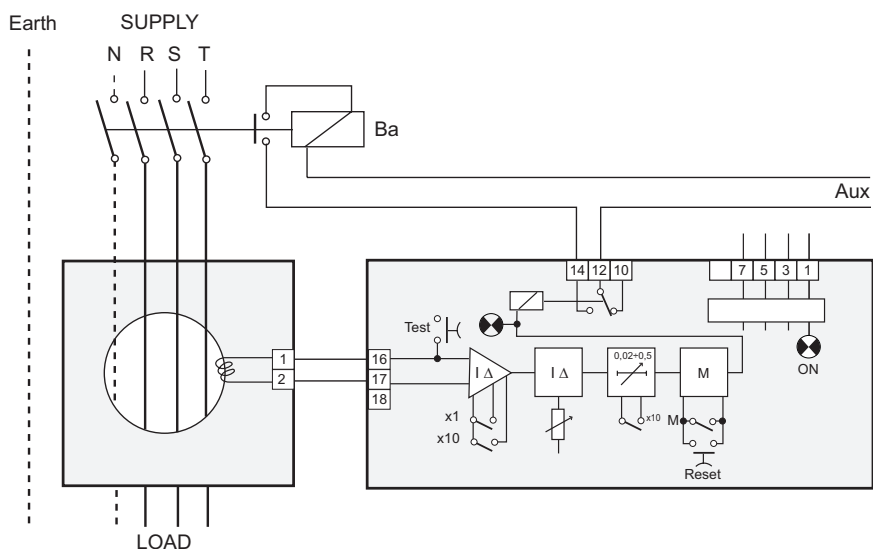


1	Manual or automatic reset selection dipswitch.
2	Tripping current selection dipswitch.
3	Tripping time selection dipswitch
4	Push button for Test
5	Push button for manual reset
6	Signalling green LED for Aux. Supply presence
7	Signalling red LED for relay tripped

ELECTRICAL CHARACTERISTICS

models and value	ELR - 3F	
Auxiliary Voltage supply	24÷48 Vac/dc	110 Vac/dc 230 - 400 Vac ± 20% (standard)
Frequency	50 ÷ 60 Hz	
Maximum consumption	3 VA	
Current tripping ajustment	0,3 or 0,5A	
Tripping time adjustment range t	0,02 or 0,5 sec.	
Output: 1 changeover contact	5A 250V	
Working Temperature	-10 + 60°C	
Storing Temperature	-20 + 80°C	
Relative humidity	<90%	
Insulation Test	2,5 kV 60 seg.	
Standards	CEI 41-1/IEC 255/VDE 0664/IEC 755/CEI 64.8/ EN 61008-1(1999-11)/EN 62020 (1999-09) / EN 61543 (1996-09) /EN61326-1(1998-04) / EN 61326/A1 (1999-05)-IEC 60947-2 ANNEX M	
Wiring method	Screw terminals for cross section wires 2,5 mm2	
Mounting according DIN 50022	Snap on DIN rail 35 mm	
Protection degree according DIN 40050	IP 20	

WIRING DIAGRAM

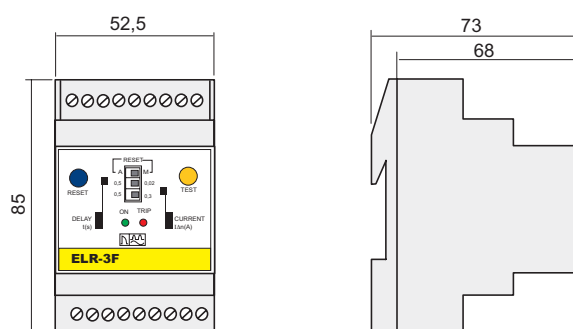


LEGEND

- 7-1 = 380 V ca/ac
- 7-3 = 220 V ca/ac
- 7-5 = 110 V ca/ac - ac/dc

- 7-3 = 48 V ca/ac - ac/dc
- 7-3 = 24 V ca/ac - ac/dc

DIMENSIONS



ELR-3E

EARTH LEAKAGE RELAY DIN RAIL MOUNTING VERSION

GENERALITY



The **ELR-3E**, maintain all the basic characteristics of ELR-3C type, with reduced dimensions. It comes to complete the range of relays, built in a modular enclosure, according with DIN 43880 Standard, with a three modules width (module base 17.5 mm).

It has a wide setting ranges and the accurate tripping current selection (by means of dip switches), in order that the contact voltage values are maintained below 50V as required by the CEI 64-8Standard

This is also the suitable answer for a proper selectivity, whenever there are other ELR's or/and RCD's downstream or upstream in the line to be protected.

MODELS

ELR-3E 110Vac/dc-230-400Vac $I_{\Delta n}$ 0,03-0,1-0,3-0,5-1
 Δt 0,02-0,2-0,5-1-5 sec.

ELR-3E 24-48Vac/dc $I_{\Delta n}$ 0,03-0,1-0,3-0,5-1 Δt 0,02-0,2-0,5-1-5 sec.

OPTIONS

T tropicalisation

An outstanding characteristic of the present relays, is the permanent control of the Toroidal - ELR circuit.

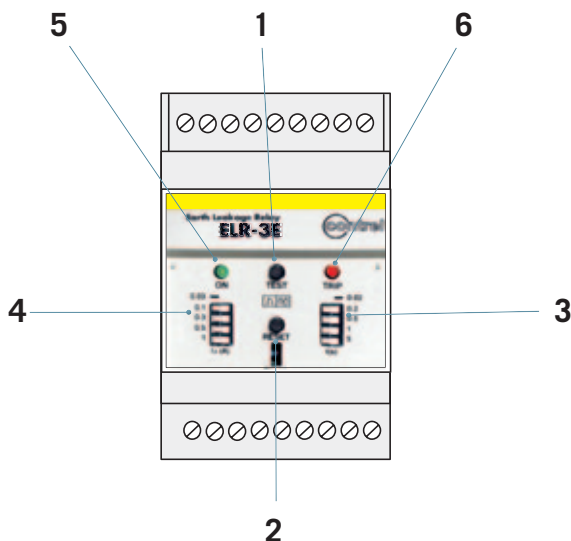
Its interruption brings along the immediate trip of the protection. This allows to identify the anomaly, without waiting to the periodical control, made with the Test push button. The instrument, fitted with filters at the input circuits, is practically immune to external disturbances, so as the pulse currents with dc components, complying with the requirements of VDE 0664 and project IEC 23 Standards.

The ELR-3E has a manual reset option only, in order to avoid unexpected reset, whilst undergoing repairs and maintenance works.

Its sealable front transparent cover may be used to avoid access to the settings to unauthorised persons.

It may also be coupled to any of our CT-1 Toroidal Transformers.

LEGEND



1	Test push button
2	Reset push button
3	Dipswitches for tripping time setting.
4	Dipswitches for current tripping setting
5	Green LED ON - U aux
6	Red LED trip

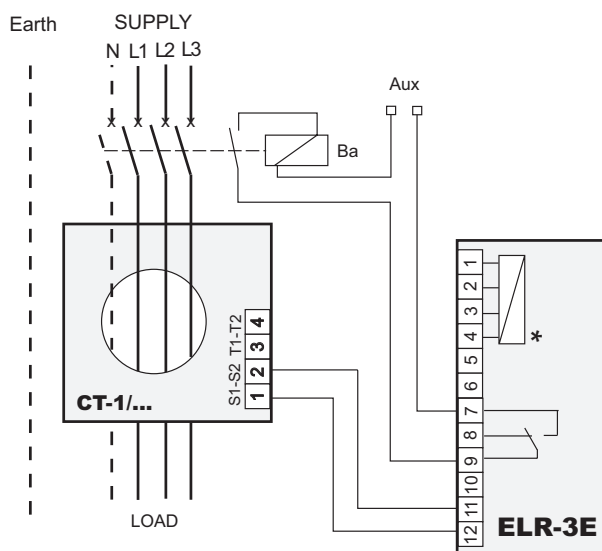
SETTING TRIP AND DELAY

$I_{\Delta n}$	0,03	0,1	0,3	0,5	1
(A)					
t	0,02	0,2	0,5	1	5
(s)					

ELECTRICAL CHARACTERISTICS

models and value	ELR - 3E	
Auxiliary Voltage supply	24÷48 Vac/dc	110 Vac/dc 230 - 400 Vac ± 20% (standard)
Frequency	50 ÷ 60 Hz	
Maximum consumption	3 VA	
Current tripping adjustment range IΔN	0,03 - 0,1 - 0,3 - 0,5 - 1A	
Tripping time adjustment range t	0,02 - 0,2 - 0,5 - 1 - 5 sec.	
Output: 1 changeover contact	5A 250V	
Working Temperature	-10 + 60°C	
Storing Temperature	-20 + 80°C	
Relative humidity	<90%	
Insulation Test	2,5 kV 60 seg.	
Standards	CEI 41-1/IEC 255/VDE 0664/IEC 755/CEI 64.8/ EN 61008-1(1999-11)/EN 62020 (1999-09) / EN 61543 (1996-09) /EN61326-1(1998-04) / EN 61326/A1 (1999-05)-IEC 60947-2 ANNEX M	
Wiring method	Terminals for cross section cable of 2,5 mm ²	
Mounting according DIN 50022	Quick mountin on a DIN rail of 35 mm	
Protection degree according DIN 40050	IP 20	

WIRING DIAGRAM

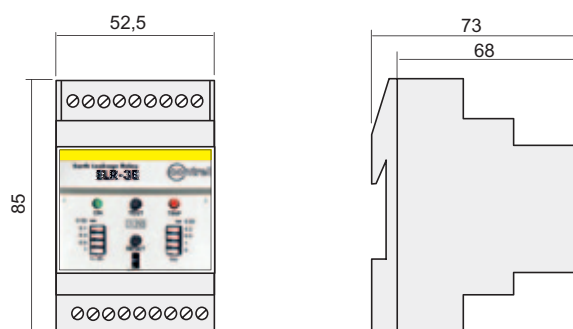


LEGEND

- 1-4 = 380-415 V ac
- 1-3 = 220-240 V ac
- 1-2 = 110-125 V ac / dc
- 1-3 = 48 V ac/dc
- 1-2 = 24 V ac/dc

* Auxiliary supply Uaux:

DIMENSIONS



ELR-61 / ELR-M61 ELR-62 / ELR-M62

EARTH LEAKAGE RELAY
DIN RAIL MOUNTING VERSION

GENERALITY



The **ELR-61 -ELRm-61 -ELR-62 -ELRm-62** are serie of Earth Leakage Relays manufactured within a modular enclosure, according with DIN 43800 Standard, with 6 modules width (module base 17,5mm.).

An outstanding characteristic of the present relays, is the permanent control of the Toroidal - ELR circuit.

Its interruption brings along the immediate trip of the protection. This allows to identify the anomaly, without waiting to the periodical control, made with the Test push button.

The instrument, fitted with filters at the input circuits, is practically im-

MODELS

ELR-61 / ELR-m61 ELR-62 / ELR-m62	110-230-400 Vac
ELR-61 / ELR-m61 ELR-62 / ELR-m62	24-48 Vac/dc
ELR-61 / 10 setting trip current 10mA	110-230-400 Vac

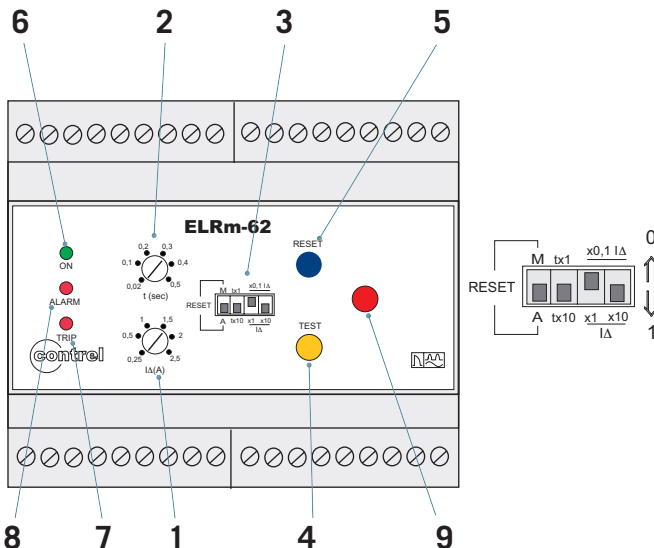
OPTIONS

F	built-in filter for 3rd harmonic
SP	fail safe
T	tropicalisation

mune to external disturbances, so as the pulse currents with dc components, complying with the requirements of VDE 0664 and project IEC 23 Standards.

The optional alarm feature (ELR-62) tripping at 70% of the adjusted tripping current, may advise in advance about a lack of isolation situation.

LEGEND



1	Tripping time delay setting potentiometer
2	Tripping current setting potentiometer.
3	Constant selection microswitch: Constant selection for time settings: K = 1 for micro(b) in position 0; K=10 for micro (b) in position 1; Constant selection for current settings: K=0,1 for micros (c-d) in position 0; K= 1 for micro (c) in position 1 and (din position 0); K=10 for micro (c) in position 1 and micro (d) in position 1.
4	Test push button.
5	Manual reset push button.
6	Signallig lamp for Aux.Supply presence (green LED).
7	Signalling lamp for relay tripped (red LED)
8	Signalling lamp for alarm threshold over come (Red LED) at 70% of the I _{AN} (only for ELR-62 and ELR-m62)
9	Mechanical Signalling (only for ELR-m61 and ELR-m62)

ELECTRICAL CHARACTERISTICS

models and value	ELR- 61**	ELRm-61	ELR-62	ELRm-62
Auxiliary Voltage supply	24-48 Vac/dc	110-230-400 Vac (standard)	± 20%	
Frequency	50 ÷ 60 Hz			
Maximum consumption	4 VA			
Current tripping adjustment range IΔN	0,025÷0,25 A K=0,1 - 0,25÷2,5 A K=1 - 2,5÷25 A K=10 25÷250 A*			
Allarm current range	-		70%	
Tripping time setting range	0,02 ÷ 0,5 sec. K=1 - 0,2 ÷ 5 sec. K=10			
Mechanical Signalisation	-	•	-	•
Output: 2 changeover contacts	5A 250V			
Working Temperature	-10 + 60 °C			
Storing Temperature	-20 + 80 °C			
Relative humidity	90%			
Insulation Test	2,5 kV 60 sec.			
Standards	CEI 41-1/IEC 255/VDE 0664/IEC 755/CEI 64.8/ EN 61008-1(1999-11)/EN 62020 (1999-09) / EN 61543 (1996-09) /EN61326-1(1998-04) / EN 61326/A1 (1999-05)-IEC 60947-2 ANNEX M			
Wiring method	Screw terminals for cross section wires 2,5 mm ²			
Protection degree according DIN 40050	IP 20			

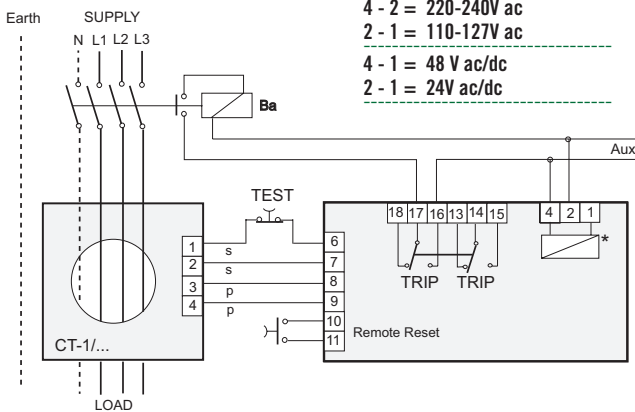
*By means of external multiplier (see pag. 40) - ** Available with current tripping adjustment range 0,01÷10A

WIRING DIAGRAM - LEGEND

ELR-61 / ELR-m61

* Auxiliary supply Uaux:

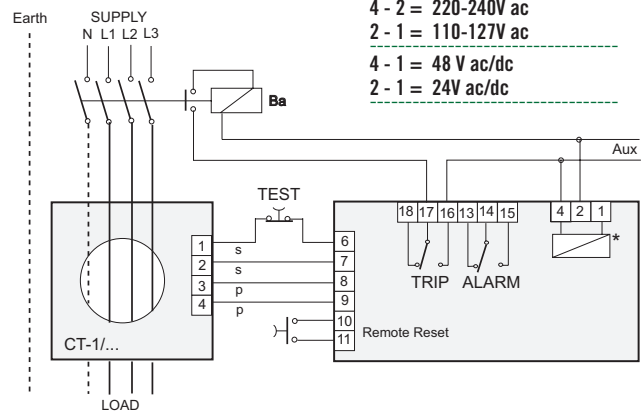
- 4 - 1 = 380-415 V ac
- 4 - 2 = 220-240V ac
- 2 - 1 = 110-127V ac
- 4 - 1 = 48 V ac/dc
- 2 - 1 = 24V ac/dc



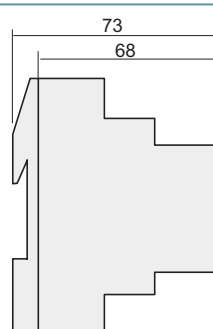
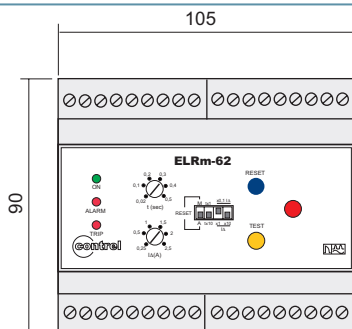
ELR-62 / ELR-m62

* Auxiliary supply Uaux:

- 4 - 1 = 380-415 V ac
- 4 - 2 = 220-240V ac
- 2 - 1 = 110-127V ac
- 4 - 1 = 48 V ac/dc
- 2 - 1 = 24V ac/dc



DIMENSIONS



ELRC-B

EARTH LEAKAGE RELAY

“COMPACT” VERSION WITH BUILT-IN TOROIDAL TRANSFORMER FOR DIN RAIL MOUNTING

GENERALITY



The **ELRC-B**, with all features and wide tripping current and time setting ranges of the ELR's family, has been manufactured in a compact design of 6 modules DIN (17.5 mm) with a built-in Toroidal Transformer of 28 mm inner diameter for the passage of the cables.

All this allows to reduce to the very minimum the wiring, the overall dimensions and to avoid the disturbances, due to the possible electromagnetic fields which could be coupled to the wiring between the T/T and the ELR.

MODELS

ELRC-B	110 Vac/dc - 230 - 400 Vac
ELRC-B	24-48 V ac/dc

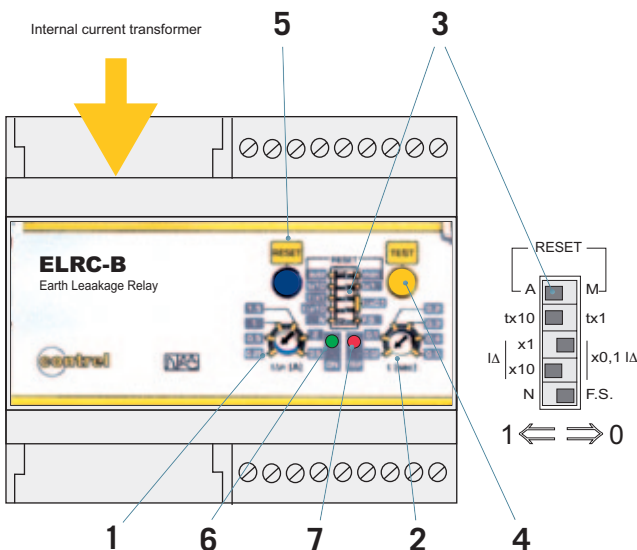
OPTIONS

F	built-in filter for 3rd harmonic
T	tropicalisation

It also has a micro switch, which allows the selection of the working method of the end relay. This could be as normally de-energized (non tripped) or normally energized (fail safe).

So as for the rest of the ELR's range, the preset ELR is fitted with the appropriated filters at the input circuits to make it immune to external disturbances and the electronically control of the internal circuits and the T/T.

