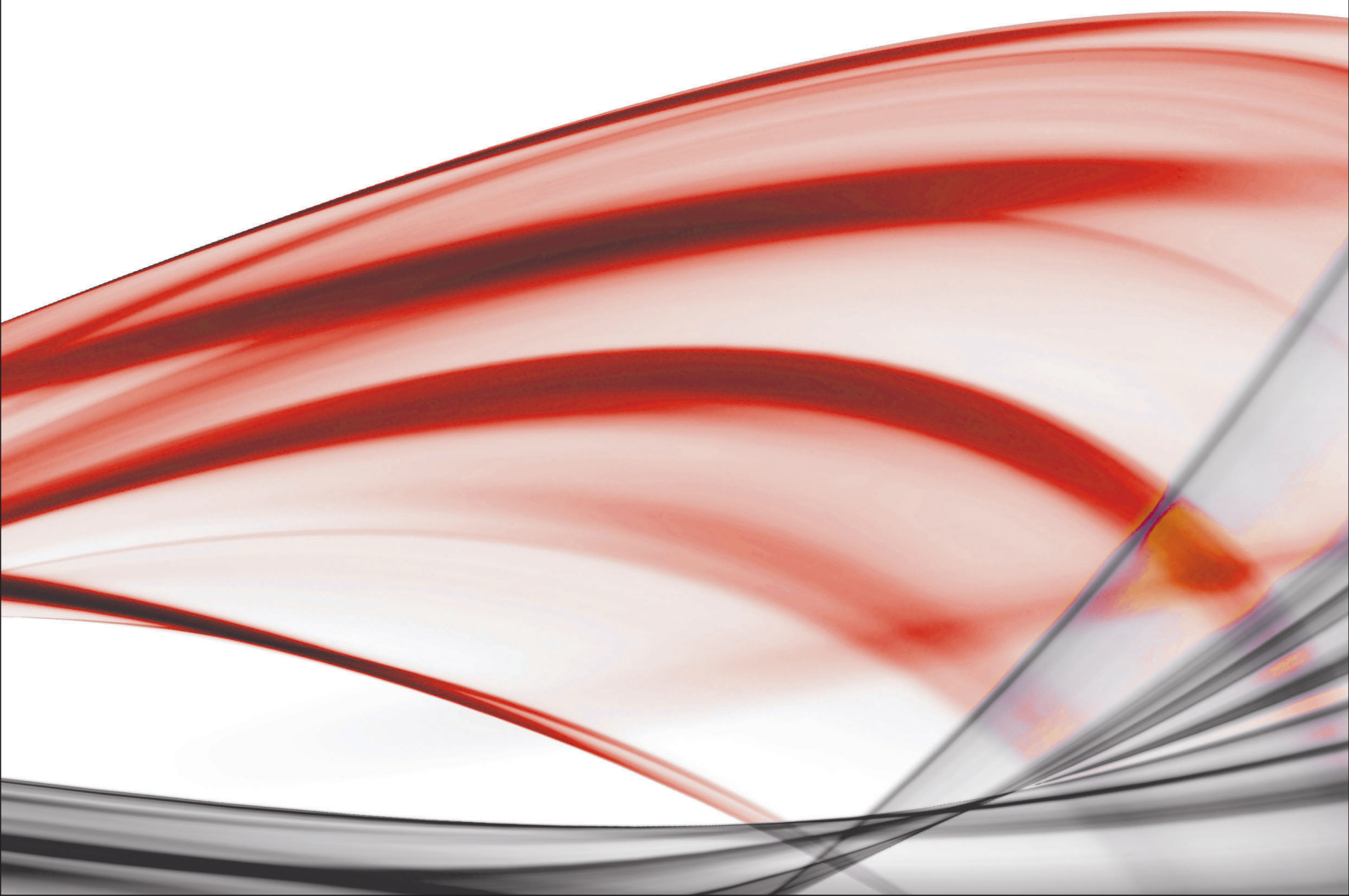


generalcatalogue PROTECTION

BRIDEX



general catalogue PROTECTION

PROTECTION

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BRIDEX

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1. COMPANY PROFILE

1.1 INTRODUCTION

Bridex Singapore Pte Ltd is founded in 1978 as a manufacturer of instruments transformer for the Asian market. We are the first local electrical switchgear components manufacturer that launches our own Asian identity – Bridex Rudolf.

