Ziegler

Redefine Innovative Metering

Technical Datasheet

ZAR Series

EARTH LEAKAGE PROTECTOR ZAR SCER |SCER+ | VAFM | VANE | VADI | NEVA

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ZAR SCER | SCER+ | VAFM | VANE | VADI | NEVA

Earth leakage protectors ZAR series, are used to detect and protect instruments from leakage current. It comes in different variants offering protection from Earth Leakage Current, Over Current, Under Current, Over Voltage, Under Voltage, Reverse Power.

Product features

- **Multi Parameter Protection :** Model Available with measurement and Protection of Multiple parameters like Voltage, Current and Leakage current of load in a single Device i.e ZAR NEVA
- **Leakage current monitoring in 1 & 3 phase system** : 1ph and 3ph can be programmed on-site
- **User selectable trip setting** : Programmable trip setting from 30mA to 30A
- **Adjustable set point & set delay for** : Leakage Current, Pre-alarm, Over Voltage, Under Voltage, Over Current, Under Current, Reverse Power Flow
- **Multi Load Protection :** A single SCER+ can Protect two different Loads at a time with two RCT input.
- **RCT Open Detection :** It can detect conditions when the residual current transformer becomes open circuited
- **Protection curve :** Inverse Curve for higher Earth Leakage current protection.
- **Reverse Power Protection :** Reverse Power Protection (3P4W balanced load, 3P3W balanced load, 1P2W)
- **Earth to Neutral voltage** measurement and Protection in ZAR NEVA/VANE model
- **Auto re-closure / Manual reset :** In auto re-closure mode instrument automatically tries to re-connect load within a programmable specified time. If the fault persists it disconnects the load. If device set into manual mode, then device must be reset manually by push button.
- **Device Configuration with programmable cable :** Simply configure the ZAR Series using programmable cable interface
- **Previous fault storage :** Instrument memorizes the last 15 faults occurred
- Trip protector device cum DPM

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Fact Sheet

Display	
Type	4 Digit ultra bright LED display
Mounting options	DIN Rail : ZAR SCER/ZAR SCER+/ZAR VADI/ZAR NEVA Flush Mounted : ZAR SCER/ZAR SCER+/ZAR VAFM/ZAR VANE
Dimensions	DIN Rail : 53 x 110 x 60.5 mm Flush Mounted : 96 x 96 x 35 mm Panel cutout : 92 + 0.8 mm x 92 + 0.8 mm

Interface	
Programming interface	Programming can be done using programmable cable or using front panel keys
Relay output	1CO, 2CO, 1CO+1CO
	5A / 250VAC / 30VDC
	Mechanical Endurance : $1x10^7$ operations
	Electrical Endurance : NO - $3x10^4$ operations
Conforms Standards	
Testing as per	IEC 60947-2, Annex M
EMC	IEC 61326-1 : 2012, Table 2
Immunity	IEC 61000-4-3 10V/m min – Level 3
Safety	IEC 61010-1-2010 , Permanently connected use
IP for water & dust	IEC 60529 (IP 20 Front only)
Installation category	300 V CAT III / 600 V CAT II
High Voltage Test	2.2 KV AC, 50Hz for 1 minute between all circuits
Pollution Degree	2
LED Indications	
	Relay 1
	Relay 2
	LED indication EL for one RCT model
	EL1, EL2 for two RCT model
	V (Voltage), I (Current) and “k” for ZAR VADI model
	Trip indication are displayed on 4 Digit display