LEGEND

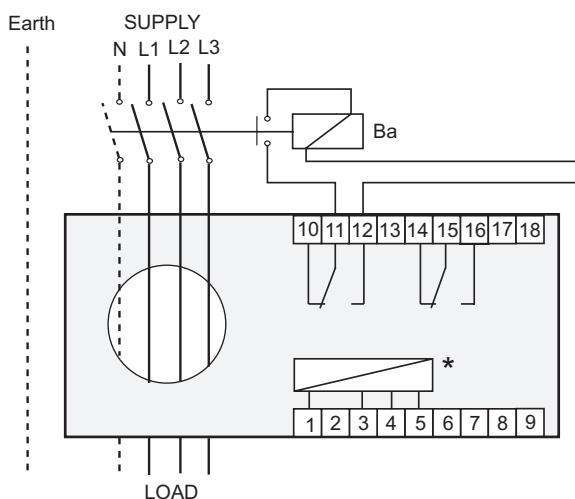


1	Current tripping setting potentiometer.
2	Tripping time setting potentiometer.
3	Micro switches for programming: <ul style="list-style-type: none"> • a In position 1 automatic reset; In position 0 manual reset • b Selection of the multiplying constant Tripping time, in position 1 K=10 in position 0 K=1 • c,d Selection of the multiplying constant of tripping current: With c d in position 0 K=0.1 With c in position 1, d in position 0 K=1 . With c, d in position 1 K=10 • e In position 1 the output relays will be de-energized at rest, in position 0 the output relays will be energized at rest (fail safe).
4	Push button for Test
5	Push button for manual reset
6	Signalling green LED for Aux. Supply presence
7	Signalling red LED for relay tripped

ELECTRICAL CHARACTERISTICS

models and value	ELRC-B	
Auxiliary Voltage supply	24-48Vac/dc	110 - 230 - 400 Vac (standard)
Frequency	50 ÷ 60 Hz	
Maximum consumption	3 VA	
Current tripping adjustment range IΔN	0,025÷0,25A K=0,1 - 0,25÷2,5A K=1 - 2,5÷25A K=10	
Tripping time setting range t	0,02 ÷ 0,5 sec. K=1 - 0,2 ÷ 5 sec. K=10	
Built in toroidal transformer's diameter	28 mm	
Output: 2 changeover contacts	5A 250V carico resistivo	
Working Temperature	-10 + 60°C	
Storing Temperature	-20 + 80°C	
Relative humidity	< 90%	
Insulation Test	2,5 kV 60 sec.	
Standards	CEI 41-1/IEC 255/VDE 0664/IEC 755/CEI 64.8/ EN 61008-1(1999-11)/EN 62020 (1999-09) / EN 61543 (1996-09) /EN61326-1(1998-04) / EN 61326/A1 (1999-05)-IEC 60947-2 ANNEX M	
Wiring method	Terminals for cross section wires 2,5 mm ²	
Mounting DIN 50022	Snap on DIN rail 35 mm	
Protection degree	IP 40 front with closed cover - IP 20 enclosure	

WIRING DIAGRAM



Wiring diagram with shunt trip of the MCCB and excited end relay (N) for fail safe (F.S.)
 Connect terminals 10 -11 to BA (NO contact under non tripped condition)

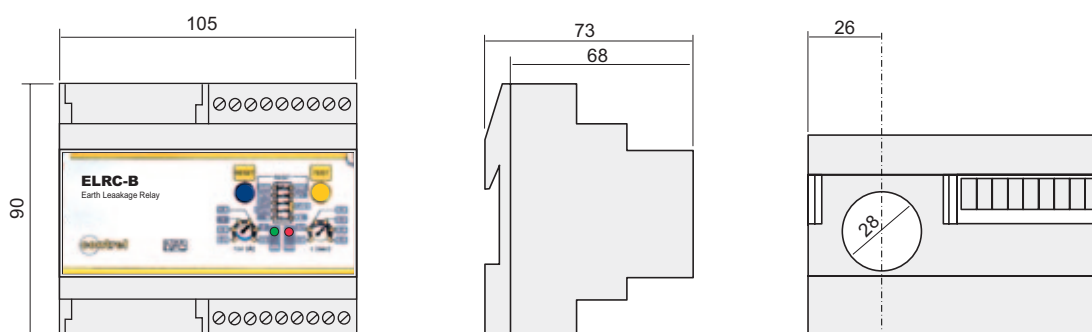
LEGEND

5 - 1 = 400 Vac
 5 - 3 = 220 Vac
 5 - 4 = 110 Vac/dc

5 - 4 = 24 Vac/dc
 5 - 3 = 48 Vac/dc

* Auxiliary supply Uaux.

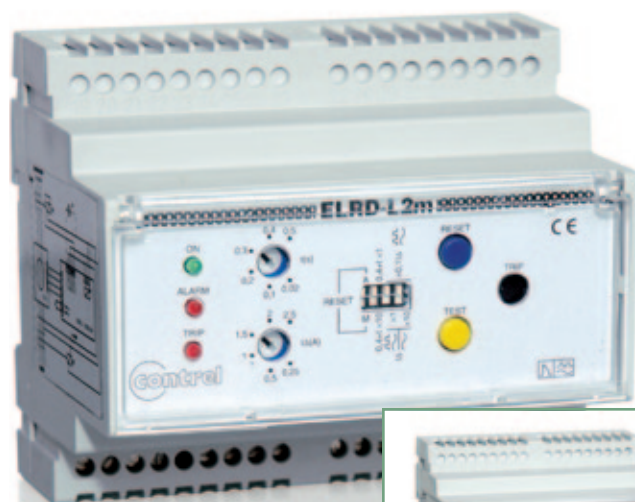
DIMENSIONS



ELRD-L / ELRD-L2m ELRC-BL EARTH LEAKAGE RELAY

DIN RAIL MOUNTING. WITH AUTOMATIC TRIP AND RECLOSING FOR CONTROLLING THE EARTH LEAKAGE IN PUBLIC LIGHTING, REFRIGERATION ROOMS, TRAFFIC LIGHTS AND SIMILAR UNATTENDED INSTALLATIONS.

GENERALITY



MODELS	
ELRC-BL	230 Vac
ELRD-L	230 Vac
ELRD-L2m	230 Vac

OPTIONS	
T	tropicalisation

The **ELRC-BL**, **ELRD-L** and **ELRD-L2M** are devices, which maintain the wide range of current and time settings of the ELR series, being in a 6 modules DIN enclosures for single and three phase installations. They are fitted with special filters at the input for avoiding external disturbance, with following alternatives:

ELRD-L2M: With pre-alarm at 70% of the rated current.

ELRC-BL: With built-in toroidal (inner diameter of 28mm).

The logical working principles of these relays controls the earth leakage of electrical installations, discriminating between transitory and permanent leakages and allowing, therefore, the reclosing or definitive disconnection of the line under control, depending on the type of leakage.

Their most common application is on the Public Lighting Installations and generally unattended installations as Refrigerated Rooms. Sometimes the reason of a section being out of order is due to a lightning which has influenced in a defined area, rebounding to their sections of the line, through the earthing connections.

These devices will react as an earth leakage, but in the next control, 40 seconds later approximately, will verify the disappearance of the leakage and if so they'll proceed to the reclosing of the lighting system, under control. It will avoid that the system remains out of order, with the corresponding intervention of labour hand for the manual reclosing.

As far as its operation is concerned, we can study two leakage types, as follows:

As far as its operation is concerned, we can study two leakage types, as follows:

A) The first leakage situation is occurring between the relays and the contactor, commanded by the first output relay (R1). A typical case for such anomaly, always within the Public Lighting, can be the photo-cell which is earthen through its column.

Under these conditions, if the leakage current (ID) is over the set value, the R1 relay will be energized and the (B1) contactor de-energized, after the elapsing of the time delay (t) programmed, disconnecting the supply to the line.

B) The second leakage situation and the most common, is the one happening at the contactor's end. Under such given situation, the R1 relay will be energized and the (B1) contactor de-energized, after the elapsing of the time delay (t) programmed, disconnecting the supply to the line.

Simultaneously, with the option ELRD-L2M, the mechanical signalisation will come on, even in case of definitive disconnection, due to a permanent earth leakage situation, which might imply the total switch off in the Distribution Board.

In this particular case, as the leakage disappears when the contactor is de-energized, the device is not blocked but it starts an automatic reclosing cycle, 40 seconds after approximately, the R1 is de-energized and the contactor reclosed, supplying to the load again.

The relay will remain blocked, memorizing the intervention, until the manual reset of the unit by the personnel in charge, either directly on the relay or by remote control system. The ELRD-L2M option, with the mechanical signalling, can only be reset manually with the push button at the front plate of the relay. This allows to maintain the earth leakage tripping information although the remote reset of the unit.

After 30 seconds of correctly working time of the line under control, after an automatic reclosing cycle, the device will reset itself the interventions memory and the full cycle may start again.

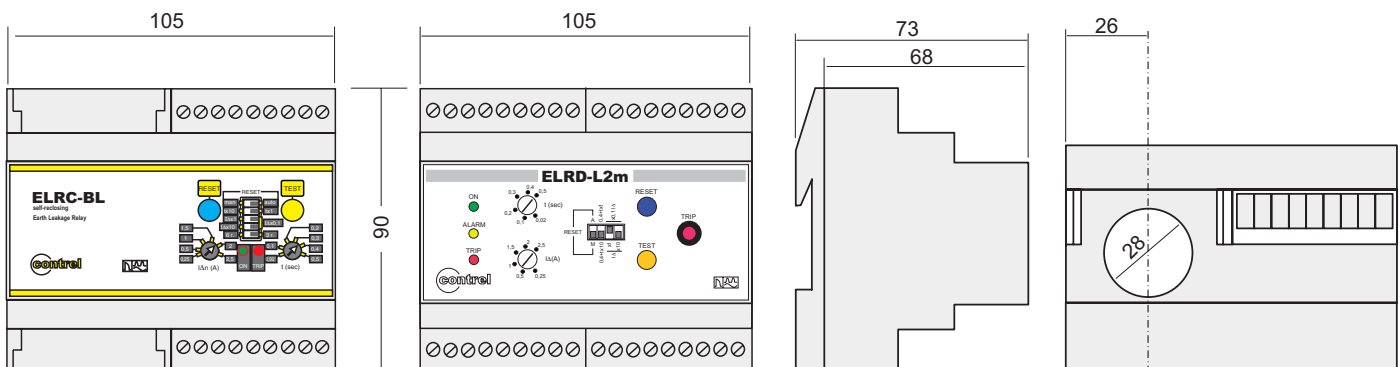
On top of the above the ELRD-L2M is fitted with an alarm threshold of 70% the tripping current set. It is a very useful information to prevent the tripping due to the cables lack of insulation or at the setting operations of the device.

DIN RAIL MOUNTING. WITH AUTOMATIC TRIP AND RECLOSING FOR CONTROLLING THE EARTH LEAKAGE IN PUBLIC LIGHTING, REFRIGERATION ROOMS, TRAFFIC LIGHTS AND SIMILAR UNATTENDED INSTALLATIONS.

ELECTRICAL CHARACTERISTICS

models and value	ELRC-BL	ELRD-L	ELRD-L2m
Auxiliary Voltage supply	230 Vac		
Frequency	50 ÷ 60 Hz		
Maximum consumption	4 VA		
Setting range for current tripping I Δ N	0,025÷0,25A K=0,1 - 0,25÷2,5A K=1 - 2,5÷25A K=10		
Setting range for current alarm	-	-	70% I Δ N
Setting range for time delay R1	0,02 ÷ 0,5 sec. K=1 - 0,2 ÷ 5 sec. K=10		
Setting range for time delay R2	Delay for R1 + 0,4 sec.		
Self-closing	With micro switch in position AUT		
Number of self-closing attempts	3 or 6 consecutive	max 3 consecutive	
Time elapsed between self-closings	25÷35 sec.	50÷70 sec.	
Memory reset	30 seconds after operating without any current leakage		
Mechanical tripping signal	-	-	It comes with the definitive blocking
Output relays	R1 NO-C-NC contact 5A 250V resistive load - R2 NO contact 5A 250V resistive load		
Hole's diameter for passing the cables	28 mm	-	
Working Temperature	-10 + 60°C		
Storing Temperature	-20 + 80°C		
Relative humidity	<90%		
Insulation Test	2,5 kV 60 sec.		
Standards	CEI 41-1/IEC 255/VDE 0664/IEC 755/CEI 64.8/ EN 61008-1(1999-11)/EN 62020 (1999-09) / EN 61543 (1996-09) /EN61326-1(1998-04) / EN 61326/A1 (1999-05)-IEC 60947-2 ANNEX M		
Wiring method	By terminal block with cross section cable of 2,5 mm ²		
Mounting according with DIN 50022	Mounting on DIN rail 35 mm		
Protection degree	IP 40 front with closed cover - IP 20 enclosure		

DIMENSIONS

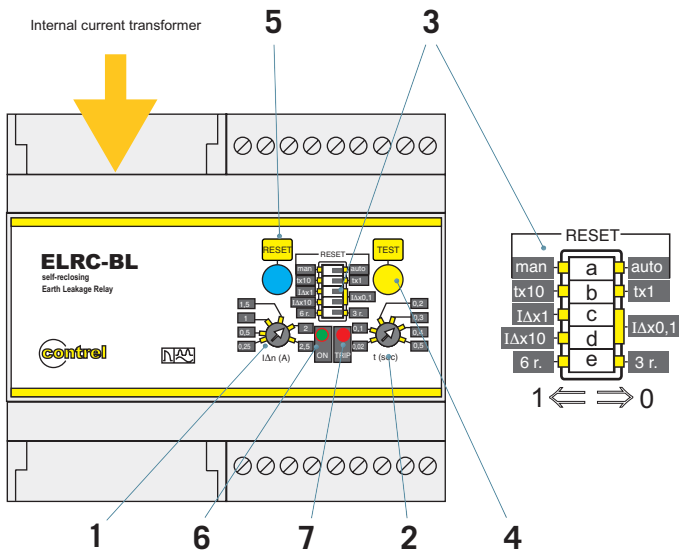


ELRD-L / ELRD-L2m / ELRC-BL

EARTH LEAKAGE RELAY

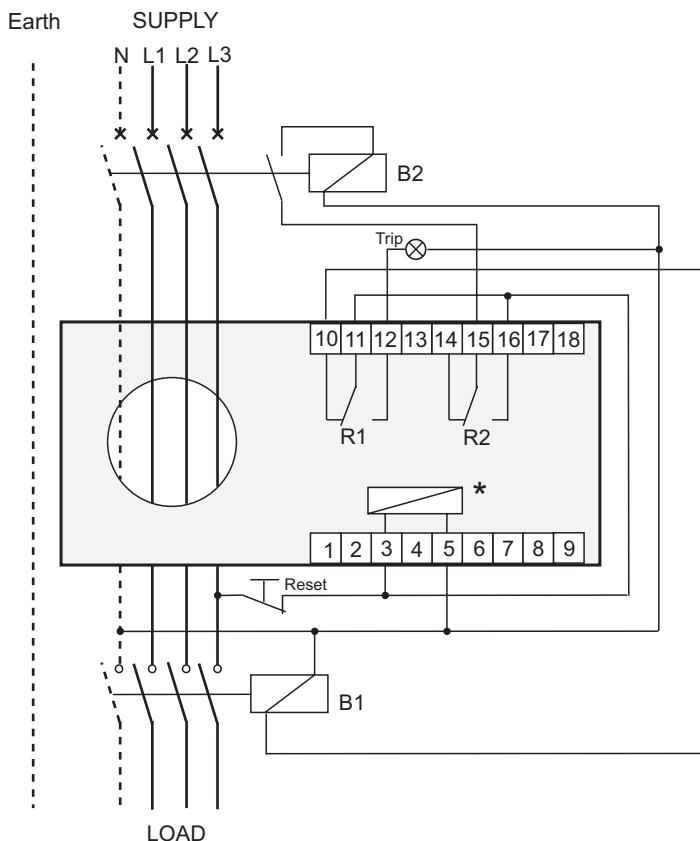
DIN RAIL MOUNTING. WITH AUTOMATIC TRIP AND RECLOSING FOR CONTROLLING THE EARTH LEAKAGE IN PUBLIC LIGHTING, REFRIGERATION ROOMS, TRAFFIC LIGHTS AND SIMILAR UNATTENDED INSTALLATIONS.

LEGEND - ELRC-BL



1	Current tripping setting potentiometer.
2	Tripping time setting potentiometer.
3	Micro switches for programming: <ul style="list-style-type: none"> • a. In position 1: manual reset, In position 0: automatic reset, • b. Selection of the multiplying constant for tripping time In position 1: K=10 In position 0: K=1 • c,d. Selection of the multiplying constant of tripping current: with c and d in position 0: K=0,1 with c in position 1 and d in position 0: K=1 with c and d in position 1: K=10 • e. In position 1: 6 re-closings In position 0: 3 re-closings
4	Push button for Test
5	Push button for manual reset
6	Signalling green LED for Aux. Supply presence
7	Signalling red LED for relay tripped

WIRING DIAGRAM - ELRC-BL



LEGEND

B1
First intervention coil (for de-energising the contactor's coil etc.)

B2
Second intervention coil (for energising the shunt trip coil of the MCCB, etc.)

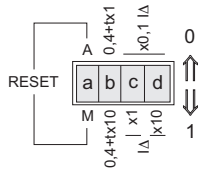
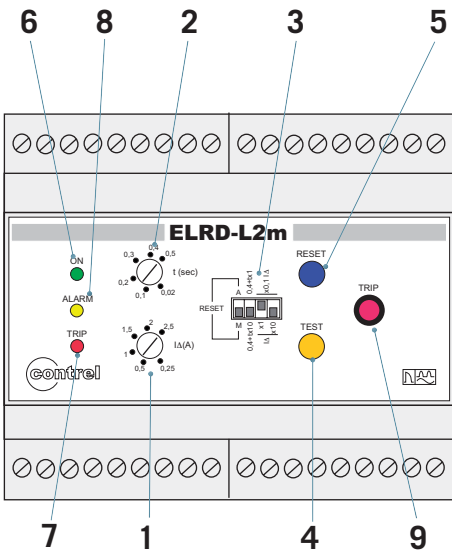
RESET
Remote reset push button (in serie with the relay's power supply)

TRIP
Eventual remote optical signal of tripped relay

* Auxiliary supply Uaux:
terminals [3-5] 220-240V 50-60Hz

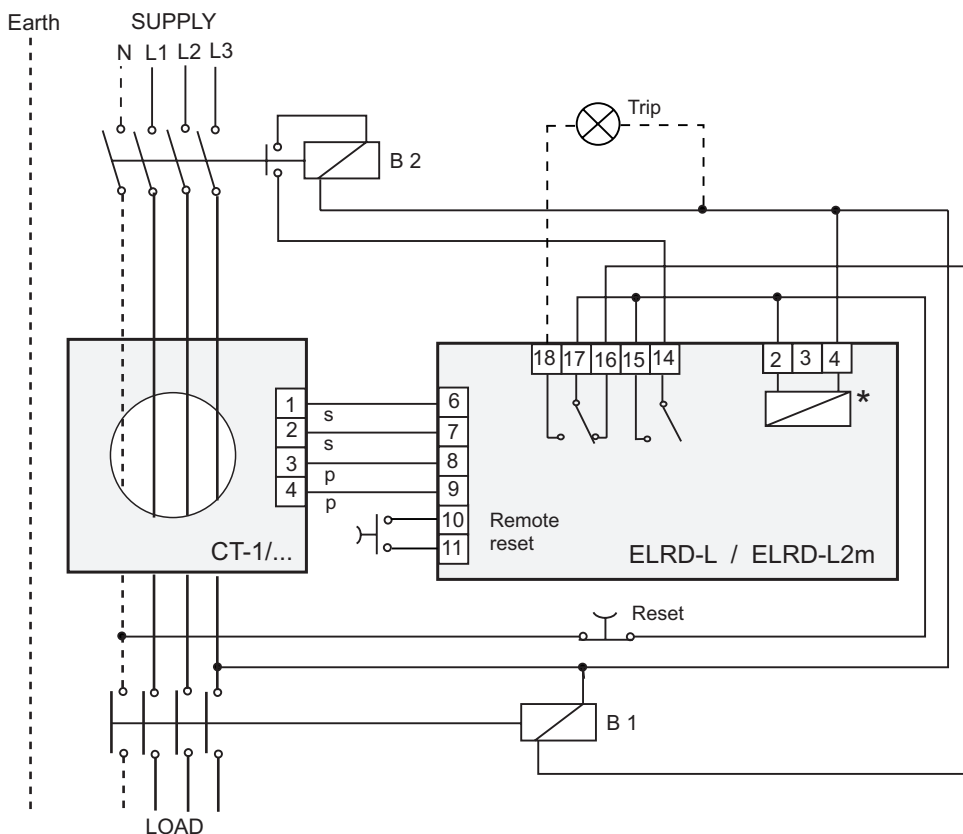
DIN RAIL MOUNTING. WITH AUTOMATIC TRIP AND RECLOSING FOR CONTROLLING THE EARTH LEAKAGE IN PUBLIC LIGHTING, REFRIGERATION ROOMS, TRAFFIC LIGHTS AND SIMILAR UNATTENDED INSTALLATIONS.

LEGEND - ELRD-L / ELRD-L2m



1	Tripping time setting potentiometer.
2	Earth leakage current setting potentiometer.
3	Micro switch for constants (K) choice: <ul style="list-style-type: none"> • a. automatic re-closing with micro switch in position 1 • b. constant selection for tripping time setting: K=1 micro switch in position 1 K= 10 micro switch in position 0 • c,d. constant selection for current tripping setting: K= 0,1 for micro switches in position 1 K= 1 for micro switch (c) in position 0 and micro switch (d) in position 1. K= 10 for micro switch (c) in position 1 and micro switch (d) in position 0.
4	Push button for Test
5	Manual reset push button
6	Signalling lamp for aux. supply presence (green LED)
7	Signalling lamp for relay tripped or in re-closing cycle (red LED)
8	Alarm signalling LED (only for ELRD-L2m)
9	Mechanical signal (only for ELRD-L2m)

WIRING DIAGRAM - ELRD-L / ELRD-L2m



LEGEND

B1
First intervention coil (for de-energising the contactor's coil etc.)

B2
Second intervention coil (for energising the shunt trip coil of the MCCB, etc.)

RESET
Remote reset push button (in serie with the relay's power supply)

TRIP
Eventual remote optical signal of tripped relay

s-s
measuring signal connection (use screened or twisted cable)

p-p
test signal connection (use screened or twisted cable)

* Auxiliary supply Uaux:
terminals [2-4] 220-240V 50-60Hz

ELRC-1

EARTH LEAKAGE RELAY

"COMPACT" VERSION WITH BUILT-IN TOROIDAL TRANSFORMER

GENERALITY



The **ELRC-1** have the particularity that they are manufactured with the buit-in Toroidal Transformers.

They are specially conceived for those applications, in which the space saving is an advantage (for example, in **MOTOR CONTROL CENTERS, BATTERIES OF DISTRIBUTION**, etc.).

Although its reduced dimensions , the relay has as wide setting ranges as the other ELR's series.

