



ELR
EARTH LEAKAGE RELAYS
According to IEC/EN 60947-2 Annex M

CT
TOROIDAL CURRENT TRANSFORMERS

RSR
AUTO RESTART MOTORS RELAY

EARTH LEAKAGE RELAYS

According to IEC/EN 60947-2 Annex M

Introduction

- **NETWORK MONITORING AND PROTECTION**

The electronic residual current relays allow monitoring and protection of the low voltage distribution network through the use of a toroidal transformer.

- **CARRYING OUT THE PROTECTION**

Thanks to the residual current relays it is possible to measure the leakage current to earth.

These relays work in conjunction with a separate external toroid.

The active conductors that pass through the toroid create a magnetic field proportional to the current flow. Under normal conditions and in the absence of leakage current, the vector sum of the current is zero.

Any fault condition causes an unbalance in the vector sum proportional to the value of the leakage current.

The value of the fault current is constantly detected by the toroid:
when the residual current relay receives a signal from the toroid,
it switches its output contacts. Then the shunt-trip opens the circuit breaker.

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EARTH LEAKAGE RELAYS

Compliance to IEC/EN 60947-2 Annex M

The features and benefits

- **ADJUSTING SENSITIVITY AND TRIPPING TIMES**

The sensitivity $I_{\Delta n}$ can be set from 0.03 to 30 A while the tripping times from 0 to 5 seconds, thus ensuring flexibility for many applications.

- **ALARM**

If the alarm function is ON, the alarm contact switches when the fault current exceeds 60% of the threshold $I_{\Delta n}$ selected.

- **FAIL SAFE**

The new range of ELR residual current relays allows, through a selector switch, to enable or not the fail safe function.

If Fail safe is OFF, the relay activates the shunt-trip once the fault current is detected and also when there is no connection between the relay and toroid.

If Fail Safe is ON, the relay activates the shunt-trip also when there is lack of supply to the residual current relay.

The Fail Safe prevents the line from not being protected when there is no auxiliary power to the device.

- **REMOTE RESET**

The output contacts of the ELR residual current relays can be reset remotely, using push-buttons.

- **AUTORESET**

When the fault will be removed from the network, the relay contacts will switch automatically, without the need to press the reset button from a local or remote position.

- **FREQUENCY FILTERING**

This feature makes the relay stronger in presence of currents with harmonic components that are not due to an effective fault in the circuit but they are typically caused by the presence of electronic filters (e.g. when using frequency converters driving motors).

- **FAULT MEMORY**

The fault memory turns on in case of a fault and is only resettable manually. In this way it is possible to know if the relay has tripped even if the fault is no longer present and the contacts have returned into the standard position thanks to the autoreset.

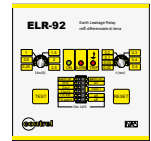
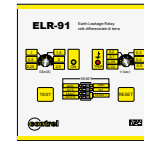
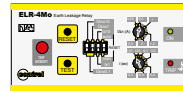
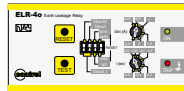
- **DIGITAL DISPLAY**

The digital display allows instant reading of the value of earth leakage current. It is possible, through a minidip, to block the display on the residual current value that has generated the intervention of the circuit breaker.

EARTH LEAKAGE RELAYS

Technical features

COMPARATIVE TABLE

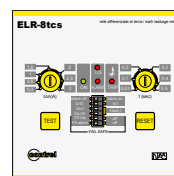
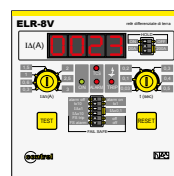
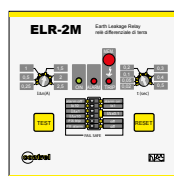
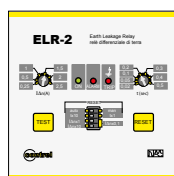
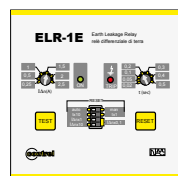


	ELR-7	ELR-4o ELR-4v	ELR-4Mo ELR-4Mv	ELR-91	ELR-92
CONTROL CIRCUIT					
Toroidal transformer	External	External	External	External	External
Adjustments tripping set-point ($I\Delta$)	0.025÷25A	0.025÷25A	0.025÷25A	0.025÷25A	0.025÷25A
Adjustments tripping time (t)	0.02÷5s	0.02÷5s	0.02÷5s	0.02÷5s	0.02÷5s
Shunt tripping control	-	-	-	-	-
AUXILIARY SUPPLY					
Auxiliary voltage (Us)	24-48 VAC/DC 110 VAC/DC-240 VAC	24-48 VAC/DC 110 VAC/DC-240-415 VAC	24-48 VAC/DC 110 VAC/DC-240-415 VAC	24-48 VAC/DC 110 VAC/DC-240 VAC	24-48 VAC/DC 110 VDC 110-240-415 VAC/DC
Rated frequency	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Maximum power consumption	3VA	4VA	4VA	3VA	3VA
OUTPUT RELAYS					
Contact arrangement	2 changeovers (both trip)	1 changeovers (trip)	1 changeovers (trip)	1 changeovers (trip)	2 changeovers (1 trip, 1 alarm)
Rated contact capacity Ith	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)
INDICATIONS					
Auxiliary voltage available (ON)	Green LED	Green LED	Green LED	Green LED	Green LED
Relay tripping (TRIP)	Red LED	Red LED	Red LED	Red LED	Red LED
Alarm advance (ALARM)	-	-	-	-	Red LED
Mechanical flag (TRIP)	-	-	Flag indicator	-	-
Display	-	-	-	-	-
Shunt tripping circuit	-	-	-	-	-
SERIAL INTERFACE					
Connection port	-	-	-	-	-
INSULATION					
Insulation test	2.5kV for 1 minute	2.5kV for 1 minute	2.5kV for 1 minute	2.5kV for 1 minute	2.5kV for 1 minute
AMBIENT OPERATING CONDITIONS					
Operating temperature	-10÷60 °C	-10÷60 °C	-10÷60 °C	-10÷60 °C	-10÷60 °C
Storage temperature	-20÷80 °C	-20÷80 °C	-20÷80 °C	-20÷80 °C	-20÷80 °C
Relative humidity	≤ 90%	≤ 90%	≤ 90%	≤ 90%	≤ 90%
ENCLOSURE					
Version	Flush mount 48x48mm	Flush mount 48x96mm	Flush mount 48x96mm	Flush mount 72x72mm	Flush mount 72x72mm
Degree of protection	IP20 terminals, IP40 with protective cover				
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M				

EARTH LEAKAGE RELAYS

Technical features

COMPARATIVE TABLE

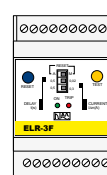
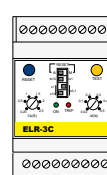
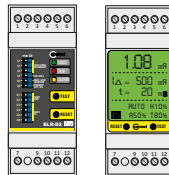
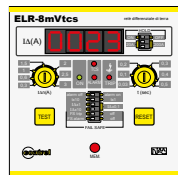


	ELR-1E	ELR-2	ELR-2M	ELR-8V	ELR-8tcs
CONTROL CIRCUIT					
Toroidal transformer	External	External	External	External	External
Adjustments tripping set-point ($I\Delta$)	0.025÷25A	0.025÷25A	0.025÷25A	0.03÷30A	0.03÷30A
Adjustments tripping time (t)	0.02÷5s	0.02÷5s	0.02÷5s	0.02÷5s	0.02÷5s
Shunt tripping control	-	-	-	-	Si
AUXILIARY SUPPLY					
Auxiliary voltage (Us)	12 VAC/DC 24-48 VAC/DC 110 VAC/DC-240-415 VAC	24-48 VAC/DC 110 VAC/DC-240-415 VAC	24-48 VAC/DC 110 VAC/DC-240-415 VAC	24-48 VAC/DC 110 VDC 110-240-415 VAC	24-48 VAC/DC 110 VDC 110-240-415 VAC
Rated frequency	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Maximum power consumption	5,5VA	4,5VA	4,5VA	5,5VA	5,5VA
OUTPUT RELAYS					
Contact arrangement	1 changeovers (trip)	2 changeovers (1 trip, 1 alarm)	2 changeovers (1 trip, 1 alarm)	1 changeovers (trip)	2 changeovers (1 trip, 1 alarm)
Rated contact capacity Ith	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)
INDICATIONS					
Auxiliary voltage available (ON)	Green LED	Green LED	Green LED	Green LED	Green LED
Relay tripping (TRIP)	Red LED	Red LED	Red LED	Red LED	Red LED
Alarm advance (ALARM)	-	Red LED	Red LED	Red LED	Red LED
Mechanical flag (TRIP)	-	-	Flag indicator	-	-
Display	-	-	-	Display a 4 digit	-
Shunt tripping circuit	-	-	-	-	Red LED
SERIAL INTERFACE					
Connection port	-	-	-	-	-
INSULATION					
Insulation test	2.5kV for 1 minute	2.5kV for 1 minute	2.5kV for 1 minute	2.5kV for 1 minute	2.5kV for 1 minute
AMBIENT OPERATING CONDITIONS					
Operating temperature	-10÷60 °C	-10÷60 °C	-10÷60 °C	-10÷60 °C	-10÷60 °C
Storage temperature	-20÷80 °C	-20÷80 °C	-20÷80 °C	-20÷80 °C	-20÷80 °C
Relative humidity	≤ 90%	≤ 90%	≤ 90%	≤ 90%	≤ 90%
ENCLOSURE					
Version	96x96mm	96x96mm	96x96mm	96x96mm	96x96mm
Degree of protection	IP20 terminals, IP40 with protective cover				
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M				

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Technical features

COMPARATIVE
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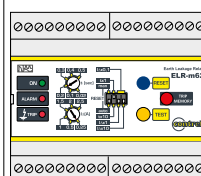
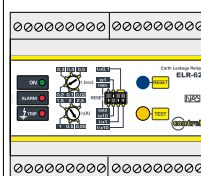
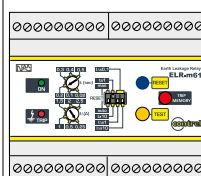
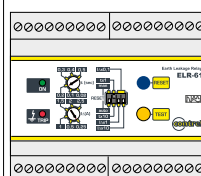


	ELR-8MVtcs	ELR-1D	ELR-D2/ELR-D2-V	ELR-3C	ELR-3F
CONTROL CIRCUIT					
Toroidal transformer	External	External	External	External	External
Adjustments tripping set-point (I Δ)	0.03÷30A	0.03÷30A	0.03÷30A	0.025÷25A	0.3 A o 0.5 A
Adjustments tripping time (t)	0.02÷5s	0.02÷5s	da 0.02 a 10 s	0.02÷5s	0.02 s o 0.5 s
Shunt tripping control	Si	-	-	-	-
AUXILIARY SUPPLY					
Auxiliary voltage (Us)	24-48 VAC/DC 110 VDC 110-240-415 VAC	24 VAC/DC 48 VAC/DC 110 VAC/DC 240-415 VAC	110 VAC 240 VAC	12 VAC/DC 24-48 VAC/DC 110 VAC/DC-240-415 VAC	24-48 VAC/DC 110 VAC/DC-240-415 VAC
Rated frequency	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Maximum power consumption	5,5VA	3 VA	3 VA	3VA	3VA
OUTPUT RELAYS					
Contact arrangement	2 changeovers (1 trip, 1 alarm)	1 changeovers (trip)	1 changeovers (trip)	1 changeovers (trip)	1 changeovers (trip)
Rated contact capacity Ith	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)
INDICATIONS					
Auxiliary voltage available (ON)	Green LED	Green LED	Green LED (version ELR-D2)	Green LED	Green LED
Relay tripping (TRIP)	Red LED	Red LED	Red LED (version ELR-D2) Red LCD (version ELR-D2-V)	Red LED	Red LED
Alarm advance (ALARM)	Red LED	-	Yellow LED (version ELR-D2) Yellow LCD (version ELR-D2-V)	-	-
Mechanical flag (TRIP)	Flag indicator	-	-	-	-
Display	Display a 4 digit	-	Yes (version ELR-D2-V)	-	-
Shunt tripping circuit	Red LED	-	-	-	-
SERIAL INTERFACE					
Connection port	-	-	RS485 - Modbus RTU	-	-
INSULATION					
Insulation test	2.5kV for 1 minute	2.5kV for 1 minute	2.5kV for 1 minute	2.5kV for 1 minute	2.5kV for 1 minute
AMBIENT OPERATING CONDITIONS					
Operating temperature	-10÷60 °C	-10÷60 °C	-10÷60 °C	-10÷60 °C	-10÷60 °C
Storage temperature	-20÷80 °C	-20÷80 °C	-20÷80 °C	-20÷80 °C	-20÷80 °C
Relative humidity	≤ 90%	≤ 90%	≤ 90%	≤ 90%	≤ 90%
ENCLOSURE					
Version	96x96mm	1 module DIN	2 modules DIN	3 modules DIN	3 modules DIN
Degree of protection	IP20 terminals, IP40 with protective cover				
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M				

EARTH LEAKAGE RELAYS

Technical features

COMPARATIVE TABLE

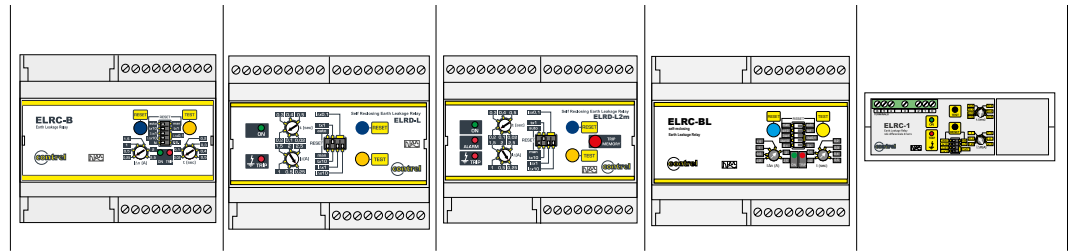


	ELR-3E	ELR-61	ELR-m61	ELR-62	ELR-m62
CONTROL CIRCUIT					
Toroidal transformer	External	External	External	External	External
Adjustments tripping set-point ($I\Delta$)	0,03A or 0,1A or 0,3A or 0,5A or 1A	0,025÷25A	0,025÷25A	0,025÷25A	0,025÷25A
Adjustments tripping time (t)	0,02s or 0,2s or 0,5s or 1s	0,02÷5s	0,02÷5s	0,02÷5s	0,02÷5s
Shunt tripping control	-	-	-	-	-
AUXILIARY SUPPLY					
Auxiliary voltage (Us)	24-48 VAC/DC 110 VAC/DC-240-415 VAC	24-48 VAC/DC 110-240-415 VAC	24-48 VAC/DC 110-240-415 VAC	24-48 VAC/DC 110-240-415 VAC	24-48 VAC/DC 110-240-415 VAC
Rated frequency	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Maximum power consumption	3VA	4VA	4VA	4VA	4VA
OUTPUT RELAYS					
Contact arrangement	1 changeovers (trip)	2 changeovers (both trip)	2 changeovers (both trip)	2 changeovers (1 trip, 1 alarm)	2 changeovers (1 trip, 1 alarm)
Rated contact capacity Ith	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)
INDICATIONS					
Auxiliary voltage available (ON)	Green LED	Green LED	Green LED	Green LED	Green LED
Relay tripping (TRIP)	Red LED	Red LED	Red LED	Red LED	Red LED
Alarm advance (ALARM)	-	-	-	Red LED	Red LED
Mechanical flag (TRIP)	-	-	Flag indicator	-	Flag indicator
Display	-	-	-	-	-
Shunt tripping circuit	-	-	-	-	-
SERIAL INTERFACE					
Connection port	-	-	-	-	-
INSULATION					
Insulation test	2,5kV for 1 minute	2,5kV for 1 minute	2,5kV for 1 minute	2,5kV for 1 minute	2,5kV for 1 minute
AMBIENT OPERATING CONDITIONS					
Operating temperature	-10÷60 °C	-10÷60 °C	-10÷60 °C	-10÷60 °C	-10÷60 °C
Storage temperature	-20÷80 °C	-20÷80 °C	-20÷80 °C	-20÷80 °C	-20÷80 °C
Relative humidity	≤ 90%	≤ 90%	≤ 90%	≤ 90%	≤ 90%
ENCLOSURE					
Version	3 modules DIN	6 modules DIN	6 modules DIN	6 modules DIN	6 modules DIN
Degree of protection	IP20 terminals, IP40 with protective cover				
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M				

EARTH LEAKAGE RELAYS

Technical features

COMPARATIVE
TABLE



	ELRC-B	ELRD-L	ELRD-L2m	ELRC-BL	ELRC-1
CONTROL CIRCUIT					
Toroidal transformer	Incorporated Ø 28 mm	External	External	Incorporated Ø 28 mm	Incorporated 35-60-80-110 mm standard diameter
Adjustments tripping set-point (I Δ)	0.025÷25A	0.025÷25A	0.025÷25A	0.025÷25A	0.025÷25A
Adjustments tripping time (t)	0.02÷5s	0.02÷5s	0.02÷5s	0.02÷5s	0.02÷5s
Shunt tripping control	-	-	-	-	-
AUXILIARY SUPPLY					
Auxiliary voltage (Us)	24-48 VAC/DC 110 VAC/DC-240-415 VAC	240 VAC	240 VAC	240 VAC	24-48 VAC/DC 110 VAC/DC-240-415 VAC
Rated frequency	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Maximum power consumption	3VA	4VA	4VA	4VA	-
OUTPUT RELAYS					
Contact arrangement	2 changeovers (both trip)	2 changeovers (1 trip, 1 alarm)	2 changeovers (1 trip, 1 alarm)	2 changeovers (both trip)	1 changeover (trip)
Rated contact capacity Ith	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)
INDICATIONS					
Auxiliary voltage available (ON)	Green LED	Green LED	Green LED	Green LED	Green LED
Relay tripping (TRIP)	Red LED	Red LED	Red LED	Red LED	Red LED
Alarm advance (ALARM)	-	Red LED	Red LED	-	-
Mechanical flag (TRIP)	-	-	Flag indicator	-	-
Display	-	-	-	-	-
Shunt tripping circuit	-	-	-	-	-
SERIAL INTERFACE					
Connection port	-	-	-	-	-
INSULATION					
Insulation test	2.5kV for 1 minute	2.5kV for 1 minute	2.5kV for 1 minute	2.5kV for 1 minute	2.5kV for 1 minute
AMBIENT OPERATING CONDITIONS					
Operating temperature	-10÷60 °C	-10÷60 °C	-10÷60 °C	-10÷60 °C	-10÷60 °C
Storage temperature	-20÷80 °C	-20÷80 °C	-20÷80 °C	-20÷80 °C	-20÷80 °C
Relative humidity	≤ 90%	≤ 90%	≤ 90%	≤ 90%	≤ 90%
ENCLOSURE					
Version	6 modules DIN	6 modules DIN	6 modules DIN	6 modules DIN	Compatto
Degree of protection	IP20 terminals, IP40 with protective cover				
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M				

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EARTH LEAKAGE RELAY - FLUSH-MOUNT VERSION DIN 48x48 mm



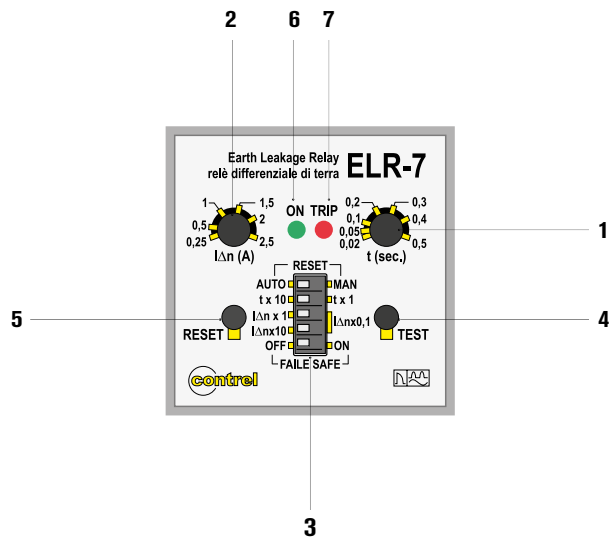
GENERAL CHARACTERISTICS

- Earth leakage relay type A
- Configurable fail safe operation
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Front TEST and RESET buttons
- Configurable automatic or manual resetting
- Flush mount 96x96mm housing with transparent cover
- Degree of protection: IP20 terminals, IP40 on front with cover.

ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE	OUTPUTS CONTACTS	WT [kg]
ELR-7 48	24-48 VAC/DC	2	0,112
ELR-7 240	110 VAC/DC-240 VAC	2	0,112
OPTIONS			
T	Tropicalisation		
F	Built-in filter for 3rd harmonic		

ADJUSTMENTS	
Configurable tripping set-point ($I\Delta n$)	0,025...0,25A 0,25...2,5A 2,5...25A 25...250A (with external multiplier CT1-M)
Configurable tripping delay time (t)	0,02...0,5s 0,2...5s

LEGENDA	
1	Tripping delay time adjustment
2	Fault current to earth adjustment
3	Dip switches settings: 3a - auto reset (A) - man reset (M) auto reset = automatic reset man reset = manual reset through RESET key on the front. For remote resetting, simply shut off the auxiliary supply for about 1 second 3b - tx10 - tx1 constant selection for tripping delay time adjustment. Examples: positioning the dip switch on tx10 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I\Delta n$ threshold of $0.3 \times 10 = 3$ seconds; positioning the dip switch on tx1 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I\Delta n$ threshold of $0.3 \times 1 = 0.3$ seconds 3c - $I\Delta n \times 0,1$ - $I\Delta n \times 1$ - $I\Delta n \times 10$ constant selection for fault current to earth adjustment. The constants in relation to the position of the 2 dip switches are the following: • dip switch position $I\Delta n \times 0,1$ and $I\Delta n \times 0,1$ K = 0.1 • dip switch position $I\Delta n \times 1$ and $I\Delta n \times 0,1$ K = 1 • dip switch position $I\Delta n \times 1$ and $I\Delta n \times 10$ K = 10 3d - fail safe off - fail safe on Fail safe off = positive safety deactivated. Output relay normally deenergised Fail safe on = positive safety activated; in this condition the output relay is normally energised; therefore in the event of the lack of auxiliary voltage the output contacts move to the tripping condition.
4	TEST key. Causes tripping of the relay.
5	RESET key. To reset the relay after tripping. For remote reset, simply shut off the auxiliary supply for about 1 second.
6	ON LED. Indicates the presence of auxiliary voltage.
7	TRIP LED. Lighting up indicates the cutting in of the TRIP relay due to exceeding the $I\Delta n$ set.