Today we aim to become a knowledge-based, technology driven engineering organization, with emphasis on providing solution for electrical distribution and control. We specialize in the area of instruments, distribution & protection and power quality solution.

With our present headquarter in Singapore and subsidiaries that are located in Australia, Malaysia, Philippines and representative office in Vietnam, we are well equipped to service both local market and countries in the Asia Pacific.

2. PRODUCT APPLICATION

Product family	Market Sector		
	Residential	Commercial	Industrial
Earth Fault relay	Model with Is 0 - 2A or Ir less than or equal than 120A & time delay μ to 1sec		
Over-current relay	Model with Is 0 - 6A & time delay μ to 1sec		
Earth leakage relay	Model with sensitivity less or equal than 30mA & no time delay	Model with sensitivity up to 30A & time delay up to 10sec	
Surge Protective Device	Class II	Class I & II	



Local brand . Global solution
 Adding Value to Your Solution

3. PRODUCT INTRODUCTION

3.1 Definite time Earth Fault & Over-Current Relay

Rudolf DT earth fault relay and over-current relay are micro-processor based digital protection unit with enhance sensitivity, selectivity and speed.

- ▶ The DT earth fault relay R-EFM1*
Designed to monitor power system
Provides a relay operation when an earth fault current occurs.
- ▶ The DT over-current relay R-OCM31*
Designed to monitor current in each phase of a 3 phase systems
Provide a relay operation when an over-current condition occurs.
- ▶ They are designed to operate either individually or together for its designated protection requirement.
- ▶ Both protection relays are extremely accurate, compact and user friendly in setting and installation method.
- ▶ They satisfy the local protection requirement and is guarantee to provide user with ease of mind basing on its enhance reliability.



Definite time Earth Fault & Over-Current Relay

Basic Features

Housing

- ▶ Rudolf earth fault relay is housed in a DIN standard 96 x 48mm case.
- ▶ Rudolf over-current relay is housed in a DIN standard 96 x 96mm case (which is of front panel mounting)

This feature provides major economic and safety benefits, when compared with the traditional DIN rail mounted product. Any required re-adjustment or function checking can be achieved without the need to access the live side of the panel.

Current Input Settings

- ▶ The earth fault relay has adjustable current input setting from 0 to 2 amp and an adjustable time delay of 0 to 1 second.
- ▶ The over-current relay has adjustable current input setting from 2 to 6amp and an adjustable time delay of 0 to 1 second.
- ▶ The over-current relay also has the benefit over conventional over-current relay in that it indicates which phase current has reached the trip level (applicable only for independent auxiliary supply).

Test

- ▶ For both relays, a manual push to "Test" button is provided for checking the relay operation.
- ▶ To test the relay, push the "test" button, LED of each /respective phase and timer (after setting time respectively) will lighted.
- ▶ The status of the relay is always apparent from the front panel.
A red LED indicates the state of the relay.
A green LED indicates the state of the auxiliary power supply.
(Note for over-current relay, a further 3 red LED are provided to indicate which phase current has exceeded the preset level)

Latched Relay

- ▶ The relay is latched so once the earth fault or over-current occurs, the relay remains energized, regardless of the condition of the system being monitored.

Reset

- ▶ The relay can be reset via a reset button on the front of the both type of relay without breaking the locking seal.

Security

- ▶ A transparent plastic lockable front cover is provided for sealing of the setting knob to ensure that unauthorized personnel cannot tamper with the set point or the time delay of the earth fault relay or the over-current relay

3.2 Earth Leakage Relay

Rudolf earth leakage relay is a complete micro-processor base earth leakage relay which is manufacture and tested to international standard.

Rudolf is one of the pioneers to provide an earth leakage protection solution with an integrated earth leakage meter as standard part of the product offer. User will be able to view instantaneous earth leakage current as well as the last tripped earth leakage current via the local LED display. This provides user with necessary information to execute proper maintenance.