MODELS	
ELRC-1/35 ELRC-1/60 ELRC-1/80 ELRC-1/110	110Vac/dc-230-400 Vac
ELRC-1/35 ELRC-1/60 ELRC-1/80 ELRC-1/110	24 - 48 Vac/dc

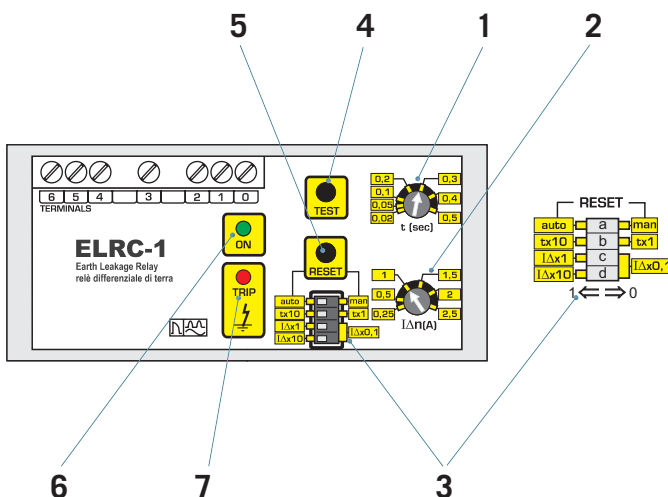
OPTIONS	
F	built-in filter for 3rd harmonic
2	Double output contact NO-C-NC (in such a case the relay is renamed as ELRC-2/...)
T	tropicalisation

Such a feature allows to easily choose the tripping current value, in the way that the voltage values are maintained below 50V, in compliance with the CEI Standards.

It allows also to perform a tripping selectivity, whenever there are more ELR's or RCD's in the same line.

Other important feature is its insensitivity to external disturbances and pulse currents with dc components (presents in the line), due to the filters built on the input circuits, as pe rthe VDE Standards.

LEGEND

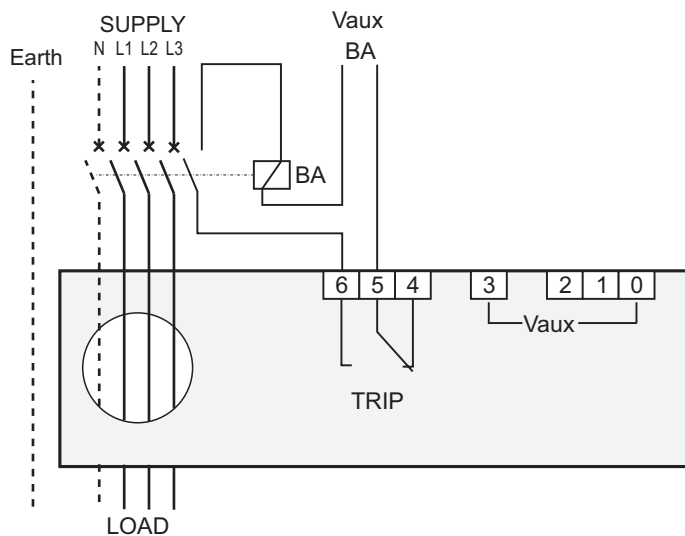


1	Potentiometer for tripping time setting.
2	Potentiometer for tripping current setting.
3	Microswitches for constant selection: <ul style="list-style-type: none"> time: K = 1 with micro (a) in position 0; K=10 with micro (a) in position 1; current: K=0,1 with micros (b-c) in position 0; K= 1 with micro(b) in position 1and (c) in position 0; K=10 with micros (c-b) in position 1
4	Test push button.
5	Manual reset push button.
6	Signalling lamp for Aux. Supply presence (green LED).
7	Signalling lamp for relay tripped (red LED).

ELECTRICAL CHARACTERISTICS

models and value	ELRC-1
Auxiliary Voltage supply	24-48V ac/dc / 110 Vac/dc - 230 - 400 Vac ± 20% (standard)
Frequency	50 ÷ 60 Hz
Maximum consumption	3 VA
Current tripping adjustment range IΔN	0,025÷0,25A K=0,1 - 0,25÷2,5A K=1 - 2,5÷25A K=10
Tripping time setting range	0,02 ÷ 0,5 sec. K=1 - 0,2 ÷ 5 sec. K=10
Output: 2 change over contacts	5A 250V
Working Temperature	-10 + 60°C
Storing Temperature	-20 + 80°C
Relative Humidity	90%
Insulation Test	2,5 kV 60 sec.
Standards	CEI 41-1/IEC 255/VDE 0664/IEC 755/CEI 64.8/ EN 61008-1(1999-11)/EN 62020 (1999-09) / EN 61543 (1996-09) /EN61326-1(1998-04) / EN 61326/A1 (1999-05)-IEC 60947-2 ANNEX M
Wiring method	Screw terminals for cross section wire 2,5 mm ²
Terminals protection according with DIN 40050	IP20

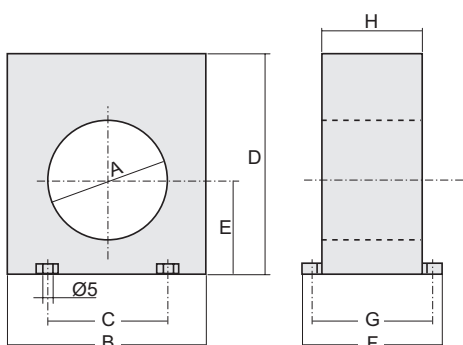
WIRING DIAGRAM



LEGEND

- 0-1 = 110 V ac/dc
- 0-3 = 230 V ac
- 0-5 = 400 V ac
- 0-1 = 24 V ac/dc
- 0-2 = 48 V ac/dc

DIMENSIONS



type	DIMENSIONS (mm)							
	A	B	C	D	E	F	G	H
ELRC-1/35	35	100	60	110	47	70	60	50
ELRC-1/60	60	100	60	110	47	70	60	50
ELRC-1/80	80	150	110	160	70	70	60	50
ELRC-1/110	110	150	110	160	70	70	60	50

ELR-7

EARTH LEAKAGE RELAY FLUSH MOUNTING VERSION DIN 48X48 mm

GENERALITY



MODELS

ELR-7	110Vac/dc-230Vac 50-60Hz
ELR-7	24-48Vac/dc 50-60Hz

OPTIONS

F	built-in filter for the third harmonic
T	tropicalisation

ACCESSORIES

front cover could be supplied to achieve an IP55 protection degree.

The **ELR-7** is an earth leakage protection device, which maintaining its ample scope of settings, both for current and time delay, it has been built in a flush mounting enclosure DIN 48x48mm with a reduced depth of 72mm, including wiring terminals.

This allows to reduce the overall dimensions to a minimum, in those applications in which the space is critical, like in MCC's.

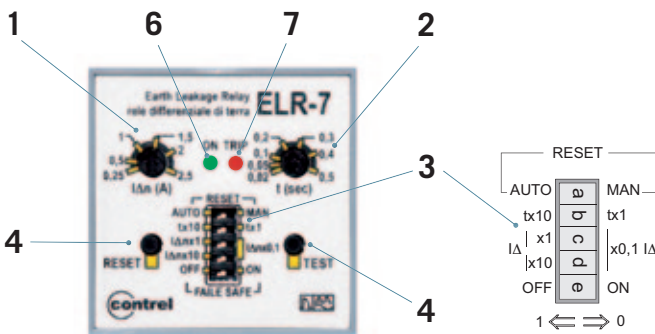
The present ELR, so as the others of the ELR's families, has a built-in filter, at the input circuits, which brings it practically immune to external distortions.

It is possible to program the tripping current (25mA ÷ 25 A), the tripping time delay (0,02 ÷ 5 sec.) and the working mode of the reset (automatic or manual), at its front plate.

The ELR-7 has a micro switch to select the working mode of the end relay, normally de-energized, whilst at rest (no tripped condition) or normally energized (fail safe).

On top of the above, it also has 2 change-over separated contacts and a transparent front cover for protection. Its draw-out wiring terminals rends it very easy to install.

LEGEND



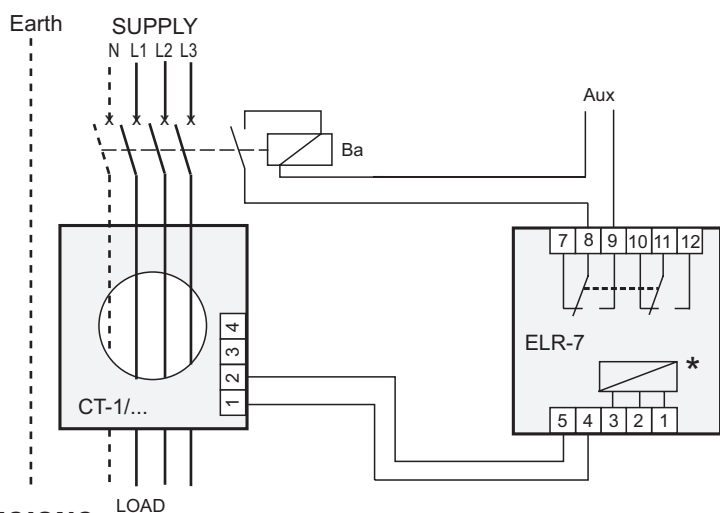
1	Current tripping setting potentiometer
2	Tripping time setting potentiometer
3	Microswitches for programming: <ul style="list-style-type: none"> • a In position 1 automatic reset, In position 0 manual reset • b Selection of the multiplying constant Tripping time, in position 1 K=10 in position 0 K=1 • c,d Selection of the multiplying constant of tripping current: With c d in position 0 K=0.1 With c in position 1, d in position 0 K=1 . With c,d in position 1 K=10 • e In position 1 the output relays will be de-energized at rest, in position 0 the output relays will be energized at rest (fail safe)
4	Push button for Test
5	Push button for manual reset
6	Signalling green LED for Aux. Supply presence
7	Signalling red LED for relay tripped

ELECTRICAL CHARACTERISTICS

models and value	ELR-7
Auxiliary Voltage supply	24 - 48 Vac/dc / 110 Vac/dc - 230 Vac ± 20% (standard)
Frequency	50 ÷ 60 Hz
Maximum consumption	3 VA
Current tripping setting range I Δ N	0,025÷0,25A K=0,1 - 0,25÷2,5A K=1 - 2,5÷25A K=10 25÷250A*
Tripping time setting range t	0,02÷0,5 sec K=1 - 0,2÷5 sec K=10
External Toroidal Transformers and accessories	Ct1/...serie - setting multiplier, adaptor CT
Output: 2 voltage free contacts	2 changeover contacts NO-C-NC 5A 250V resistive load
Working Temperature	-10 + 60°C
Storing Temperature	-20 + 80°C
Relative humidity	< 90%
Insulation Test	2,5 kV 60 sec.
Standards	CEI 41-1/IEC 255/VDE 0664/IEC 755/CEI 64.8/ EN 61008-1(1999-11)/EN 62020 (1999-09) / EN 61543 (1996-09) /EN61326-1(1998-04) / EN 61326/A1 (1999-05)-IEC 60947-2 ANNEX M
Protection degree according DIN 40050	IP40 front with cover (opt. Ip55) - IP 20 enclosure
Mounting according DIN 43700	Flush mounting DIN 48x48mm, depth 72mm
Wiring method	Draw out terminals for cross section wires 2,5 mm ²

* By means of an external multiplier (see pag. 40)

WIRING DIAGRAM



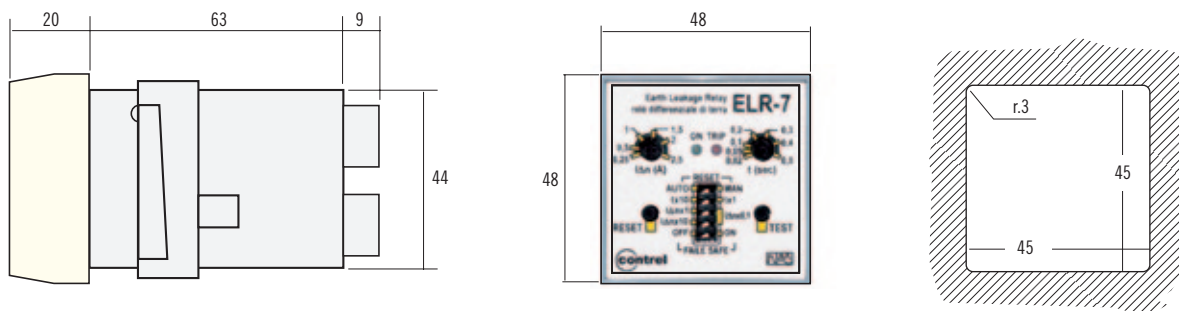
Wiring diagram for MCCB with shunt trip and energized end relay to the trip (FAIL SAFE OFF) for using de-energized (FAIL SAFE ON) connect to the BA the terminals 7 - 8 (contact NO in no tripped condition)

LEGEND

- 1 - 3 = 220 - 240 Vac
- 2 - 3 = 110 - 125 Vac/dc
- 1 - 3 = 48 Vac/dc
- 2 - 3 = 24 Vac/dc

* Auxiliary supply Uaux

DIMENSIONS



ELR-4o / ELR-m4o ELR-4v / ELR-m4v

EARTH LEAKAGE RELAY
FLUSH MOUNTING VERSIONS DIN 48X96 mm

GENERALITY



The ELR-4 and ELRm-4 series, maintain all the basic characteristics of the DIN 96x96 mm. series, although their reduced dimensions.

An outstanding characteristic of the present relays, is the permanent control of the Toroidal - ELR circuit.

Its interruption brings along the immediate trip of the protection. This allows to identify the anomaly, without waiting to the periodical control, made with the Test push button.

The instrument, fitted with filters at the input circuits, is practically immune to external disturbances, so as the pulse currents with dc components, complying with the requirements of VDE 0664 and project IEC 23 Standards.

MODELS

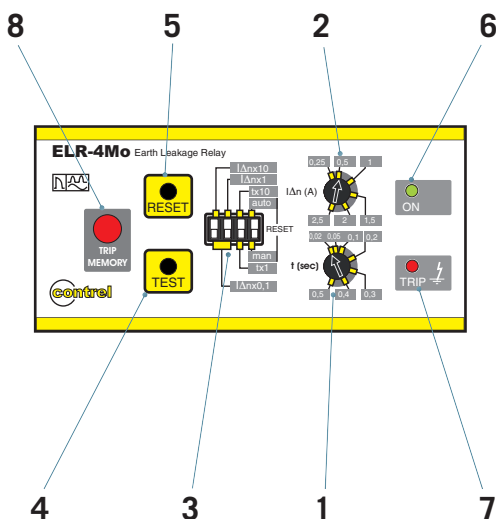
ELR-4v / ELR-m4v ELR-4o / ELR-m4o	110Vac/dc - 230 - 400 Vac
ELR-4v / ELR-m4v ELR-4o / ELR-m4o	24-48 Vac/dc

OPTIONS

F	built - in filter for 3rd harmonic
T	tropicalisation

Following versions available:
DIN 96x48 mm ELR-40 and ELR-m40
DIN 48x96 mm ELR-4V and ELR-m4V
With reduced depth of 75 mm.

LEGEND



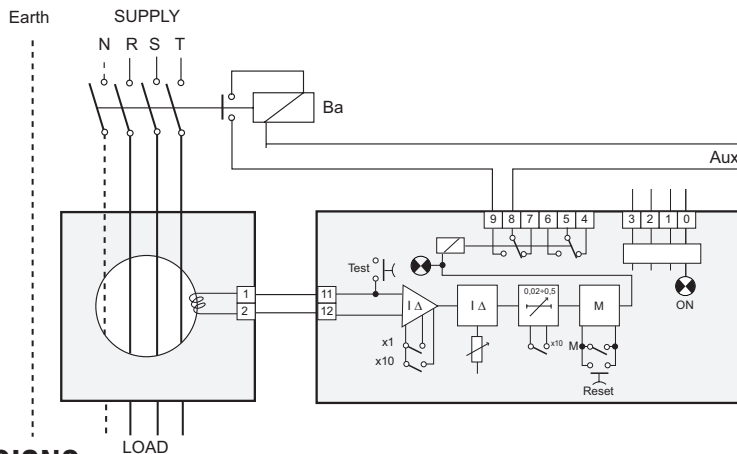
1	Tripping time delay setting potentiometer
2	Tripping current setting potentiometer
3	Constant selection micro switch: <ul style="list-style-type: none"> • a Automatic reset with micro (a) in position 1 • b Constant selection for time settings: K=1 for micro(b) in position 0; K=10 for micro (b) in position 1; • c Constant selection for current settings: K=0,1 for micros (c-d) in position 0; K=1 for micro (c) in position 1 and (d) in position 0; K=10 for micro (c) in position 1 and micro (d) in position 1.
4	Test push button.
5	Manual reset push button.
6	Signalling lamp for Aux. Supply presence (green LED)
7	Signalling lamp for relay tripped (red LED)
8	Mechanical Signalling (only for ELRm)

ELECTRICAL CHARACTERISTICS

models and value	ELR- 40	ELR-m40	ELR-4V	ELR-mV
Auxiliary Voltage supply	24-48V ac/dc 110Vac/dc - 230 - 400 Vac ±20% (standard)			
Frequency	50 ÷ 60 Hz			
Maximum consumption	4 VA			
Current tripping setting range IΔN	0,025÷0,25A K=0,1 - 0,25÷2,5A K=1 - 2,5÷25A K=10 25÷250A*			
Tripping time setting range t	0,02÷0,5 sec K=1 - 0,2÷5 sec K=10			
Mechanical Signalisation	-	•	-	•
Output: 2 changeover contacts	5A 250V			
Working Temperature	-10 + 60°C			
Storing Temperature	-20 + 80°C			
Relative humidity	90%			
Insulation Test	2,5 kV 60 sec.			
Standards	CEI 41-1/IEC 255/VDE 0664/IEC 755/CEI 64.8/ EN 61008-1(1999-11)/EN 62020 (1999-09) / EN 61543 (1996-09) /EN61326-1(1998-04) / EN 61326/A1 (1999-05)-IEC 60947-2 ANNEX M			
Wiring method	Screw terminals for cross section wires 2,5 mm2			
Protection degree according DIN 40050	IP 20			
Frontal protection degree	Ip52 (opt. IP54)			

* By means of an external multiplier (see pag. 40)

WIRING DIAGRAM - LEGEND

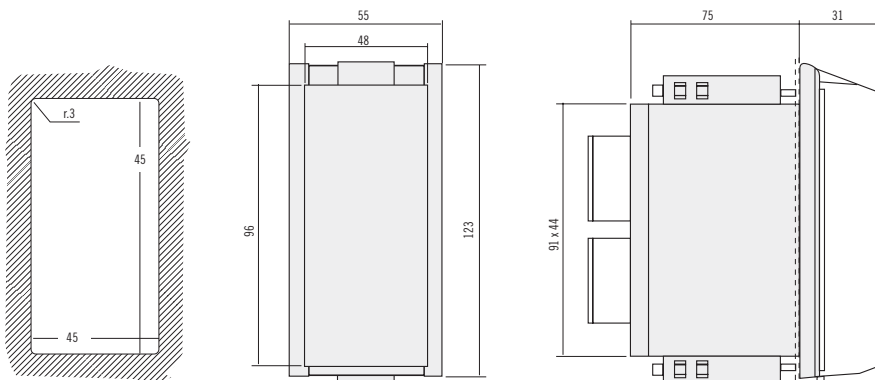


LEGENDA

- 0-3 = 400 V ac
- 0-2 = 230 V ac
- 0-1 = 110 V ac/dc

- 0-2 = 48 V ac/dc
- 0-1 = 24 V ac/dc

DIMENSIONS



ELR-91 / ELR-92

EARTH LEAKAGE RELAY
FLUSH MOUNTING VERSION DIN 72X72 mm

GENERALITY



MODELS

ELR-91	110 Vac/dc - 230 Vac
ELR-91 / ELR-92	24-48 Vac/dc
ELR-92	110 Vdc
ELR-92	110 - 230 - 400 Vac

OPTIONS

F	built - in filter for 3rd harmonic (only for ELR-92)
T	tropicalisation

This new series of relays, for flush mounting according to DIN 72x72 mm, on top of granting a high reliability level, like the previous models, have evolved the technical and mechanical characteristics.

ELR-91

This is the basic unit of the new series, is particularly advised in those cases, in which it's required to use a reduced flush mounting ELR's option, without other particular options. One of its main novelties is the reduced depth (60mm including terminals).

It may be coupled to any of our Toroidal Transformers of the CT-1(close core) and CTA-1 (split core) families.

There are various versions, in order to meet different auxiliary supply requirements. Their wide time and current setting ranges, allows to easily select the tripping characteristics, in order to maintain the contact values below 50 V, as required by the IEC standards.

This is also the suitable answer for a proper selectivity, whenever there are other ELR's or/and RCD's downstream or upstream in the line to be protected.

The instrument, fitted with filters at the input circuits, is practically immune to external disturbances, so as the pulse currents with dc components, complying with the requirements of VDE 0664 and project IEC 23 Standards.