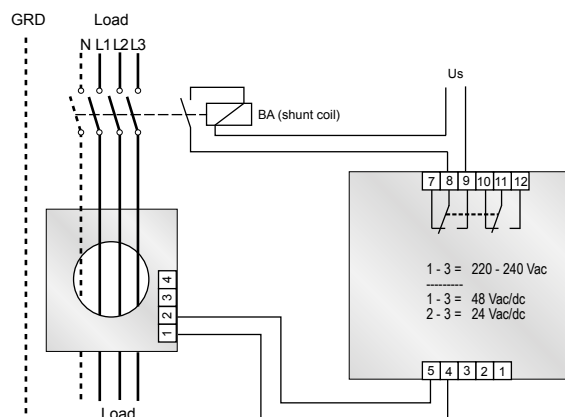


ELR - 7

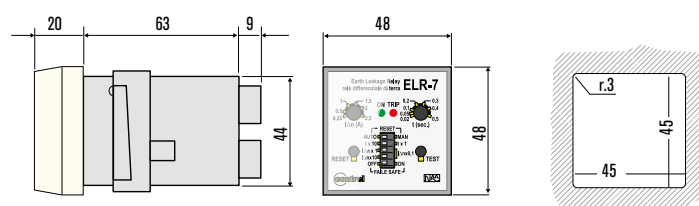
EARTH LEAKAGE RELAY - FLUSH-MOUNT VERSION DIN 48x48 mm

TECHNICAL CHARACTERISTICS		ELR-7
CONTROL CIRCUIT		
Toroidal transformer		External
Adjustments tripping set-point (I Δ)		0.025÷25A (25÷250A with external multiplier)
Adjustments tripping time (t)		0.02÷5s
AUXILIARY SUPPLY		
Auxiliary voltage (Us)		24-48 VAC/DC 110 VAC/DC-240 VAC
Rated frequency		50-60 Hz
Maximum power consumption		3 VA
OUTPUT RELAYS		
Contact arrangement		2 changeovers (both trip)
Rated contact capacity lth		5 A (240 VAC)
INDICATIONS		
Auxiliary voltage available (ON)		Green LED
Relay tripping (TRIP)		Red LED
INSULATION		
Insulation test		2.5kV for 1 minute
AMBIENT OPERATING CONDITIONS		
Operating temperature		-10÷60 °C
Storage temperature		-20÷80 °C
Relative humidity		≤90%
ENCLOSURE		
Version		Flush mount 48x48mm
Degree of protection		IP20 terminals IP40 with protective cover
CERTIFICATIONS AND COMPLIANCE		
Reference standards		IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M

WIRING CONNECTION



MECHANICAL DIMENSIONS



ELR-4o | ELR-4mo | ELR-4v | ELR-4mv

EARTH LEAKAGE RELAY - FLUSH-MOUNT VERSION DIN 48x96 mm



GENERAL CHARACTERISTICS

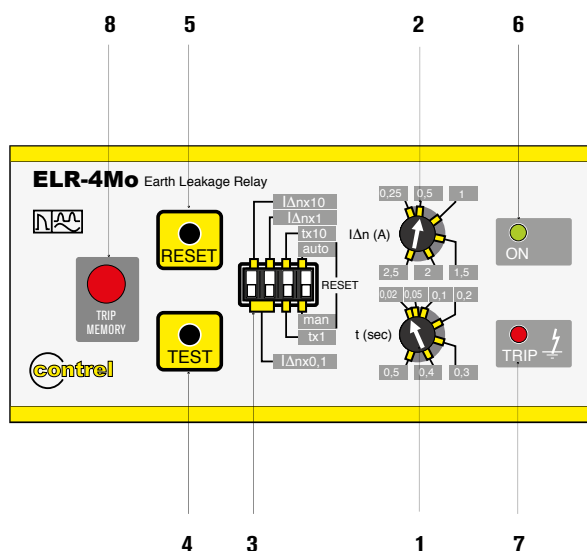
- Earth leakage relay type A
- External toroidal
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Front TEST and RESET buttons
- Configurable automatic or manual resetting
- Flag indicator (TRIP MEMORY) (ELR-m4o, ELR-m4v only)
- Flush mount 48x96mm housing with transparent cover
- Degree of protection: IP20 terminals, IP40 on front with cover

ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE	OUTPUTS CONTACTS	WT [kg]
ELR-4v 48	24-48 VAC/DC	2	0,390
ELR-4v 415	110 VAC/DC-240-415 VAC	2	0,390
ELR-4o 48	24-48 VAC/DC	2	0,390
ELR-4o 415	110 VAC/DC-240-415 VAC	2	0,390
ELR-m4v 48	24-48 VAC/DC	2	0,390
ELR-m4v 415	110 VAC/DC-240-415 VAC	2	0,390
ELR-m4o 48	24-48 VAC/DC	2	0,390
ELR-m4o 415	110 VAC/DC-240-415 VAC	2	0,390

OPTIONS	
T	Tropicalisation
F	Built-in filter for 3rd harmonic

ADJUSTMENTS	
Configurable tripping set-point ($I_{\Delta n}$)	0,025...0,25A 0,25...2,5A 2,5...25A 25...250A (with external multiplier CT1-M)
Configurable tripping delay time (t)	0,02...0,5s 0,2...5s.

LEGENDA	
1	Tripping delay time adjustment
2	Fault current to earth adjustment
3	Dip switches settings: 3a - auto reset (A) - man reset (M) auto reset = automatic reset man reset = manual reset through RESET key on the front. For remote resetting, simply shut off the auxiliary supply for about 1 second 3b - tx10 - tx1 constant selection for tripping delay time adjustment. Examples: positioning the dip switch on tx10 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of $0.3 \times 10 = 3$ seconds; positioning the dip switch on tx1 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of $0.3 \times 1 = 0.3$ seconds 3c - $I_{\Delta n} \times 0,1$ - $I_{\Delta n} \times 1$ - $I_{\Delta n} \times 10$ constant selection for fault current to earth adjustment. The constants in relation to the position of the 2 dip switches are the following: • dip switch position $I_{\Delta n} \times 0,1$ and $I_{\Delta n} \times 0,1$ K = 0.1 • dip switch position $I_{\Delta n} \times 1$ and $I_{\Delta n} \times 0,1$ K = 1 • dip switch position $I_{\Delta n} \times 1$ and $I_{\Delta n} \times 10$ K = 10
4	TEST key. Causes tripping of the relay.
5	RESET key. To reset the relay after tripping. For remote reset, simply shut off the auxiliary supply for about 1 second.
6	ON LED. Indicates the presence of auxiliary voltage.
7	TRIP LED. Lighting up indicates the cutting in of the TRIP relay due to exceeding the $I_{\Delta n}$ set.
8	TRIP MEMORY (versions ELR-m4o, ELR-m4v) Mechanical trip relay indicator for exceeding the $I_{\Delta n}$ set. It stores the indication also in the lack of auxiliary voltage. The flag indicator resetting can only be made with the RESET button.

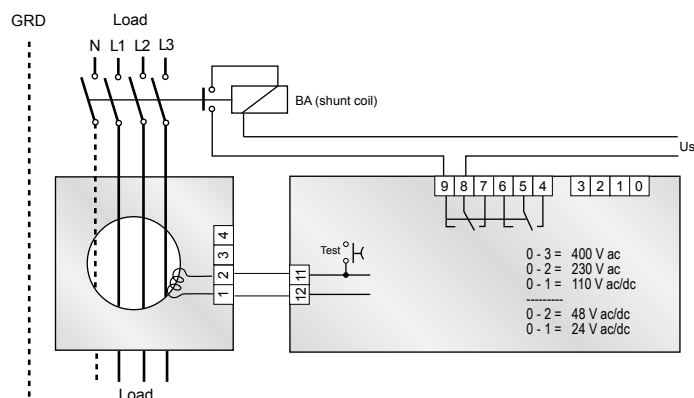


ELR-4o | ELR-4mo | ELR-4v | ELR-4mv

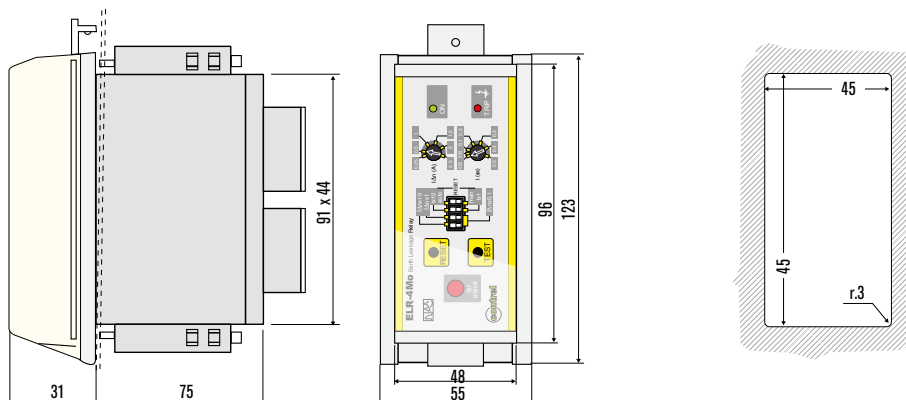
EARTH LEAKAGE RELAY - FLUSH-MOUNT VERSION DIN 48x96 mm

TECHNICAL CHARACTERISTICS		ELR-4 / ELR-m4	
CONTROL CIRCUIT			
Toroidal transformer	External		
Adjustments tripping set-point (IΔ)	0.025÷25A (25÷250A with external multiplier)		
Adjustments tripping time (t)	0.02÷5s		
AUXILIARY SUPPLY			
Auxiliary voltage (Us)	24-48 VAC/DC 110 VAC/DC-240-415 VAC		
Rated frequency	50-60 Hz		
Maximum power consumption	4 VA		
OUTPUT RELAYS			
Contact arrangement	1 changeover (trip)		
Rated contact capacity Ith	5 A (240 VAC)		
INDICATIONS			
Auxiliary voltage available (ON)	Green LED		
Relay tripping (TRIP)	Red LED		
Mechanical flag (TRIP)	Flag indicator (versioni ELR-m4)		
INSULATION			
Insulation test	2.5kV for 1 minute		
AMBIENT OPERATING CONDITIONS			
Operating temperature	-10÷60 °C		
Storage temperature	-20÷80 °C		
Relative humidity	≤90%		
ENCLOSURE			
Version	Flush mount 48x96mm		
Degree of protection	IP20 terminals IP40 with protective cover		
CERTIFICATIONS AND COMPLIANCE			
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M		

WIRING CONNECTION



MECHANICAL DIMENSIONS



ELR-91 | ELR-92

EARTH LEAKAGE RELAY - FLUSH-MOUNT VERSION DIN 72x72 mm



GENERAL CHARACTERISTICS

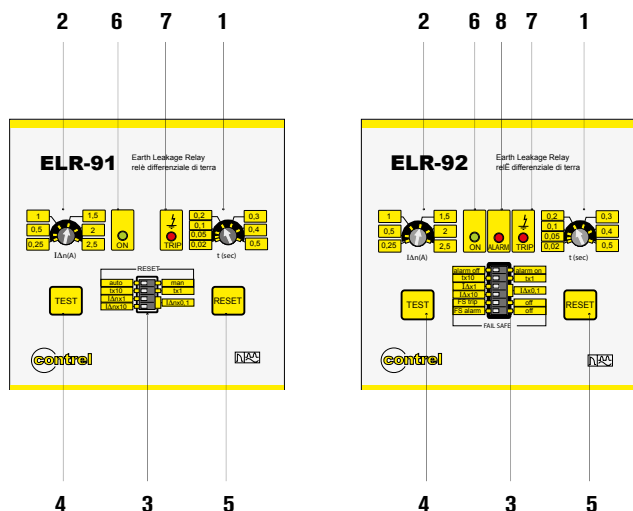
- Earth leakage relay type A
- Configurable fail safe prealarm and operation (ELR-92 only)
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Red tripping prealarm LED indicator (ALARM)
- Front TEST and RESET buttons
- Configurable automatic or manual resetting
- Flush mount 72x72mm housing with transparent cover
- Degree of protection: IP20 terminals, IP40 on front with cover

ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE	OUTPUTS CONTACTS	WT [kg]
ELR-91 48	24-48 VAC/DC	1	0,322
ELR-91 240	110 VAC/DC-240VAC	1	0,322
ELR-92 48	24-48 VAC/DC	2	0,322
ELR-92 110	110 VDC	2	0,322
ELR-92 415	110-240-415 VAC	2	0,322

OPTIONS	
T	Tropicalisation
F	Built-in filter for 3rd harmonic (ELR-92 only)

ADJUSTMENTS	
Configurable tripping set-point ($I_{\Delta n}$)	0,025...0,25A 0,25...2,5A 2,5...25A 25...250A ((with external multiplier GT1-M)
Configurable tripping delay time (t)	0,02...0,5s 0,2...5s.
Prealarm set-point	70% fisso (ELR-92 only)

LEGENDA	
1	Tripping delay time adjustment
2	Fault current to earth adjustment
3	Dip switches settings: 3a - Version ELR-92 auto reset (A) - man reset (M) auto reset = automatic reset man reset = manual reset through RESET key on the front. For remote resetting, simply shut off the auxiliary supply for about 1 second Version ELR-91 alarm off - alarm on alarm on = trip prealarm activated; upon reaching 70% of the set $I_{\Delta n}$ rate, LED ALARM lights up and signal contact changeover takes place. Upon exceeding the set $I_{\Delta n}$ rate LED TRIP will light up and the TRIP contacts will change over 3b - tx10 - tx1 constant selection for tripping delay time adjustment. Examples: positioning the dip switch on tx10 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of $0.3 \times 10 = 3$ seconds; positioning the dip switch on tx1 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of $0.3 \times 1 = 0.3$ seconds 3c - $I_{\Delta n} \times 0.1$ - $I_{\Delta n} \times 1$ - $I_{\Delta n} \times 10$ constant selection for fault current to earth adjustment. The constants in relation to the position of the 2 dip switches are the following: • dip switch position $I_{\Delta n} \times 0.1$ and $I_{\Delta n} \times 0.1$ K = 0.1 • dip switch position $I_{\Delta n} \times 1$ and $I_{\Delta n} \times 0.1$ K = 1 • dip switch position $I_{\Delta n} \times 1$ and $I_{\Delta n} \times 10$ K = 10 3d - Version ELR-92 FS trip - off FS trip = positive safety activated on TRIP relay; in this condition the TRIP relay (terminals 7-8-9) is normally energised; therefore in the event of the lack of auxiliary voltage the output contacts move to the tripping condition (TRIP). Off = positive safety deactivated. TRIP relay normally deenergised. 3e - Version ELR-92 FS alarm- off FS alarm = positive safety activated on ALARM relay, in this condition the prealarm relay ALARM is normally energised; therefore in the event of the lack of auxiliary voltage the output contacts move to the trip condition (TRIP). Off = positive safety deactivated. ALARM relay normally deenergised.
4	TEST key. Causes tripping of the relay.
5	RESET key. To reset the relay after tripping. For remote reset, simply shut off the auxiliary supply for about 1 second.
6	ON LED. Indicates the presence of auxiliary voltage.
7	TRIP LED. Lighting up indicates the cutting in of the TRIP relay due to exceeding the $I_{\Delta n}$ set.
8	ALARM LED (versions ELR-92); lighting up depends on the dip switch programming; see the instructions of point 3a).

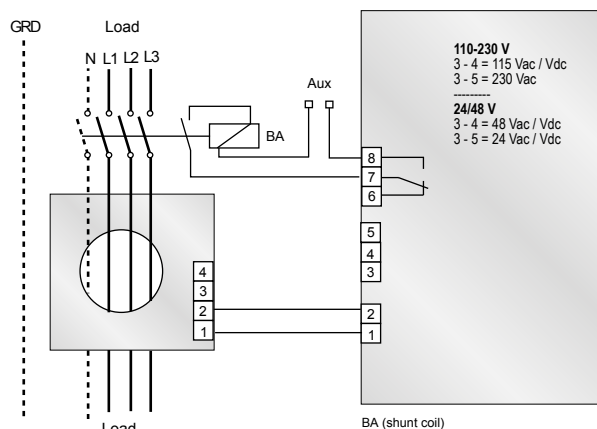


ELR-91 | ELR-92

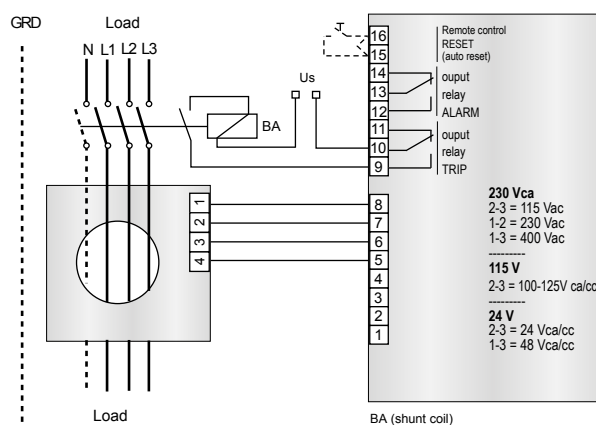
EARTH LEAKAGE RELAY - FLUSH-MOUNT VERSION DIN 72x72 mm

TECHNICAL CHARACTERISTICS	ELR-91	ELR-92
CONTROL CIRCUIT		
Toroidal transformer	External	External
Adjustments tripping set-point (I Δ)	0.025÷25A (25÷250A with external multiplier)	0.025÷25A (25÷250A with external multiplier)
Adjustments tripping time (t)	0.02÷5s	0.02÷5s
AUXILIARY SUPPLY		
Auxiliary voltage (Us)	24-48 VAC/DC 110 VAC/DC-240-415 VAC	24-48 VAC/DC 110 VDC 110-240-415 VAC/DC
Rated frequency	50-60 Hz	50-60 Hz
Maximum power consumption	3 VA	3 VA
OUTPUT RELAYS		
Contact arrangement	1 changeover (trip)	2 changeovers (1 trip, 1 alarm)
Rated contact capacity Ith	5 A (240 VAC)	5 A (240 VAC)
INDICATIONS		
Auxiliary voltage available (ON)	Green LED	Green LED
Relay tripping (TRIP)	Red LED	Red LED
Alarm advance (ALARM)	-	Red LED (versione ELR-92)
INSULATION		
Insulation test	2.5kV for 1 minute	2.5kV for 1 minute
AMBIENT OPERATING CONDITIONS		
Operating temperature	-10÷60 °C	-10÷60 °C
Storage temperature	-20÷80 °C	-20÷80 °C
Relative humidity	≤90%	≤90%
ENCLOSURE		
Version	Flush mount 72x72mm	Flush mount 72x72mm
Degree of protection	IP20 terminals IP40 with protective cover	IP20 terminals IP40 with protective cover
CERTIFICATIONS AND COMPLIANCE		
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2	IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M

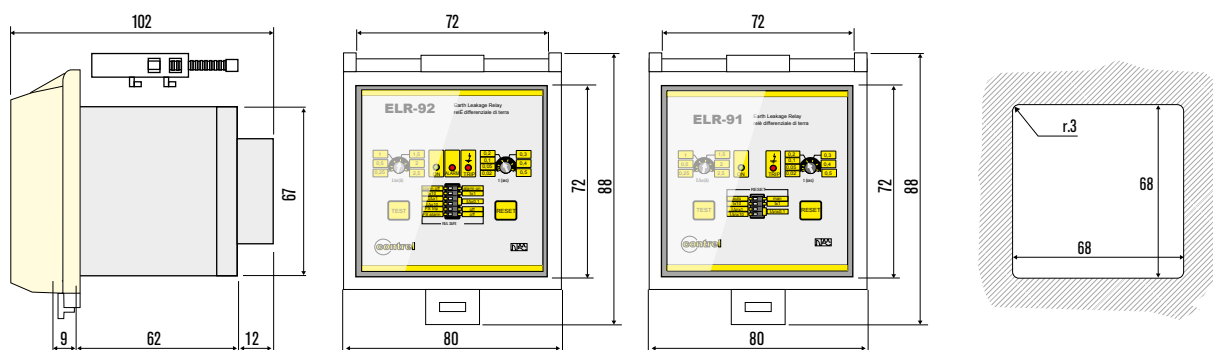
WIRING CONNECTION ELR-91



WIRING CONNECTION ELR-92



MECHANICAL DIMENSIONS ELR-91 | ELR-92



ELR-1E | ELR-2 | ELR-2M

EARTH LEAKAGE RELAY - FLUSH-MOUNT VERSION DIN 96x96 mm



GENERAL CHARACTERISTICS - ELR-1E

- Earth leakage relay type A
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Front TEST and RESET buttons
- Configurable automatic or manual resetting
- Flush mount 96x96mm housing with transparent cover
- IEC degree of protection: IP20 terminals, IP40 on front with cover.

ADJUSTMENTS PER ELR-1E

Configurable tripping set-point ($I_{\Delta n}$)	0,025...0,25A
	0,25...2,5A
	2,5...25A
	25...250A (with external multiplier CT1-M)
Configurable tripping delay time (t)	0,02...0,5s
	0,2...5s.

GENERAL CHARACTERISTICS - ELR-2 | ELR-2M

- Earth leakage relay type A
- 2 output relays each with changeover contact, configurable 2 tripping or 1 tripping and 1 alarm
- Configurable fail safe prealarm and operation
- Automatic toroid connection control
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Red tripping prealarm LED indicator (ALARM)
- Front TEST button
- Manual resetting by front RESET button or remote contact closing
- Automatic resetting by remote contact closing or rear jumper connection
- Flag indicator (TRIP MEMORY) (ELR-2M only)
- Flush mount 96x96mm housing with transparent cover
- IEC degree of protection: IP20 terminals, IP40 on front with cover

ADJUSTMENTS PER ELR-2 | ELR-2M

Configurable tripping set-point ($I_{\Delta n}$)	0,025...0,25A
	0,25...2,5A
	2,5...25A
	25...250A (with external multiplier CT1-M)
Prealarm set-point	70% fisso
Configurable tripping delay time (t)	0,02...0,5s
	0,2...5s.