In addition and as standard part of our offer, Rudolf earth leakage relay monitor and detect true rms earth leakage current responding at <25msec (for earth leakage 5 x set sensitivity). It is incorporated with tamperproof cover to safe guard tampering to the set sensitivity and time delay.

Our standard offer come with local test/reset function with 2 SPDT relay output & an additional built in user programmable contact. This contact allows user to program a pre-alarm condition and hence activation of this contact provides information to conduct pre-trip evaluation on your site condition. The objective is to eliminate down time to locate a fault when a trip occurs.



Earth Leakage Relay

Basic Features

In order to select the most appropriate earth leakage relay, these are the selection criteria:

Earth leakage current is the current flowing from the live parts of the installation to earth in the absence of an insulating fault.

The sensitivity $I_{\Delta n}$ can be selected with its time delay as follow:

R-ELRM-30V-*

- ▶ Sensitivity : 5, 10, 30, 50, 75, 100, 300, 500, 750 mA
1, 3, 5, 7.5, 10, 15, 20, 25, 30A (user – selectable)
- ▶ Time delay : instantaneous, 50, 100, 250, 500msec, 1, 2.5, 5, 10 sec (user – selectable)

R-ELRM-10V

- ▶ Sensitivity : 5, 10, 30, 50, 75, 100, 300, 500, 750 mA
1, 3, 5, 7.5, 10A (user – selectable)
- ▶ Time delay : instantaneous, 50, 100, 250, 500msec (user – selectable)

User Programmable Contact

Rudolf earth leakage relay come with a built in user programmable contact to provide pre-alarm indication via local bar indicator and remote contact.

- ▶ Pro-alarm setting 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60% & 65% of $I_{\Delta n}$ (user selectable)

Fault conditions

Fault conditions are displayed to ease troubleshooting process

- ▶ OC : Toroid open circuit indicating wiring between unit & toroid becomes damaged
- ▶ SC : Toroid short circuit indicating shorts that are present across terminals 11 & 13
- ▶ UF : Supply voltage fault indicating applied supply voltage is <70% of U_n

3.3 Surge Protective Device

Transient over-voltage is characterized with high peak values, rapid amplitude growth and a short duration. Surge voltages can be caused by:

- ▶ Lightning
- ▶ Switching of electrical loads by the power utilities
- ▶ Switching of high power machines
- ▶ Electro-static discharges

When a surge voltage is produced in an electrical conductor, an over-current with a magnitude of several kA is lead to earth, it can reach installation through low voltage network, data lines (voice & data), high frequency lines (antennas) or conductors of earth terminations.

In order to avoid the over-current destroying the equipment connected to the electrical system, surge protective device is installed in front of the equipment to derive the current generated by the surge voltage directly to earth. This action by-pass the surge voltage from the equipment and lead it to earth.

Surge Protection Devices are needed in any kind of electrical installation, in order to protect and provide the following benefits:

- ▶ Protect against lightning, its destructive consequences, and the costly repairs and downtimes that they originate;
- ▶ Avoid downtimes caused by random logic failures (that require to restart electronic equipment to get it back into operation);
- ▶ Increase operative life of electronics, by providing to it always a clean and disturbance-free power supply;



Surge Protection Device

Basic Features

In order to select the most appropriate SPD, we need to understand the selection criteria:

Maximum discharge current (I_{max}):

The maximum current through the SPD having an 8/20 wave-shape and magnitude to derive the over-current to earth for one time without suffering damage.

Nominal discharge current (I_n):

The current through the SPD having a 8/20 wave-shape and magnitude to derive the over-current to earth for 15 times without suffering damage.

Voltage protection level (U_p):

The performance of the SPD in limiting the voltage across its terminals when the nominal discharge current passes through it.

Maximum continuous operating voltage/rated voltage (U_c):

The maximum r.m.s. voltage which may be continuously applies to the SPD mode of protection.

Location of the protector

In accordance to international standard recommendation is classified into 3 classes:

- ▶ Class I:
High protection level, 10/350 wave-shape to be assemble at the entry connection
- ▶ Class II:
Medium protection level, 8/20 wave-shape to be assemble downstream from Class I protection for example: at the LV Main Switchboard.
- ▶ Class III:
Fine protection level, 8/20 wave-shape to be assemble at the load end or downstream from Class II protection.