ELR-92

The present model, on top of the previous basic unit characteristics, it's fitted with following features:

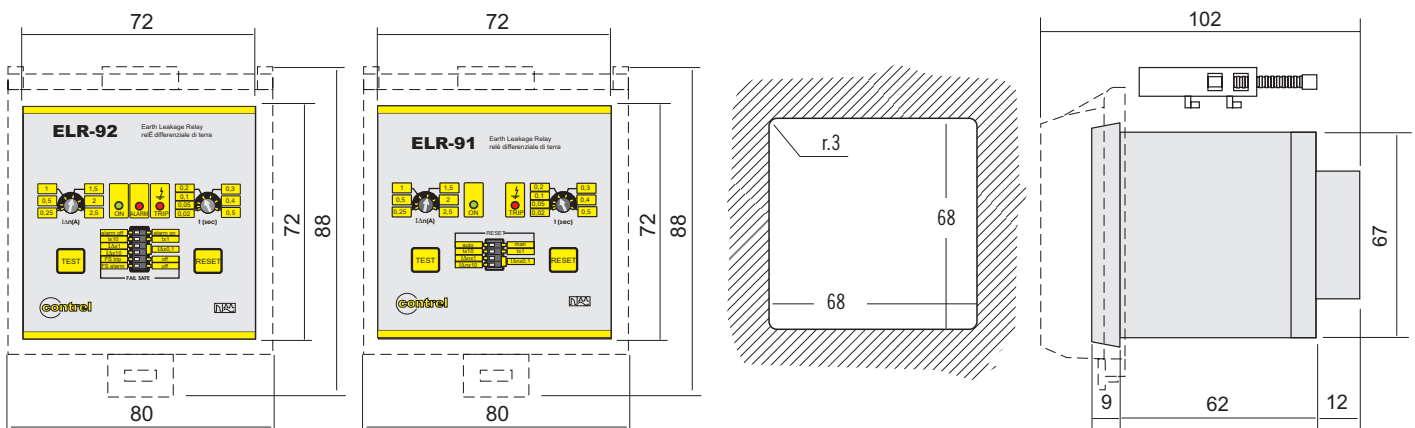
- A double output changeover contact, one can be used for disconnection and the other for an alarm function at 70% of the set current (the selection of the working type of the second contact is being made by means of a dipswitch)
- selectable negative or positive safety (fail safe) by means of a dipswitch

ELECTRICAL CHARACTERISTICS

models and value	ELR - 91	ELR - 92
Auxiliary voltage supply	110 Vac/dc-230 Vac ± 20% (standard) or 24-48 Vac/dc	110 - 230 - 400 Vac ± 20% (standard) or 110 Vdc or 24-48 Vac/dc
Frequency	50 ÷ 60 Hz	
Maximum consumption	4 VA	
Tripping current setting range I Δ N	0,025÷0,25A K=0,1 - 0,25÷2,5A K=1 - 2,5÷25A K=10 - 25÷250A*	
Alarm current setting range	-	70% ID N
Tripping time setting range	0,02 ÷ 0,5 sec. K=1 - 0,2 ÷ 5 sec. K=10	
Output: changeover contacts	Nr.1 5A 250V	Nr.2 5A 250V
Working temperature	-10 + 60°C	
Storing temperature	-20 + 80°C	
Relative humidity	90%	
Insulation test	2,5 kV 60 sec.	
Standards of reference	CEI 41-1/IEC 255/VDE 0664/IEC 755/CEI 64.8/ EN 61008-1(1999-11)/EN 62020 (1999-09) / EN 61543 (1996-09) /EN61326-1(1998-04) / EN 61326/A1 (1999-05)-IEC 60947-2 ANNEX M	
Wiring type	Screw terminals / cross section cables 2,5 mm ²	
Terminal protection degree according with DIN 40050	IP20	
Frontal protection degree	IP52 (optional IP65)	
Selectable fail safe for each output relay	-	•

* By means of external multiplier (see pag. 40)

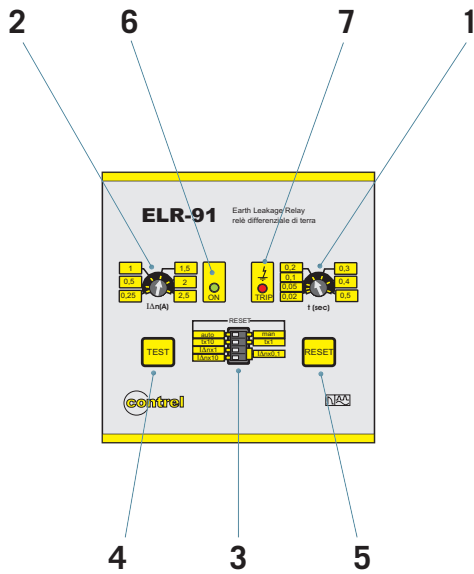
DIMENSIONS



ELR-91 / ELR-92

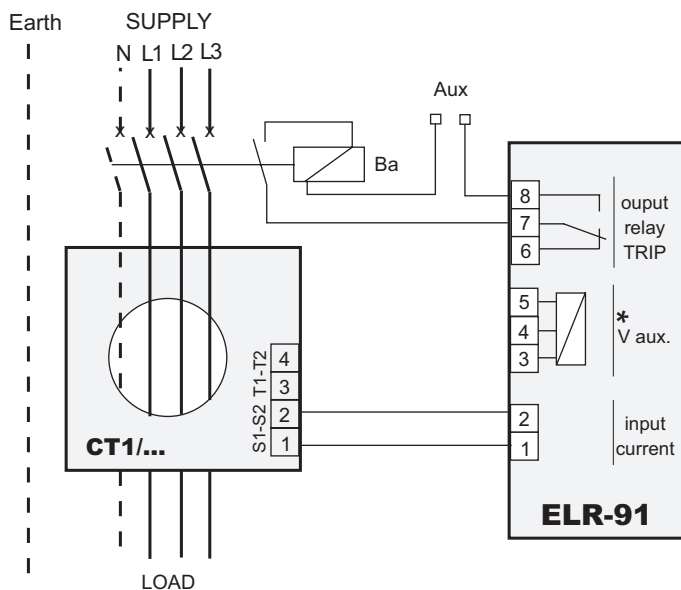
EARTH LEAKAGE RELAY
FLUSH MOUNTING VERSION DIN 72X72 mm

LEGEND - ELR-91



1	Potentiometer for tripping time setting.
2	Potentiometer for tripping current setting
3	4 ways of dip-switches: <ul style="list-style-type: none"> • On/Off the automatic reset . • Constant selection for time setting. • Constant selection for current setting
4	Push button for test.
5	Push button for manual reset.
6	Green Led for auxiliary supply signalling.
7	Red Led for tripped relay signalling.

WIRING DIAGRAM - ELR-91



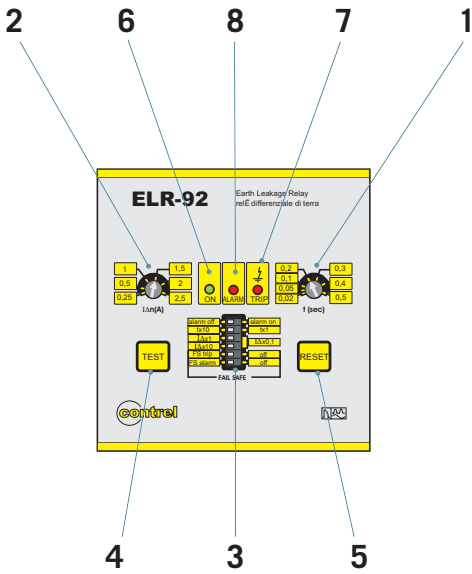
* Auxiliary supply U_{aux}

LEGEND

110-230 V
 3 - 4 = 115 Vac / Vdc
 3 - 5 = 230 Vac

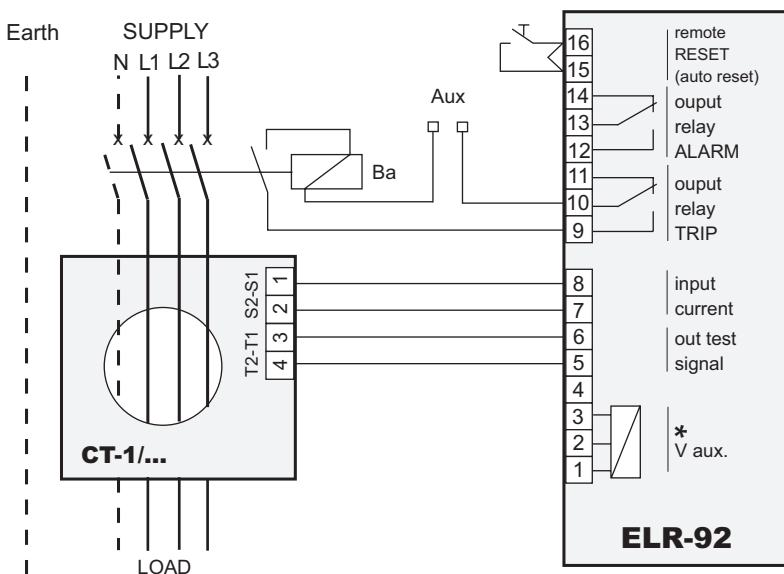
24/48 V
 3 - 4 = 48 Vac / Vdc
 3 - 5 = 24 Vac / Vdc

LEGEND - ELR-92



1	Potentiometer for tripping time setting.
2	Potentiometer for tripping current setting
3	ways of dip-switches: <ul style="list-style-type: none"> • On/Off the alarm feature . • Constant selection for time setting. • Constant selection for current setting. • On/Off the fail safe of the tripped relay. • On/Off the fail safe of the tripped alarm.
4	Push button for test.
5	Push button for manual reset.
6	Green Led for auxiliary supply signalling.
7	Red Led for tripped relay signalling.
8	Red Led for tripped alarm signalling

WIRING DIAGRAM - ELR-92



* Auxiliary supply Uaux

LEGEND

230 Vca

2 - 3 = 115 Vac

1 - 2 = 230 Vac

1 - 3 = 400 Vac

115 V

2 - 3 = 100-125 Vdc

24 V

2 - 3 = 24 Vac/dc

1 - 3 = 48 Vac/dc

ELR-1E / ELR-2 / ELR-2M

EARTH LEAKAGE RELAY

FLUSH MOUNTING VERSION DIN 96X96 mm WITH REDUCED DEPTH ENCLOSURES.

GENERALITY



MODELS

ELR-1E	110 Vac/dc - 230 - 400 Vac
ELR-1E	12 Vac/dc
ELR-1E / ELR-2 / ELR-2M	24-48 Vac/dc
ELR-2 / ELR-2M	110 - 230 - 400 Vac
ELR-2 / ELR-2M	110 Vdc

OPTIONS

F	built - in filter for 3rd harmonic (only for ELR-2 ELR- 2M)
T	tropicalisation

This new series of relays, for flush mounting according to DIN 96x96 mm, on top of granting a high reliability level, like the previous models, have evolved the technical and mechanical characteristics.

ELR-1E

This is the basic unit of the new series, is particularly advised in those cases, in which it's required to use a reduced flush mounting ELR's option, without other particular options. One of its main novelties is the reduced depth (60mm including terminals). It may be coupled to any of our Toroidal Transformers of the CT-1(close core) and CTA-1 (split core) families.

There are various versions, in order to meet different auxiliary supply requirements. Their wide time and current setting ranges, allows to easily select the tripping characteristics, in order to maintain the contact values below 50 V, as required by the IEC standards.

This is also the suitable answer for a proper selectivity, whenever there are other ELR's or/and RCD's downstream or upstream in the line to be protected.

The instrument, fitted with filters at the input circuits, is practically immune to external disturbances, so as the pulse currents with dc components, complying with the requirements of VDE 0664 and project IEC 23 Standards.

ELR-2

The present model, on top of the previous basic unit characteristics, it's fitted with following features:

- a double output changeover contact, one can be used for disconnection and the other for an alarm function at 70% of the set current (the selection of the working type of the second contact is being made by means of a dipswitch);
- selectable negative or positive safety (fail safe) by means of a dip-switch

ELR-2M

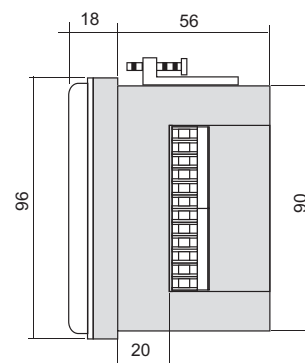
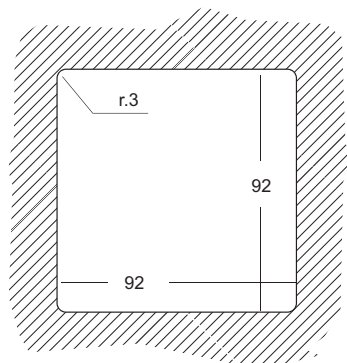
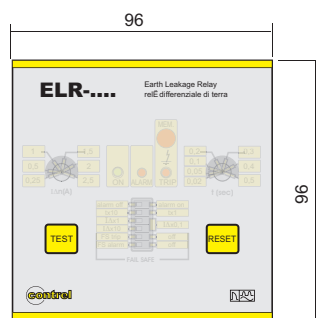
In this case the ELR is also fitted with the mechanical signalisation, which enables to keep the information of a tripped relay, without auxiliary supply even. This avoids the dangerous inconvenience of having an energised panel with the door open.

ELECTRICAL CHARACTERISTICS

models and value	ELR-1E	ELR-2	ELR-2M
Auxiliary voltage supply	110Vac/dc-230-400Vac (standard) or 24-48Vac/dc or 12Vac/dc	110 - 230 - 400 Vac \pm 20% (standard) or 110 Vdc or 24-48 Vac/dc	
Frequency	50 \div 60 Hz		
Maximum consumption	4 VA		
Tripping current setting range $I_{\Delta N}$	0,025 \div 0,25A K=0,1 - 0,25 \div 2,5A K=1 - 2,5 \div 25A K=10 25 \div 250A*		
Alarm current setting range	-	70% $I_{\Delta N}$	
Tripping time setting range	0,02 \div 0,5 sec. K=1 - 0,2 \div 5 sec. K=10		
Mechanical signalisation	-	-	•
Output: changeover contacts	Nr.1 5A 250V	Nr.2 5A 250V	Nr.2 5A 250V
Working temperature	-10 + 60°C		
Storing temperature	-20 + 80°C		
Relative humidity	90%		
Insulation test	2,5 kV 60 sec.		
Standards of reference	CEI 41-1/IEC 255/VDE 0664/IEC 755/CEI 64.8/ EN 61008-1(1999-11)/EN 62020 (1999-09) / EN 61543 (1996-09) /EN61326-1(1998-04) / EN 61326/A1 (1999-05)-IEC 60947-2 ANNEX M		
Wiring type	Screw terminals / cross section cables 2,5 mm ²		
Terminal protection degree according with DIN 40050	IP20		
Frontal protection degree	IP52 (optional IP65)		
Selectable fail safe for each output relay	-	•	•

* By means of external multiplier(see pag. 40)

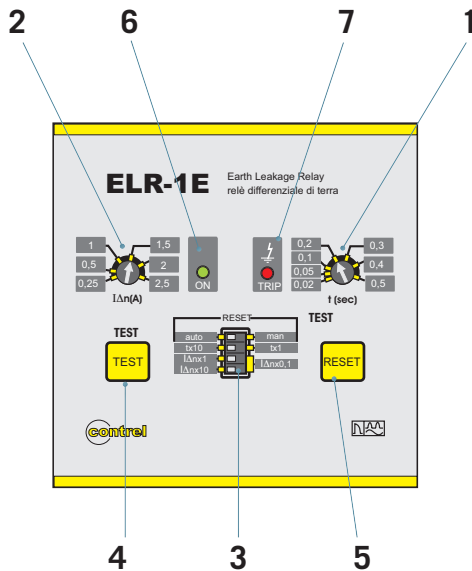
DIMENSIONS



ELR-1E / ELR-2 / ELR-2M

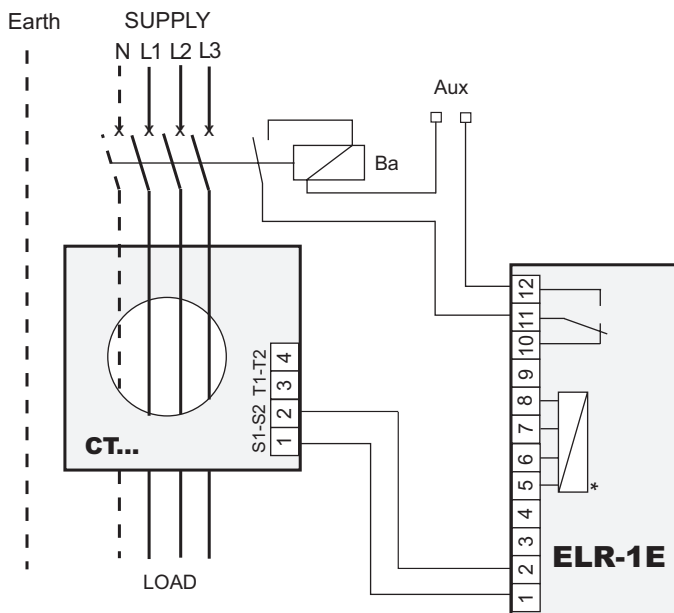
EARTH LEAKAGE RELAY
 FLUSH MOUNTING VERSION DIN 96X96 mm WITH REDUCED DEPTH ENCLOSURES.

LEGEND - ELR-1E



1	Potentiometer for tripping time setting.
2	Potentiometer for tripping current setting.
3	4 ways of dipswitches: • On/Off the automatic reset. • Konstant selection for time setting. • Konstant selection for current setting.
4	Push button for test.
5	Push button for manual reset.
6	Green Led for auxiliary supply signalling.
7	Red Led for tripped relay signalling.

WIRING DIAGRAM - ELR-1E



* Auxiliary supply U_{aux}

110-400 V
 5 - 6 = 115 Vac/dc
 5 - 7 = 230 Vac
 5 - 8 = 400 Vac

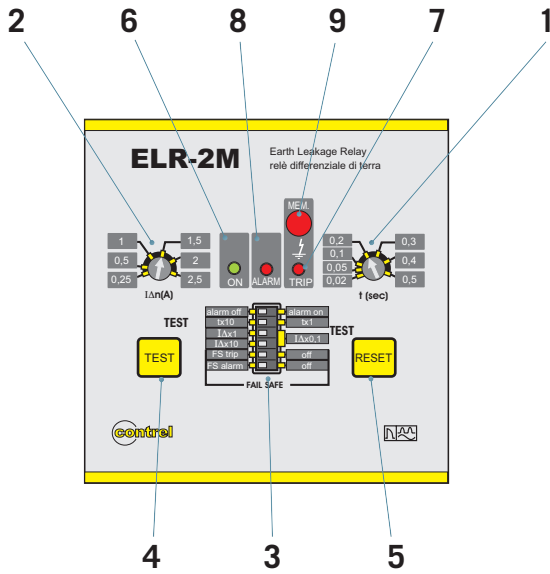
24/48 V
 5 - 7 = 48 Vac / Vdc
 5 - 6 = 24 Vac / Vdc

12 V
 5 - 6 = 12 Vac / Vdc

ELR-1E / ELR-2 / ELR-2M

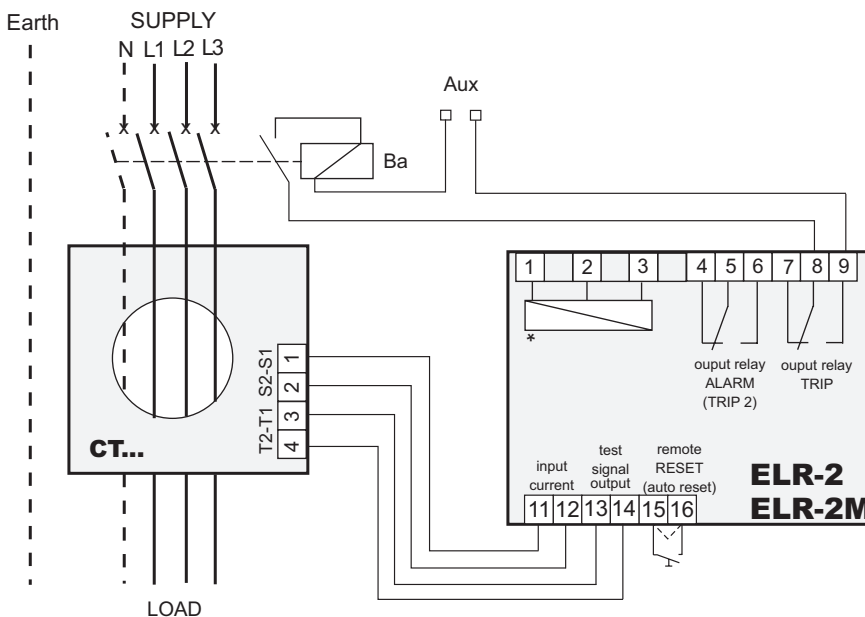
EARTH LEAKAGE RELAY
FLUSH MOUNTING VERSION DIN 96X96 mm WITH REDUCED DEPTH ENCLOSURES.

LEGEND - ELR-2 / ELR-2M



1	Potentiometer for tripping time setting.
2	Potentiometer for tripping current setting.
3	6 ways of dipswitches: <ul style="list-style-type: none"> • On/Off the automatic reset . • Konstant selection for time setting. • Konstant selection for current setting. • On/Off the fail safe of the tripped relay. • On/Off the fail safe of the tripped alarm.
4	Push button for test.
5	Push button for manual reset.
6	Green Led for auxiliary supply signalling.
7	Red Led for tripped relay signalling.
8	Red Led for tripped alarm signalling.
9	Mechanical signalling of tripped relay (only per ELR-2M)

WIRING DIAGRAM - ELR-2 / ELR-2M



* Auxiliary supply Uaux

LEGEND

230 Vca

- 1 - 2 = 100-125 Vac
- 2 - 3 = 220-240 Vac
- 1 - 3 = 380-415 Vac

115 V

- 1 - 2 = 100-125 Vdc

24 V

- 1 - 2 = 24 Vac/dc
- 1 - 3 = 48 Vac/dc

ELR-8V ELR-8tcs / ELR-8MVtcs

EARTH LEAKAGE RELAY
FLUSH MOUNTING VERSION DIN 96X96 mm WITH ADVANCED FUNCTIONS

GENERALITY



MODELS

ELR-8V / ELR-8tcs / ELR-8MV-tcs	110 - 230 - 400 Vac
ELR-8V / ELR-8tcs / ELR-8MV-tcs	110 Vdc
ELR-8V / ELR-8tcs / ELR-8MV-tcs	24-48 Vac/dc

OPTIONS

T	tropicalisation
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ELR-8V

The ELR-8V, is being manufactured in a DIN 96x96mm enclosure for flush mounting, It can be connected to any of our toroidal transformers of the CT-1 (closed core) and CTA-1 (split core) series.