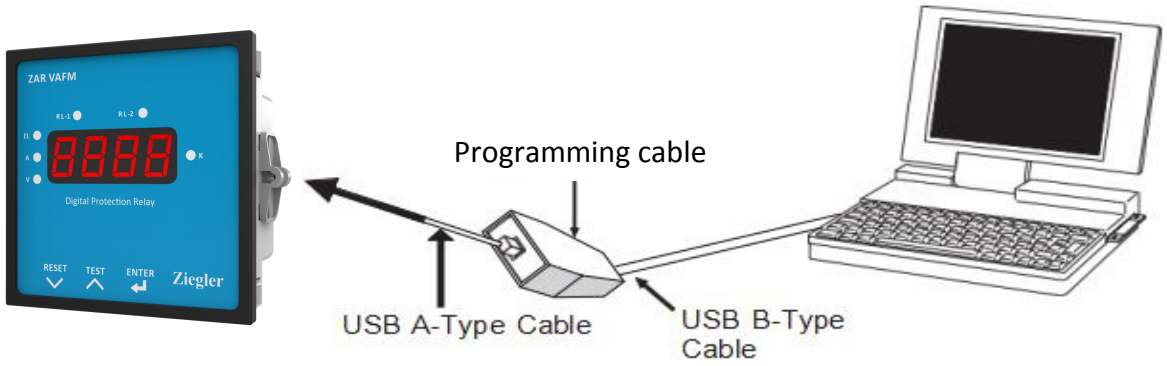
Technical Specifications

Input Details	
Leakage current (IΔn)	30 mA to 30A
Tripping Range	80% to 100% of IΔn
ZAR VADI / VAFM	
Input Voltage	
Nominal Input Voltage (AC RMS	5 V AC (for Earth to Neutral Voltage measurement), 500 (V AC).
Maximum continuous input voltage (OL Indication)	127% of PT Secondary
System PT Secondary range	1V to 5 VAC, 50V to 500 V programmable on site (as per resp. model).

System PT Primary range	50 to 1200 kV programmable on site. (Note: - Not applicable for 1 to 5V AC input).
Input Current	
Nominal Input Current (AC RMS	5 A
Max Continuous Input Current (OL Indication)	145% of CT Secondary
System CT Secondary values	1 A to 5 A programmable on site
System CT primary values	1A to 999 kA programmable on site
Operating frequency Range	45 to 66 Hz
Auxiliary Supply	
Higher Aux	60 V - 300 V AC/DC
Lower Aux	20 - 60 VDC/20- 40VAC
Aux supply frequency	45 - 65 Hz range
VA Burden (approx.)	
Nominal input voltage burden	<0.6 VA approx
Nominal input current burden	< 0.25 VA approx. per channel
Auxiliary Supply burden	< 4 VA approx for AC aux
Accuracy	
Leakage Current	± 5% of Full Scale
Voltage	± 1% of nominal value
Input Current	± 1% of nominal value
Power	± 2% of nominal value
Trip, Pre Alarm time delays (for Leakage Current	± 5% of Set Delay or ± 50 msec (whichever is greater)
Power ON ,Reset, Trip (for Voltage& Current) time delays	± 5% of Set Delay or ± 140 msec (whichever is greater)
Instantaneous tripping (Applicable for Leakage tripping)	<25msec for leakage current greater than 5 X IΔn
Environmental	
Operating temperature	-10 to +55°C
Storage temperature	-25 to +70°C
Relative humidity	0... 95% non condensing
Shock	15g in 3 planes
Vibration	10... 55 Hz, 0.15mm amplitude
Reference condition for Accuracy	
Reference Condition	23°C +/- 2°C
Input waveform	Sinusoidal (distortion factor 0.005
Input Frequency	50 or 60 Hz ±2%
Auxiliary supply voltage	230 VAC / DC ±1%
Auxiliary supply frequency	50 or 60 Hz ±1%
Input Voltage Range	50% to 125% of PT Secondary
Input Current Rang	20% to 140% of CT Secondary

Maximum Cable Length for connection between Meter and RCT : <1 Mtr
Note: - Use Twisted pair shielded cable. (Not to be run parallel to power cables)

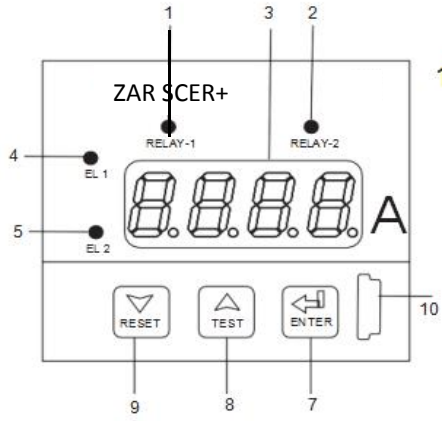
USB Configuration with programming cable