RUDOLF's SPDs are parallel units hence its installation is easy and fast.

General Installation Rules

- ▶ Selection of RUDOLF's SPD to be installed, this is done by verifying the specifications of the electrical installation with the specifications of your selected RUDOLF's SPD. (Voltage, nr. of phases, protection level);
- ▶ Read the installation manual before installing any RUDOLF's SPD;
- ▶ Measure voltage between L-N and L-L in your system. Check if the voltage is correct in respect to the U_c of the selected RUDOLF's SPD;
- ▶ Check if PE is correct (according to the standards);
- ▶ Select MCB/fuse if needed;
- ▶ Switch-off the power supply on the line or panels where the RUDOLF's SPD must be connected
- ▶ Connection of RUDOLF's SPD in parallel;
- ▶ Check the wire distance between the RUDOLF's SPD and the connection point to the Line.
 - Very important: the wire distance between the RUDOLF's SPD and the AC Line should be kept as short as possible, ideally at no more than 1 meter
 - Above 1 meter of connecting wire length, the U_p will increase at 20 V per every additional 20 cm. (decreasing performance due to larger impedance).
- ▶ Keep the connecting wire as straight as possible. Do not coil it.
- ▶ Ground properly the RUDOLF's SPD.
- ▶ If RUDOLF's SPD is connected in a cabinet or in combination with an RCB, install the RUDOLF's SPD prior to the RCB.
- ▶ When turning power "on", check if diagnostics are OK. If out of order switch off the power, check connections and try again.

4. TECHNICAL SPECIFICATION

4.1 Definite time Earth Fault & Over-Current Relay

	Earth Fault	Over-current
Input		
Current	0 – 2A	0 – 6A
Current adjustment per phase	0.1 to 2A	2 to 6A
Delay adjustment		0 – 1 second
Operating time (min delay)		With 105% input < 300m/sec With 200% input <100m/sec
Maximum input current		In x 2 continuous
Withstand capability		In x 10 for 3 sec
Power consumption		< 0.5VA
Standard	IEC 60255-4, IEC60801 & EN55020	
Auxiliary power supply		
AC voltage		115 or 230V AC (+/- 25%)
Frequency		45 to 65 Hz
Power Consumption		Burden < 2VA
Environmental		
Working temperature		0 to 60 deg C
Functional temperature		-25 to +70 deg C
Storage temperature		-55 to +85 deg C
Temperature coefficient		0.01% per deg C
Relative humidity		95% without condensation
Class of climate		HSE complying with DIN 40040-3 Complying with VDE/VDI 3540

TECHNICAL SPECIFICATION

Earth Fault

Over-current

Insulation

Test voltage	4kV rms 50Hz 1 min between input/case/aux
Impulse test	EMC 5kV transient complying with IEC60801/EN55020
HF interference test	EHF 2.5kV 1MHz complying with IEC60255-4
Protection	Class II complying with IEC60348/BS4753/DIN57411/VDE0411

Performance

Adjustable accuracy	less than +/- 5%
Repeatability	less than 0.5% of full scale
Reset	Manual via red push button
Functional test	Manual via local test push button

Relay Output

Relay type	Single pole CO or double pole CO
Material	Silver / Cadmium
Contact resistance	200mW max typical < 50mW
Rating	10A 250VAC / 150VDC
Electrical life	1 x 10 ⁵ operations at above load
Mechanical life	5 x 10 ⁶ operations
Operating time (approximate)	7msec (20 msec max)
Dielectric strength	between coil and contacts 5kV rms 1 min
	between open contacts 1kV rms 1 min
	between adjacent contacts 1kV rms 1 min
Insulation resistance	1000mW at 500VDC
Operating temperature	-30 to +75 deg C
Approval	UL and CSA recognized

Enclosure

Standard DIN case	DIN96x48x98mm	DIN96x96x98mm
Panel cutout	92 + 0.8mm x 45 +0.6mm	92 + 0.8mm x 92 + 0.8mm
Panel mount	via 2 corner bracket and thumb tensioning screws	
Materials	Black polycarbonate complying with UL94V0	
Terminals	Screw terminal for 2 x 0.5-3.5mm	