The relay has a wide adjusting range, either in current sensitivity as in time delay. The mentioned setting range allows an easy selection of the tripping value, in order to maintain the voltage contact values below 50V, as required by IEC standard. This will also allow to conduct a tripping selectivity, when there are other ELR's and/or RCD's installed in the same line. There are various versions with different power supplies, in order to meet the end user's requirements. Other important feature is the instrument's insensitivity of the external disturbances, due to the filters installed at the input circuits, so as the insensitivity to the existing direct currents in the line under control, as required by the VDE standards (built harmonic filter is standard).

Nevertheless, its most outstanding feature is the frontal display, which is permanently visualising the actual leakage value, with the possibility of selecting the full scale value, between 20 or 200A, so as the possibility of blocking the reading of the tripping leakage values ("hold" function).

On top of the previous basic characteristics, it's fitted with following features:

- A double output changeover contact, one can be used for disconnection and the other for an alarm function at 70% of the set current (the selection of the working type of the second contact is being made by means of a dip-switch);
- It is possible to select the output relay's contacts position. Fail safe (relay excited at rest) or negative safety (the relay is unexcited at rest). The fail safe offers a notorious advantage, since the relay will open in case of a failure, in order to avoid leaving the installation operative without protection.

ELR-8 tcs

The present type, without the frontal display, has the possibility of controlling the opening coil and the disconnection circuit. Should there be a failure, the relay would signal same with a LED and a changeover relay (on top of the other 2 contacts) would be activated.

ELR-8MV-tcs

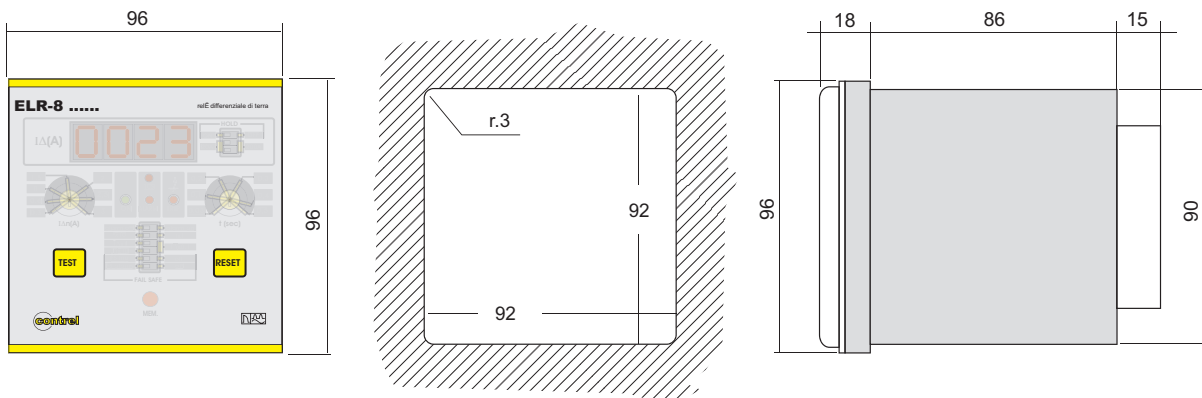
The ELR-8MV-tcs incorporates all the above functions and features in one, plus the mechanical signal, becomes the most complete flush mounting relay DIN 96 x96 mm.

ELECTRICAL CHARACTERISTICS

models and value	ELR-8V	ELR-8 tcs	ELR-8MV tcs
Auxiliary voltage supply	110 - 230 - 400 Vac ± 20% (standard) - 110Vdc - 24-48Vac/dc		
Frequency	50 ÷ 60 Hz		
Maximum consumption	4 VA		
Tripping current setting range I Δ N	0,025÷0,25A K=0,1 - 0,25÷2,5A K=1 - 2,5÷25A K=10 25÷250A*		
Alarm current setting range	70% I Δ N		
Tripping time setting range	0,02 ÷ 0,5 sec. K=1 - 0,2 ÷ 5 sec. K=10		
Mechanical signalisation	-	-	•
Output: changeover contacts	Nr.1 5A 250V	Nr.2 5A 250V	Nr.2 5A 250V
Working temperature	-10 + 60°C		
Storing temperature	-20 + 80°C		
Relative humidity	90%		
Insulation test	2,5 kV 60 sec.		
Standards of reference	CEI 41-1/IEC 255/VDE 0664/IEC 755/CEI 64.8/ EN 61008-1(1999-11)/EN 62020 (1999-09) / EN 61543 (1996-09) /EN61326-1(1998-04) / EN 61326/A1 (1999-05)-IEC 60947-2 ANNEX M		
Wiring type	Screw terminals / cross section cables 2,5 mm ²		
Terminal protection degree according with DIN 40050	IP20		
Frontal protection degree	IP52 (optional Ip65)		
Shunt coil and disconnecting circuit functionality (TCS function)	-	•	•
Frontal display with 4 digits / f.s. 20A o 200A	•	-	•
Selectable fail safe for each output relay	•	•	•

* By means of external multiplier (see pag. 40)

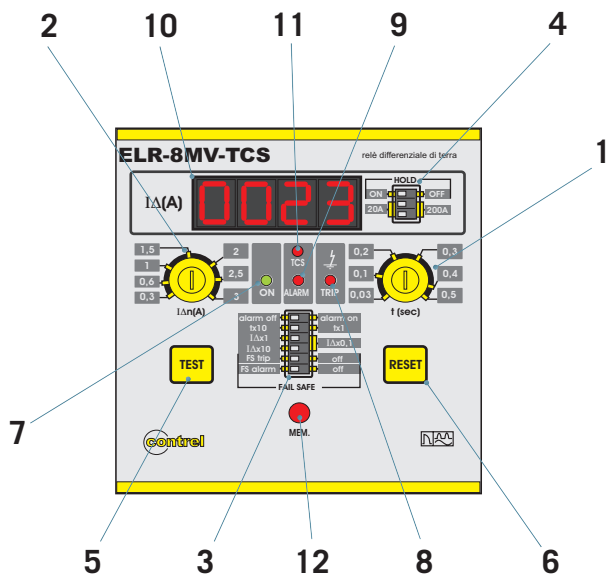
DIMENSIONS



ELR-8V / ELR-8-TCS / ELR-8MV-TCS

EARTH LEAKAGE RELAY
FLUSH MOUNTING VERSION DIN 96X96 mm WITH ADVANCED FUNCTIONS

LEGEND - ELR-8V / ELR-8MV-TCS



1	Potentiometer for tripping time setting.
2	Potentiometer for tripping current setting.
3	6 ways of dip-switches: • On/Off the alarm feature . • Constant selection for time setting. • Constant selection for current setting. • On/Off the fail safe of the tripped relay. • On/Off the fail safe of the tripped alarm.
4	3 ways of dip-switches: • On/Off leakage current reading on display. • Full scale selection on display.
5	Push button for test.
6	Push button for manual reset.
7	Green Led for auxiliary supply signalling.
8	Red Led for tripped relay signalling.
9	Red Led for tripped alarm signalling.
10	4 digits display for current leakage visualisation.
11	Red Led for TCS alarm signalling (only for ELR/8MV-tcs)
12	Mechanical signalling of tripped relay (only for ELR/8MV-tcs)

WIRING DIAGRAM - ELR-8V / ELR-8MV-TCS - LEGEND

* Auxiliary supply Uaux

110-400 V
1 - 2 = 115 Vac
2 - 3 = 230 Vac
1 - 3 = 400 Vac

24/48 V
1 - 2 = 24 Vac / Vdc
1 - 3 = 48 Vac / Vdc

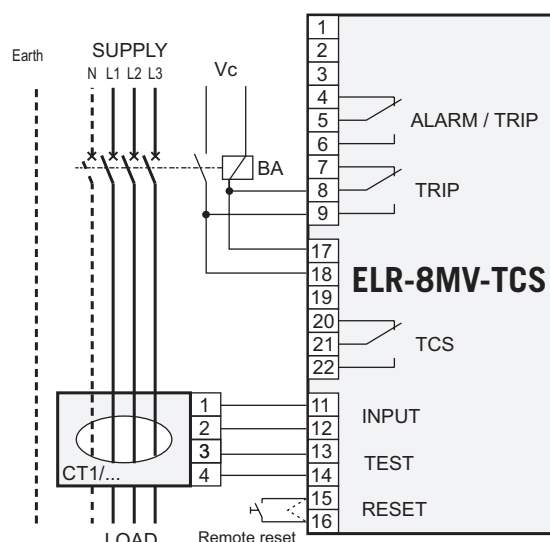
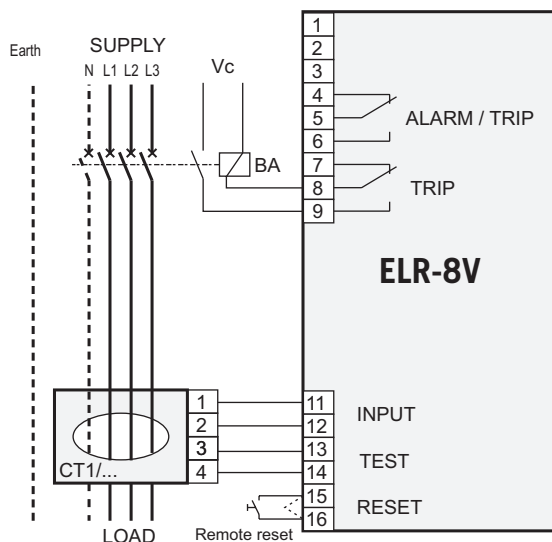
110 V
1 - 3 = 110 Vdc

110-400 V
1 - 2 = 115 Vac
2 - 3 = 230 Vac
1 - 3 = 400 Vac

24/48 V
1 - 2 = 24 Vac / Vdc
1 - 3 = 48 Vac / Vdc

110 V
1 - 3 = 110 Vdc

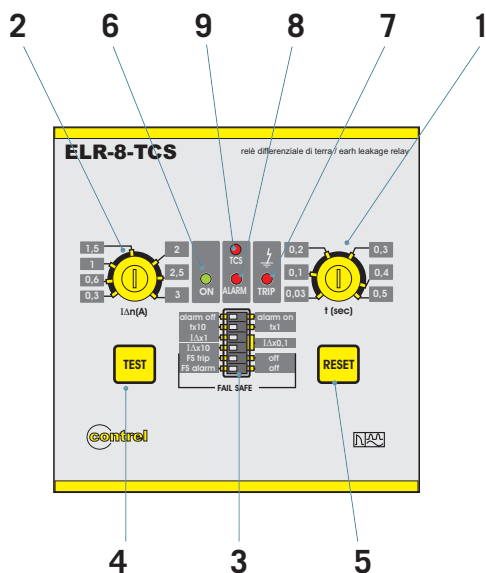
Vc
17-18=110-240 Vac/dc or 24 Vac/dc
17-19=380-415 Vac or 48 Vac/dc



ELR-8V / ELR-8-TCS / ELR-8MV-TCS

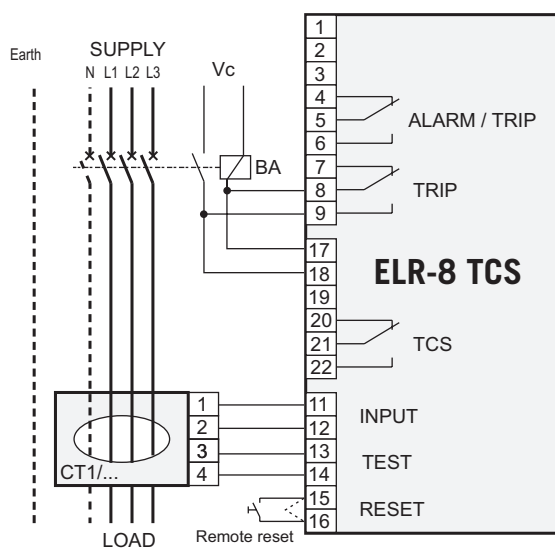
EARTH LEAKAGE RELAY
FLUSH MOUNTING VERSION DIN 96X96 mm WITH ADVANCED FUNCTIONS

LEGEND - ELR-8 TCS



1	Potentiometer for tripping time setting.
2	Potentiometer for tripping current setting.
3	6 ways of dip-switches: <ul style="list-style-type: none"> • On/Off the alarm feature . • Constant selection for time setting. • Constant selection for current setting. • On/Off the fail safe of the tripped relay. • On/Off the fail safe of the tripped alarm.
4	Push button for test.
5	Push button for manual reset.
6	Green Led for auxiliary supply signalling.
7	Red Led for tripped relay signalling.
8	Red Led for tripped alarm signalling.
9	Red Led for TCS alarm signalling.

WIRING DIAGRAM - ELR-8 TCS - LEGEND



* alimentazione ausiliaria Uaux

110-400 V

1 - 2 = 115 Vac

2 - 3 = 230 Vac

1 - 3 = 400 Vac

24/48 V

1 - 2 = 24 Vac/ Vdc

1 - 3 = 48 Vac / Vdc

110 V

1 - 3 = 110 Vac / Vdc

Vc

17-18= 110-240 Vac/cc or 24 Vac/dc

17-19= 380-415 Vac or 48 Vac/dc

ELR-51 / ELR-m51 ELR-52 / ELR-m52

EARTH LEAKAGE RELAY - FLUSH MOUNTING VERSION DIN 96x96 mm
WITH SELF-POWER FOR SMALL NETWORKS INTERRUPTION, FAIL SAFE, ETC.

GENERALITY



The **ELR-5** are new series, which comes to enlarge the range of ELR's. Mentioned relays bring some interesting variables, regarding to the normal characteristics, already available in the precedent families.

a. Working with Fail Safe. This is to say, the end relay is de-energized by leakage or lack of supply, but due to a particular time circuit on the end relays, it avoids the tripping of the MCCB, when returning of the Aux. Supply, working with shunt trip coils.

b. Self- supply during 2 sec., In case of a lack of supply. This is an important characteristic, since the relay is capable to overcome the problems related to the classic Voltage holes, whilst the automatic re-closing operations of the lines.

c. Trial current during Test, depending on the tripping current set at the relay. The trial current value is automatically set, between 100 and 160% of the $I_{\Delta N}$ set on the relay. This allows a real simulation of the leakage current, to which the relay should trip, permitting the individualisation of eventual anomalies of internal circuits or connections.

MODELS

ELR-51 / ELR-m51 ELR-52 / ELR-m52	110 - 230 - 400 Vac
--------------------------------------	---------------------

OPTIONS

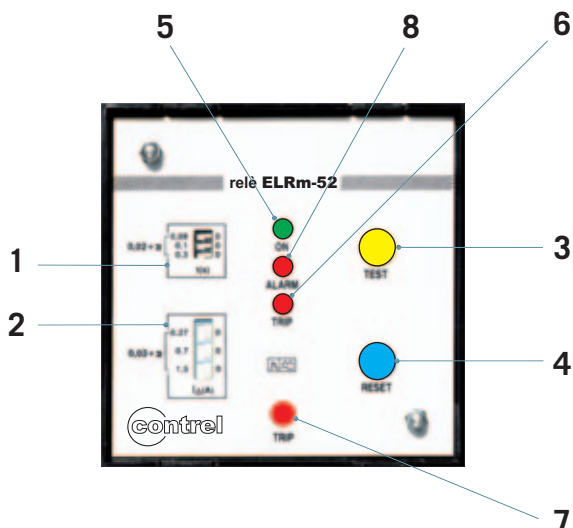
F	built-in filter of third harmonic
T	tropicalisation

d. Continuous control of the efficiency on the internal circuits, by tripping when whatever anomaly of the electrical parameters is detected.

e. Continuous control on the Toroidal-Relay circuit. The interruption of the circuit makes the ELR to trip, since there is no longer protection on the line.

f. Insensitivity to the pulse currents with dc component.

LEGEND



1	Micro switch for time delay setting.
2	Micro switch for tripping current setting.
3	Push button for Test.
4	Push button for manual reset.
5	Signalling lamp for Aux. Supply presence (Green LED)
6	Signalling lamp for relay tripped (Red LED)
7	Mechanical Signalling for relay tripped, (only for ELR-m51 ELR-m52)
8	Signalling lamp for overcoming the alarm threshold (Red LED), (only for ELR-52 ELR-m52)

ELR-51 / ELR-m51 / ELR-52 / ELR-m52

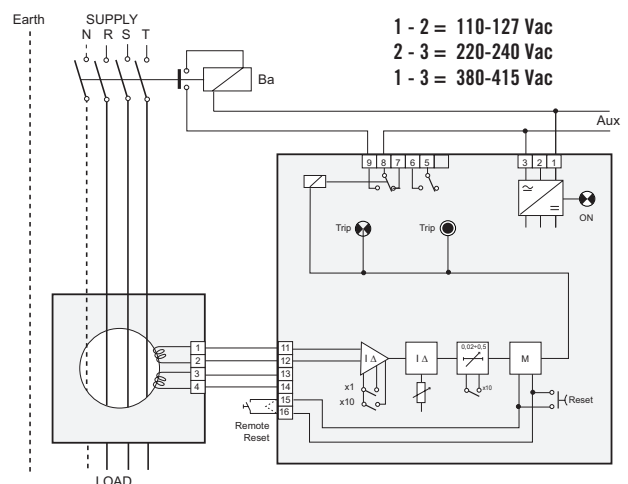
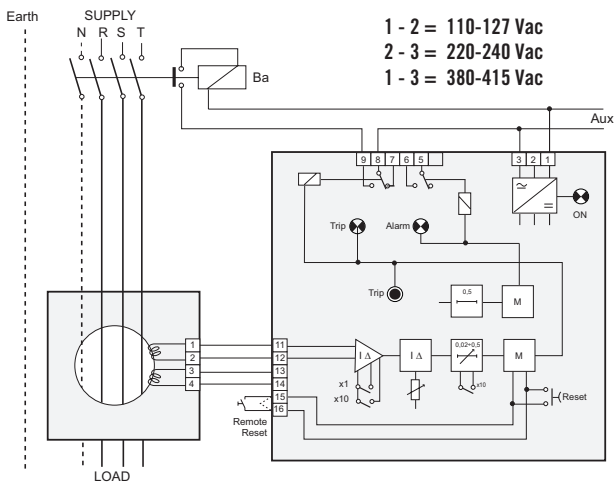
EARTH LEAKAGE RELAY
FLUSH MOUNTING VERSION DIN 96x96 mm
WITH SELF-POWER FOR SMALL NETWORKS INTERRUPTION, FAIL SAFE, ETC.