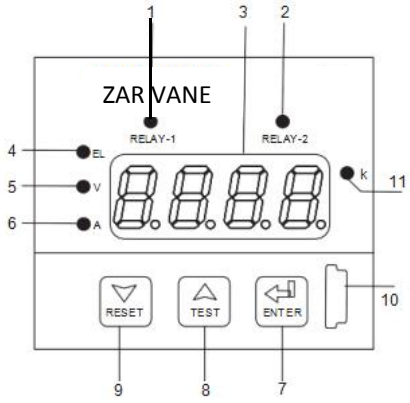


Operating Elements

1/2	Relay-1 and Relay-2 status LED : Indicates status of relay-1 and relay-2 respectively. Green Indicates Healthy condition & Red Indicates Faulty condition
3	4 Digit ultra bright 7 seg LED Display
4	Indicates status of ELC1 (Earth Leakage Current 1)
5	Indicates the status of voltage input. (In case of model with two RCTs (5) indicates status of ELC2 (2nd RCT))
6	Indicates the status of current input (Case (6) is only applicable to model with RCT, current and voltage input.)
7	Enter Key : Confirms changes of parameter setting. When on the measurement screen, holding for 3 sec enters in setup menu.
8	Test Key : Increments setting value, move upwards in the menu or change parameter. It is also used to test operation of relay. Continuous holding of test key changes relay position and when release it resets the relay position (Only in healthy condition)
9	Reset Key : Decrements setting value, move downwards in the menu or change parameter. It is also used to reset relay when manual reset mode is selected
10	USB configuration with programmable cable (For Panel mounting model USB connector is at the back side)
11	K LED : It is used to show Current, Voltage in kilo A, V (respectively for ZAR VA Model)

See in below figure





Inverse Curve Formula

$$\text{Relay Operatin Time} = \text{Set Trip Delay x } \frac{\text{Trip Set Value}}{\text{Measured Value}}$$

Hysteresis Calculation Method

I . For "OV" (Over Voltage) PT Secondary = 100 V
Trip point = 105% of PT Secondary = 105 V
Hysteresis = 3% of PT Secondary = 3 V
Relay Reset point = Trip point - Hysteresis
= 105 - 3
= 102 V
II . For Leakage Current
Leakage Current setting = 10 A
Tripping point = 80% to 100% of set Leakage Current = 8 - 10 A
Hysteresis = 10% of set Leakage Current = 1 A
Relay Reset point = Tripping point - Hysteresis
= 8 - 1 = 7 A

Parameter Setting

Parameters	ZAR SCER	Factory Default Setting
Leakage current	30 mA to 30 A	30 mA
Hysteresis setting for (Leakage Current, Alarm)	5 - 40%#	15%
Hysteresis setting for (Voltage, Current)	3 - 15%	15%
Trip setting for pre alarm	50% to 80% of I_n	60%
Programmable Trip Delay (all parameters)	0 - 30 Sec	0 Sec
Programmable Delay for Power On	0.5 - 30 Sec	1 Sec
Programmable Delay for Auto reclosure	1 - 30 Sec	10 Sec
Programmable re-closure attempts	1 to 5	3
Relay Reset option	Auto-recloser / Manual	Auto-recloser
Relay configuration mode	Energize / De-energize	De-energize
Trip setting for over voltage *	101 - 125%	110%
Trip setting for under voltage *	70 - 99%	80%
Trip setting for over current *	101 - 140%	110%
Trip setting for under current *	20 - 99%	80%
Trip setting for Reverse power *	2 to 20%	10%
Hysteresis setting for (Reverse Power) *	5 - 15%	15%

Note: - Above mentioned Parameter settings are applicable as per feature available in the model.
* Only Applicable to ZAR VA Model.
# Hysteresis Set point or 12mA whichever greater is applicable.
Instantaneous tripping is applicable only to Earth Leakage Current protection, not for Alarm.