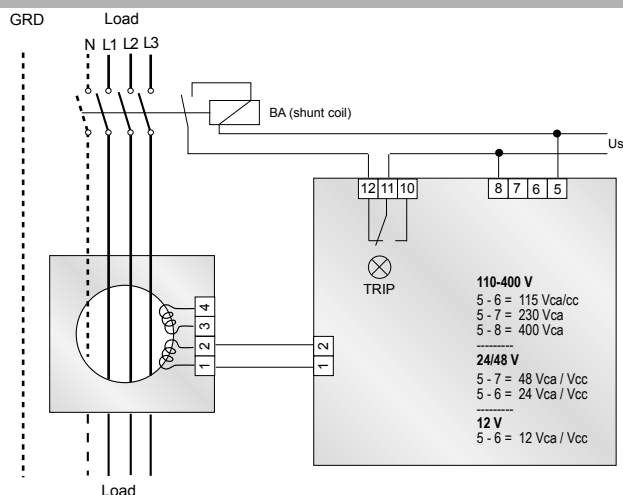
ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE	OUTPUTS CONTACTS	WT [kg]
ELR-1E 12	12 VAC/DC	1	0,280
ELR-1E 48	24-48 VAC/DC	1	0,280
ELR-1E 415	110 VAC/DC-240-415 VAC	1	0,280
ELR-2 48	24-48 VAC/DC	2	0,395
ELR-2 415	110 VAC/DC-240-415 VAC	2	0,395
ELR-2M 48	24-48 VAC/DC	2	0,405
ELR-2M 415	110 VAC/DC-240-415 VAC	2	0,405
OPTIONS			
T	Tropicalisation		
F	Built-in filter for 3rd harmonic (ELR-2, ELR-2M only)		

ELR-1 E | ELR-2 | ELR-2M

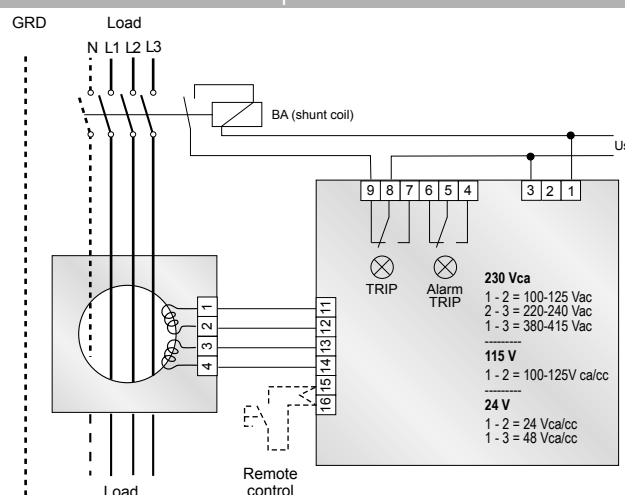
EARTH LEAKAGE RELAY - FLUSH-MOUNT VERSION **DIN 96x96 mm**

TECHNICAL CHARACTERISTICS	ELR-1E	ELR-2 / ELR-2M
CONTROL CIRCUIT		
Toroidal transformer	External	External
Adjustments tripping set-point (I Δ)	0.025÷25A (25÷250A with external multiplier)	0.025÷25A (25÷250A with external multiplier)
Adjustments tripping time (t)	0.02÷5s	0.02÷5s
AUXILIARY SUPPLY		
Auxiliary voltage (Us)	12 VAC/DC 24-48 VAC/DC 110-240-415 VAC/DC	24-48 VAC/DC 110-240-415 VAC/DC
Rated frequency	50-60 Hz	50-60 Hz
Maximum power consumption	5,5 VA	4,5 VA
OUTPUT RELAYS		
Contact arrangement	1 changeover (trip)	2 changeovers (1 trip, 1 alarm)
Rated contact capacity Ith	5 A (240 VAC)	5 A (240 VAC)
INDICATIONS		
Auxiliary voltage available (ON)	Green LED	Green LED
Relay tripping (TRIP)	Red LED	Red LED
Alarm advance (ALARM)	-	Red LED (ELR-2, ELR-2M only)
Mechanical flag (TRIP)	Flag indicator (ELR-2M only)	Flag indicator (ELR-2M only)
INSULATION		
Insulation test	2.5kV for 1 minute	2.5kV for 1 minute
AMBIENT OPERATING CONDITIONS		
Operating temperature	-10÷60 °C	-10÷60 °C
Storage temperature	-20÷80 °C	-20÷80 °C
Relative humidity	≤90%	≤90%
ENCLOSURE		
Version	96x96mm	96x96mm
Degree of protection	IP20 terminals IP40 with protective cover	IP20 terminals IP40 with protective cover
CERTIFICATIONS AND COMPLIANCE		
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2	IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M

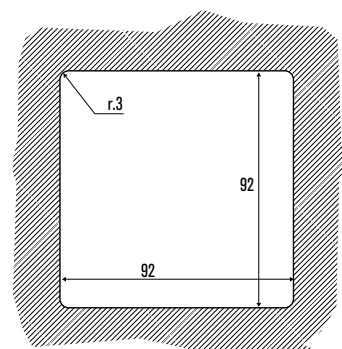
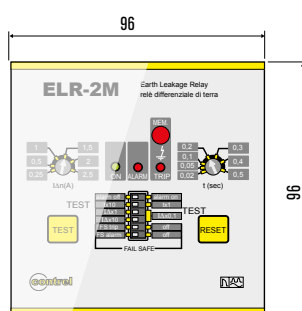
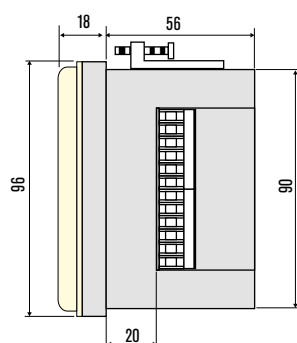
WIRING CONNECTION ELR-1E



WIRING CONNECTION ELR-2 | ELR-2M

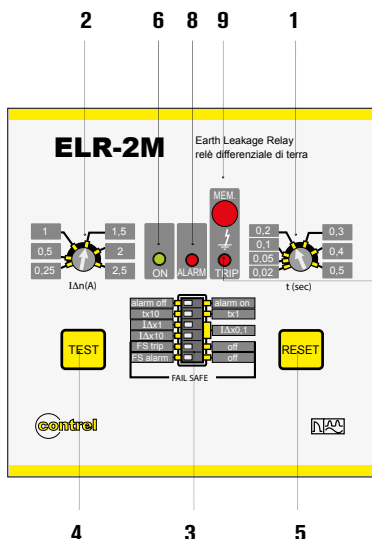
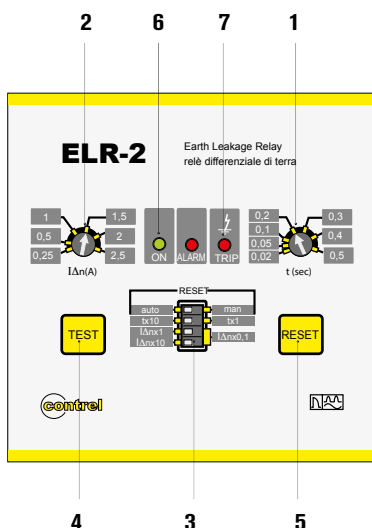
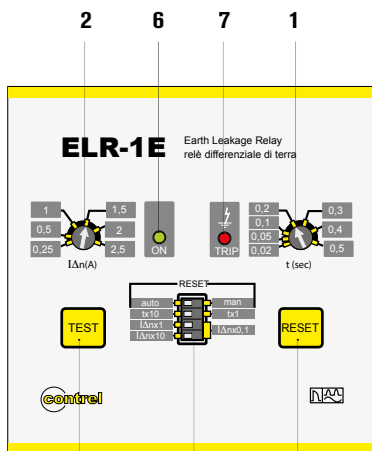


MECHANICAL DIMENSIONS ELR-1E | ELR-2 | ELR-2M



ELR-1 E | ELR-2 | ELR-2M

EARTH LEAKAGE RELAY - FLUSH-MOUNT VERSION DIN 96x96 mm



LEGENDA

1	Tripping delay time adjustment
2	Fault current to earth adjustment
3	Dip switches settings: 3a - Version ELR-1E auto reset (A) - man reset (M) auto reset = automatic reset man reset = manual reset through RESET key on the front. For remote resetting, simply shut off the auxiliary supply for about 1 second Versions ELR-2, ELR-2M alarm off - alarm on alarm on = trip prealarm activated; upon reaching 70% of the set $I\Delta n$ rate, LED ALARM lights up and signal contact changeover takes place. Upon exceeding the set $I\Delta n$ rate LED TRIP will light up and the TRIP contacts will change over 3b - tx10 - tx1 constant selection for tripping delay time adjustment. Examples: positioning the dip switch on tx10 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I\Delta n$ threshold of $0.3 \times 10 = 3$ seconds; positioning the dip switch on tx1 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I\Delta n$ threshold of $0.3 \times 1 = 0.3$ seconds 3c - $I\Delta n 0.1$ - $I\Delta n 1$ - $I\Delta n 10$ constant selection for fault current to earth adjustment. The constants in relation to the position of the 2 dip switches are the following: - dip switch position $I\Delta n 0.1$ and $I\Delta n 0.1$ K = 0.1 - dip switch position $I\Delta n 1$ and $I\Delta n 0.1$ K = 1 - dip switch position $I\Delta n 1$ and $I\Delta n 10$ K = 10 3d - Versions ELR-2, ELR-2M FS trip - off FS trip = positive safety activated on TRIP relay; in this condition the TRIP relay (terminals 7-8-9) is normally energised; therefore in the event of the lack of auxiliary voltage the output contacts move to the tripping condition (TRIP). Off = positive safety deactivated. TRIP relay normally deenergised. 3e - Versions ELR-2, ELR-2M FS alarm- off FS alarm = positive safety activated on ALARM relay, in this condition the prealarm relay ALARM is normally energised; therefore in the event of the lack of auxiliary voltage the output contacts move to the trip condition (TRIP). Off = positive safety deactivated. ALARM relay normally deenergised.
4	TEST key. Causes tripping of the relay.
5	RESET key. To reset the relay after tripping. For remote reset, simply shut off the auxiliary supply for about 1 second.
6	ON LED. Indicates the presence of auxiliary voltage.
7	TRIP LED. Lighting up indicates the cutting in of the TRIP relay due to exceeding the $I\Delta n$ set.
8	ALARM LED (versions ELR-2, ELR-2M). Lighting up depends on the dip switch programming; see the instructions of point 3a)
9	TRIP MEMORY (versions ELR-2M) Mechanical trip relay indicator for exceeding the $I\Delta n$ set. It stores the indication also in the lack of auxiliary voltage. The flag indicator resetting can only be made with the RESET button.

ELR-8V | ELR-8tcs | ELR-8mVtcs

EARTH LEAKAGE RELAY - FLUSH-MOUNT VERSION DIN 96x96 mm



GENERAL CHARACTERISTICS

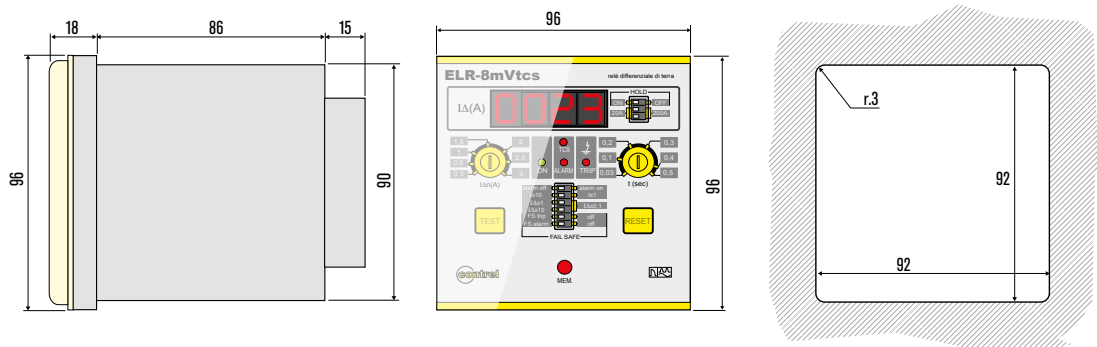
- Earth leakage relay type A
- 2 output relays each with changeover contact, configurable 2 tripping or 1 tripping and 1 alarm
- Configurable fail safe prealarm and operation
- Automatic toroid connection control
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Red tripping prealarm LED indicator (ALARM)
- Front TEST button
- Manual resetting by front RESET button or remote contact closing
- Automatic resetting by remote contact closing or rear jumper connection
- Constant toroid-relay circuit control
- Flag indicator (TRIP MEMORY) (ELR-8mVtcs only)
- Digital fault current measurement and display with configurable tripping value memory (ELR-8mVtcs only)
- Shunt tripping circuit operating test (TCS) (ELR-8tcs, ELR-8mVtcs only)
- Flush mount 96x96mm housing with transparent cover
- IEC degree of protection: IP20 terminals, IP40 on front with cover.

ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE	OUTPUTS CONTACTS	WT [kg]
ELR-8V 48	24-48 VAC/DC	2	0,570
ELR-8V 110	110 VDC	2	0,570
ELR-8V 415	110 VAC/DC-240-415 VAC	2	0,570
ELR-8Vtcs 48	24-48 VAC/DC	2	0,570
ELR-8Vtcs 110	110 VDC	2	0,570
ELR-8Vtcs 415	110 VAC/DC-240-415 VAC	2	0,570
ELR-8mVtcs 48	24-48 VAC/DC	2	0,570
ELR-8mVtcs 110	110 VDC	2	0,570
ELR-8mVtcs 415	110 VAC/DC-240-415 VAC	2	0,570

OPTIONS	
T	Tropicalisation

ADJUSTMENTS	
Configurable tripping set-point ($I_{\Delta n}$)	0,03...30A 30A...300A (with external multiplier CT1-M)
Prealarm set-point	fixed 70%
Configurable tripping delay time (t)	0,02...0,5s 0,2...5s.

MECHANICAL DIMENSIONS

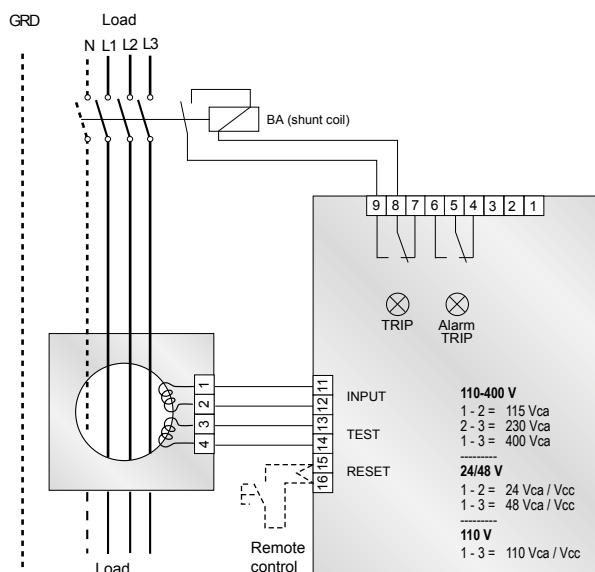


ELR-8V | ELR-8tcs | ELR-8mVtcs

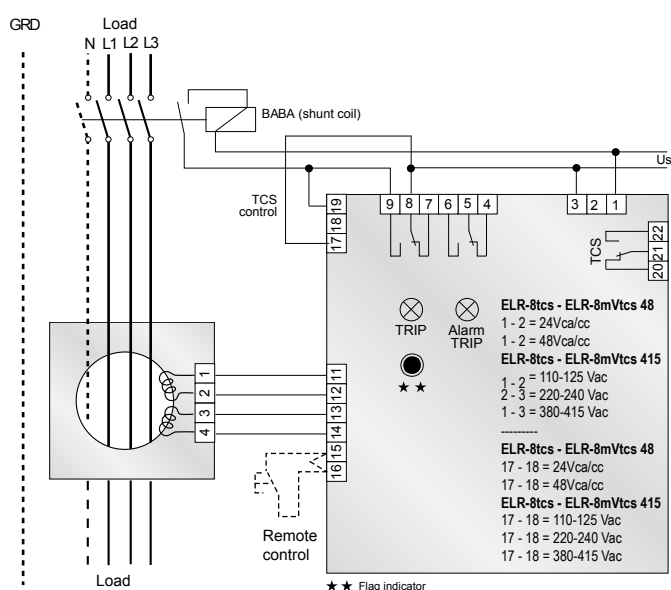
EARTH LEAKAGE RELAY - FLUSH-MOUNT VERSION DIN 96x96 mm

TECHNICAL CHARACTERISTICS	ELR-8V	ELR-8tcs / ELR-8mVtcs
CONTROL CIRCUIT		
Toroidal transformer	External	External
Adjustments tripping set-point (I Δ)	0.03÷30A (30÷300A with external multiplier)	0.03÷30A (30÷300A with external multiplier)
Adjustments tripping time (t)	0.02÷5s	0.02÷5s
Shunt tripping control	-	Yes
AUXILIARY SUPPLY		
Auxiliary voltage (Us)	24-48 VAC/DC 110 VDC 110-240-415 VAC	24-48 VAC/DC 110 VDC 110-240-415 VAC
Rated frequency	50-60 Hz	50-60 Hz
Maximum power consumption	5,5 VA	5,5 VA
OUTPUT RELAYS		
Contact arrangement	1 changeover (trip)	2 changeovers (1 trip, 1 alarm)
Rated contact capacity Ith	5 A (240 VAC)	5 A (240 VAC)
INDICATIONS		
Auxiliary voltage available (ON)	Green LED	Green LED
Relay tripping (TRIP)	Red LED	Red LED
Alarm advance (ALARM)	Red LED	Red LED
Mechanical flag (TRIP)	Flag indicator (version ELR-8mVtcs)	Flag indicator (version ELR-8mVtcs)
Display	Display a 4 digit (version ELR-8V, ELR-8mVtcs)	Display a 4 digit (version ELR-8V, ELR-8mVtcs)
Shunt tripping circuit	Red LED (version ELR-8tcs, ELR-8mVtcs)	Red LED (version ELR-8tcs, ELR-8mVtcs)
INSULATION		
Insulation test	2.5kV for 1 minute	2.5kV for 1 minute
AMBIENT OPERATING CONDITIONS		
Operating temperature	-10÷60 °C	-10÷60 °C
Storage temperature	-20÷80 °C	-20÷80 °C
Relative humidity	≤90%	≤90%
ENCLOSURE		
Version	96x96mm	96x96mm
Degree of protection	IP20 terminals IP40 with protective cover	IP20 terminals IP40 with protective cover
CERTIFICATIONS AND COMPLIANCE		
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M	

WIRING CONNECTION ELR-8V

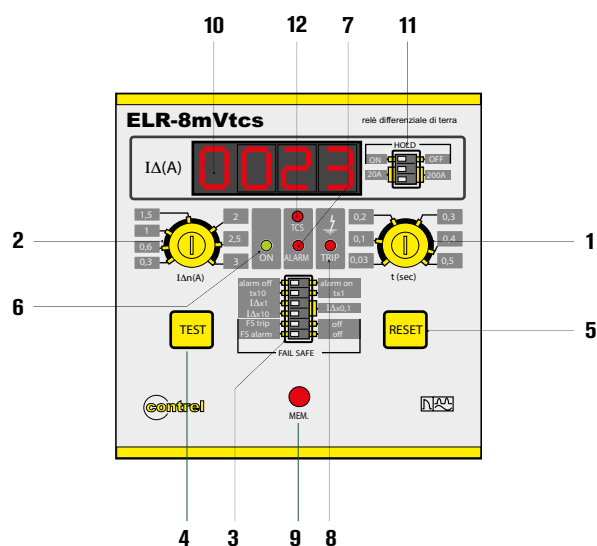
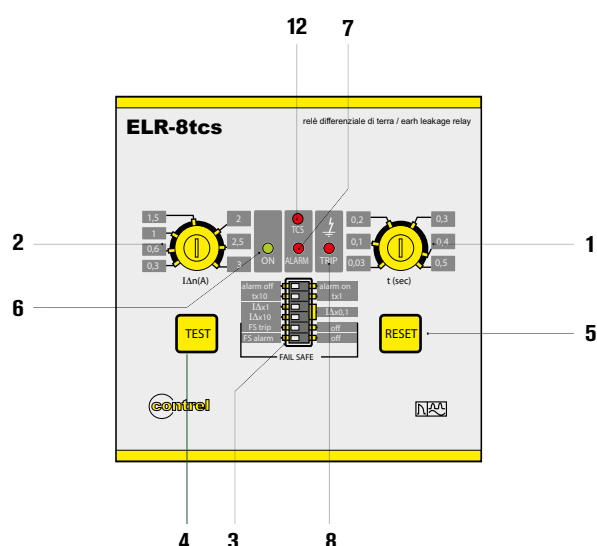
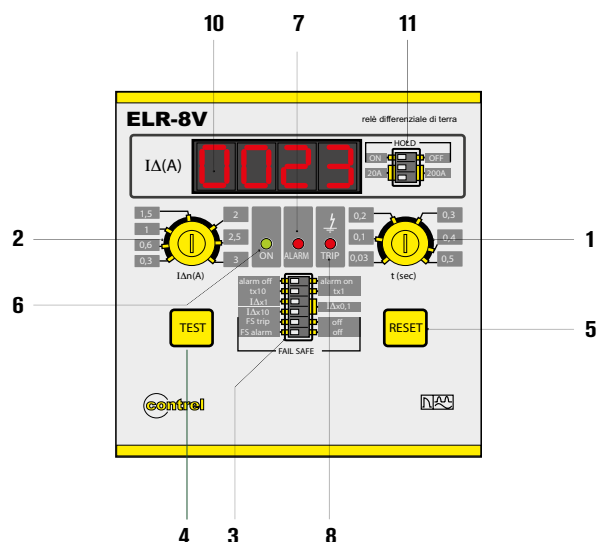


WIRING CONNECTION ELR-8tcs | ELR-8mVtcs



ELR-8V | ELR-8tcs | ELR-8mVtcs

EARTH LEAKAGE RELAY - FLUSH-MOUNT VERSION DIN 96x96 mm



LEGENDA

1	Tripping delay time adjustment
2	Fault current to earth adjustment
3	Dip switches settings: 3a - alarm off - alarm on alarm off = trip prealarm deactivated; upon exceeding the set $I_{\Delta n}$ rate, output contact changeover takes place and LEDs ALARM and TRIP light up. alarm on = trip prealarm activated; upon reaching 70% of the set $I_{\Delta n}$ rate, LED ALARM lights up and signal contact changeover takes place. Upon exceeding the set $I_{\Delta n}$ rate LED TRIP will light up and the TRIP contacts will change over 3b - tx10 - tx1 constant selection for tripping delay time adjustment. Examples: positioning the dip switch on tx10 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of $0.3 \times 10 = 3$ seconds; positioning the dip switch on tx1 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of $0.3 \times 1 = 0.3$ seconds 3c - $I_{\Delta n} \times 0.1$ - $I_{\Delta n} \times 1$ - $I_{\Delta n} \times 10$ constant selection for fault current to earth adjustment. The constants in relation to the position of the 2 dip switches are the following: - dip switch position $I_{\Delta n} \times 0.1$ and $I_{\Delta n} \times 0.1$ K = 0.1 - dip switch position $I_{\Delta n} \times 1$ and $I_{\Delta n} \times 0.1$ K = 1 - dip switch position $I_{\Delta n} \times 1$ and $I_{\Delta n} \times 10$ K = 10 3d - FS trip - off FS trip = positive safety activated on TRIP relay; in this condition the TRIP relay (terminals 7-8-9) is normally energised; therefore in the event of the lack of auxiliary voltage the output contacts move to the tripping condition (TRIP). Off = positive safety deactivated. TRIP relay normally deenergised. 3e - FS alarm- off FS alarm = positive safety activated on ALARM relay, in this condition the prealarm relay ALARM is normally energised; therefore in the event of the lack of auxiliary voltage the output contacts move to the trip condition (TRIP). Off = positive safety deactivated. ALARM relay normally deenergised.
4	TEST key. Causes tripping of the relay.
5	RESET key. To reset the relay after tripping. For remote reset, simply shut off the auxiliary supply for about 1 second.
6	ON LED. Indicates the presence of auxiliary voltage.
7	ALARM LED. Lighting up depends on the dip switch programming; see the instructions of point 3a)
8	TRIP LED. Lighting up indicates the cutting in of the TRIP relay due to exceeding the $I_{\Delta n}$ set.
9	TRIP MEMORY (versions ELR-8mVtcs) Mechanical trip relay indicator for exceeding the $I_{\Delta n}$ set. It stores the indication also in the lack of auxiliary voltage. The flag indicator resetting can only be made with the RESET button.
10	4-digit display (versions ELR-8V, ELR-8mVtcs) for viewing the differential current.
11	Display setting dip switches (versions ELR-8V, ELR-8mVtcs) 11a) hold on - hold off Earth leakage current display mode. hold on = the rate displayed is the one read in real time and the leakage current rate that caused tripping is kept on the display. hold off = the rate displayed is the one read in real time (the rate that caused tripping is not kept on the display). 11b) 20A-200A 20A = display scale to 19.99A 200A = display scale to 199.9A
12	TCS LED (versions ELR-8tcs, ELR-8mVtcs). The indicator switches on when TCS control protection trips. This protection is used to monitor the trip shunt circuit operation when connected through the current shunt coil.