4.2 Earth Leakage Relay

	R-ELRM-10V	R-ELRM-30V
Supply voltage Un	230V AC 85-115% Un Galvanic isolation between the supply and the toroid connections	115/230/415V AC 85-115% Un
Frequency range	50/60/400Hz (AC supplies)	
Isolation	over-voltage category III	
Rated impulse withstand voltage	2.5kV (115V supply) 4kV (230V supply) for 1.2/50micro sec IEC60664	
Power consumption (max)	6VA	
Monitored leakage current	2mA-10A (50-60/400Hz) through external toroid with 1000:1 ratio (terminals 11&13)	2mA to 30A (50/60/400Hz)
Sensitivity	30,50, 75, 100, 300, 500, 750mA 1, 3, 5, 7.5, 10A (user – selectable)	6, 10, 30, 50, 75, 100, 300, 500, 750 mA 1, 3, 5, 7.5, 10, 15, 20, 25, 30A (user – selectable)
Trip level	75% of $I_{\Delta n}$ (nominal)	
Hysteresis	8% of $I_{\Delta n}$ or 2mA, whichever is greater	
Accuracy	+/-15% (valid range 10-110% of $I_{\Delta n}$ or 2mA, whichever is greater)	
Time delay	instantaneous, 50, 100, 250, 500msec (user – selectable)	instantaneous, 50, 100, 250, 500msec, 1, 2.5, 5, 10 sec (user – selectable)
	Note : For $I_{\Delta n}$ setting of 30mA or less, time delay is fixed to inst & not adj	
Measured current	Display auto ranging 2 digit 7 segment red LED display	
Display Resolution	100 μ A min	
Reset time	<200msec (from supply interruption)	
Power on delays	self test duration: <5secs	
Memory	storage of the leakage fault and reset with "test/reset" button	

	R-ELRM-10V	R-ELRM-30V
Toroid connection(11,13)	to external R-ZCT toroid only (1000:1)	
Toroid withstand capacity	50kA for 200mS	
Distance between toroid & relay	50 metres (max)	
Ambient temperature	-5 to +60 deg C / -5 to +40 deg C (in accordance to IEC60755)	
Relative humidity	+95%	
Output(4, 6, 8, 10, 12, 14)	2 x SPDT relay	
Output rating	AC1 250V 8A (2000VA) AC15 250V 2.5A DC1 25V 8A (200W)	
Electrical life	>=150,000 operations at rated load	
Dielectric voltage	2kV AC (rms) IEC60947-1	
Rated impulse withstand voltage:	4kV (1.2/50 µsec) IEC60664	
Fault level output (1,2)	50% of I Δ n (factory set) User adjustable from 10-65% in 5% increments	
Hysteresis	8% of I Δ n or 2mA, whichever greater	
Load (resistive)	40mA max @ 240V	
Housing	Grey flame retardant Lexan UL94V0	
Weight	approximately 250g	
Mounting option	on to 35mm symmetric DIN rail to BS5584:1978 (EN50002, DIN46277-3)	
Terminal conductor size	<=2.5mm sq. stranded <= 4mm sq. solid	
Approval	Conforms to IEC60755, IEC 61543 (EMC) Radiated immunity IEC61000-4-3 : 1.89 GHz @ 30V/min, CE.	

4.3 Surge Protection Device

	1P	1P+N	3P+N	100kA 1P 400V
Nominal Voltage (Un)	230V AC	230V AC	230VAC (L-N) 400V AC (L-L)	400V AC
Frequency	50/60Hz			
Maximum continuous voltage Uc	275V AC	275V AC	275V AC (L-N) 440V AC (L-L)	400V AC
I _{max} (1x) 8/20 waveform	SPD20** : 20kA SPD45** : 40kA SPD65** : 65kA SPD100** : 100kA			
I _{nom} (15x) 8/20 waveform	SPD20** : 8kA (SPD2011) / 5kA (SPD202 & SPD 204S) SPD45** : 15kA SPD65** : 20kA SPD100** : 30kA			
Voltage protection level Up @ I _{nom}	SPD20** : ≤1200V SPD45** : ≤1300V SPD65** : ≤1500V SPD10011R : 1200V SPD10013R : 1800V			
Circuit type	MOV			
Time response	< 25nsec			
Protection	-	L-G, L-N, N-G	L-L, L-G, L-N, N-G	L-G
Diagnostics	Optical or Optical + signal (only for version with suffix S)			
Thermal fuse	yes			
Connection	Parallel			
Enclosure	DIN			
Maximum cable section	25-35 mm sq / 50 mm sq for 100kA version			
Ground connection	25-35 mm sq / 50 mm sq for 100kA version			
Operating temperature	- 30 deg C to +75 deg C			