ELECTRICAL CHARACTERISTICS

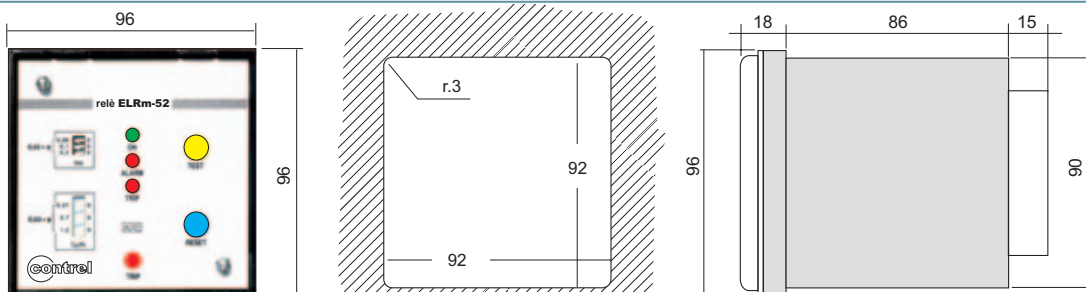
models and value	ELR- 51	ELRm-51	ELR-52	ELRm-52
Auxiliary voltage supply	110-230-400 V ac. ± 20%			
Frequency	50 ÷ 60 Hz			
Maximum consumption	4 VA			
Tripping current setting range IΔN	0,03÷2,5 0,3÷25A*			
Alarm current setting range	-		70%	
Time tripping setting range	0,02 ÷ 0,5 sec.			
Mechanical signalisation	-	•	-	•
Output: 2 change-over contacts	5A 250V			
Working temperature	-10 + 60°C			
Storing temperature	-20 + 80°C			
Relative humidity	90%			
Insulation Test	2,5 kV 60 sec.			
Standards	CEI 41-1/IEC 255/VDE 0664/IEC 755/CEI 64.8/ EN 61008-1(1999-11)/EN 62020 (1999-09) / EN 61543 (1996-09) /EN61326-1(1998-04) / EN 61326/A1 (1999-05)-IEC 60947-2 ANNEX M / AS 2081-1 / AS 2081-3			
Wiring method	Screw terminals for cross section wire 2,5 mm ²			
Protection degree at terminals according with DIN 40050	IP 20			
Frontal protection degree	Ip52 (optional IP54)			

* By means of external multiplier (see pag. 40)

WIRING DIAGRAM - LEGEND



DIMENSIONS



selection table

EARTH LEAKAGE RELAY

Type	Characteristics																															
	ELR-1E	ELR-2	ELR-2M	ELR-8V	ELR-8tcs	ELR-8MVtcs	ELR-91	ELR-92	ELR-4.0	ELRm-4.0	ELR-4v	ELRm-4V	ELR7	ELR-51	ELRm-51	ELR-52	ELRm-52	ELRC-1	ELR-3C	ELR-3F	ELR-3E	ELR-61	ELRm-61	ELR-62	ELRm-62	ELR-CB	ELR-DL	ELR-DL2M	ELRC-BL			
MECHANICAL																																
Flush mounting	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DIN rail mounting																			•	•	•	•	•	•	•	•	•	•	•	•	•	•
Base plate mounting																																
Mechanical signalling			•			•				•		•			•									•								
Alarm at 70% of the set current		•	•	•	•	•		•								•	•								•	•					•	
TECHNICAL																																
Function select 2nd contact (trip or alarm)		•	•	•	•	•		•																								
Selectable fail safe k		•	•	•	•	•		•																								
Frontal display				•		•																										
TCS function					•	•																										
Built-in Toroid Transformer																			•								•					•
Automatic reset and reclosing																												•	•	•	•	•
AUXILIARY SUPPLY																																
12V ac/dc	•																			•												
24-48V ac/dc	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
110V dc	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
110 / 240 / 415 Vac	•	•	•	•	•	•	**	•	•	•	•	•	**	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Frequenza 50-60 Hz	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SELF CONSUMPTION																																
Maximum 3VA									•	•	•	•	•						•	•	•	•					•					
Minimum 4VA	•	•	•	•	•	•	•	•						•	•	•	•						•	•	•	•		•	•	•	•	
TRIP CURRENT SETTING																																
0,025÷25A	•	•	•	•	•	•	•	•	•	•	•	•	•						•	•				•	•	•	•	•	•	•	•	
0,25A÷250A op.	•	•	•	•	•	•	•	•	•	•	•	•	•						•					•	•	•	•	•	•	•	•	
0,03÷2,5A														•	•	•	•															
0,3÷25A opz.														•	•	•	•															
0,03 o 0,5A																																
0,03-0,1-0,3-0,5-1A																																
TRIP TIME SETTING																																
0,02÷5 sec.	•	•	•	•	•	•	•	•	•	•	•	•	•						•	•				•	•	•	•	•	•	•	•	
0,02÷0,5 sec.														•	•	•	•															
0,02 o 5 sec.																																
0,02-0,2-,05-1-5sec.																																
OUTPUT CONTACTS																																
Max: 5A-250V	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
1 changeover for tripping	•	•	•	•	•	•	•	•											•	•	•	•	•	•	•	•	•	•	•	•	•	
2 changeover for tripping									•	•	•	•	•	•	•	•	•	•						•	•	•	•	•	•	•	•	
1 changeover for alarm			•	•	•	•		•																								
1 changeover for alarm TCS						•																										
TEMPERATURE																																
Storing: -20 ÷ +80°C	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Working: -10 ÷ +60°C	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Relative humidity: 90%	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
INSULATION TEST																																
2,5 kV per 60 sec	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
STANDARDS OF REFERENCE																																
CEI 41-1/IEC 255/VDE 0664/IEC 755/CEI 64.8/ EN 61008 1(1999-11)/EN 62020 (1999-09)/EN 61543 (1996-09)/EN 61326 1(1998-04) / EN 61326/A1 (1999-05)/IEC 60947-2 ANNEX M	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
AS 2081-1														•	•	•	•															
AS 2081-3														•	•	•	•															
GRADO DI PROTEZIONE																																
IP20	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
IP54 (option)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	

* only 230 Vca

** only 110-230 Vca

MULTIFUNCTIONAL AMMETER MEASURING FOR NETWORK DIFFERENTIAL CURRENT

FLUSH MOUNTING DIN 96X96 mm

These could be used for measuring differential or residual currents (up to 4 simultaneously) with an external toroidal current transformer **CT-1 series**

GENERAL



Environmental working characteristics

Working T -5 ÷ +50°C
Storage T -15 ÷ +60°C
Humidity ≤90%

ELM-4
 ELM-4-485

Standards/ Regulation

Safety 61010-1:2001
EMC: EN61000-6-2 / EN61000-6-4
 CISPR22-EN55022

Electrical compatibility CE

models and value	ELM 4	ELM 4-485
Mechanical characteristics	Flush mounting DIN 96 x 96 mm Depth 56 mm Panel cut out 92x92 mm Weight: 0,5 kg	
Auxiliary supply	110-230-400 V 50-60 Hz	
OPTION C1	20÷60 Vca/dc	
OPTION C2	90÷250 Vca/dc	
Protection degree	Frontal IP 52 Box IP 20 (IP65 with external cover)	
Current inputs	4 inputs 0,05÷5A rms from external toroidal reducer series CT-1	
OPTION 1A Δ	4 inputs 0,01÷1A rms (from external toroidal reducer series CT-1..)	
OPTION 50 A Δ	4 inputs 0,05÷50A (from external toroidal reducer series CT-1)	
Measured parameters	AΔ1 AΔ2 AΔ3 AΔ4	
Measuring accuracy	Current:<0,5%	
Frequency measure	40 ÷ 100 Hz	
Serial outputs	-	1 Rs485 Communication protocol MODBUS-RTU Baud rate 9600-19200 bps
Digital outputs	2 photomos - 10÷300 Vcc/150 mA or 10÷250 Vca/150 mA max for alarms or re-emission pulses (programmable time of pulse 100÷500 m Sec.)	
Analog outputs	-	3 outputs 0-20/4-20 mA, completely programmable 16 bit definition (by external toroidal converter serial/analog Z3A0) *
Display	4 displays with 10 mm red LED (3 digit of 10 mm - 7 segments)	

* in this case serial output RS485 can not be used.

CT-1

TOROIDAL CURRENT TRANSFORMERS

GENERALITY



The CT series toroidal transformers allow to sense the leaking currents to earth. These transformers have been designed to be coupled to the maximum earth leakage current relays of the ELR series.

The T/T's should be installed upstream of the lines or loads to be protected and/or supervised. All active wires (phase and neutral) of the three phase or single phase lines should pass through the internal core of the transformers. It senses, in this way, the currents vectorial addition, in order to transmit the earth leakage current to the secondary.

For further applications of the CT toroidal transformers, please refer to the specific documentation (i.e. The sensing of the earth leakage current on the distribution transformers).

The current T/T's are made of an optimum quality magnetic core, which allows to detect leakage currents of a very low value even. There are two windings coupled in the core, one to detect the signal of a leakage in the line (to be sent to the relay), and the other for performing the Test. The eventual Test which uses this second winding is performed through various specific ELR's types. A signal from the ELR is sent to the Test winding. This signal generates a flow equivalent to a leakage, which is detected by other winding and resent to the relay and makes it to trip.

The selection of the transformer should be made on basis of the dimensions of the wires or bars that should pass through its inner hole. There are split core types available, which allow their installation without disconnecting the actual wiring.

INSTALLATION

All phases should pass through the inner part of the T/T, even the neutral if same is distributed. The earthing wire shouldn't pass through the T/T.

The passage direction of all wires has to be the same, but in those applications which do not use Current Transformers in parallel, it is not necessary to respect the introduction direction(P1).

The output signal should be taken from terminals 1 (S1) and 2 (S2) and then connected to the ELR for its measure. Terminals 3-4 should be connected to the output test of those relays that have this feature available, otherwise they would be left without connection. For this wiring it is suggested to use shielded or twisted cables, placing them as far as possible from power cables. The minimum cross section of the wiring cable should allow to have a maximum resistance of 3 W; as indication it could be said 0,5 mm² max 20 metres, and 2,5 mm² max 100 metres.

The fixing of the transformers could be made on base plate DIN rail or on cables.

Should the case be of using the split core transformers, it is necessary to supervise that the contact faces of the half-cores are properly clean, so as the tightening of the fixing side screws and the right electrical wire connections between both half-cores.

In the case that the cables are shielded or they have metal protection, these should be earthen downstream of the toroidal transformer. If the shielding of the cable passes through the inner hole, the shielding connection to earth should pass again in the inverse direction by the inner hole (see image).

In presence of specific line over currents, which may happen when starting big motors, giving voltage to transformers etc., they could cause nuisance tripping of the relays. Following guidelines could be of help:

Install the T/T in a right piece of cable, centre the position of the cable at the inner hole of the T/T and use T/T's with bigger diameter of the cables (2 times the cables diameter even).

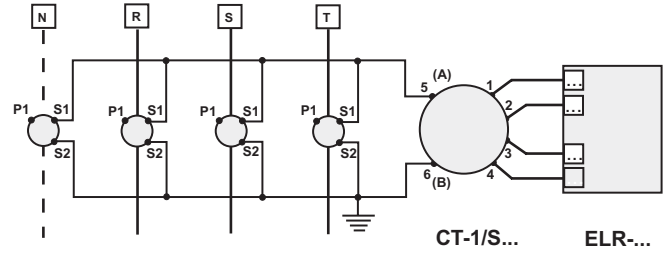
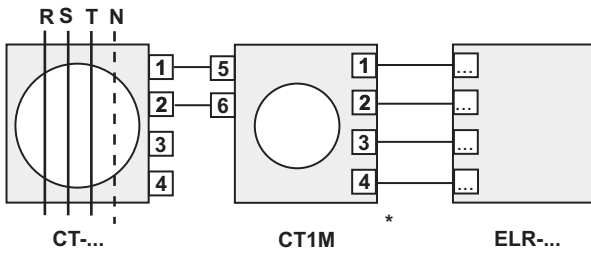
CHARACTERISTICS

type	CTD-1/28	CT-1/35	CT-1/60	CT-1/80	CT-1/110	CTA-1/110	CT-1/160	CTA-1/160	CT-1/210	CTA-1/210	CT-1/415
Core	closed	closed	closed	closed	closed	split core	closed	split core	closed	split core	closed
Inner diameter	28 mm	35 mm	60 mm	80 mm	110 mm	110mm	160 mm	160 mm	210 mm	210 mm	400 x 150 mm
Weight	0,20 Kg	0,22 Kg	0,28 Kg	0,45 Kg	0,52 Kg	0,60 Kg	1,35 Kg	1,60 Kg	1,45 Kg	1,85 Kg	8,3 Kg
Min. Meas. current	25 mA	25 mA	25 mA	100 mA	250 mA	250 mA	250 mA	500 mA	250 mA	500mA	500mA
Mounting position	Any one										
Application	For using with ELR series										
Working temperature	-10 ÷ 70°C										
Stocking temperature	-20 ÷ 80°C										
Transformation ratio	500/1										
Isolation	2,5 kV per 60 sec										
Permanent overload	1000 A										
Thermal overload	40 kA per 1 sec										
Terminals	screws with maximum cross section 2,5 mm ²										
Protection degree	IP20										
Standard of reference	EMC CEI-EN 50081-2 CEI-EN50082-2 SAFETY CEI 41.1 CEI-EN 60255										

CT-1

TOROIDAL CURRENT TRANSFORMERS

CT1M - CT1S - SPECIAL TOROIDAL TRANSFORMERS



CT1M: It's a multiplier for the current setting of those ELR's up to 250 A. It's placed between the ELR and the measuring T/T (It isn't a wire passing through transformer)

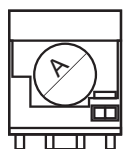
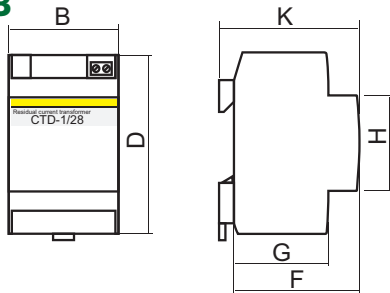
CT1S: It's a summation T/T, which should be used, in those cases when the cables of the system to be protected are bigger than the inner diameter of the T/T's. In such a case Ct's should be used and installed in the line. The CT's are connected to the summation T/T's and these to the ELR. (For more information, please refer to the applications notes described hereinafter).

DIMENSIONS TABLE

type	DIMENSIONS (mm)								
	A	B	C	D	E	F	G	H	K
CTD-1/28	28	52,5	-	85,5	-	58	44	45	54
CT-1/35	35	100	60	100	47	50	43	30	-
CT-1/60	60	100	60	100	47	50	43	30	-
CT-1/80	80	150	110	160	70	50	43	30	-
CT-1/110	110	150	110	160	70	50	43	30	-
CTA-1/110	110	145	110	150	75	45	38	25	180
CT-1/160	160	220	156	236	110	64	50	34	-
CTA-1/160	160	220	156	236	110	64	50	34	-
CT-1/210	210	310	240	290	145	260	280	36	55
CTA-1/210	210	310	240	290	145	260	280	36	55
CT-1/415	400	150	500	497	240	-	-	50	-
CT-1M	-	100	60	110	47	50	43	30	-
CT1-1S	-	100	60	110	47	50	43	30	-

DIMENSIONS

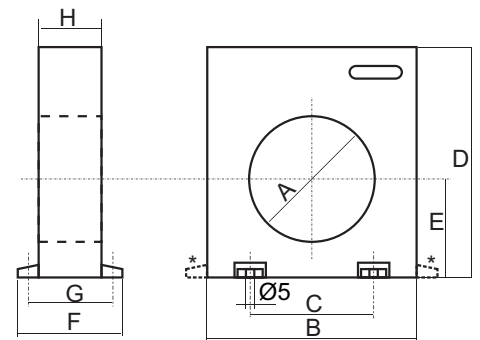
CTD-1/28



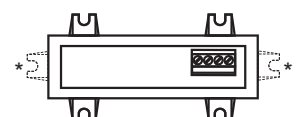
Mounting on rail 35mm according with DIN 50022
3 modules of 17,5 mm

DIMENSIONS

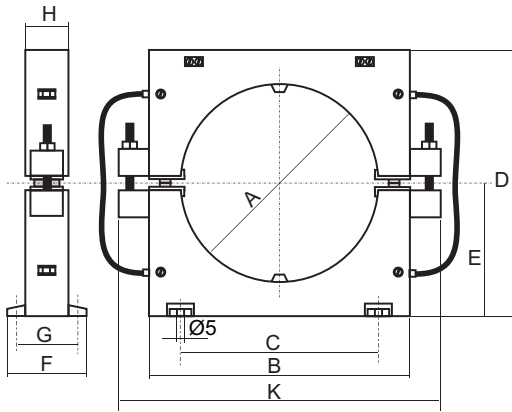
CT-1/35, CT-1/60, CT-1/80, CT-1/110, CT-1/160, CTA-1/160



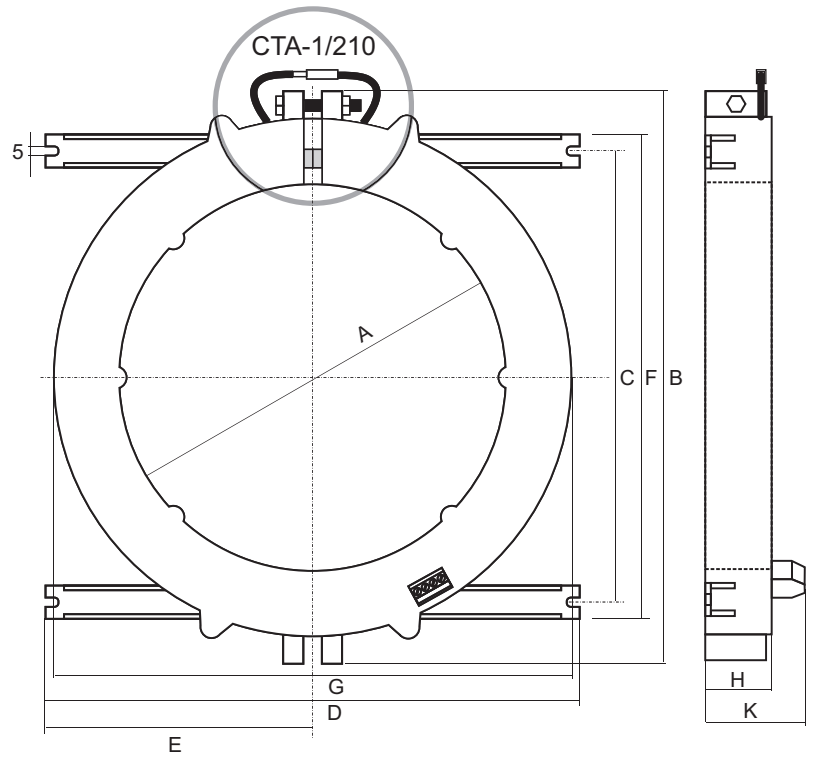
* Fixing grooves only available on CT-1/160 and CTA-1/160 types
The CT-1/160 and CTA-1/160 type dimensions are identical
The CT-1/210 and CTA-1/210 type dimensions are identical



DIMENSIONS - CTA-1/110



DIMENSIONS - CT-1/210, CTA-1/210



DIMENSIONS - CT-1/415



APPLICATION NOTE FOR EARTH LEAKAGE RELAYS ELR SERIES

1. EARTH LEAKAGE RELAYS APPLICATION WITH CT-1/S

1.1. APPLICATION

This application is particularly useful in those cases, in which it is impossible to embrace all conductors (supply bars) of the system, with only one transformer.

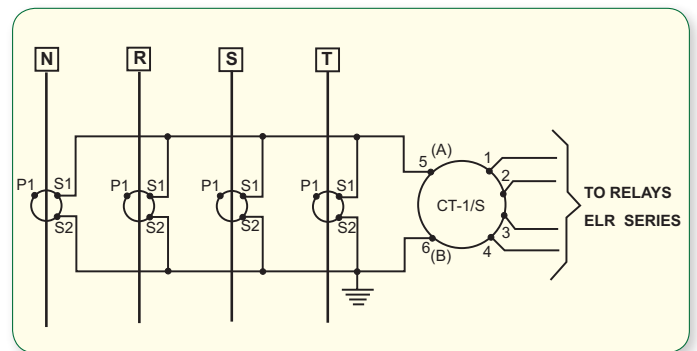
In this case, it is possible to have Earth Leakage Protection, by using Ct's and one of our special toroid transformers (exclusively made by us, based on the winding rate of the Ct's), complying with the wiring diagram, described below. For this application the Ct's should have: the same transformation ratio (5A secondary), same power (10 VA at least) and class 0,5. On the other hand, it is important that the Ct's are mounted, in such a way that the script P1 is orientated upstream, towards the line to be protected, and the various secondaries exactly as per the diagram.

1.2. WORKING PRINCIPLES

When there is no earth leakage, the vectorial addition of the currents sensed by the Ct's, is equal to zero. Thence, there is no current flowing in the windings related to our terminals 5 and 6 (in our special toroid). There isn't any voltage generated in our terminals 1 and 2 therefore, which should make the ELR to trip.

When there is a leakage, otherwise, the vectorial addition of the currents sensed by the Ct's is different to zero. Thence, a voltage is generated through the terminals 1 and 2, making the ELR to trip.

For this application, it is advisable to have a tripping threshold of the ELR, not lower than a 1/100 of the rated current of the system to be protected.



2. ELR'S APPLICATION WITH GROUND WIRE OF TRANSFORMERS

2.1. APPLICATION

This application is particularly indicated when the system is supplied through Transformers, working in parallel.

In fact, it could be impossible to protect the line with ELR's sited immediately downstream of the transformers. Since it wouldn't be possible to establish which part of the Current Leakage to Ground (clg) is borne by one or the other transformer. This brings us to a point, in which is practically impossible to establish exactly the threshold of the tripping value of the relays.

EXAMPLE:

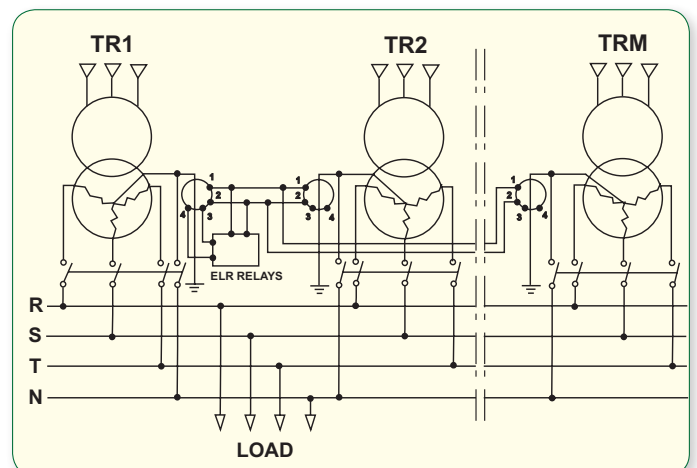
Suppose that we wish to protect an installation, which requires that the ELR should trip when the clg is equal to 5A. Should we install 2 ELR's with 5A threshold, it would certainly be required a higher value of clg, in order to make the ELR to trip. On top of the above, in case of an equal distribution of the current leakage between both transformers, it should be required a $clg = 10A$, in order to make the ELR's to trip. Otherwise, if we adjust the tripping threshold to 2.5A, it could be the case that one transformer is bearing fl of the clg and the other/only. Thence the ELR of the first transformer would trip before the 5A of clg are reached. Other factor to be considered, is the eventual separation of a transformer from the parallel, during low load demand periods. In this case the eventual clg is totally re-closed through the earth of an unique transformer and the tripping threshold should be establish exactly as 5A, under these conditions. The solution of the problem is given in our diagram.

2.2. WORKING PRINCIPLES

Our diagram here below shows the solution, based in connecting the star centres of both transformers together to earth with an unique wire, which has passed through our toroidal transformer before.