ELR-1 D

EARTH LEAKAGE RELAY - MODULAR VERSION 1 MODULE



GENERAL CHARACTERISTICS

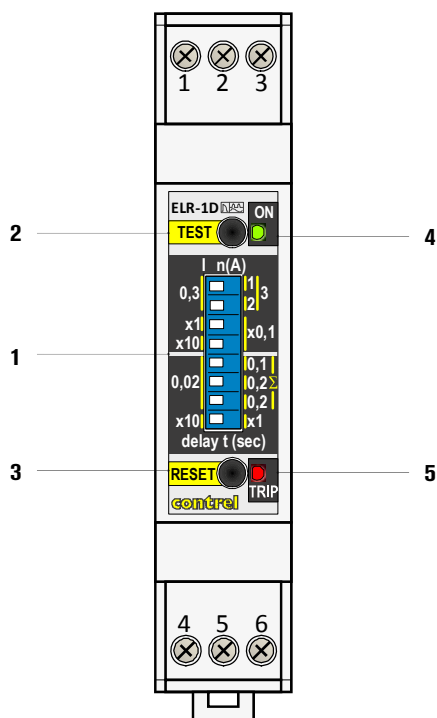
- Earth leakage relay type A
- External toroidal
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Front TEST and RESET buttons
- Modular DIN housing, 1 module, with transparent cover, suitable for fixing on 35mm DIN rail (IEC/EN 60715)
- IEC degree of protection: IP20 terminals, IP40 on front with cover.

ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE	OUTPUTS CONTACTS	WT [kg]
ELR-1D 24	24 VAC/DC	1	0,190
ELR-1D 48	48 VAC/DC	1	0,190
ELR-1D 110	110 VAC/DC	1	0,190
ELR-1D 230	230 VAC/DC	1	0,190

OPTIONS	
T	Tropicalisation

ADJUSTMENTS	
Configurable tripping set-point ($I_{\Delta n}$)	0,03...0,30A 0,3...3A 3...30A
Configurable tripping delay time (t)	0,02...0,5s 0,2...5s.

LEGENDA	
1	Dip switches settings: 1a - 0.3 - 3 - selection of fault current to earth tripping threshold $I_{\Delta n}$. Positioning the dip switch on 0.3 we will have a tripping threshold $I_{\Delta n}$ of 0.3A; in position 3 the threshold will be 3A. 1b - $I_{\Delta n} \times 0,1$ - $I_{\Delta n} \times 1$ - $I_{\Delta n} \times 10$ constant selection for fault current to earth adjustment. The constants in relation to the position of the 2 dip switches are the following: • dip switch position $I_{\Delta n} \times 0,1$ and $I_{\Delta n} \times 0,1$ K = 0.1 • dip switch position $I_{\Delta n} \times 1$ and $I_{\Delta n} \times 0,1$ K = 1 • dip switch position $I_{\Delta n} \times 1$ and $I_{\Delta n} \times 10$ K = 10 1c - 0.5(0.2+0.1+0.1) - 0.02 tripping delay time selection Positioning the dip switch on 0.2,0.2,0.1 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of 0.5 sec; in the 0.02 position the delay will be 0.02sec 1d - tx10 - tx1 constant selection for tripping delay time adjustment. Examples: positioning the dip switch on tx10 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of $0.3 \times 10 = 3$ seconds; positioning the dip switch on tx1 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of $0.3 \times 1 = 0.3$ seconds
2	TEST key. Causes tripping of the relay.
3	RESET key. To reset the relay after tripping. For remote reset, simply shut off the auxiliary supply for about 1 second.
4	ON LED. Indicates the presence of auxiliary voltage.
5	TRIP LED. Lighting up indicates the cutting in of the TRIP relay due to exceeding the $I_{\Delta n}$ set.

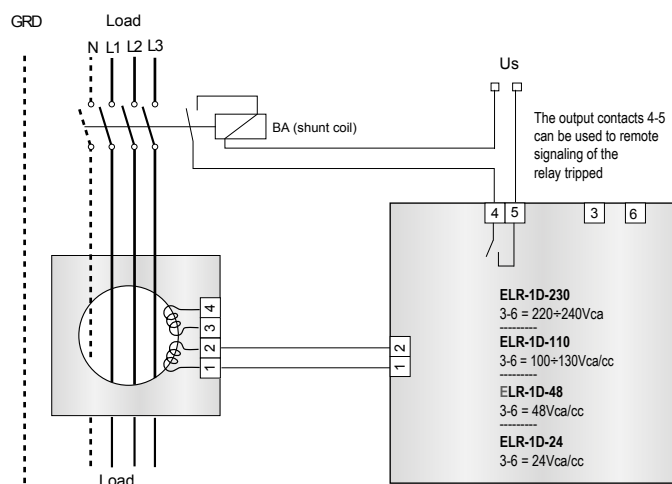


ELR-1 D

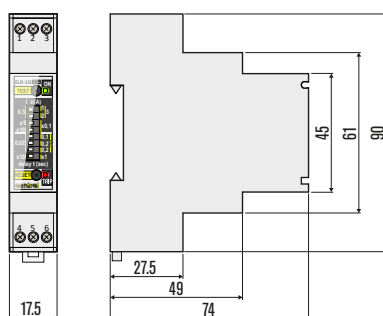
EARTH LEAKAGE RELAY - MODULAR VERSION 1 MODULE

TECHNICAL CHARACTERISTICS		ELR-1D
CONTROL CIRCUIT		
Toroidal transformer		External
Adjustments tripping set-point ($I\Delta$)		0.03÷30A
Adjustments tripping time (t)		0.02÷5s
AUXILIARY SUPPLY		
Auxiliary voltage (Us)	24 VAC/DC 48 VAC/DC 110 VAC/DC 240-415 VAC	
Rated frequency		50-60 Hz
Maximum power consumption		3 VA
OUTPUT RELAYS		
Contact arrangement		1 changeover (trip)
Rated contact capacity Ith		5 A (240 VAC)
INDICATIONS		
Auxiliary voltage available (ON)		Green LED
Relay tripping (TRIP)		Red LED
INSULATION		
Insulation test		2.5kV for 1 minute
AMBIENT OPERATING CONDITIONS		
Operating temperature		-10÷60 °C
Storage temperature		-20÷80 °C
Relative humidity		≤90%
ENCLOSURE		
Version		1 module DIN
Degree of protection		IP20 terminals IP40 with protective cover
CERTIFICATIONS AND COMPLIANCE		
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M	

WIRING CONNECTION



MECHANICAL DIMENSIONS



ELR-D2

EARTH LEAKAGE RELAY - MODULAR VERSION 2 MODULE



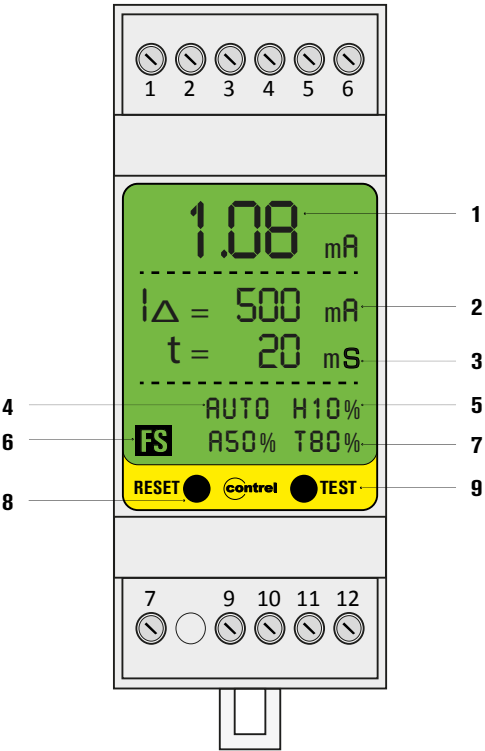
GENERAL CHARACTERISTICS

- True RMS
- Earth leakage relay type A
- External toroidal
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- LCD display
- Front TEST and RESET buttons
- RS485 serial interface (Modbus RTU)
- Modular DIN housing, 2 modules, with transparent cover
- Degree of protection: IP20 terminals, IP40 on front with cover

ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE	OUTPUTS CONTACTS	DISPLAY	COMMUNICATION PORT	WT [kg]
ELR-D2 110	110 VAC	1	-	-	0,200
ELR-D2-V 110	110 VAC	1	LCD	-	0,200
ELR-D2-V-485 110	110 VAC	1	LCD	RS485 (Modbus RTU)	0,200
ELR-D2 240	240 VAC	1	-	-	0,200
ELR-D2-V 240	240 VAC	1	LCD	-	0,200
ELR-D2-V-485 240	240 VAC	1	LCD	RS485 (Modbus RTU)	0,200

ADJUSTMENTS	
Configurable tripping set-point ($I_{\Delta n}$)	0,03...30A
Prealarm set-point	OFF 50...90%
Configurable tripping delay time (t)	0,02...10 s

LEGENDA	
1	LCD display (version ELR-D2-V, ELR-D2-V-485) for viewing the differential current
2	Set of fault current to earth tripping threshold $I_{\Delta n}$.
3	Set tripping delay time (t)
4	auto reset (AUTO) - man reset (MAN) auto reset = automatic reset man reset = manual reset through RESET key on the front.
5	Threshold set hysteresis
6	FS alarm = positive safety activated on ALARM relay, in this condition the prealarm relay ALARM is normally energised; therefore in the event of the lack of auxiliary voltage the output contacts move to the trip condition (TRIP). Off = positive safety deactivated. ALARM relay normally deenergised.
7	Alarm and trip advance set-point
8	RESET key. To reset the relay after tripping. For remote reset, simply shut off the auxiliary supply for about 1 second.
9	TEST key. Causes tripping of the relay.

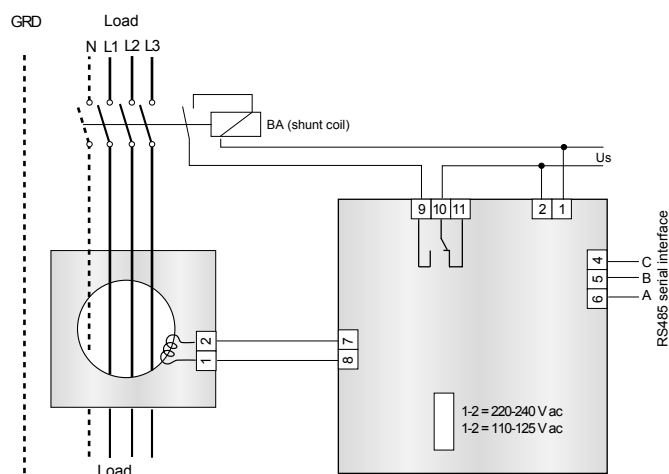


ELR-D2

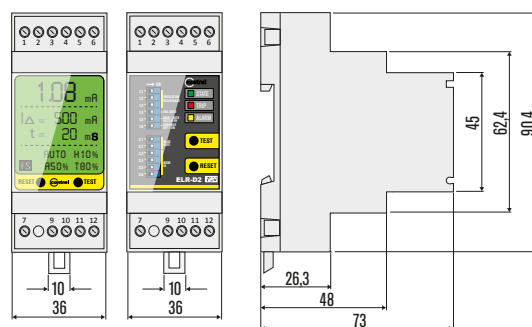
EARTH LEAKAGE RELAY - MODULAR VERSION 2 MODULE

TECHNICAL CHARACTERISTICS	ELR-D2	ELR-D2-V	ELR-D2-V-485
CONTROL CIRCUIT			
Toroidal transformer	External	External	External
Adjustments tripping set-point (IΔ)	0.03÷30A	0.03÷30A	0.03÷30A
Adjustments tripping time (t)	da 0,02 a 10 s	da 0,02 a 10 s	da 0,02 a 10 s
Prealarm set-point	50%...trip set-point	50%...trip set-point	50%...trip set-point
Set-point trip	50...90%	50...90%	50...90%
AUXILIARY SUPPLY			
Auxiliary voltage (Us)	110 VAC - 230 VAC	110 VAC - 230 VAC	110 VAC - 230 VAC
Rated frequency	50-60 Hz	50-60 Hz	50-60 Hz
Maximum power consumption	3 VA	3 VA	3 VA
OUTPUT RELAYS			
Contact arrangement	1 changeover (trip)	1 changeover (trip)	1 changeover (trip)
Rated contact capacity lth	5 A (240 VAC)	5 A (240 VAC)	5 A (240 VAC)
INDICATIONS			
Auxiliary voltage available (ON)	Green LED	green backlight	green backlight
Superamento soglia di allarme	Yellow LED	yellow backlight	yellow backlight
Relay tripping (TRIP)	Red LED	red backlight	red backlight
RS485 SERIAL INTERFACE			
Baud-rate	-	-	Programmable
DISPLAY			
Type	-	graphic LCD with RGB backlight	graphic LCD with RGB backlight
Format	-	72 x 100 pixel	72 x 100 pixel
INSULATION			
Insulation test	2.5kV for 1 minute	2.5kV for 1 minute	2.5kV for 1 minute
AMBIENT OPERATING CONDITIONS			
Operating temperature	-10÷60 °C	-10÷60 °C	-10÷60 °C
Storage temperature	-20÷80 °C	-20÷80 °C	-20÷80 °C
Relative humidity	≤90%	≤90%	≤90%
ENCLOSURE			
Version	2 modules DIN		
Degree of protection	IP20 terminals IP40 with protective cover		
CERTIFICATIONS AND COMPLIANCE			
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M		

WIRING CONNECTION



MECHANICAL DIMENSIONS



ELR-3C

EARTH LEAKAGE RELAY - MODULAR VERSION 3 MODULES

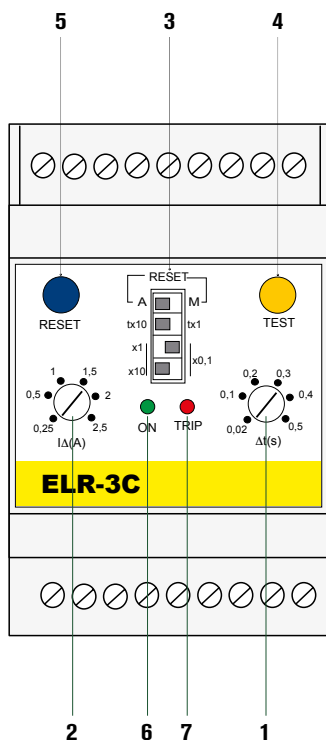


GENERAL CHARACTERISTICS

- Earth leakage relay type A
- External toroidal
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Front TEST and RESET buttons
- Configurable automatic or manual resetting
- Modular DIN housing, 3 module, with transparent cover
- Degree of protection: IP20 terminals, IP40 on front with cover

ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE	OUTPUTS CONTACTS	WT [kg]
ELR-3C 12	12 VAC/DC	1	0,190
ELR-3C 48	24-48 VAC/DC	1	0,190
ELR-3C 415	110 VAC/DC-240-415 VAC	1	0,190
OPTIONS			
T	Tropicalisation		

ADJUSTMENTS	
Configurable tripping set-point ($I_{\Delta n}$)	0,025...0,25A 0,25...2,5A 2,5...25A 25...250A (with external multiplier CT1-M)
Configurable tripping delay time (t)	0,02...0,5s 0,2...5s.



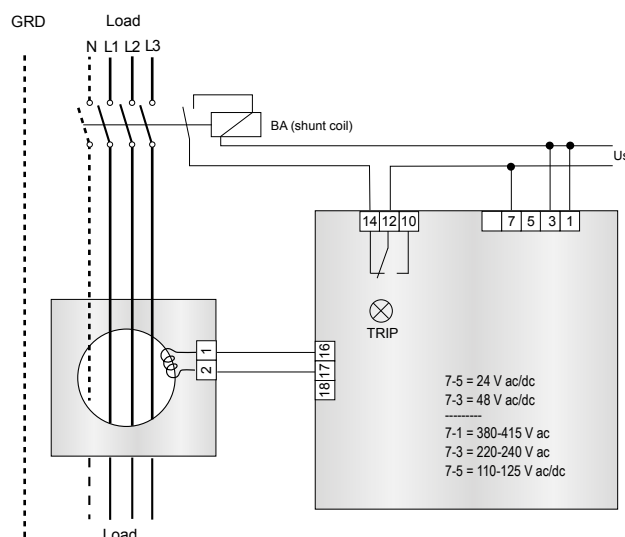
LEGENDA	
1	Tripping delay time adjustment
2	Fault current to earth adjustment
3	Dip switches settings: 3a -auto reset (A) - man reset (M) auto reset = automatic reset man reset = manual reset through RESET key on the front. For remote resetting, simply shut off the auxiliary supply for about 1 second 3b -tx10 - tx1 constant selection for tripping delay time adjustment. Examples: positioning the dip switch on tx10 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of $0.3 \times 10 = 3$ seconds; positioning the dip switch on tx1 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of $0.3 \times 1 = 0.3$ seconds 3c -$I_{\Delta n} \times 0.1$ - $I_{\Delta n} \times 1$ - $I_{\Delta n} \times 10$ constant selection for fault current to earth adjustment. The constants in relation to the position of the 2 dip switches are the following: • dip switch position $I_{\Delta n} \times 0.1$ and $I_{\Delta n} \times 0.1$ K = 0.1 • dip switch position $I_{\Delta n} \times 1$ and $I_{\Delta n} \times 0.1$ K = 1 • dip switch position $I_{\Delta n} \times 1$ and $I_{\Delta n} \times 10$ K = 10
4	TEST key. Causes tripping of the relay.
5	RESET key. To reset the relay after tripping. For remote reset, simply shut off the auxiliary supply for about 1 second.
6	ON LED. Indicates the presence of auxiliary voltage.
7	TRIP LED. Lighting up indicates the cutting in of the TRIP relay due to exceeding the $I_{\Delta n}$ set.

ELR-3C

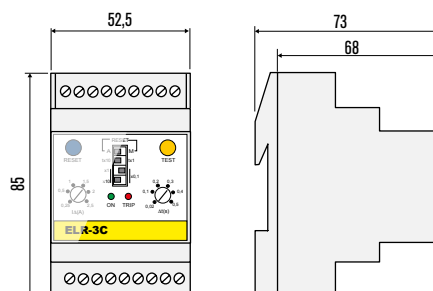
EARTH LEAKAGE RELAY - MODULAR VERSION 3 MODULES

TECHNICAL CHARACTERISTICS		ELR-3C		
CONTROL CIRCUIT				
Toroidal transformer	External			
Adjustments tripping set-point (IΔ)	0.025÷25A (25÷250A with external multiplier)			
Adjustments tripping time (t)	0.02÷5s			
AUXILIARY SUPPLY				
Auxiliary voltage (Us)	12 VAC/DC		24-48 VAC/DC	110 VAC/DC-240-415 VAC
Rated frequency	50-60 Hz			
Maximum power consumption	3 VA			
OUTPUT RELAYS				
Contact arrangement	1 changeover (trip)			
Rated contact capacity Ith	5 A (240 VAC)			
INDICATIONS				
Auxiliary voltage available (ON)	Green LED			
Relay tripping (TRIP)	Red LED			
INSULATION				
Insulation test	2.5kV for 1 minute			
AMBIENT OPERATING CONDITIONS				
Operating temperature	-10÷60 °C			
Storage temperature	-20÷80 °C			
Relative humidity	≤90%			
ENCLOSURE				
Version	3 modules DIN			
Degree of protection	IP20 terminals IP40 with protective cover			
CERTIFICATIONS AND COMPLIANCE				
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M			

WIRING CONNECTION



MECHANICAL DIMENSIONS



ELR-3F

EARTH LEAKAGE RELAY - MODULAR VERSION 3 MODULES

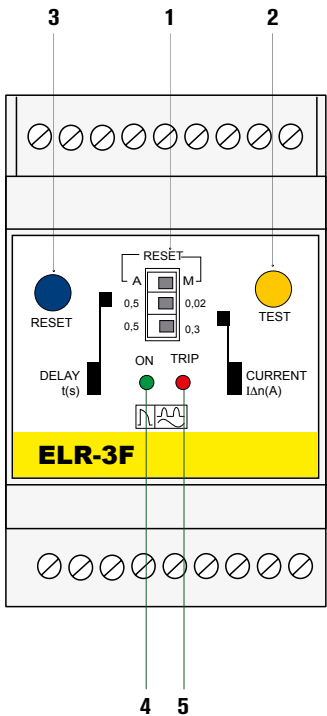


GENERAL CHARACTERISTICS

- Earth leakage relay type A
- External toroidal
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Front TEST and RESET buttons
- Configurable automatic or manual resetting
- Modular DIN housing, 3 module, with transparent cover
- Degree of protection: IP20 terminals, IP40 on front with cover

ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE	OUTPUTS CONTACTS	WT [kg]
ELR-3F 48	24-48 VAC/DC	1	0,175
ELR-3F 415	110 VAC/DC-240-415 VAC	1	0,175
OPTIONS			
T	Tropicalisation		

ADJUSTMENTS	
Configurable tripping set-point (IΔn)	fixed 0,3A or 0,5A
Configurable tripping delay time (t)	fixed 0,02s or 0,5s



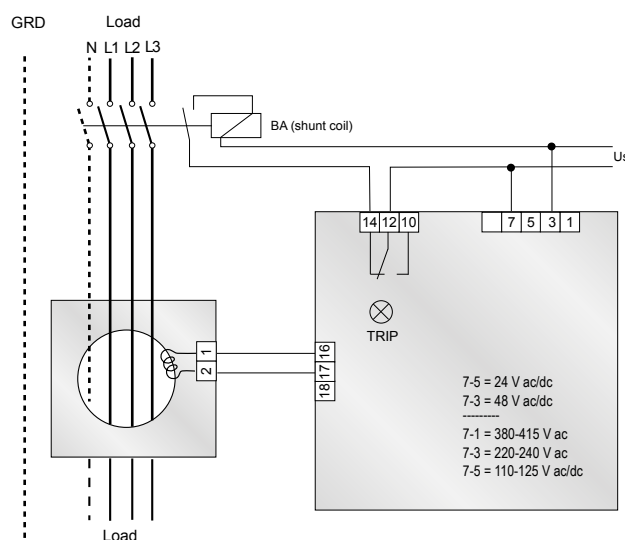
LEGENDA	
1	Dip switches settings: 1a - auto reset (A) - man reset (M) auto reset = automatic reset man reset = manual reset through RESET key on the front. For remote resetting, simply shut off the auxiliary supply for about 1 second 1b - 0.5 - 0.02 tripping delay time selection Positioning the dip switch on 0.5 we will have a tripping delay upon exceeding the IΔn threshold of 0.5 sec; in the 0.02 position the delay will be 0.02sec 1c - 0.5 - 0.3 selection of fault current to earth tripping threshold IΔn. Positioning the dip switch on 0.5 we will have a tripping threshold IΔn of 0.5A; in position 0.3 the threshold will be 0.3A
2	TEST key. Causes tripping of the relay.
3	RESET key. To reset the relay after tripping. For remote reset, simply shut off the auxiliary supply for about 1 second.
4	ON LED. Indicates the presence of auxiliary voltage.
5	TRIP LED. Lighting up indicates the cutting in of the TRIP relay due to exceeding the IΔn set.