** 11 1P
 2 1P+N
 4S 3P+N signal
 11S 1P+signal 230VAC
 13S 1P+signal 400VAC

TECHNICAL SPECIFICATION

5. SELECTION GUIDE

5.1 Definite time Earth Fault & Over-Current Relay

Product Code	Current setting	Time Delay	Output Configuration	Auxiliary Supply
R-EFM1-M	0.1 – 2A	0.1 – 1 sec	1 C/O	230V AC
R-OCM31-M	2 – 6A			

5.2 Earth Leakage Relay

Earth Leakage Relay

Product Code	Sensitivity	Time Delay	Auxiliary Supply
R-ELRM-10V	Adjustable up to 10A	Adjustable up to 0.5sec	230 VAC
R-ELRM-30V-F	Adjustable up to 30A	Adjustable up to 10sec	115 VAC
R-ELRM-30V-M			230 VAC
R-ELRM-30V-N			415VAC

Toriod

Product Code		Internal diameter	
	R-ZCT035		35mm sq.
	R-ZCT070		70mm sq.
	R-ZCT120		120mm sq.
	R-ZCT210		210mm sq.

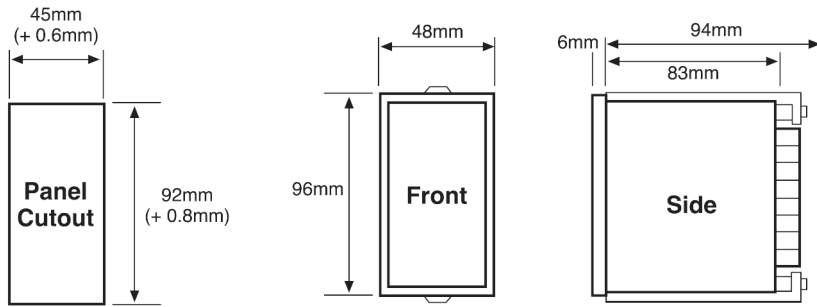
5.3 Surge Protection Device

Product Code	No. of Poles	I _{max}	U _n	Configuration	Modes Protected
R-SPD2011	1	20kA	230V AC	Mono-block	1
R-SPD202	1P+N	20kA	230V AC	Mono-block	3
R-SPD204S	3P+N	20kA	400(L-L) / 230(L-N)V AC	Mono-block + signal	7
R-SPD4511	1	40kA	230V AC	Mono-block	1
R-SPD452	1P+N	40kA	230V AC	Mono-block	3
R-SPD454S	3P+N	40kA	400(L-L) / 230(L-N) VAC	Mono-block + signal	7
R-SPD6511	1	65kA	230V AC	Mono-block	1
R-SPD652	1P+N	65kA	230V AC	Mono-block	3
R-SPD654S	3P+N	65kA	400(L-L) / 230(L-N) VAC	Mono-block + signal	7
R-SPD10011S	1	100kA	230V AC	Mono-block + signal	1
R-SPD10013S	1	100kA	400V AC	Mono-block + signal	1