It is based in the fact that any current leakage to ground can't be re-closed but through the star centres of the transformers. With the toroidal, positioned as per our diagram, it is measured therefore the total current leakage to ground.

Back to the above mentioned example, we should establish as 5A the tripping threshold value, with the assurance that the ELR will trip, when the clg goes above the 5A threshold.



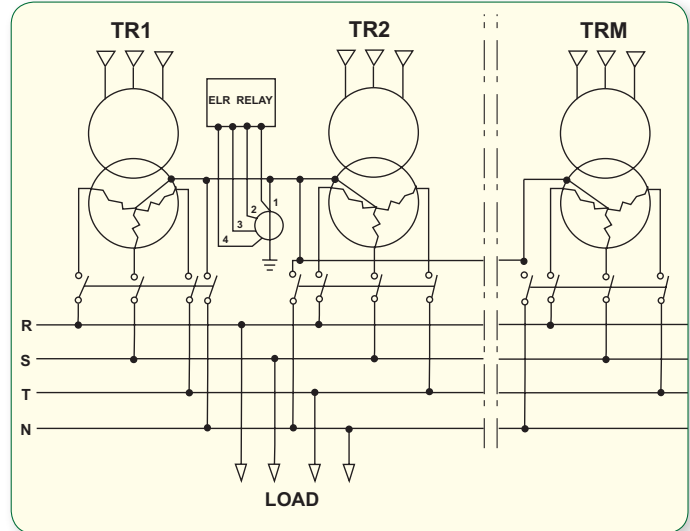
3. APPLICATION OF ELR's ON VARIOUS LINES IN PARALLEL

3.1. APPLICATION

This application can be used whenever there are various connecting lines through two bar systems OMNIBUS.

In this case, the use of ELR's with their corresponding T/T's ,per each connecting line, it could give operation inconveniences; since the vectorial addition of the currents , on each connecting line, might not necessarily be equal to zero. It could be the case that, with 2 perfectly equal lines, there could be a difference of current distribution, due to a contact resistance difference (in phase R, for example), whilst the adsorbed current by the load might be equally distributed, in the other lines.

All this brings along that, there might be a leakage signal, at the toroidals terminals 1-2, which could be sufficient to make the ELR's to trip, without any earth leakage. With this kind of distribution, it is advisable to go to the wiring diagram, in which there are used as many T/T's as connecting lines, all of them orientated towards the 1 and 2 terminals of our ELR.



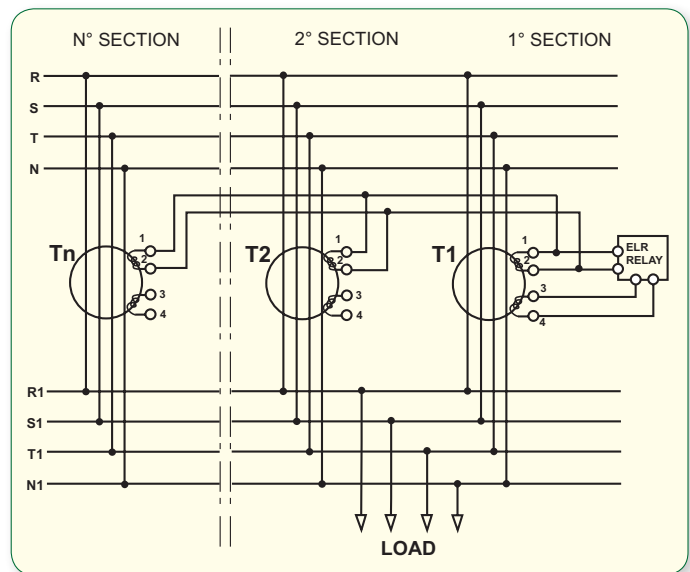
3.2. WORKING PRINCIPLES

when there is no leakage, although with a non uniform current distribution, as mentioned in the above paragraph 3.1, the originated signal at the first toroidal, is totally void by the leakage signal originated at the second toroidal, since the signal can't be but in opposition, and the ELR's terminals won't receive any signal and the ELR won't trip therefore.

Otherwise, when there is an earth leakage, independently of whatever it might be the current distribution, the signals summation, being measured by the various Tt's, meet at the 1 and 2 terminals of the ELR, which will trip therefore. This application is valid for a maximum of 6 Tt's connected in parallel.

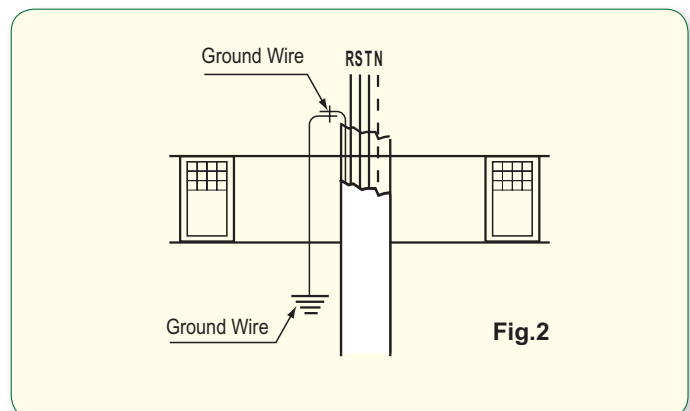
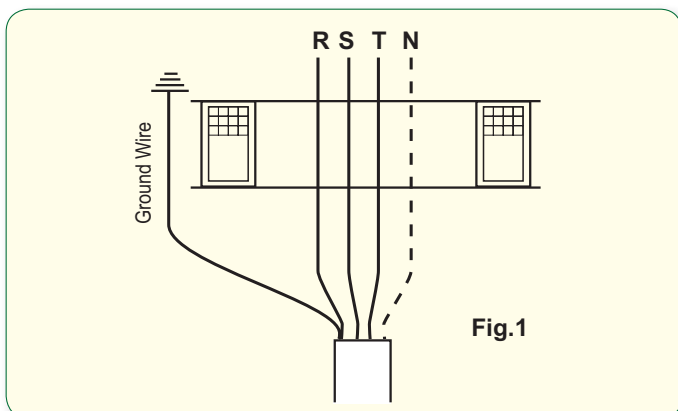
In those cases, in which a higher number might be required,, it is advised to contact us.

For this application, it is advisable to have a tripping threshold not below 1/1000 of the nominal current of the system to be protected.



4. MEDIUM VOLTAGE LINES APPLICATION

Should an ELR be used in MV lines, it is advisable to use the built-in filter for third harmonic version.



Nota: If there is an earthing circuit , it should be placed outside of the T/T (fig1).

When the cable is fitted with a metallic screen and it gets through the T/T, the earthing connection should be as (fig. 2)

TCS

RELAY FOR PERMANENT CONTROL OF THE MCCB'S TRIPPING CIRCUIT

GENERALITY



TCS-1 / TCS-2

TCS-3 / TCS-4

MODELS	
TCS1	circuits 24-48Vac/dc / esec. DIN rail 3 modules
TCS2	circuits 110-230-400Vac/dc / esec. DIN rail 3 modules

OPTIONS	
T	tropicalization

MODELS	
TCS3	circuits 24-48Vac/dc / esec. flush mounting DIN 96x96mm
TCS4	circuits 110-230-400Vac/dc / esec. flush mounting DIN 96x96mm

OPTIONS	
T	tropicalization

The **TCS** is devoted to control the MCCB's disconnection circuits (trip) or the safety circuits. In fact, whenever there is an interruption in a circuit (Output relay of any given protection MCCB's shunt trip coil and the connection between the relay and the coil), and it is required that the MCCB trips due to any anomaly in the line, such MCCB will be unable to trip.

Provided that the system has been installed with other protections, some other Circuit Breaker will trip and the result will be the loss of service of other sections of the system, which might be most important.

Should the MCCB be the sole protection, the use of the TCS is most important, because the working guarantee of the tripping circuit becomes critical, in this particular case.

An important application is with the safety or emergency circuits, according with the CEI 64-8/537.4.3 Standard, when using shunt trip coils for emergency reactions, as the starting of a fire fighting

system, por example.

The relay has an auxiliary supply electrically separated from the Control Voltage.

In normal conditions, with auxiliary supply to the TCS relay, the OK green LED will glow. If there is any anomaly on the disconnection or safety circuit, the "ALARM" red LED will glow and the OK green LED will be switched off. The double changeover end relay will be de-energized enabling a possible acoustic signal and a remote repetition. Same signal is shown with tripped breaker.

On top of the above it is possible to detect the loss of supply on the auxiliary circuits, by supplying the TCS with same auxiliary voltage.

If the end relay is normally energized (fail safe), when there is a lack of supply, the end relay will be de-energized, as per anomaly situations, but in this case the LED's at the front will be switched off.

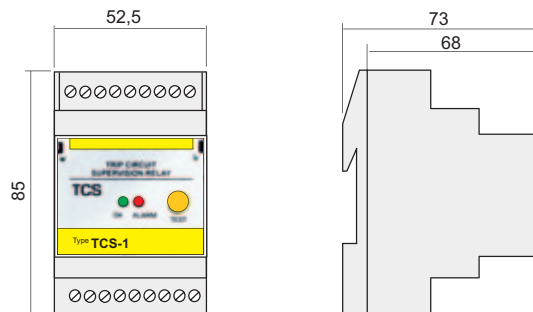
ELECTRICAL CHARACTERISTICS

models and value	TCS-1	TCS-2	TCS-3	TCS-4
Auxiliary Voltage supply	24÷48 Vac/dc ± 20%	110-230-400Vac/dc ± 20%	24÷48 Vac/dc ± 20%	110-230-400Vac/dc ± 20%
Frequency	50 ÷ 60 Hz			
Maximum consumption	1,5÷3,5VA depending on Vaux			
Current of circuit under control	6 mA	2 mA 110-380V 4mA 220V	6 mA	2 mA 110-380V 4mA 220V
Voltage of circuit under control	13÷30V ac/dc 8-9 terminals 24÷60V ac/dc 7-9 terminals	50÷260V ac/dc 8-9 terminals 250÷440V ac/dc 7-9 terminals	13÷30V ac/dc 8-9 terminals 24÷60V ac/dc 7-9 terminals	50÷260Vac/dc 8-9 terminals 250÷440Vac/dc 7-9 terminals
Tripping Time delay	0,4÷1 seg. Depending on input Voltage	0,2÷0,5 seg. Depending on input Voltage	0,4÷1 seg. Depending on input Voltage	0,2÷0,5 seg. Depending on input Voltage
Reset Time	0,6÷1seg. Depending on input Voltage	1,5÷2 seg. Depending on input Voltage	0,6÷1seg. Depending on input Voltage	1,5÷2 seg. Depending on input Voltage
Output. 2 change-over contacts	5A 250V			
Working Temperature	-10 + 60°C			
Storing Temperature	-20 + 80°C			
Relative humidity	< 90%			
Insulation Test	2,5 kV 60 sec.			
Pulse Test	5 kV 1,2/50 microsec.			
Standards	CEI 41-1 - IEC 255-801			
Wiring method	Drawing out screw terminals for cross section wires 2,5 mmq			
Protection degree according DIN 40050	IP 20		Ip52	
Mounting according DIN 50022	Snap on DIN rail 35 mm - 3 modules		Flush mounting 96x96mm	
Optional resistance (R) to be used for the monitoring of the circuit also when the switch board is open. The value of the resistance change for the voltage of the circuit.	24 Vac/dc R=0,8÷1kohm 5W 48 Vac/dc R=2,2÷3,3kohm 5w	110 Vac/dc R=8,2÷12kohm 7W 230 Vac/dc R=15÷22kohm 10W 400 Vac/dc R=39÷57kohm 15W	24 Vac/dc R=0,8÷1kohm 5W 48 Vac/dc R=2,2÷3,3kohm 5w	110 Vac/dc R=8,2÷12kohm 7W 230 Vac/dc R=15÷22kohm 10W 400 Vac/dc R=39÷57kohm 15W

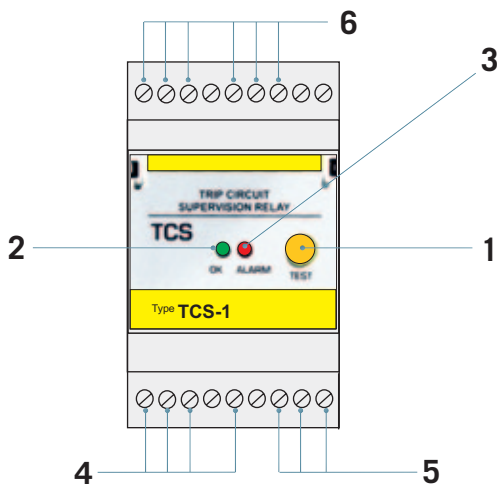
TCS

RELAY FOR PERMANENT CONTROL OF THE MCCB'S TRIPPING CIRCUIT

DIMENSIONS - TSC-1, TSC-2

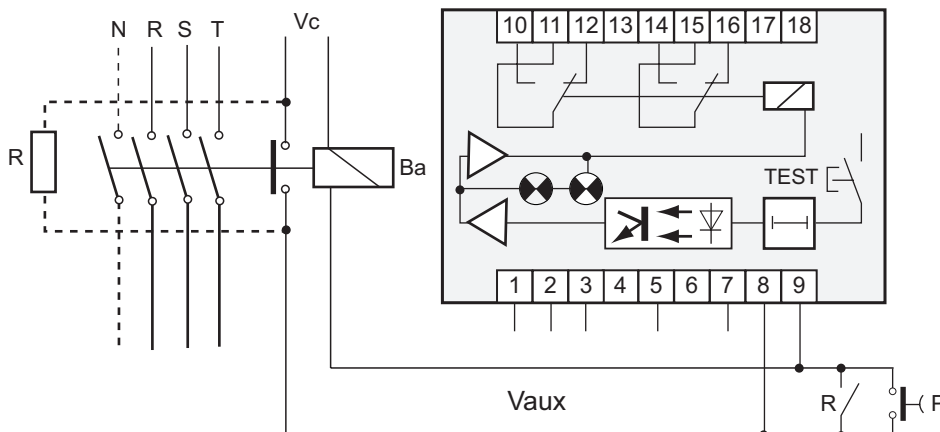


LEGEND - TCS-1, TCS-2



1	Test push button
2	Signalling lamp of OK circuit (green LED)
3	Signalling lamp of anomaly in the circuit (red LED)
4	Terminals for auxiliary supply
5	Connecting terminals to the circuit under control
6	Output terminals of the end relay with double changeover

WIRING DIAGRAM - TCS-1, TCS-2



TCS-1

Vaux
 1 - 2 = 24 Vac/dc
 1 - 3 = 48 Vac/dc

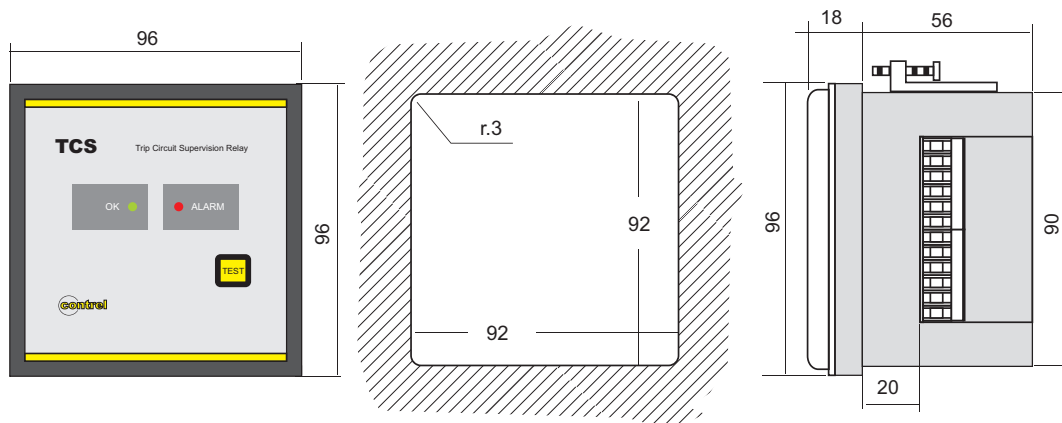
Vc
 9 - 8 = 24 Vac/dc
 9 - 7 = 48 Vac/dc

TCS-2

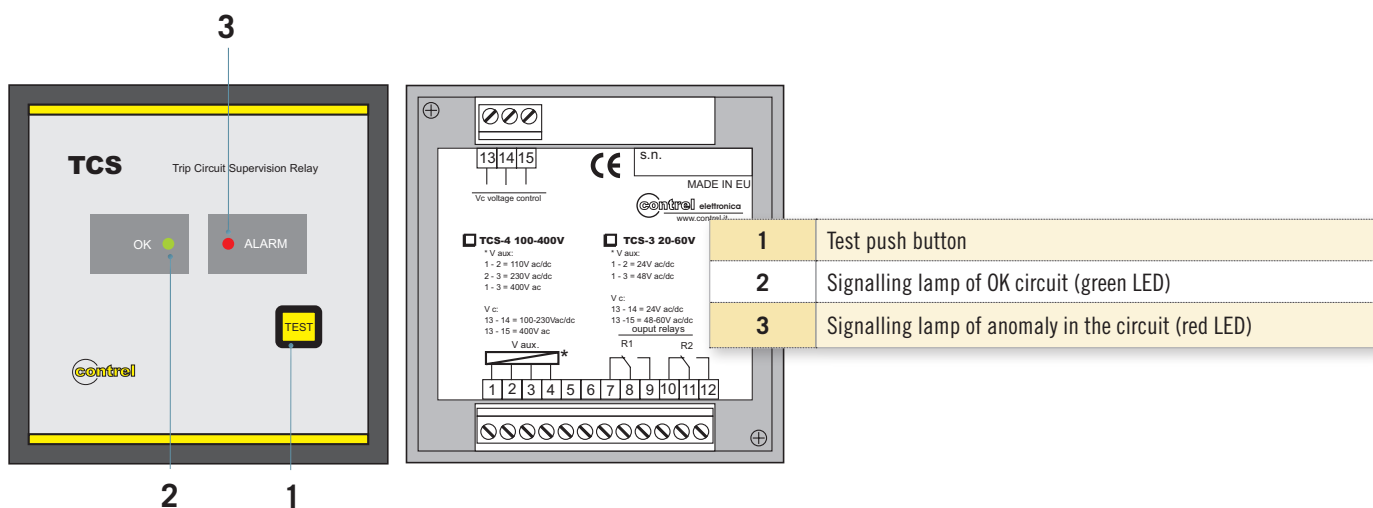
Vaux
 1 - 2 = 110 Vac/dc
 1 - 3 = 220-240 Vac/dc
 1 - 5 = 380-415 Vac/dc

Vc
 9 - 8 = 110-240 Vac/dc
 9 - 7 = 380-415 Vac/dc

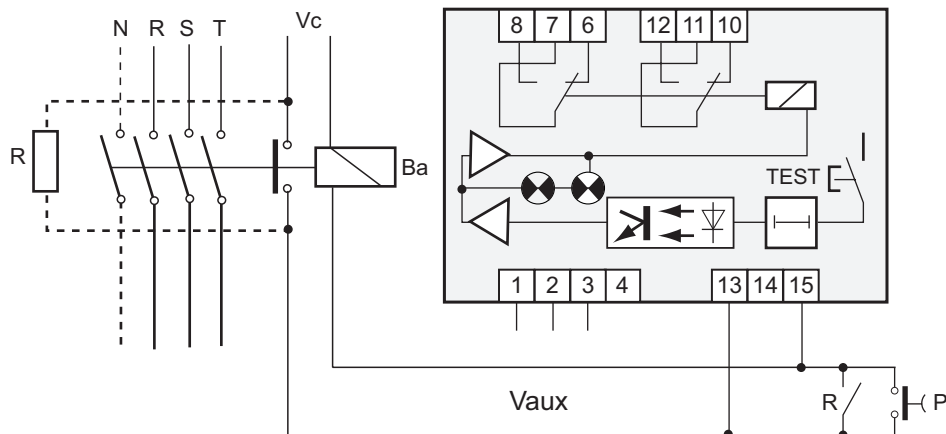
DIMENSIONS - TCS-3, TCS-4



LEGEND - TCS-3, TCS-4



WIRING DIAGRAM - TCS-3, TCS-4



TCS-3

Vaux

1 - 2 = 24 Vac/dc
1 - 3 = 48 Vac/dc

Vc

13 - 14 = 24 Vac/dc
13 - 15 = 48 Vac/dc

TCS-4

Vaux

1 - 2 = 110 Vac/dc
1 - 3 = 230 Vac/dc
1 - 5 = 400 Vac/dc

Vc

13 - 14 = 110-230 Vac/dc
13 - 15 = 400 Vac/dc

TCS-A5

ACTUATOR FOR SAFETY CIRCUIT

GENERALITY



As required by CEI 64/8, the condition of maximum safety in the opening of the switches is obtained with the use of buttons with normally closed contacts associated to an opening coil at minimum voltage. This solution is critical because any voltage interruption (even short) creates an out of service with the relative consequences. The TCS-A5 device has the benefits to have the command (button, relay, etc.) with normally closed contacts and at the same time those of the shunt trip opening coil (immune from defect of opening on voltage brake) instead of that a minimum voltage. This device, as the TCS classical, control the efficiency of the safety network or the opening circuit of the switch associated.