ELR-3F

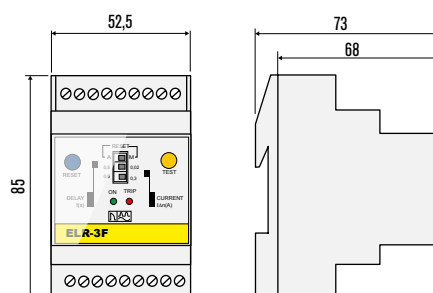
EARTH LEAKAGE RELAY - MODULAR VERSION 3 MODULES

TECHNICAL CHARACTERISTICS		ELR-3F
CONTROL CIRCUIT		
Toroidal transformer		External
Adjustments tripping set-point ($I\Delta$)		0,3 A o 0,5 A
Adjustments tripping time (t)		0,02 o 0,5 s
AUXILIARY SUPPLY		
Auxiliary voltage (Us)	24-48 VAC/DC	110 VAC/DC-240-415 VAC
Rated frequency		50-60 Hz
Maximum power consumption		3 VA
OUTPUT RELAYS		
Contact arrangement		1 changeover (trip)
Rated contact capacity Ith		5 A (240 VAC)
INDICATIONS		
Auxiliary voltage available (ON)		Green LED
Relay tripping (TRIP)		Red LED
INSULATION		
Insulation test		2.5kV for 1 minute
AMBIENT OPERATING CONDITIONS		
Operating temperature		-10÷60 °C
Storage temperature		-20÷80 °C
Relative humidity		≤90%
ENCLOSURE		
Version		3 modules DIN
Degree of protection		IP20 terminals IP40 with protective cover
CERTIFICATIONS AND COMPLIANCE		
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2	IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M

WIRING CONNECTION



MECHANICAL DIMENSIONS



ELR-3E

EARTH LEAKAGE RELAY - MODULAR VERSION 3 MODULES

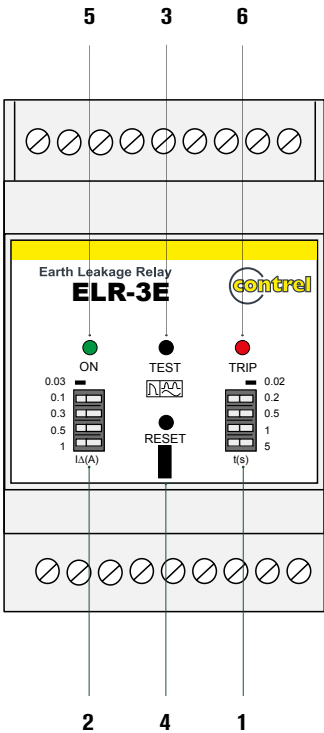


GENERAL CHARACTERISTICS

- Earth leakage relay type A
- External toroidal
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Front TEST and RESET buttons
- Manual resetting
- Modular DIN housing, 3 module, with transparent cover
- Degree of protection: IP20 terminals, IP40 on front with cover

ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE	OUTPUTS CONTACTS	WT [kg]
ELR-3E 48	24-48 VAC/DC	1	0,190
ELR-3E 415	110 VAC/DC-240-415 VAC	1	0,190
OPTIONS			
T	Tropicalisation		

ADJUSTMENTS	
Configurable tripping set-point (IΔn)	0,03A 0,1A 0,3A 0,5A 1A
Configurable tripping delay time (t)	0,02s 0,2s 0,5 1s 5s



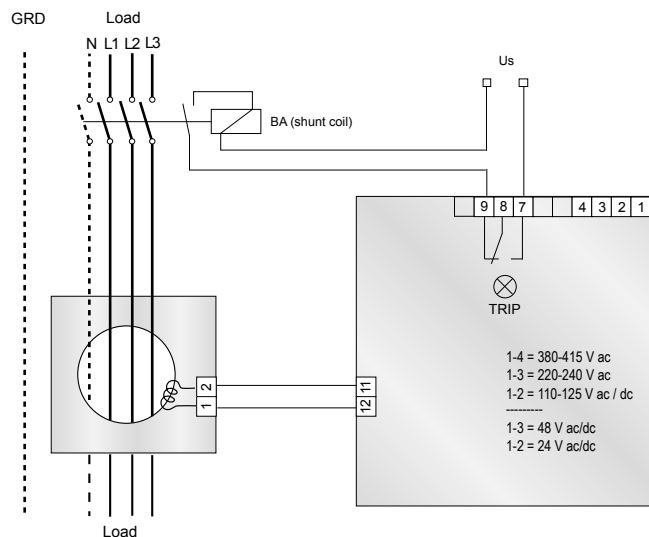
LEGENDA	
1	Tripping delay time adjustment
2	Fault current to earth adjustment
3	TEST key. Causes tripping of the relay.
4	RESET key. To reset the relay after tripping. For remote reset, simply shut off the auxiliary supply for about 1 second.
5	ON LED. Indicates the presence of auxiliary voltage.
6	TRIP LED. Lighting up indicates the cutting in of the TRIP relay due to exceeding the IΔn set.

ELR-3E

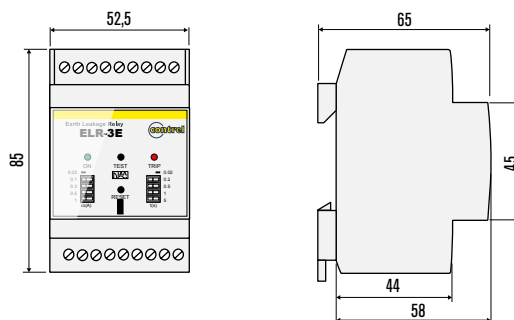
EARTH LEAKAGE RELAY - MODULAR VERSION 3 MODULES

TECHNICAL CHARACTERISTICS		ELR-3E
CONTROL CIRCUIT		
Toroidal transformer		External
Adjustments tripping set-point (I Δ)		0,03 A o 0,1 A o 0,3 A o 0,5 A o 1 A
Adjustments tripping time (t)		0,02 s o 0,2 s o 0,5 s o 1 s
AUXILIARY SUPPLY		
Auxiliary voltage (Us)		24-48 VAC/DC 110 VAC/DC-240-415 VAC
Rated frequency		50-60 Hz
Maximum power consumption		3 VA
OUTPUT RELAYS		
Contact arrangement		1 changeover (trip)
Rated contact capacity Ith		5 A (240 VAC)
INDICATIONS		
Auxiliary voltage available (ON)		Green LED
Relay tripping (TRIP)		Red LED
INSULATION		
Insulation test		2.5kV for 1 minute
AMBIENT OPERATING CONDITIONS		
Operating temperature		-10÷60 °C
Storage temperature		-20÷80 °C
Relative humidity		≤90%
ENCLOSURE		
Version		3 modules DIN
Degree of protection		IP20 terminals IP40 with protective cover
CERTIFICATIONS AND COMPLIANCE		
Reference standards		IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M

WIRING CONNECTION



MECHANICAL DIMENSIONS



ELR-61 | ELR-m61 / ELR-62 | ELR-m62

EARTH LEAKAGE RELAY - MODULAR VERSION 6 MODULES



GENERAL CHARACTERISTICS

- Earth leakage relay type A
- External toroidal
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Red tripping prealarm LED indicator (ALARM) (ELR-62, ELR-m62 only)
- Front TEST and RESET buttons
- Configurable automatic or manual resetting
- Flag indicator (TRIP MEMORY) (ELR-m61, ELR-m61 only)
- Modular DIN housing, 6 module, with transparent cover
- Degree of protection: IP20 terminals, IP40 on front with cover

ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE	OUTPUTS CONTACTS	WT [kg]
ELR-61 48	24-48 VAC/DC	2	0,390
ELR-61 415	110-240-415 VAC	2	0,390
ELR-61 /10 Calibration up to 10 mA	110-240-415 VAC	2	0,390
ELR-m61 48	24-48 VAC/DC	2	0,390
ELR-m61 415	110-240-415 VAC	2	0,390
ELR-62 48	24-48 VAC/DC	2	0,390
ELR-62 415	110-240-415 VAC	2	0,390
ELR-m62 48	24-48 VAC/DC	2	0,390
ELR-m62 415	110-240-415 VAC	2	0,390

OPTIONS

T	Tropicalisation
F	Built-in filter for 3rd harmonic (ELR-92 only)
SP	Configurable fail safe operation

ADJUSTMENTS

Configurable tripping set-point ($I\Delta n$)	0,025...0,25A 0,25...2,5A 2,5...25A 25...250A (with external multiplier CT1-M)
Prealarm set-point	fixed 70% (ELR-62, ELR-m62 only)
Configurable tripping delay time (t)	0,02...0,5s 0,2...5s.

EARTH LEAKAGE RELAY - MODULAR VERSION 6 MODULES

WIRING CONNECTION ELR-61 | ELR-m61

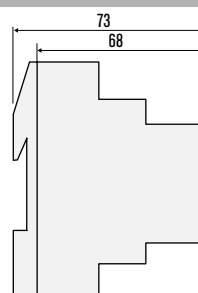
Uaux
 4 - 1 = 380-415 V ac
 4 - 2 = 220-240V ac
 2 - 1 = 110-127V ac

 4 - 1 = 48 V ac/dc
 2 - 1 = 24V ac/dc

WIRING CONNECTION ELR-62 | ELR-m62

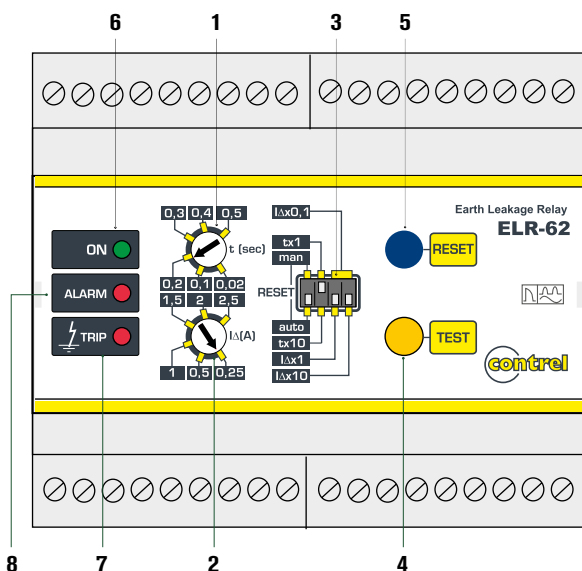
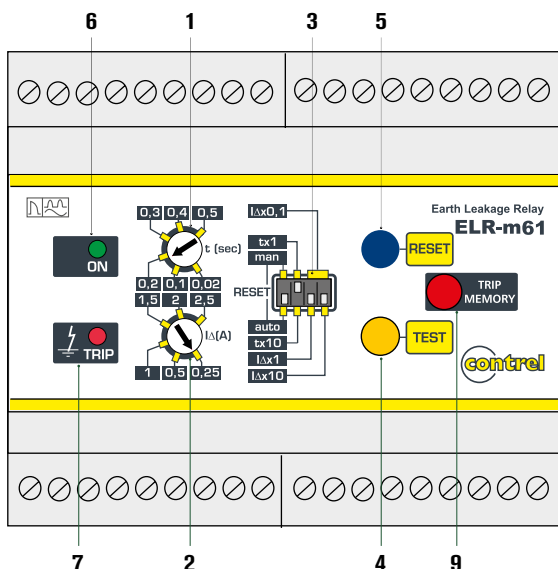
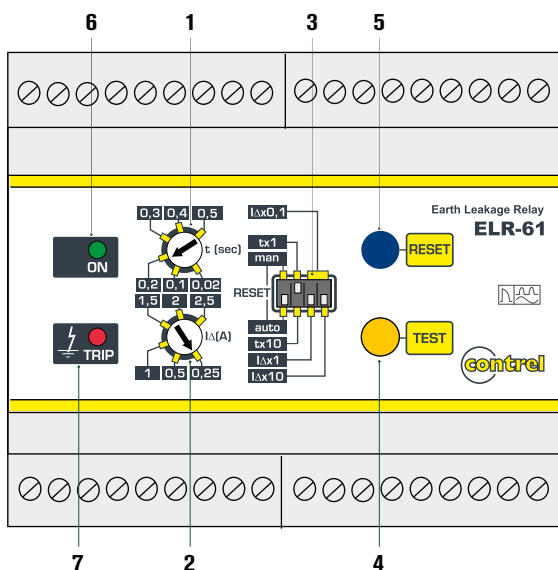
Uaux
 4 - 1 = 380-415 V ac
 4 - 2 = 220-240V ac
 2 - 1 = 110-127V ac

 4 - 1 = 48 V ac/dc
 2 - 1 = 24V ac/dc

[illegible]

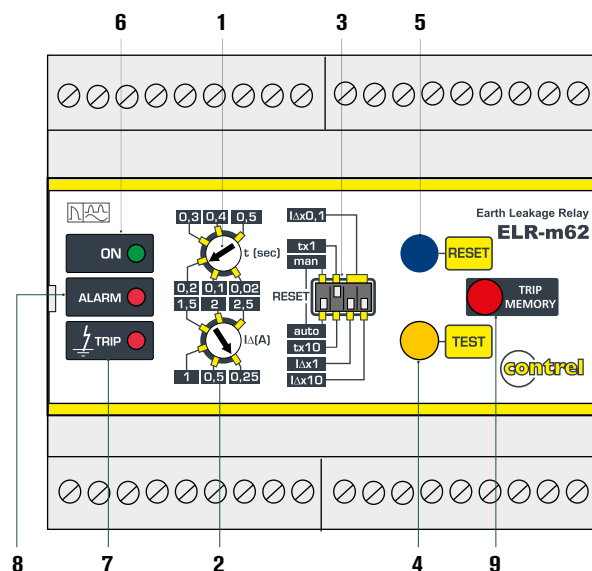
ELR-61 | ELR-m61 / ELR-62 | ELR-m62

RELÈ DIFFERENZIALI DI TERRA - ESECUZIONE MODULARE DIN



LEGENDA

1	Tripping delay time adjustment
2	Fault current to earth adjustment
3	Dip switches settings: 3a - auto reset (A) - man reset (M) auto reset = automatic reset man reset = manual reset through RESET key on the front. For remote resetting, simply shut off the auxiliary supply for about 1 second 3b - tx10 - tx1 constant selection for tripping delay time adjustment. Examples: positioning the dip switch on tx10 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I\Delta n$ threshold of $0.3 \times 10 = 3$ seconds; positioning the dip switch on tx1 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I\Delta n$ threshold of $0.3 \times 1 = 0.3$ seconds 3c - $I\Delta n 0.1$ - $I\Delta n 1$ - $I\Delta n 10$ constant selection for fault current to earth adjustment. The constants in relation to the position of the 2 dip switches are the following: - dip switch position $I\Delta n 0.1$ and $I\Delta n 0.1$ K = 0.1 - dip switch position $I\Delta n 1$ and $I\Delta n 0.1$ K = 1 - dip switch position $I\Delta n 1$ and $I\Delta n 10$ K = 10
4	TEST key. Causes tripping of the relay.
5	RESET key. To reset the relay after tripping. For remote reset, simply shut off the auxiliary supply for about 1 second.
6	ON LED. Indicates the presence of auxiliary voltage.
7	TRIP LED. Lighting up indicates the cutting in of the TRIP relay due to exceeding the $I\Delta n$ set.
8	ALARM LED (versions ELR-62, ELR-m62). lighting up depends on the dip switch programming; see the instructions of point 3a)
9	TRIP MEMORY (versions ELR-m61, ELR-m62). Mechanical trip relay indicator for exceeding the $I\Delta n$ set. It stores the indication also in the lack of auxiliary voltage. The flag indicator resetting can only be made with the RESET button.



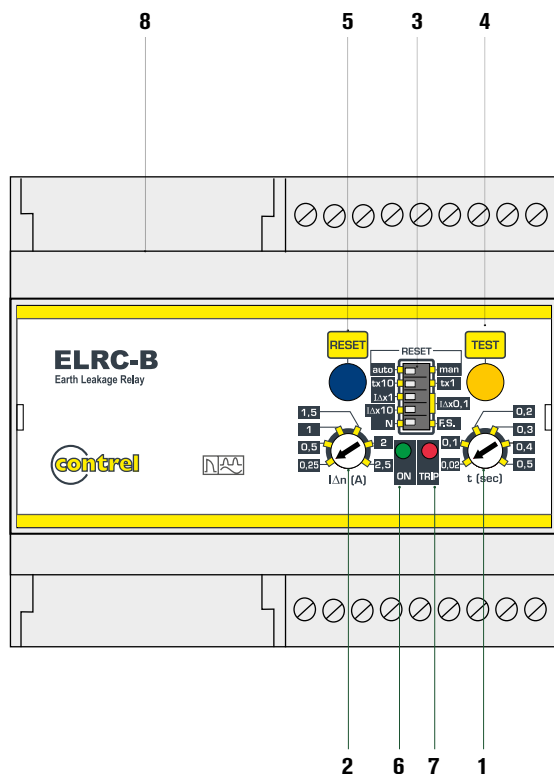
ELRC-B

EARTH LEAKAGE RELAY - MODULAR VERSION 1 MODULE, WITH INCORPORATED TOROIDAL TRANSFORMER



ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE	OUTPUTS CONTACTS	WT [kg]
ELRC-B 48	24-48 VAC/DC	2	0,375
ELRC-B 415	110 VAC/DC 240-415 VAC	2	0,375

OPTIONS	
T	Tropicalisation
F	Built-in filter for 3rd harmonic (ELR-92 only)



GENERAL CHARACTERISTICS

- Earth leakage relay type A
- Incorporated toroidal Ø28mm
- Configurable fail safe operation
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Front TEST and RESET buttons
- Configurable automatic or manual resetting
- Modular DIN housing, 6 module, with transparent cover
- Degree of protection: IP20 terminals, IP40 on front with cover

ADJUSTMENTS

Configurable tripping set-point ($I_{\Delta n}$)	0,025...0,25A
	0,25...2,5A
	2,5...25A
Configurable tripping delay time (t)	0,02...0,5s
	0,2...5s.