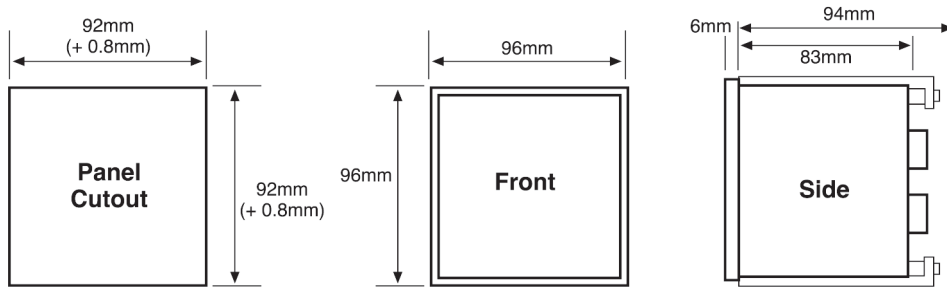
6. DIMENSION DRAWING

6.1 Definite time Earth Fault & Over-Current Relay

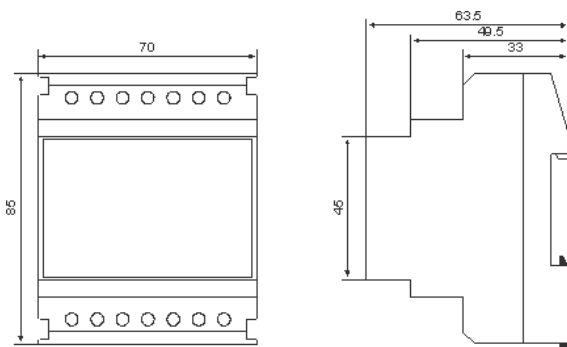
Earth Fault



Over-current



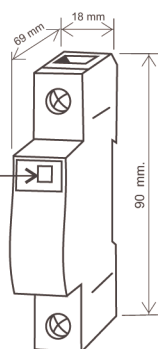
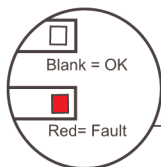
6.2 Earth Leakage Relay



6.3 Surge Protection Device

SPD2011, 4511, 6511

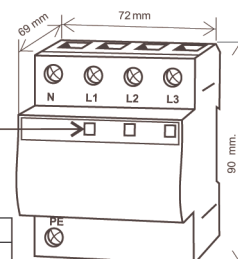
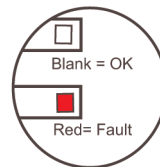
Status indicator flag window



Mod.	Weight
R-SPD 2011	70 g.
R-SPD 4511	100 g.
R-SPD 6511	140 g.

SPD 204S, 454S, 654S

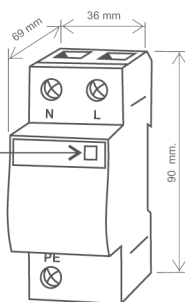
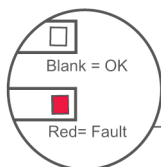
Status indicator flag window



Mod.	Weight
R-SPD 202	215 g.
R-SPD 452	265 g.
R-SPD 652	315 g.

SPD 202, 452, 652

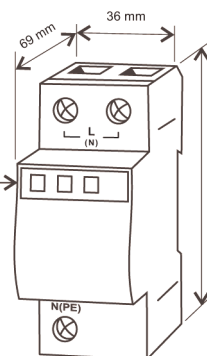
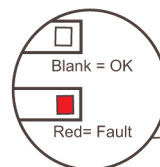
Status indicator flag window



Mod.	Weight
R-SPD 202	100 g.
R-SPD 452	135 g.
R-SPD 652	175 g.