FUNCTIONING

The classic application of the device is to command a switch with shunt trip opening coil (BA) using a series connection of safety buttons. When the device is connected as showed in the picture, with Vc present but without Vaux, the relays are de-energized, the BA don't receive energy and the relay RA is in alarm status. When the Vaux is supplied the led ON turn ON, the Alarm Relay (RA) is energized, the device is in condition of normal functioning, the Trip Relay (RT) after 80 ms is energizing, after others 80 ms the Safety Relay (RS) is energizing and the Led Ready turn ON. In this condition the device is ready to receive the command to trip from the normally closed safety button (NC). After 150 ms from the trip request (NC button pressed) the RT relay is de-energized while the BA actuator is energized, opening the associated switch. The trip status is signalled on the device with the TRIP led turned ON and the READY led turned off and with a remote lamp in parallel to the BA coil. This condition can be stored. In this way it's possible to use safety buttons with instantaneous opening (without mechanical retain). The memory can be resetted using the button on the device or using the

MODELS

TCS-A5	circuits 115-230 Vca
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OPTIONS

T	tropicalisation
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remote button (free of voltages).

Short-circuiting the terminal 8 and 9 the device will be resetted after the trip request. With the TEST button of the device is possible perform a test without to use the safety buttons. The 5 safety button are checked in the perfect condition of functioning (without short-circuit on terminals or on connection). These buttons should contain a resistance of 1000Ω 1/2W or 1W 1% after the connection terminals (see wiring connection).

This presence allows at the device to detect when there are short-circuit on the terminals or on connection.

In application with more of 5 buttons, the button that exceed the limit of 5 should not be of the self-control type.

The number of the self-control buttons should be exactly balanced setting the number on the dip-switches on the device.

It's important to set the number correct because an error could create some problem to the device that don't recognize the number and the condition of the connected button.

When on one or more of the self-control buttons there is an abnormal connection, the Push button Alarm Led, on the device, turn on and the Alarm relay is de-energized, the exchange 16-17-18 commute for the remote signalling; This condition is only of alarm and don't cause the system Trip. In addition to the fail safe, on the power supply, the device also contain TCS function (control open circuit). The device can also control the efficiency of the source of control voltage (Vc) and the circuit connection to the BA. For a fault on a BA circuit, it's possible to have the two following situation:

1. With Trip-BA switch set to OFF, the BA Alarm led is turning ON and the RA relay is de-energized with the signalling of remote Alarm. When the fault disappears the BA Alarm led is turning off and the RA relay energized, the remote signalling disappears. The Trip relay (RT) doesn't change his status.
2. With Trip-BA switch set to ON it's possible to have one of the following cases:
 - 2.1. With Auto-Reset (Remote Reset) not inserted the Trip memory will be activated, the Trip Led will turn on, the led READY will turn OFF and the Trip relay (RT) will be de-energized, the same way of the BA trip.

This condition is hold up to the RESET that turn off the memory. If in the meantime the fault was removed, everything come back to the normal, otherwise, even if the TCS-A5 is come back in the READY condition, the ALARM BA led remain ON and the RA relay is still in alarm.

It's obvious that this is an emergency condition and the power switch should not be closed because it would be not able to open by electricity.

2.2 With Auto-Reset (Remote Reset) inserted (short-circuit between 8 and 9 terminals) the Trip Relay (RT) is de-energized for 50÷100 ms and after it come back energized. This caused the momentary closing of the contacts of the 11 and 12 terminals. With this contacts and with the RA contacts it's possible to create a specific remote signalling of fault of the BA circuit, with priority greater than the alarm signalling for button in short-circuit.

If in the condition of normal functioning the Vaux is missing, the device has a duration of about 1 second. Exceeded this time there are the following conditions:

1. With the Trip switch set to OFF, the Safety Relay (RS) will be de-energized before of the Trip Relay (RT), without the BA tripping.
2. With the Trip switch set to ON, the Trip Relay (RT) will be de-energized before of the Safety Relay (RS) causing the BA tripping.

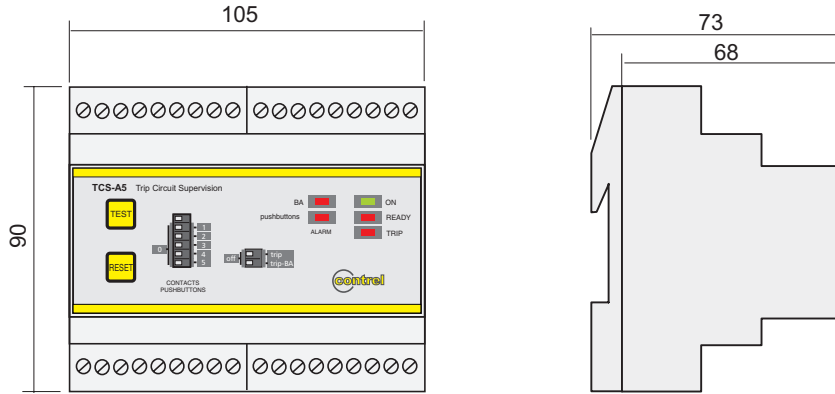
ELECTRICAL CHARACTERISTICS

models and value	TCS-A5
Auxiliary power voltage Vaux	115÷230Vca 50÷60Hz
Max Consumption	5VA (4W)
Line voltage BA	110÷230Vca/cc
Functioning Voltage NC contacts	max 30Vcc
Current of NC contacts	Min. 0,4mAcc Max 0,7mAcc
BA command output	1 contact 5A 250Vca free of voltage (fail safe)
Alarm output	1 change 5A 250Vca free of voltage (fail safe)
Input NC contacts	n°5 monitored (selectable using dip-switches)+ number unlimited and uncontrolled
Signalling on device (led)	ON: presence of power supply. READY: device ready to work. TRIP: Tripping. BA: BA fault. Pushbuttons: NC contact fault
Dip-switch	n°5: for monitored contacts n°1 Trip: ON/OFFOFF (for possible trip in case of lack Vaux) n°1 Trip BA: ON/OFF (for any request for trip in case of BA fault circuit)
Push-buttons	TEST (test of the device except the NC buttons). RESET (to reset the Trip memory) REMOTE RESET using a free voltage NO contact (short-circuiting the terminals 8 and 9 is performed the auto-reset of the Trip memory)
NC command buttons	MAX n°5 monitored (it's important to place the number of dip-switches correct, corresponding to the amount of controlled external buttons). Resistance to be inserted in the button = 1000hm 1W.
Box	6 DIN modules
Working temperature	-10°C ÷ +60°C.
Storing temperature	-25°C ÷ +85°C
Relative Humidity	90% without condensing
Trip from NC	150ms
Ready from Vaux	about 160ms
Trip impulse when missing Vaux	about 100ms
Trip when missing Vc	(control voltage) or fault on BA
Duration without Vaux	about 1 second
Norme di riferimento	CEI 64-8/537.4.3 - CEI 64-8 - CEI EN 61010-1 (safety) - CEI EN 61551-1 (safety) - CEI EN 61236-1 (EMC compatibility) - CEI EN 61236-2-4 (EMC compatibility)

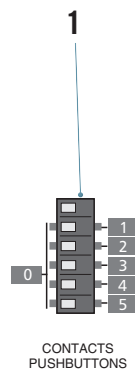
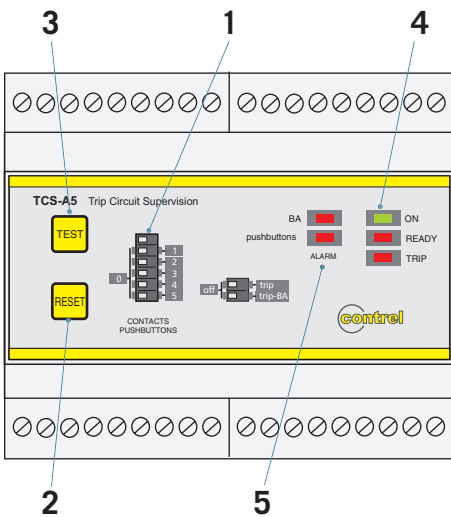
TCS-A5

ACTUATOR FOR SAFETY CIRCUIT

DIMENSIONS

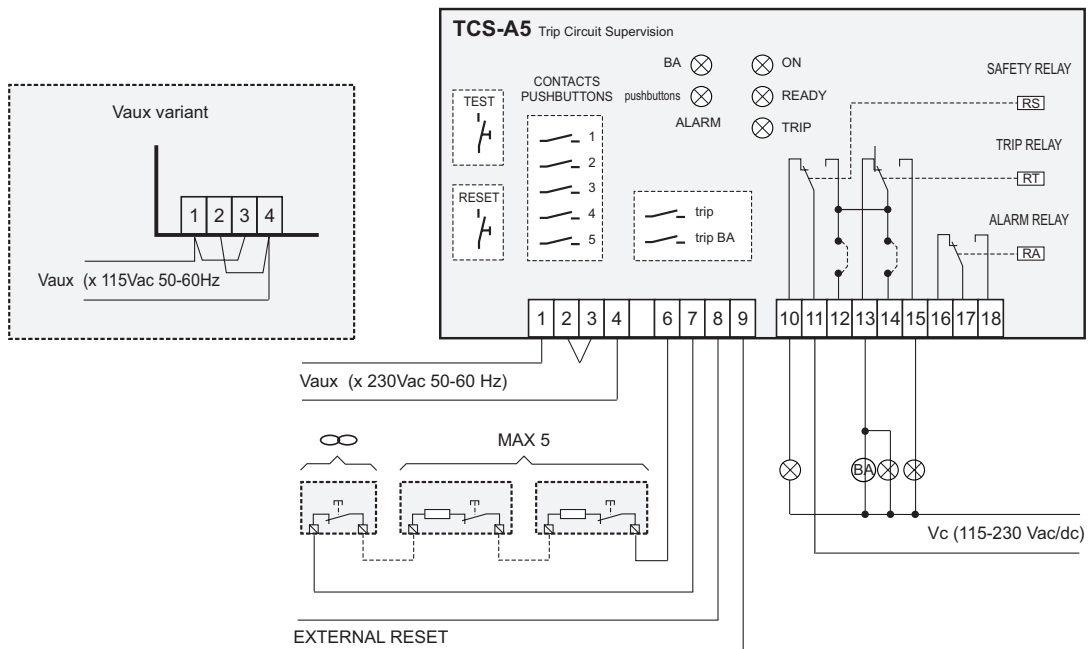


LEGEND



1	Micro-switches for setting
2	Test push-button
3	Reset push-button
4	GREEN LED for network presence RED LED for relay ready to trip and RED LED trip
5	RED LED to signalling coil and push button status

WIRING DIAGRAM



STATIC RELAY FOR MOTOR RE-START AND REACCELERATION

GENERALITY



UNDECAL SOCKET

MODELS

RSR-72	circuits 230V 50-60Hz
RSR-72	circuits 115V 50-60Hz

OPTION

Z	Undecal support
M	Restraint spring for fixing Undecal support

FUNCTIONALITY

The RSR-72 relay is used in association with an holding position contact. On the relay is possible to set a memory time from 0.4 to 60 seconds and a delay time from 0.4 to 1000 seconds.

Anytime a voltage lack (or with a value less of 65% of the rated voltage) and subsequently the voltage restores (at least the 90% of the rated voltage) within the memory time set the re-start motor output will be activated after the delay set.

If the voltage restores after the memory time, the automatic re-start will not happen, while the voltage restores in a time less than 0.4 seconds (the minimum memory time), the motor will reaccelerate.

If the reacceleration function is activated and the voltage go back in a time less than 0.2 seconds (maximum time for reacceleration) the motor will reaccelerate immediately, if the reacceleration function is not activated after the delay time the motor will restart automatically.

The main circuits are:

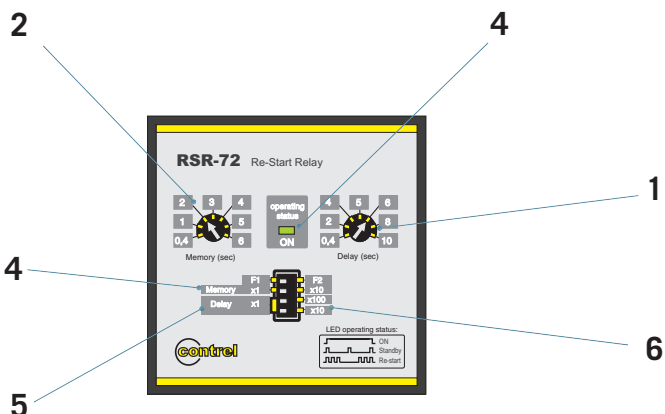
- supply circuit and voltage control
- circuit of contactor control and of memory activation with separation by photo-coupler
- circuit of motor stop control by PA pushbutton (stop) and quick memory shutdown separated by photo-coupler.
- circuit for final relay closing and control circuit are managed by microprocessor

The **RSR-72** type relay for re-start and reacceleration is designed to perform the automatic motor restarting, after control and protection device opening, as a consequence of a momentary line voltage interruption or drop-out.

The RSR-72 relays allow, after the stop of the motors, the automatic re-start with a correct sequence depending of the working process.

The RSR-72 relays are housed in a case for flush mounting or panel mounting or on DIN rail 35 mm on extractible undecal socket type. On front panel there are potentiometers and micro-switches for settings and one LED to indicate the functional status.

LEGEND



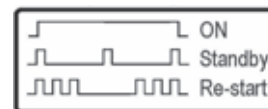
1	Delay adjustment trimmer
2	Memory adjustment trimmer
3	Green led to indicate the relay status ON - STANDBY-RE-START
4	Sliding contact switch for memory rating
5	Sliding contact switch for delay rating
6	Sliding contact for reaccelerate function

SIGNALLING FUNCTION LED OPERATING STATUS

The LED of signalling of the relay status has the following means:

- **LED off:** power supply and measure voltage are not present
- **LED on, fixed light:** relay at rest with measure voltage within the range set
- **LED with 1/1 rate (about 1 Hz) blinking light:** relay in STAND-BY, the voltage lack has been for a time less than memory time, the re-start is not performed even if the power supply is present
- **LED lamp. rapporto 1/3 (3 lampeggi veloci):** relay in RE-START, the voltage lack has been for a time less than memory time, after the delay time set the re-start will be done

LED OPERATING STATUS



Multiplier factors with MEMORY and DELAY switches

Slide F1-F2 position	Reaccelerate Function	Slide MEMORY position	MEMORY trimmer setting range
F1	Not activated	X1	0,4÷6 second
F1	Activated	X10	4÷60 second

Slide DELAY Position	DELAY trimmer setting range
X1	0,4÷10 sec.
X1	
X10	4÷100 sec.
X100	40÷1000 sec.
X1	
X10	NOT PREVIEWED (0,4÷10 sec.)
X100	

ELECTRICAL CHARACTERISTICS

models and value	RSR-72
Auxiliary supply and control voltage	<ul style="list-style-type: none"> • 230V 50-60Hz or 115V 50-60Hz • others supply voltages on request
Consumption	max 3 VA
Front panel controls	memory and delay times regulation – LED signalling
Threshold voltage lack	65% of rated voltage
Threshold voltage restore	90% of rated voltage
Minimum time for detecting the voltage lack	10 ms
Maximum reacceleration time	Max 0,2 seconds
MEMORY time	0.4÷60 seconds
DELAY time to restart	0.4÷1000 seconds
Pulse duration to restart	0.7 second (other on request)
Outputs	relay NO - 5A 250 Vac / 0,4A 110 Vdc
Connections	screw terminals max 4 mm2 on extractible socket
Mounting	flush mounting DIN 72x72 mm or panel mounting or on DIN rail 35 mm on extractible socket with optional accessory (detection spring), depth 110 mm
Mechanics	self-extinguishing plastic case, dimensions 72x72x110mm, weight 0,2 kg
Protection degree	IP20 – front side IP40 (IP52 with optional protection cover)
Working temperature	-10 ÷ +60°C (storing -25 ÷ +75°C)
Humidity	95% not condensing
Insulation	2,5 kV 60 seconds
Tropicalization	On request
Standards	CEI 41.1 CEI EN60255-6 electromagnetic compatibility EN 50081-2 / EN 50082-2

WORKING PRINCIPLES

Premised:

when the voltage is under the threshold of the 65% of the rated voltage, for the RSR-72 relay is a voltage lack

when the voltage restores over the threshold of the 90% of the rated voltage, for the RSR-72 the voltage is ok

1. With power supply, the RSR-72 relay is in STAND-BY way and the LED blink with rate 1/1. In this way if the voltage go under the threshold value, no operation of restart is performed.

2. Pressing the PM button (START)

- the contactor is energized and self-retained by its auxiliary contact;
- the motor starts, the "R" contact is open
- the memory circuit inside the RSR-72 relay is activated;
- RSR 72 go in ON position, signalled by the led also fixed in ON position.

3. In case of temporary voltage lack:

3a. if voltage is OFF for a time longer of the MEMORY time set:

- the motor remain out of service and the contactor is de-energized;
- the "R" contact is open;
- the RSR 72 go in STANDBY mode, and the led blink at rate 1/1.

3b. if voltage is OFF for a time in the range from 0.2 seconds and the MEMORY time fixed:

- the contactor is de-energized, the RSR-72 relay is in RE-START mode and the LED blink with rate 1/3 beginning the count of the DELAY time set;
- elapsed the delay time, the "R" contact switch in closed giving the pulse to restart, in this way the contactor is energized and the motor restart;
- next the RSR 72 go in ON mode, signalled by the led fixed to ON;

3c. if the voltage is OFF for a time smaller of 0.2 sec. with reaccelerate function not activated (F1)

- the functioning is the same of the b) item

3d. if the voltage is OFF for a time smaller of 0.2 sec. with reaccelerate function activated (F2)

- the contactor is de-energized, when the voltage restores the RSR-72 relay active immediately the reaccelerate of the motor, the "R" contact switch in closed giving the pulse to reaccelerate.

4. Pressing the "PA" push-button (stop)

4a. the contactor-switch is de-energized, the motor stops;

4b. the memory circuit inside the RSR-72 relay is deactivated;

4c. the "R" contact is open and the motor automatic restart does not occur.

4d. the RSR-72 go in STANDBY mode, and the LED blink at rate 1/1.

5. After operation of item 4 in case of lack and recovery of the supply voltage, the motor automatic restart doesn't occur.

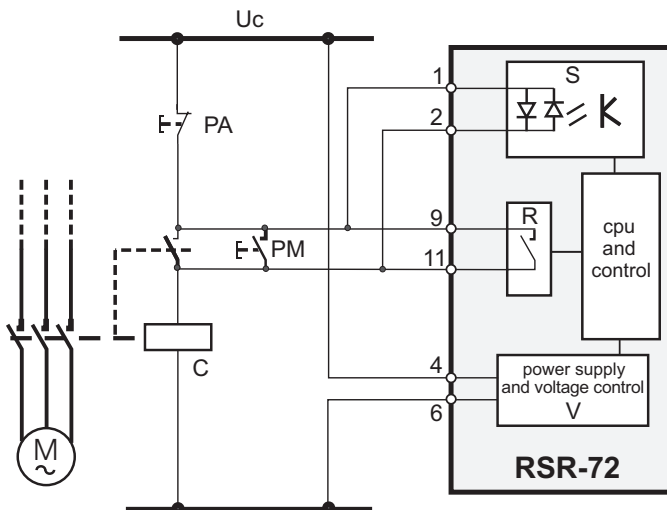
6. In case of pushing of the "PA" push-button (stop) during the count of re-start time (operation of item 3b)

- the memory is deactivated;
- the "R" contact does not close and the motor automatic restart does not occur;
- the RSR 72 go in STANDBY mode, and the led blink at rate 1/1.

7. Each "NO" contact placed directly in series to "PA" push-button carries out the same function of "PA" push-button.

8. Each "NO" contact placed directly in parallel to "PM" push-button carries out the same function of "PM" push-button

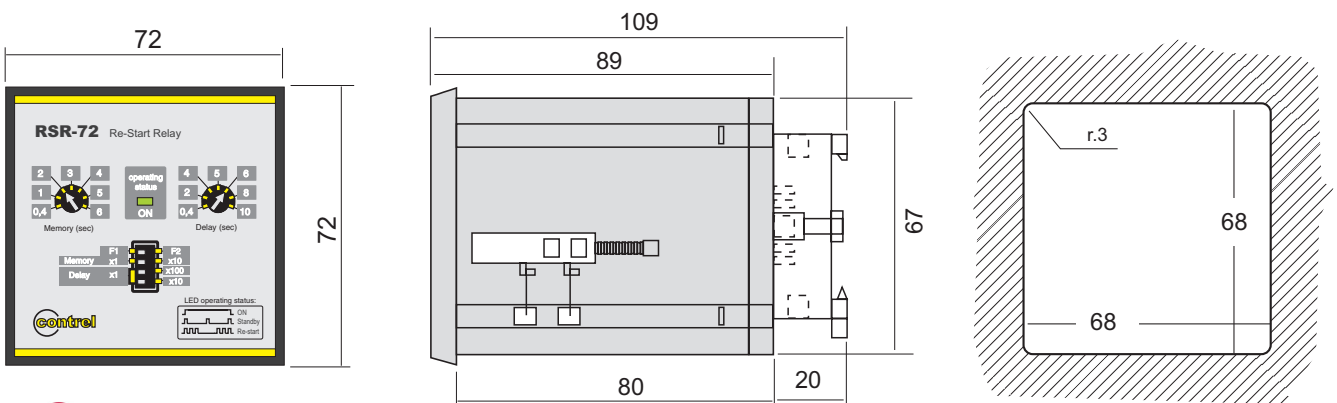
WIRING DIAGRAM



LEGENDA

- Uc: power supply line of the contactor and power supply and control voltage
- PA: stop motor button (STOP)
- PM: start motor button (START)
- C: contactor of command motor
- M: motor
- V: power supply and control voltage section
- S: command button and contactor control section
- R: output relay for re-start an reaccelerate command

DIMENSIONS



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