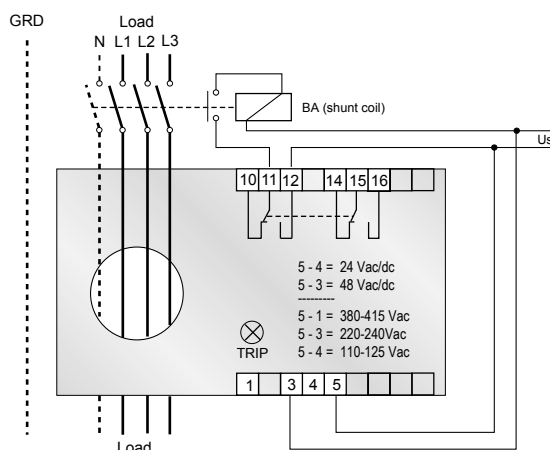
LEGENDA

1	Tripping delay time adjustment
2	Fault current to earth adjustment
3	Dip switches settings: 3a - auto reset (A) - man reset (M) auto reset = automatic reset man reset = manual reset through RESET key on the front. For remote resetting, simply shut off the auxiliary supply for about 1 second 3b - tx10 - tx1 constant selection for tripping delay time adjustment. Examples: positioning the dip switch on tx10 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of $0.3 \times 10 = 3$ seconds; positioning the dip switch on tx1 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of $0.3 \times 1 = 0.3$ seconds 3c - $I_{\Delta n}0,1$ - $I_{\Delta n}1$ - $I_{\Delta n}10$ constant selection for fault current to earth adjustment. The constants in relation to the position of the 2 dip switches are the following: - dip switch position $I_{\Delta n}0,1$ and $I_{\Delta n}0,1$ K = 0.1 - dip switch position $I_{\Delta n}1$ and $I_{\Delta n}0,1$ K = 1 - dip switch position $I_{\Delta n}1$ and $I_{\Delta n}10$ K = 10 3d - N - F.S. F.S. = positive safety activated; in this condition the output relay is normally energised; therefore in the event of the lack of auxiliary voltage the output contacts move to the tripping condition. N = positive safety deactivated. Output relay normally deenergised
4	TEST key. Causes tripping of the relay.
5	RESET key. To reset the relay after tripping. For remote reset, simply shut off the auxiliary supply for about 1 second.
6	ON LED. Indicates the presence of auxiliary voltage.
7	TRIP LED. Lighting up indicates the cutting in of the TRIP relay due to exceeding the $I_{\Delta n}$ set.
8	Built-in current transformer. Hole diameter 28mm. It must be crossed by the cables of the line to be controlled; insert the phases and neutral if present. The earth cable must NOT cross the current transformer

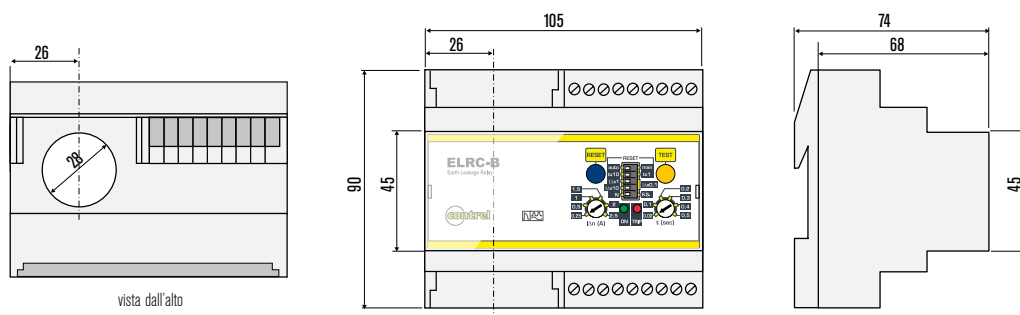
EARTH LEAKAGE RELAY - MODULAR VERSION 1 MODULE, WITH INCORPORATED TOROIDAL TRANSFORMER

TECHNICAL CHARACTERISTICS		ELRC-B	
CONTROL CIRCUIT			
Toroidal transformer	Incorporated Ø 28 mm		
Adjustments tripping set-point (IΔ)	0.025÷25A		
Adjustments tripping time (t)	0.02÷5s		
AUXILIARY SUPPLY			
Auxiliary voltage (Us)	24-48 VAC/DC 110 VAC/DC-240-415 VAC		
Rated frequency	50-60 Hz		
Maximum power consumption	3 VA		
OUTPUT RELAYS			
Contact arrangement	2 changeovers (both trip)		
Rated contact capacity Ith	5 A (240 VAC)		
INDICATIONS			
Auxiliary voltage available (ON)	Green LED		
Relay tripping (TRIP)	Red LED		
INSULATION			
Insulation test	2.5kV for 1 minute		
AMBIENT OPERATING CONDITIONS			
Operating temperature	-10÷60 °C		
Storage temperature	-20÷80 °C		
Relative humidity	≤90%		
ENCLOSURE			
Version	6 modules DIN		
Degree of protection	IP20 terminals IP40 with protective cover		
CERTIFICATIONS AND COMPLIANCE			
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M		

WIRING CONNECTION



MECHANICAL DIMENSIONS



ELRC-BL

ELRD-L

ELRD-L2m

EARTH LEAKAGE RELAY - MODULAR VERSION 6 MODULES (PUBLIC LIGHTING)



GENERAL CHARACTERISTICS

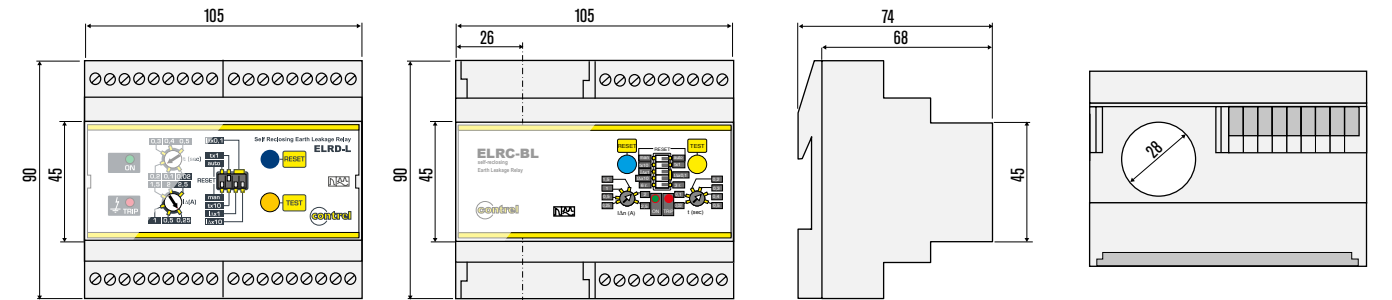
- Earth leakage relay type A
- Automatic trip and reclosing
- External toroidal (ELRD-L, ELRD-L2m only)
- Incorporated toroidal Ø28mm (ELRC-BL only)
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Red tripping prealarm LED indicator (ALARM) (ELRD-L2m only)
- Front TEST and RESET buttons
- Configurable automatic or manual resetting
- Flag indicator (TRIP MEMORY) (ELRD-L2m only)
- Modular DIN housing, 6 module, with transparent cover
- Degree of protection: IP20 terminals, IP40 on front with cover

ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE	OUTPUTS CONTACTS	WT [kg]
ELRC-BL	240 VAC	2	0,370
ELRD-L	240 VAC	2	0,390
ELRD-L2m	240 VAC	2	0,390

OPTIONS	
T	Tropicalisation

ADJUSTMENTS PER	ELRC-BL	ELRD-L	ELRD-L2m
Configurable tripping set-point (IΔn)	0,025...0,25A 0,25...2,5A 2,5...25A 25...250A (with external multiplier CT1-M)		
Set-point prealarm		fixed 70% (ELRD-L2m only)	
Configurable tripping delay time (t)	0,02...0,5s 0,2...5s.		
Self-closing attempts	3 or 6 consecutive (version ELRC-BL)	3 consecutive (version ELRD-L, ELRD-L2m)	

MECHANICAL DIMENSIONS

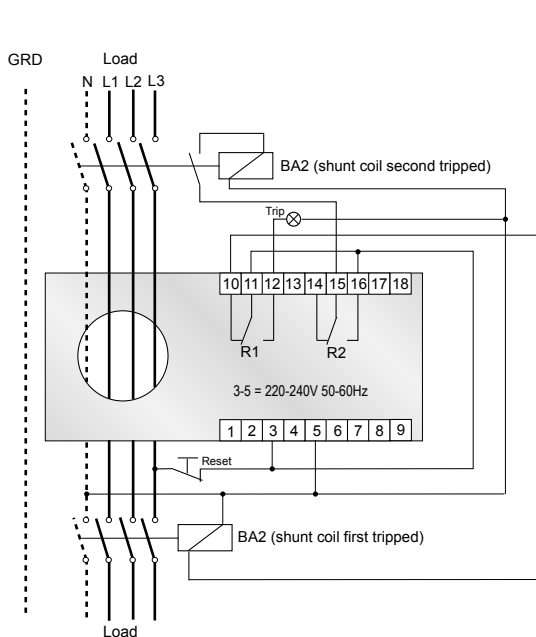


ELRC-BL | ELRD-L | ELRD-L2m

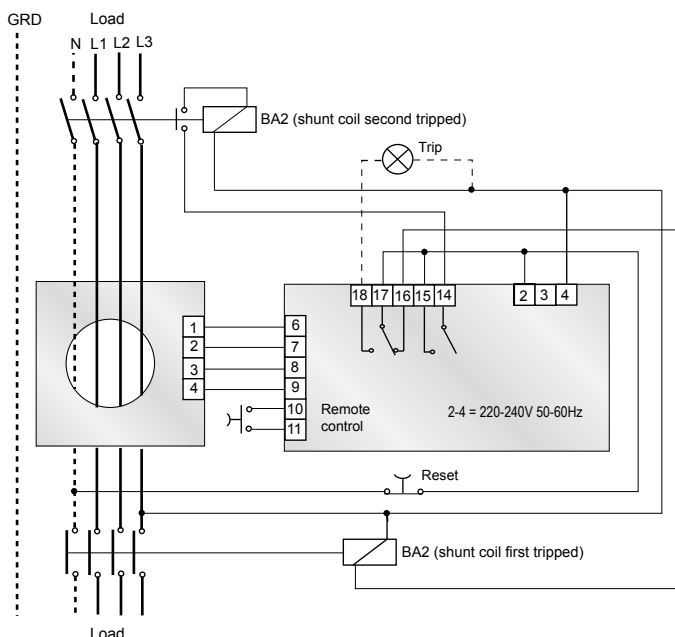
EARTH LEAKAGE RELAY - MODULAR VERSION 6 MODULES (PUBLIC LIGHTING)

TECHNICAL CHARACTERISTICS	ELRC-BL	ELRD-L	ELRD-L2m
CONTROL CIRCUIT			
Toroidal transformer	External (version ELRC-BL Incorporated Ø 28 mm)		
Adjustments tripping set-point (IΔ)	0.025÷25A		
Adjustments tripping time (t)	0.02÷5s		
Set-point prellarme	70% IΔn (fixed) (version ELRD-L2m)		
Numero tentativi di ripristino	3 o 6 consecutive	3 consecutive	3 consecutive
AUXILIARY SUPPLY			
Auxiliary voltage (Us)	240 VAC		
Rated frequency	50-60 Hz		
Maximum power consumption	4 VA		
OUTPUT RELAYS			
Contact arrangement	2 changeovers (both trip)	2 changeovers (1 trip, 1 alarm)	2 changeovers (1 trip, 1 alarm)
Rated contact capacity Ith	5 A (240 VAC)		
INDICATIONS			
Auxiliary voltage available (ON)	Green LED		
Relay tripping (TRIP)	Red LED		
Alarm advance (ALARM)	red LED (versions ELRD-L, ELRD-L2m)		
Mechanical flag (TRIP)	Flag indicator (version ELRD-L2m)		
INSULATION			
Insulation test	2.5kV for 1 minute		
AMBIENT OPERATING CONDITIONS			
Operating temperature	-10÷60 °C		
Storage temperature	-20÷80 °C		
Relative humidity	≤90%		
ENCLOSURE			
Version	6 modules DIN		
Degree of protection	IP20 terminals IP40 with protective cover		
CERTIFICATIONS AND COMPLIANCE			
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2	IEC/EN 61000-6-3, IEC/TR 60755	CEI EN 60947-2 Annex M

WIRING CONNECTION ELRC-BL

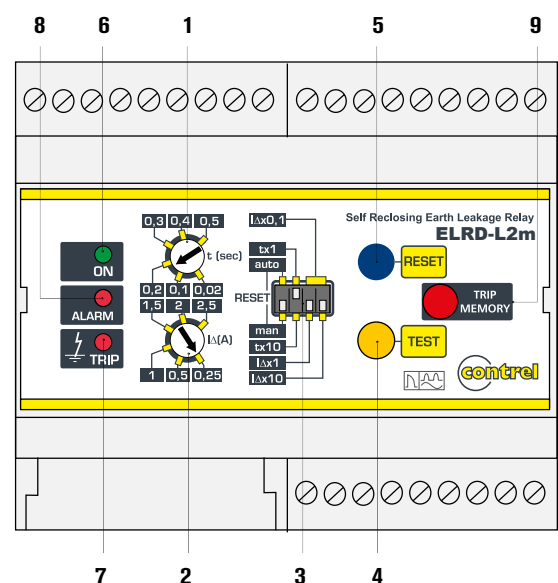
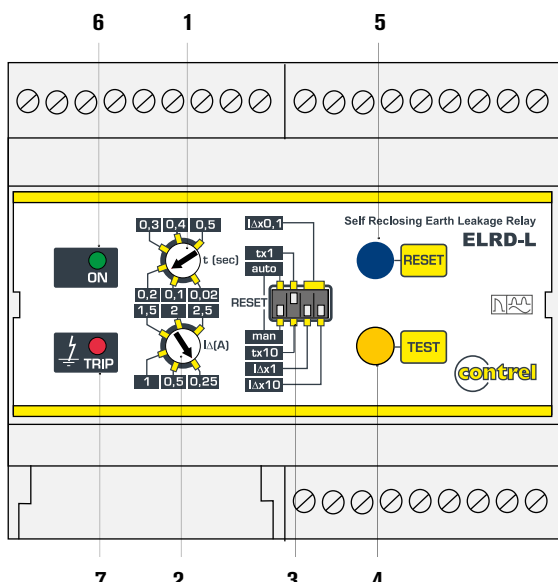
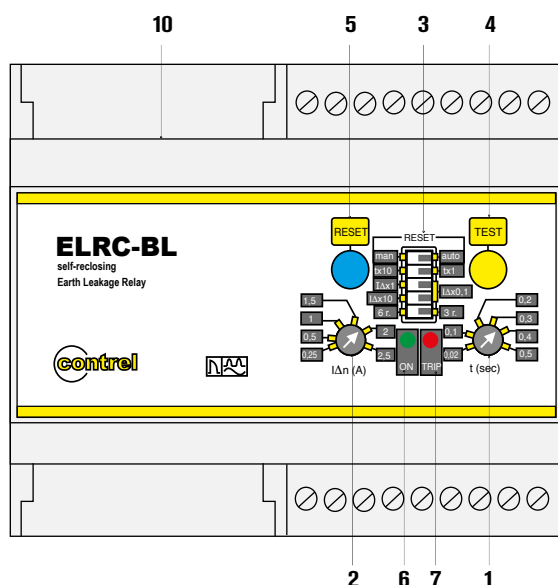


WIRING CONNECTION ELRD-L | ELRD-L2m



ELRC-BL | ELRD-L | ELRD-L2m

EARTH LEAKAGE RELAY - MODULAR VERSION 6 MODULES (PUBLIC LIGHTING)



LEGENDA

1	Tripping delay time adjustment
2	Fault current to earth adjustment
3	Dip switches settings: 3a - auto reset (A) - man reset (M) auto reset = automatic reset man reset = manual reset through RESET key on the front. For remote resetting, simply shut off the auxiliary supply for about 1 second 3B - tx10 - tx1 constant selection for tripping delay time adjustment. Examples: positioning the dip switch on tx10 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of $0.3 \times 10 = 3$ seconds; positioning the dip switch on tx1 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I_{\Delta n}$ threshold of $0.3 \times 1 = 0.3$ seconds 3C - $I_{\Delta n} 0.1$ - $I_{\Delta n} 1$ - $I_{\Delta n} 10$ constant selection for fault current to earth adjustment. The constants in relation to the position of the 2 dip switches are the following: - dip switch position $I_{\Delta n} 0.1$ and $I_{\Delta n} 0.1 K = 0.1$ - dip switch position $I_{\Delta n} 1$ and $I_{\Delta n} 0.1 K = 1$ - dip switch position $I_{\Delta n} 1$ and $I_{\Delta n} 10 K = 10$ 3D - Version ELRC-BL 6r - 3r selection for self-reclosing attempts 6r = 6 self-reclosing attempts 3r = 3 self-reclosing attempts
4	TEST key. Causes tripping of the relay.
5	RESET key. To reset the relay after tripping. For remote reset, simply shut off the auxiliary supply for about 1 second.
6	ON LED. Indicates the presence of auxiliary voltage.
7	TRIP LED. Lighting up indicates the cutting in of the TRIP relay due to exceeding the $I_{\Delta n}$ set.
8	ALARM LED (version ELRD-L2m) Lighting up depends on the dip switch programming; see the instructions of point 3a)
9	TRIP MEMORY (version ELRD-L2m) Mechanical trip relay indicator for exceeding the $I_{\Delta n}$ set. It stores the indication also in the lack of auxiliary voltage. The flag indicator resetting can only be made with the RESET button.
10	Built-in current transformer. Hole diameter 28mm. It must be crossed by the cables of the line to be controlled; insert the phases and neutral if present. The earth cable must NOT cross the current transformer

ELRC-1

EARTH LEAKAGE RELAY - COMPACT INTERNAL PANEL VERSION WITH INCORPORATED TOROIDAL TRANSFORMER

The ELRC-1 have the particularity that they are manufactured with the built-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.



GENERAL CHARACTERISTICS

- Earth leakage relay type A
- Incorporated toroidal 35-60-80-110 mm standard diameter
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Front TEST and RESET buttons
- Configurable automatic or manual resetting
- Compact housing for fixing on panel mounting plate
- IEC degree of protection: IP20 terminals.

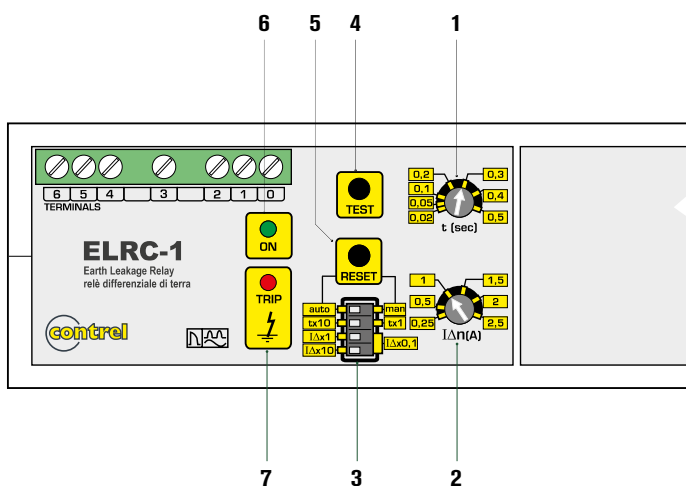
ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE	OUTPUTS CONTACTS	WT [kg]
ELRC-1 /... 48	24-48 VAC/DC	1	0,485
ELRC-1 /...415	110VAC/DC 240-415 VAC	1	0,485

/... Replace with the digit of the required diameter (35-60-80-110 mm)

OPTIONS	
T	Tropicalisation
F	Built-in filter for 3rd harmonic (ELR-92 only)
2	2 outputs (version ELRC-2 /...)

ADJUSTMENTS	
Configurable tripping set-point ($I\Delta n$)	0,025...0,25A 0,25...2,5A 2,5...25A 5...250A (with external multiplier CT1-M)
Configurable tripping delay time (t)	0,02...0,5s 0,2...5s.

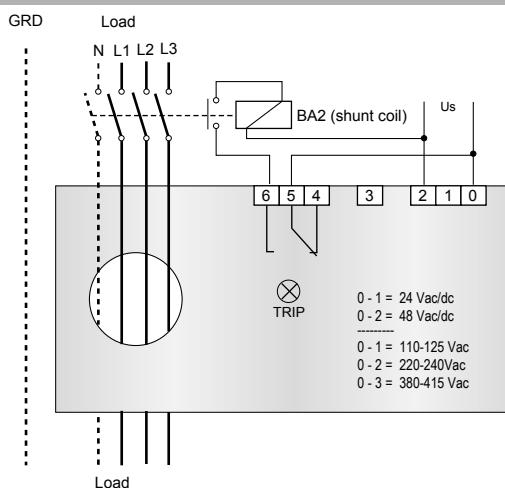
LEGENDA	
1	Tripping delay time adjustment
2	Fault current to earth adjustment
3	Dip switches settings: 3a - auto reset - man reset auto reset = automatic reset man reset = manual reset through the RESET key on the front. For remote resetting, simply shut off the auxiliary supply for about 1 second. 3b - tx10 - tx1 constant selection for tripping delay time adjustment. Examples: positioning the dip switch on tx10 and the potentiometer on 0.3 we will have a tripping delay upon exceeding the $I\Delta$ threshold of $0.3 \times 10 = 3$ seconds; positioning the dip switch on tx1 and the selector on 0.3 we will have a tripping delay upon exceeding the $I\Delta$ threshold of $0.3 \times 1 = 0.3$ seconds. 3c - $I\Delta n \times 0,1$ - $I\Delta n \times 1$ - $I\Delta n \times 10$ constant selection for fault current to earth adjustment. The constants in relation to the position of the 2 dip switches are the following: - dip switch position $I\Delta n \times 0,1$ and $I\Delta n \times 0,1$ K = 0.1 - dip switch position $I\Delta n \times 1$ and $I\Delta n \times 0,1$ K = 1 - dip switch position $I\Delta n \times 1$ and $I\Delta n \times 10$ K = 10
4	TEST key. Causes tripping of the relay.
5	RESET key. To reset the relay after tripping. For remote reset, simply shut off the auxiliary supply for about 1 second.
6	ON LED. Indicates the presence of auxiliary voltage.
7	TRIP LED. Lighting up indicates the cutting in of the TRIP relay due to exceeding the $I\Delta n$ set.
8	Built-in current transformer. It must be crossed by the cables of the line to be controlled; insert the phases and neutral if present. The earth cable must NOT cross the current transformer.