SPD 10011S, 10013S

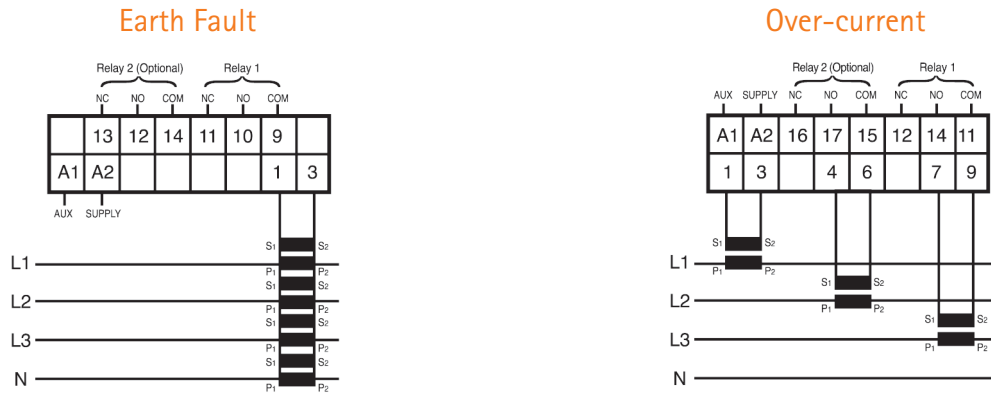
Status indicator flag window



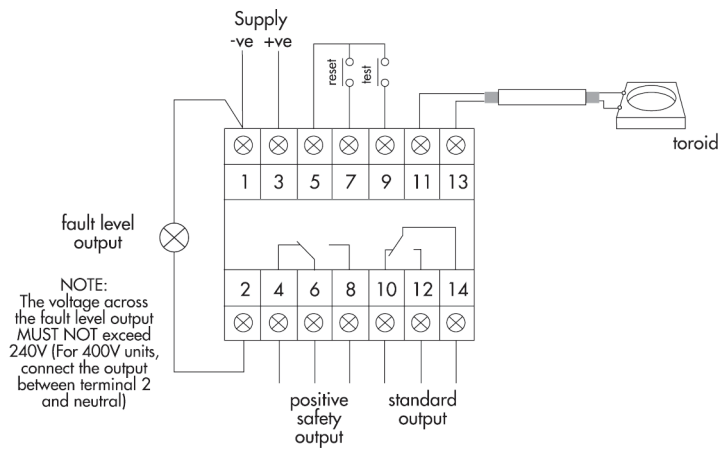
Mod.	Weight
R-SPD 10011S	230g.
R-SPD 10013S	230g.

7. CONNECTION DIAGRAM

7.1 Definite time Earth Fault & Over-Current Relay

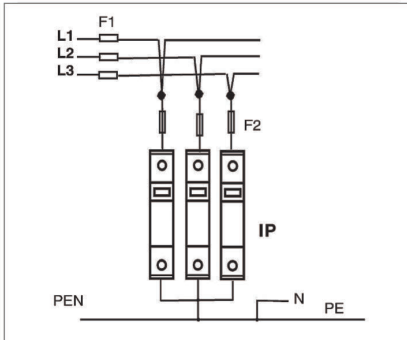


7.2 Earth Leakage Relay

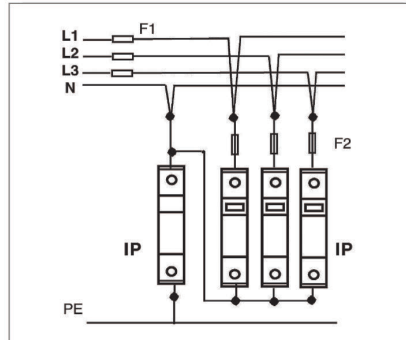


7.3 Surge Protection Device

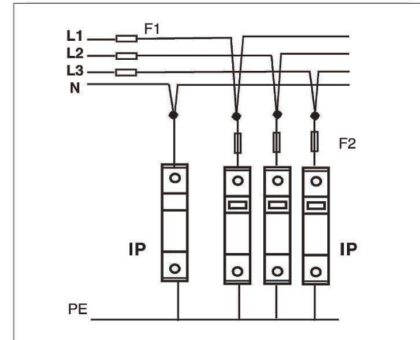
TN-C Networks



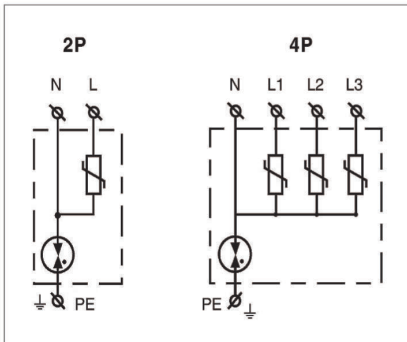
TT Networks



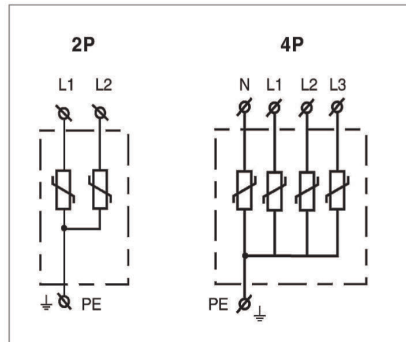
TNS Networks



TNT Networks



TN Networks



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