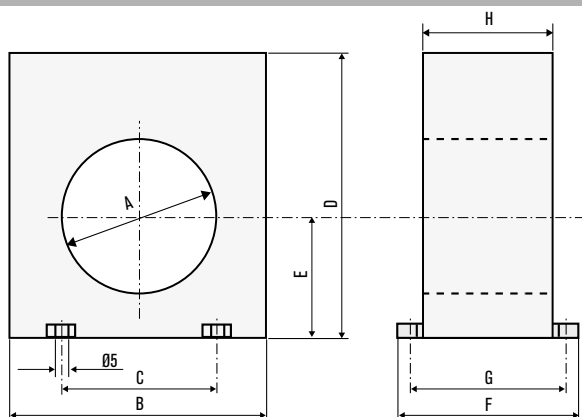
ELRC-1

EARTH LEAKAGE RELAY - COMPACT INTERNAL PANEL VERSION WITH INCORPORATED TOROIDAL TRANSFORMER

TECHNICAL CHARACTERISTICS		ELRC-1	
CONTROL CIRCUIT			
Toroidal transformer	Incorporated 35-60-80-110 mm standard diameter		
Adjustments tripping set-point (IΔ)	0.025÷25A		
Adjustments tripping time (t)	0.02÷5s		
AUXILIARY SUPPLY			
Auxiliary voltage (Us)	24-48 VAC/DC		110 VAC/DC-240-415 VAC
Rated frequency	50-60 Hz		
Maximum power consumption	3 VA		
OUTPUT RELAYS			
Contact arrangement	1 changeover (trip)		
Rated contact capacity Ith	5 A (240 VAC)		
INDICATIONS			
Auxiliary voltage available (ON)	Green LED		
Relay tripping (TRIP)	Red LED		
INSULATION			
Insulation test	2.5kV for 1 minute		
AMBIENT OPERATING CONDITIONS			
Operating temperature	-10÷60 °C		
Storage temperature	-20÷80 °C		
Relative humidity	≤90%		
ENCLOSURE			
Version	Compact		
Degree of protection	IP20 terminals IP40 with protective cover		
CERTIFICATIONS AND COMPLIANCE			
Reference standards	IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000-6-3, IEC/TR 60755 CEI EN 60947-2 Annex M		
WIRING CONNECTION			



MECHANICAL DIMENSIONS



	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

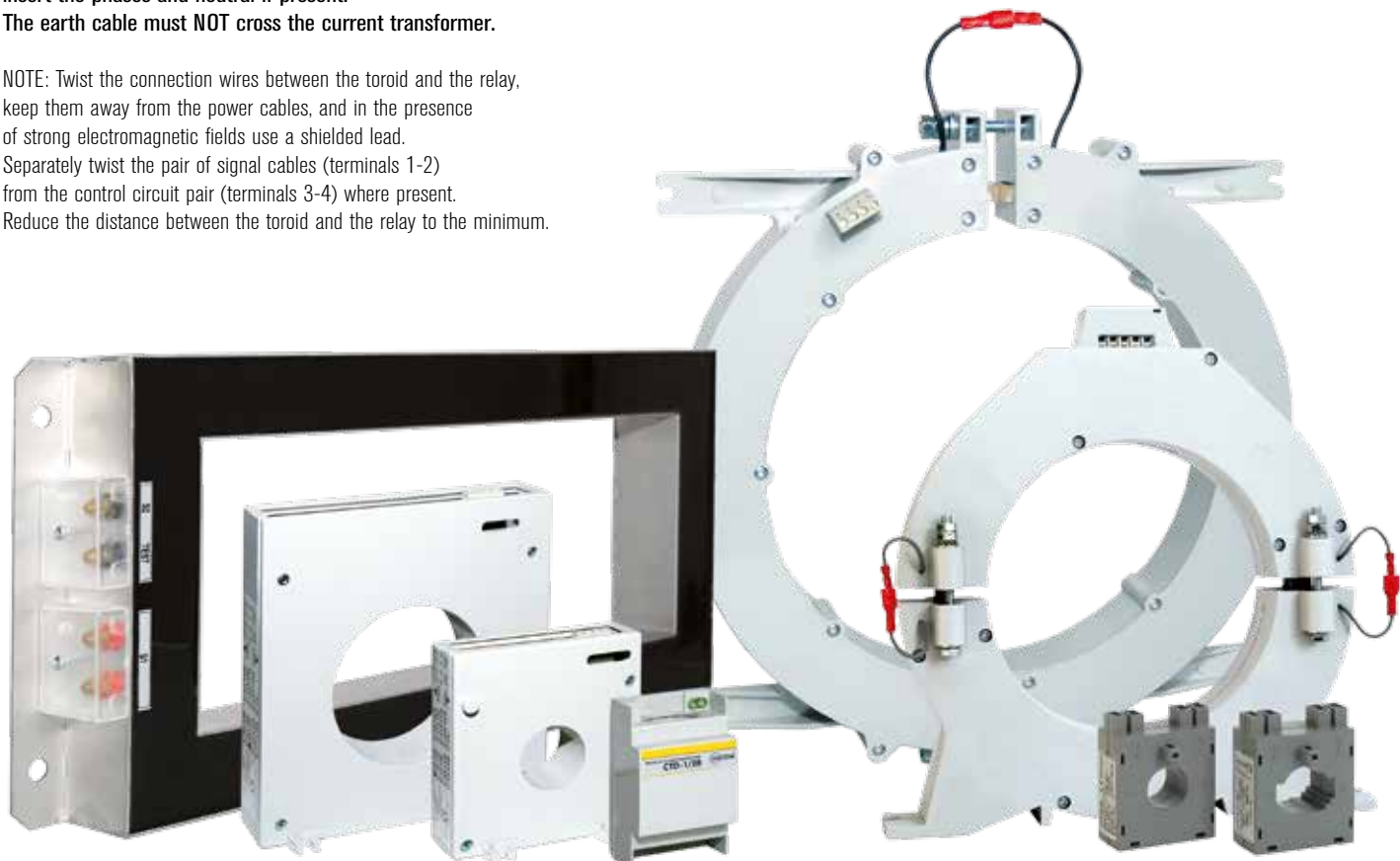
CT-1 | CTD-1 | CTA-1

TOROIDAL CURRENT TRANSFORMERS

GENERAL CHARACTERISTICS

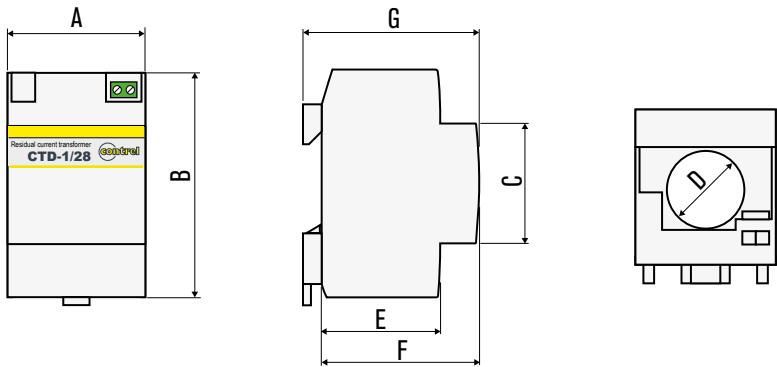
The differential earth relays CT-1 can be connected to the following toroidal current transformers. They must be crossed by the cables of the line to be controlled; insert the phases and neutral if present. The earth cable must NOT cross the current transformer.

NOTE: Twist the connection wires between the toroid and the relay, keep them away from the power cables, and in the presence of strong electromagnetic fields use a shielded lead. Separately twist the pair of signal cables (terminals 1-2) from the control circuit pair (terminals 3-4) where present. Reduce the distance between the toroid and the relay to the minimum.



CTD-1/28

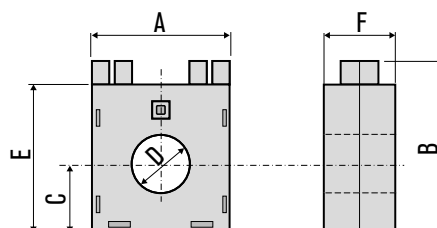
ORDER CODE	DIAMETER (mm)	CORE	WEIGHT (kg)
CTD-1/28	28	SOLID CORE	0,200



TYPE - DIMENSIONS (mm)	A	B	C	D	E	F	G
CTD-1/28	52,5	85,5	45	28	44	58	54

CT-1/22

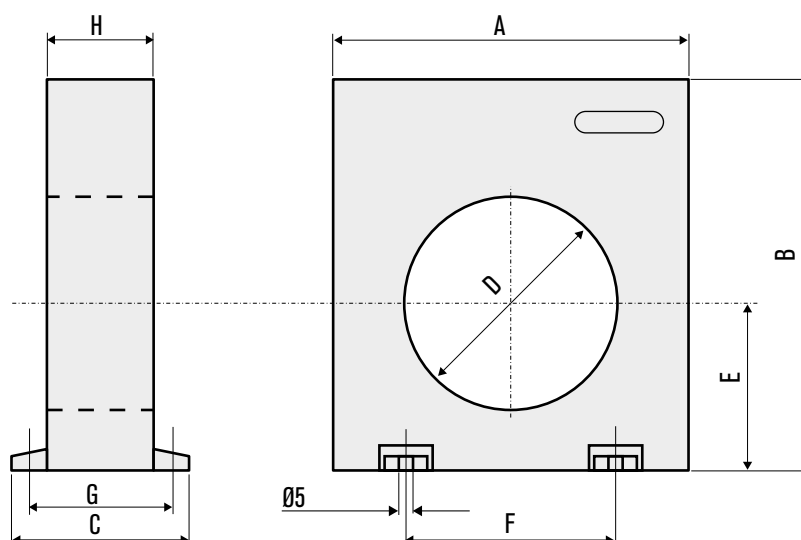
ORDER CODE	DIAMETER (mm)	CORE	WEIGHT (kg)
CT-1/22	22	SOLID CORE	0,150



TYPE - DIMENSIONS (mm)	A	B	C	D	E	F
CT-1/22	52	65	26	22	56	27

CT-1/35 | CT-1/60 | CT-1/80 | CT-1/110 | CT-1/160

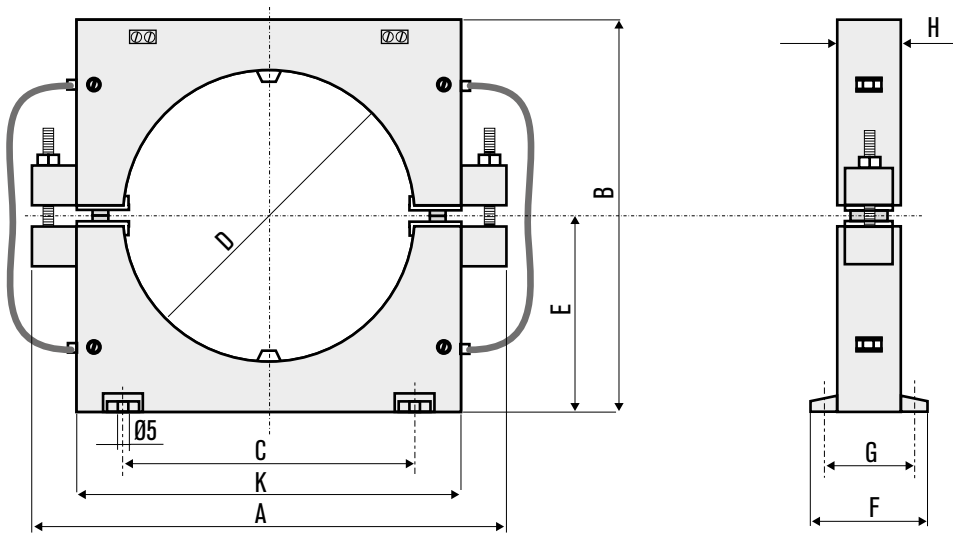
ORDER CODE	DIAMETER (mm)	CORE	WEIGHT (kg)
CT-1/35	35	SOLID CORE	0,220
CT-1/60	60	SOLID CORE	0,280
CT-1/80	80	SOLID CORE	0,450
CT-1/110	110	SOLID CORE	0,520
CT-1/160	160	SOLID CORE	1,350



TYPE - DIMENSIONS (mm)	A	B	C	D	E	F	G	H
CT-1/35	100	110	50	35	47	60	43	30
CT-1/60	100	110	50	60	47	60	43	30
CT-1/80	150	160	50	80	70	110	43	30
CT-1/110	150	160	50	110	70	110	43	30
CT-1/160	220	236	64	160	110	156	50	34

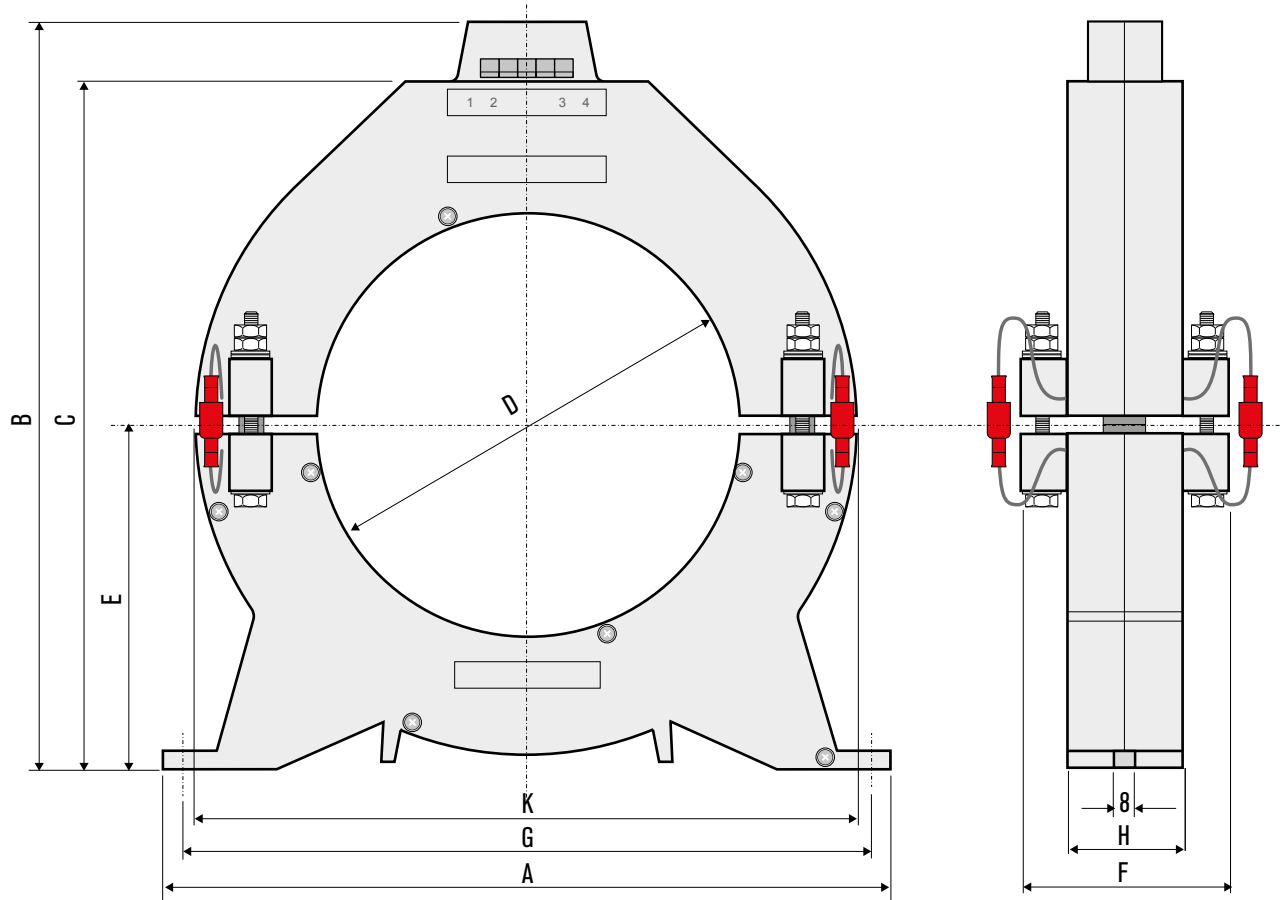
CTA-1/110

ORDER CODE	DIAMETER (mm)	CORE	WEIGHT (kg)
CTA-1/110	110	SPLIT CORE	0,600



CTA-1/160

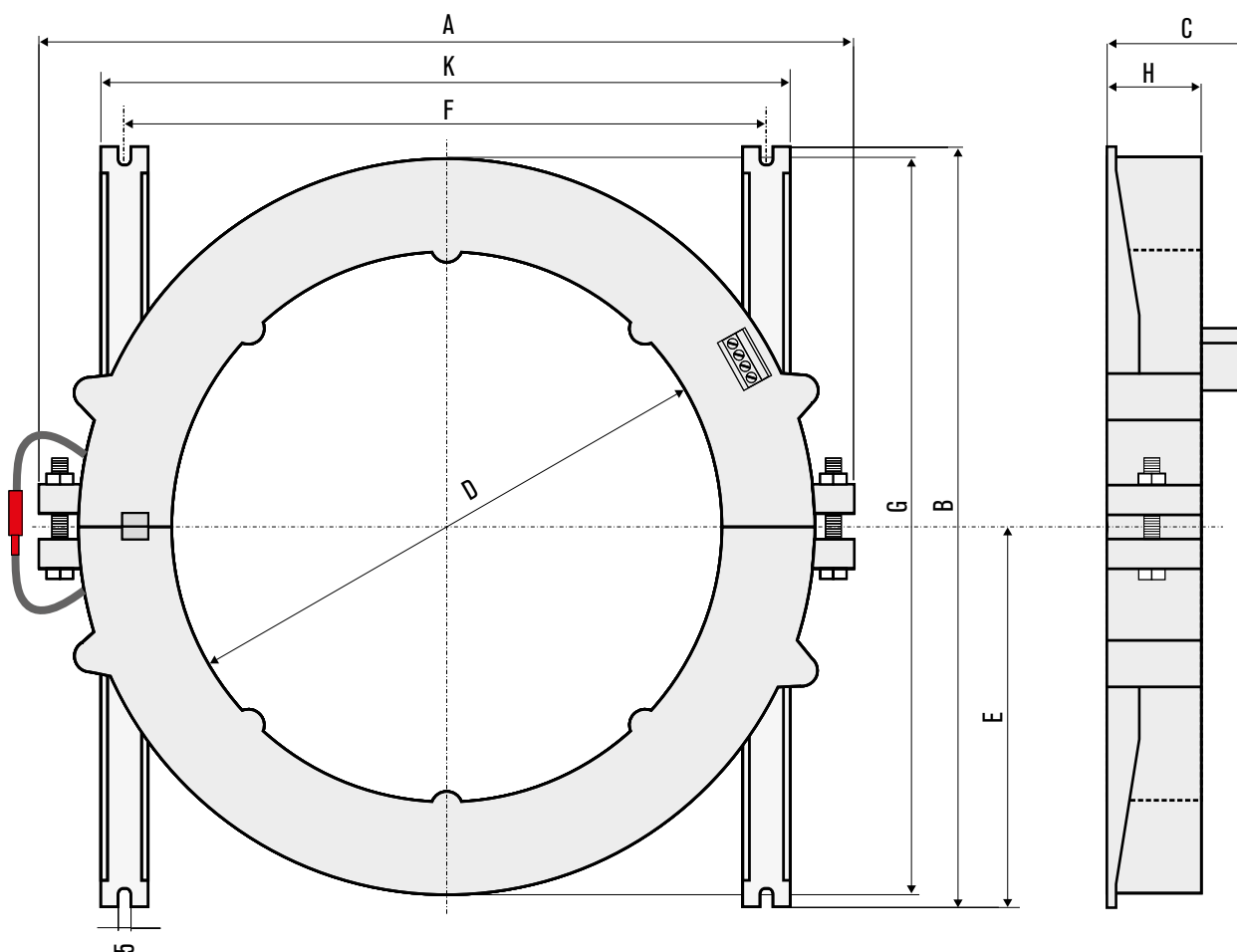
ORDER CODE	DIAMETER (mm)	CORE	WEIGHT (kg)
CTA-1/160	160	SPLIT CORE	1,600



TYPE - DIMENSIONS (mm)	A	B	C	D	E	F	G	H	K
CTA-1/110	180	150	110	110	75	45	38	25	145
CTA-1/160	275	280	260	160	129	75	260	43,5	250

CT-1/210 | CTA-1/210 | CT-1/300 | CTA-1/300

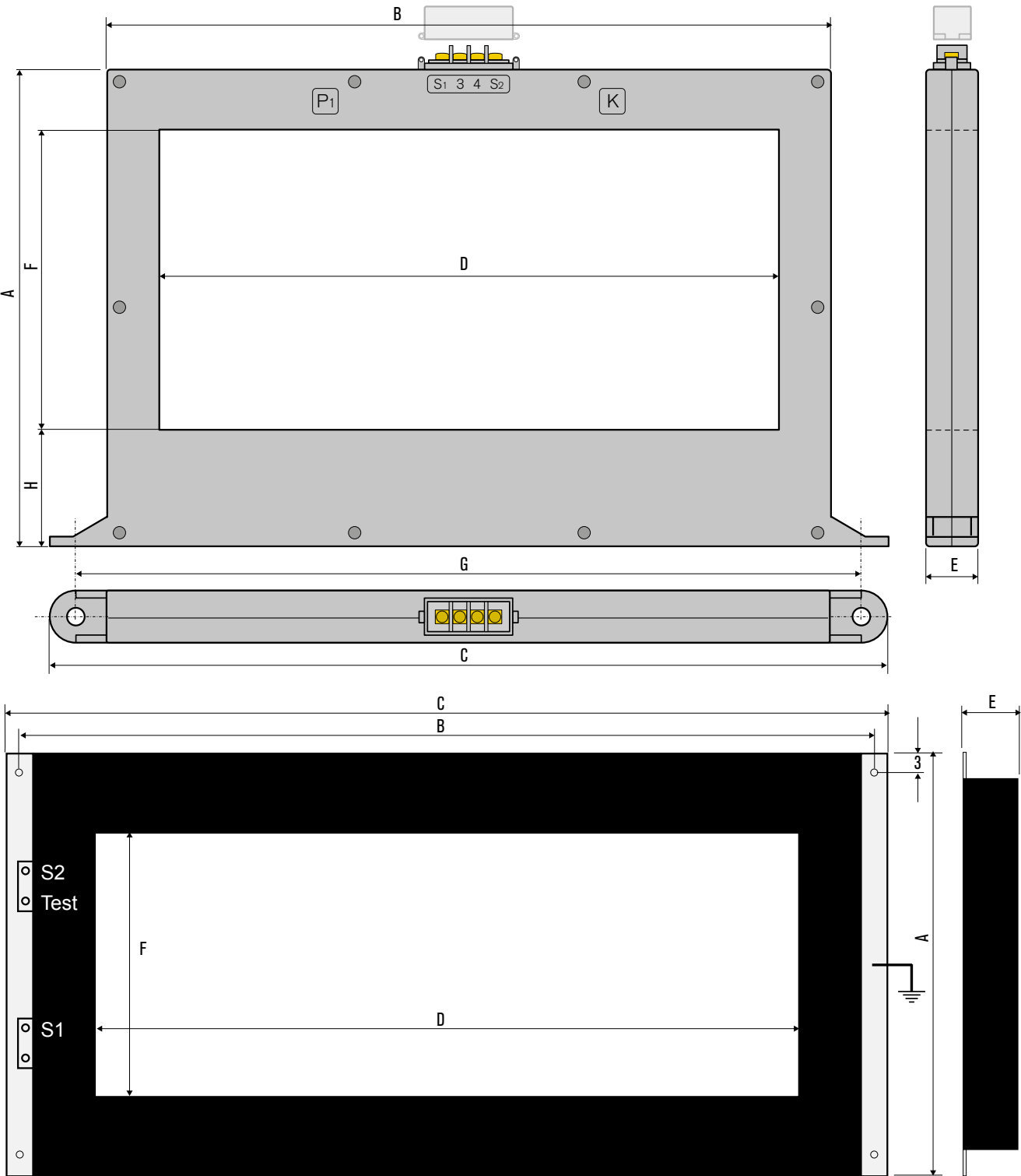
ORDER CODE	DIAMETER (mm)	CORE	WEIGHT (kg)
CT-1/210	210	SOLID CORE	1,450
CT-1/300	300	SOLID CORE	2,100
CTA-1/210	210	SPLIT CORE	1,850
CTA-1/300	300	SPLIT CORE	2,300



TYPE - DIMENSIONS (mm)	A	B	C	D	E	F	G	H	K
CT-1/210	310	290	54	210	145	240	280	36	258
CT-1/300	416	385	60	300	190	350	365	42	366
CTA-1/210	310	290	54	210	145	240	280	36	258
CTA-1/300	416	385	60	300	190	350	365	42	366

CT-1/280R | CT-1/350R | CT-1/415R

ORDER CODE	DIAMETER (mm)	CORE	WEIGHT (kg)
CT-1/280R	280 x 150	SOLID CORE	1,700
CT-1/350R	350 x 170	SOLID CORE	2,100
CT-1/415R	400 x 150	SOLID CORE	8,300



TYPE - DIMENSIONS (mm)	A	B	C	D	E	F	G	H
CT-1/280R	223	338	404	281	28	156	370	29
CT-1/350R	270	410	475	351	28	170	463	66
CT-1/415R	240	497	500	400	50	150	400	-

CT CTD CTA TECHNICAL CHARACTERISTICS	CT-1/22	CT-1/35	CT-1/60	CT-1/80	CT-1/110	CT-1/160	CT-1/210	CT-1/300	CTD-1/28	CTA-1/110	CTA-1/160	CTA-1/210	CTA-1/300	CT-1/280R	CT-1/350R	CT-1/415R
MINIMUM MEASURED CURRENT	25 mA	25 mA	25 mA	100 mA	250 mA	250 mA	250 mA	500 mA	25 mA	250 mA	500 mA	500 mA	1 A	500 mA	500 mA	250 mA
APPLICATION	Connected with earth leakage ELR serie															
OPERATING TEMPERATURE	$-10 \div 70^{\circ}\text{C}$															
STORAGE TEMPERATURE	$-20 \div 80^{\circ}\text{C}$															
TRANSFORMATION RATIO	500/1															
INSULATION TEST	2,5kV for 1 minute															
PERMANENT OVERLOAD	1000 A															
THERMAL OVERLOAD	40kA for 1 second															
TYPE OF TERMINALS	screws with maximum cross section 2,5mm ²															
DEGREE OF PROTECTION	IP20															
REFERENCE STANDARDS	CEI-EN 50081-2, CEI-EN50082-2, CEI 41.1, CEI-EN 60255, IEC/EN 60947-2 "ANNEX M"															

CT-1M EXTERNAL MULTIPLIER TOROIDAL

Toroidal multiplier to extend the current calibration of differential relays up to 250 A.

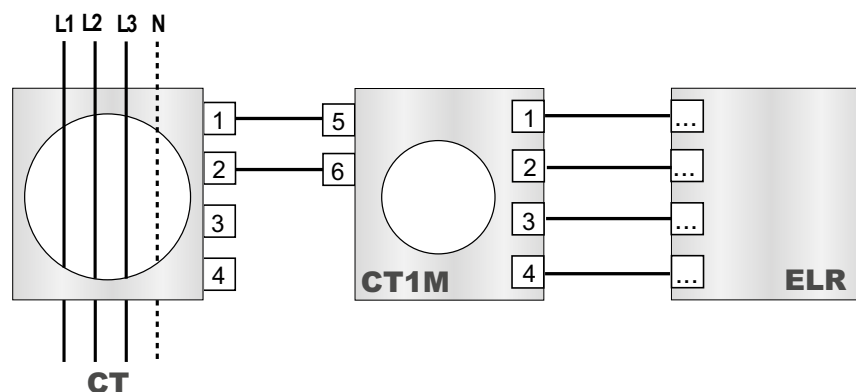
To connect between toroid and relay.

Reduces the current 10 times. Therefore, the range of the tripping set-point $I_{\Delta n}$ adjustment is multiplied by 10.

CONNECTIONS

Input terminals 5-6 of the multiplier must be connected respectively to terminals 1-2 of the toroid transformer on the controlled line.

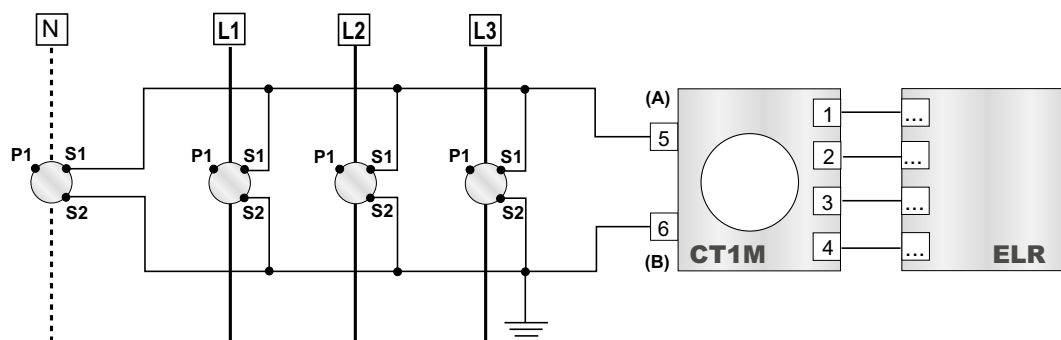
N.B. No cables must pass through the external multiplier.



CT-1S EXTERNAL ADDDER TOROIDAL

Toroidal addder to be used in cases where the conductors of the system to be protected exceed the inside diameter of the reducer.

In this case they are used CT /5A to be installed in line, which will be then connected to the toroid addder and from there to the differential.



1. APPLICATION THROUGH CT

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.

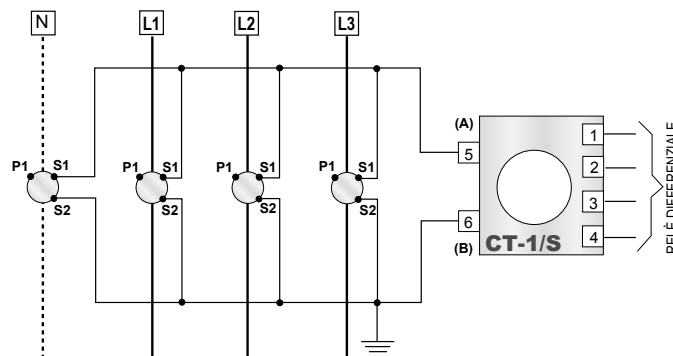
For this application the Ct's should have: the same transformation ratio (5A secondary), same power (10 VA at least) and class 0,5.

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.

2. OPERATING - 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. APPLICATION WITH TRANSFORMERS GROUND

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.

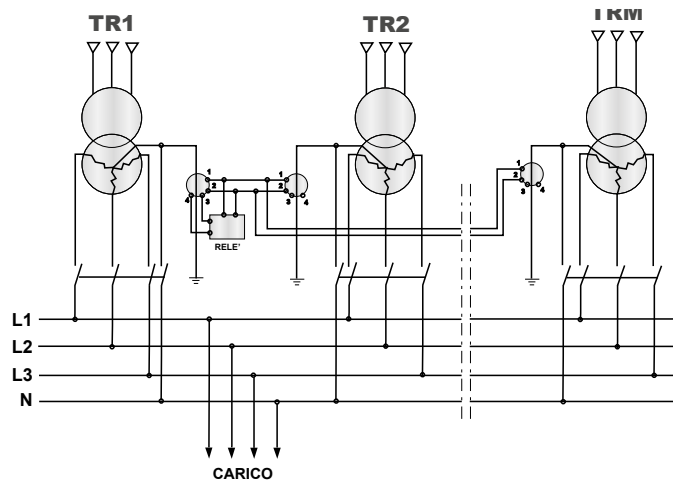
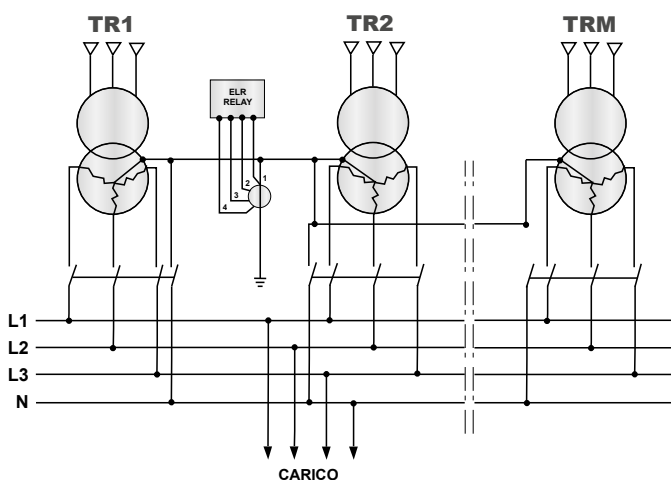
EXAMPLE: Suppose that we wish to protect an installation, which requires that the ELR should trip when the clg is equal to 5A. Should we install 2 ELR's with 5A threshold, it would certainly be required a higher value of clg, in order to make the ELR to trip. On top of the above, in case of an equal 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. OPERATING - 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 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.

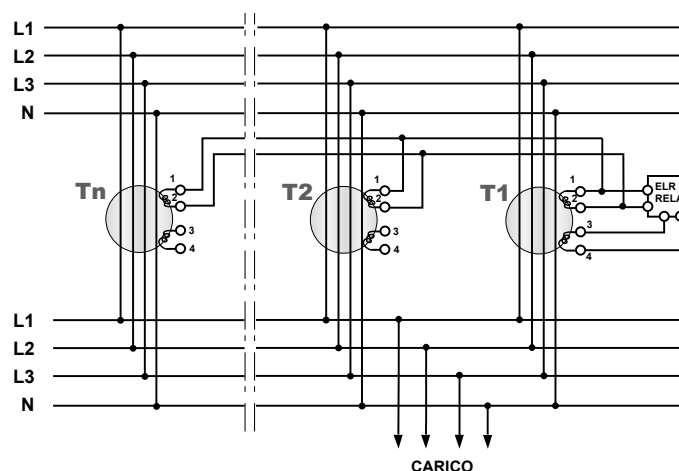
3.2. OPERATING - when there is no leakage, although with a non uniform current distribution, as mentioned in the above paragraph 3.1, the originated signal at the first toroidal, is totally void by the leakage signal originated at the second toroidal, since the signal can't be but in opposition, and 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

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

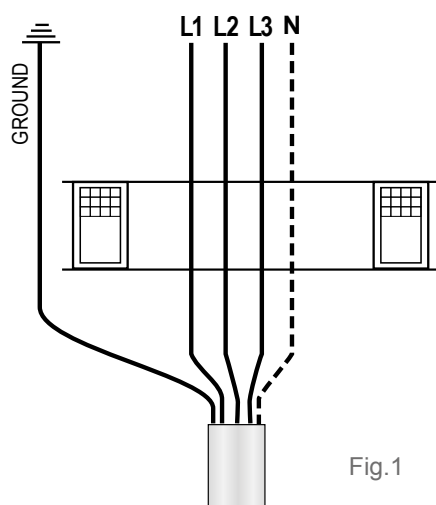


Fig.1

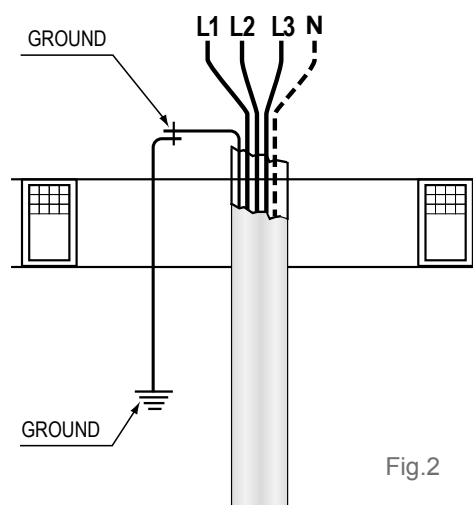


Fig.2

NOTE 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).

RSR-72

AUTO RESTART MOTORS RELAY

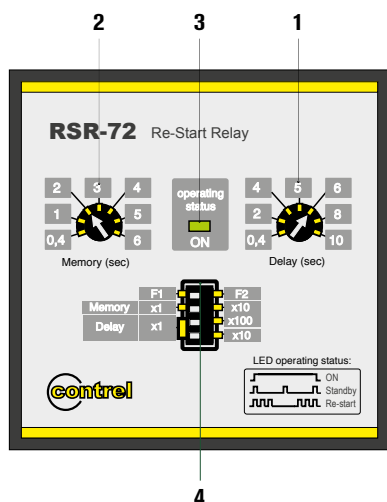
The RSR-72 type relay for re-start and reacceleration is designed to perform the automatic motor restarting, after control and protection device opening, as a consequence of a momentary line voltage interruption or drop-out.

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.



ORDER CODE	RATED AUXILIARY SUPPLY VOLTAGE
RSR-72	For applications with the control device of the contactor with contact impulsive position.
RSR-72A	For applications with device contactor control with a maintained contact.
RSR-A72B	For applications with the control device of the contactor with contact impulsive position with special mode of the memory count.
OPTIONS	
F	Tropicalisation
Z	Undecal support
M	Restraint spring for fixing undecal support



GENERAL CHARACTERISTICS

The RSR-72 relay is used in association with an holding position contact.

Otherwise from the RSR-72, **the RSR-72A maintains the contact closed after the restarting the motor/contactor.**

On the relay is possible to set a memory time from 0.2 to 60 seconds and a delay time from 0.2 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 0.2 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.

- 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

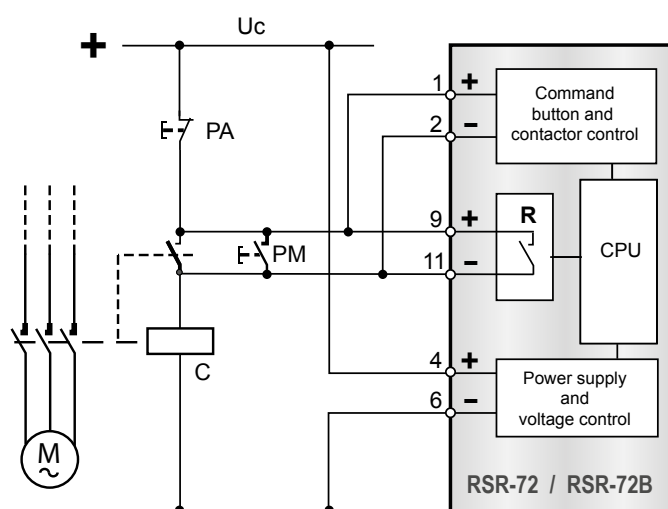
LEGENDA	
1	Tripping delay time adjustment
2	Regolazione tempo di memoria
3	LED OPERATING STATUS. OFF = power supply and measure voltage are not present ON = relay in normal voltage measurement within the expected range SLOW = relay in stand-by, the voltage lack for a time greater than the time memory, the restart is not executed even if the supply voltage is present. FAST = relay in restart, the voltage lack has been for a time less than memory time, after the delay time set the re-start will be done
4	DIP SWITCHES SETTINGS: 4a - F1 - F2 reacceleration function F1 = acceleration deactivated F2 = acceleration activated 4b - x1 - x10 constant selection for memory time adjustment. Examples: positioning the dip switch on x10 and the potentiometer on 3 we will have a memory time of $3 \times 10 = 30$ seconds; positioning the dip switch on x1 and the potentiometer on 3 we will have a memory time of $3 \times 1 = 3$ seconds 4c - x1 - x10 - x1000 constant selection for tripping delay time adjustment. The constants in relation to the position of the 2 dip switches are the following: • dip switch position x1 and x1 K = 1 • dip switch position x1 and x10 K = 10 • dip switch position x1 and x100 K = 100

RSR-72

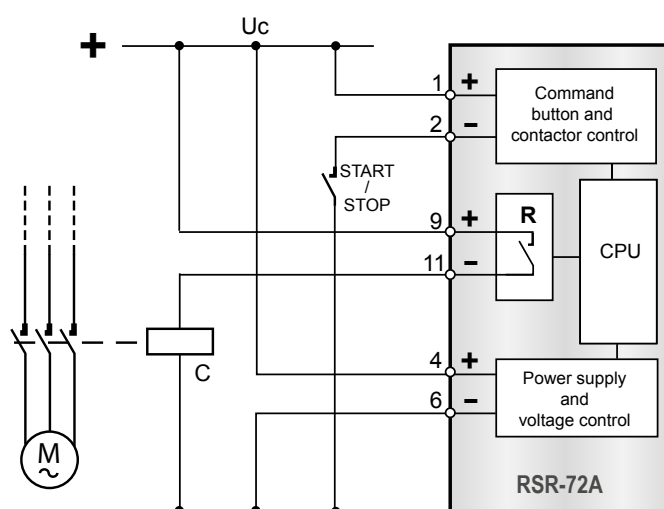
AUTO RESTART MOTORS RELAY

TECHNICAL CHARACTERISTICS	RSR-72	RSR-72A	RSR-72B
CONTROL CIRCUIT			
Control voltage	240 VAC o 110 VAC o 110 VDC		
Adjustments time (t)	da 0,2 a 1000 s		
Adjustments tripping set-point (IΔ)	da 0,2 a 60 s		
Threshold voltage lack	70% of rated voltage		
Threshold voltage restore	90% of rated voltage		
Minimum time for detecting the voltage lack	10 ms		
Maximum reacceleration time	max 0.2s		
Pulse duration to restart	0,7 s		
AUXILIARY SUPPLY			
Auxiliary voltage (Us)	240 VAC o 110 VAC o 110 VDC		
Rated frequency	50-60 Hz		
Maximum power consumption	3 VA		
OUTPUT RELAYS			
Contact arrangement	1 relay Normally open		
Rated contact capacity Ith	5 A (240 VAC) – 0,4 A (110 VDC)		
INSULATION			
Insulation test	2.5kV for 1 minute		
AMBIENT OPERATING CONDITIONS			
Operating temperature	-10+60 °C		
Storage temperature	-20+80 °C		
Relative humidity	≤ 95%		
ENCLOSURE			
Version	Flush mount 72x72mm		
Degree of protection	IP20 terminals IP54 with protective cover		
CERTIFICATIONS AND COMPLIANCE			
Reference standards	CEI 41.1 CEI EN60255-6, EN 50081-2, EN 50082-2		

WIRING CONNECTION RSR-72 / RSR-72B - RSR-72A



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
R	Output relay for re-start an reaccelerate command

RSR-72

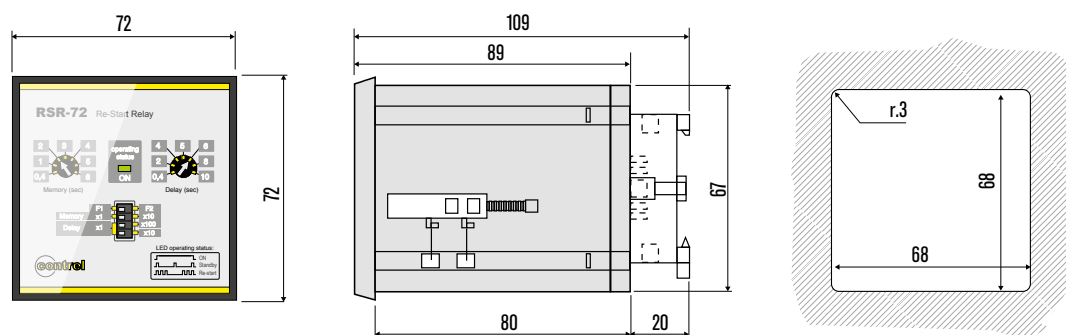
AUTO RESTART MOTORS RELAY

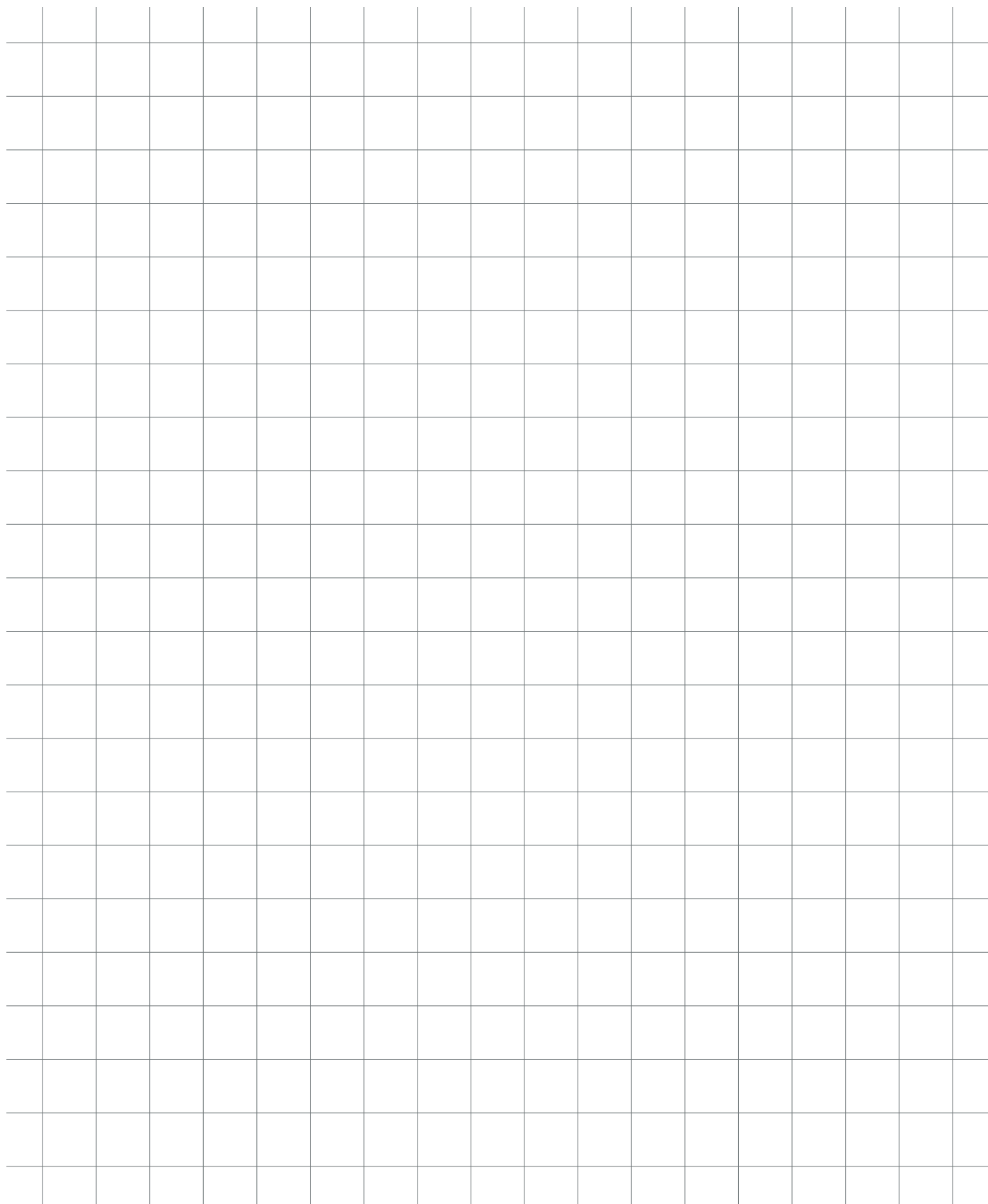
OPERATING

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
 - Version RSR-72B: start to count the MEMORY time when the first power lack happen from condition as in point 2) (motor is running).
More cycles of power lack and power restore can happen during MEMORY time count, with consequently starting of DELAY time before activate R contact);
if before the R contact can re-close another power lack happen, anyway the MEMORY time continue to allow another retry to restart the motor if power will restore;
but if the MEMORY count is all elapsed and restart is not happened, the RSR-72B go in condition as in point 3a)
 - 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 "NC" contact placed directly in series to "PA" pushbutton carries out the same function of "PA" push-button
8. Each "NO" contact placed directly in parallel to "PM" pushbutton carries out the same function of "PM" push-button.

MECHANICAL DIMENSIONS





CERTIFICAZIONI



CERTIFICATIONS



CSQ
ISO 9001:2008
9105.C035

IQNET
ISO 9001:2008
IT - 417

DESIGN, PRODUCTION AND SALE OF ELECTRONIC DEVICES FOR:

PROTECTION

MEASUREMENT

ALARM SYSTEMS

INSULATION MONITORING

MANAGEMENT SOFTWARE



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