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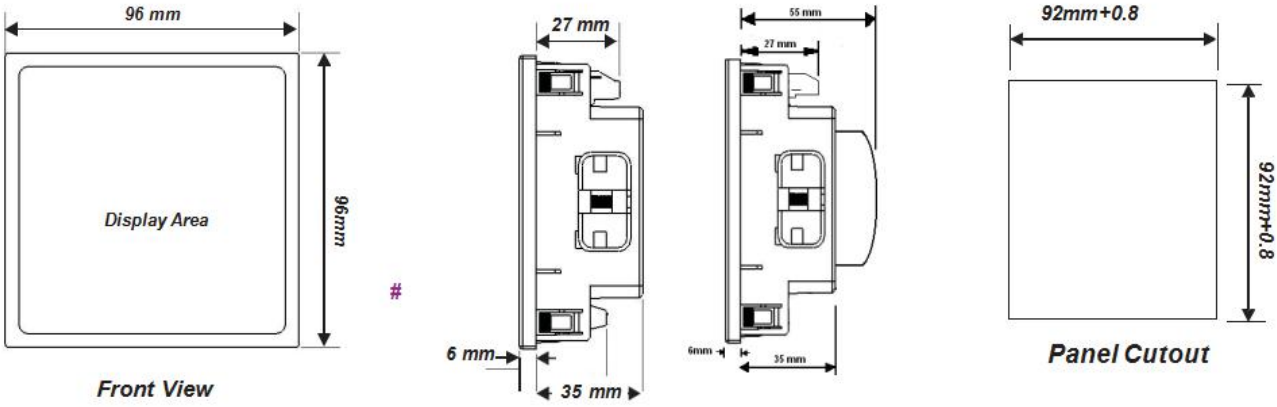
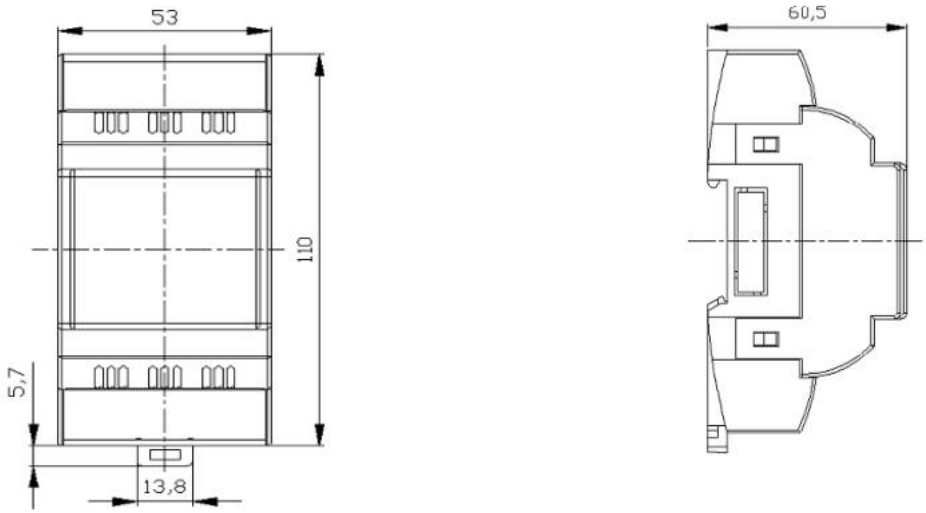
Dimensions :

PANEL MOUNTING OPTIONS :

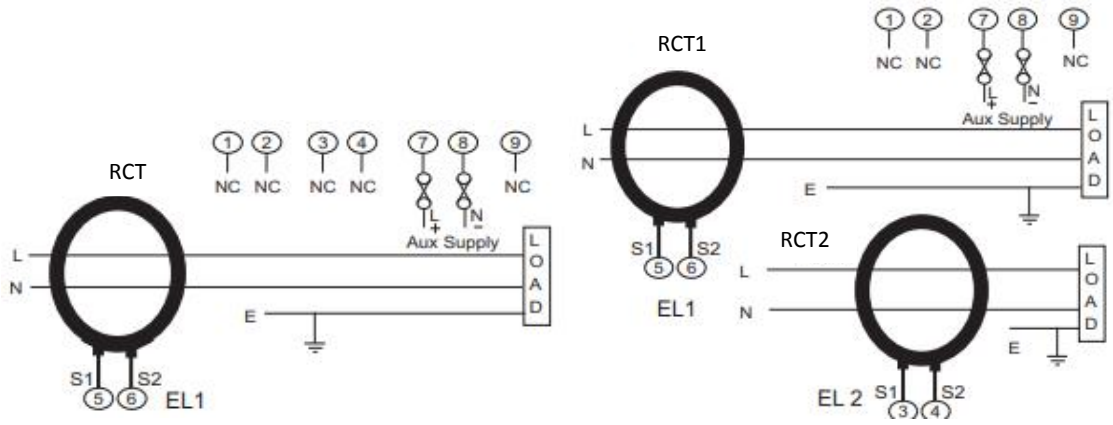


DIN RAIL MOUNTING:



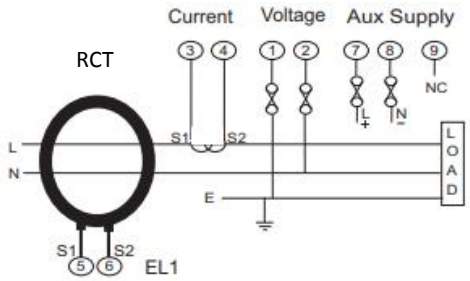
Electrical Connections :

DIN RAIL MOUNT

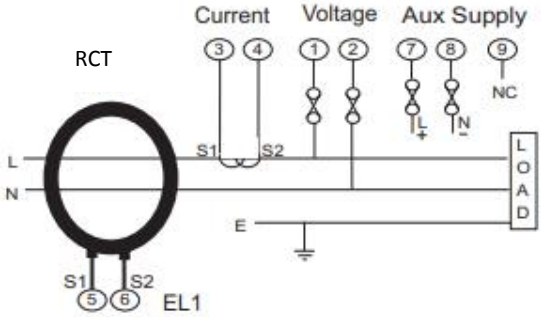


ZAR SCER

ZAR SCER+

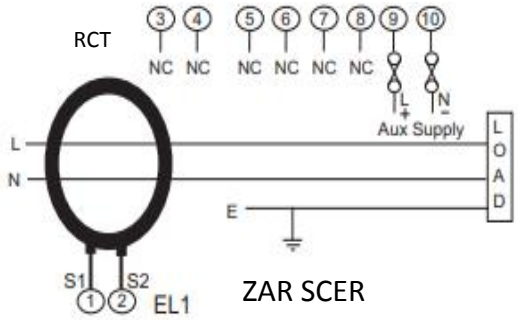


ZAR VADI

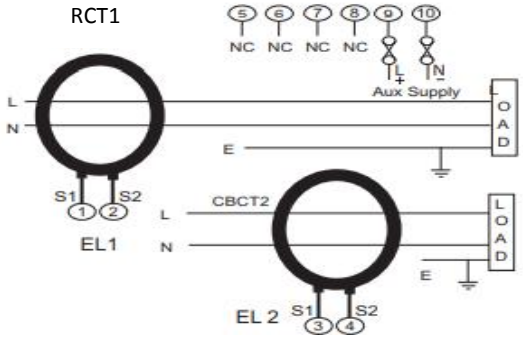


ZAR NEVA

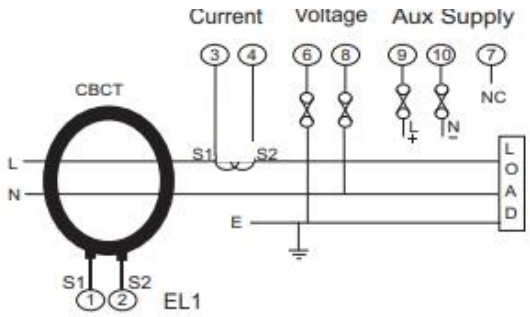
PANEL MOUNT



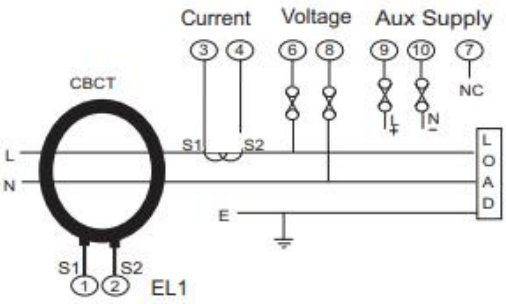
ZAR SCER



ZAR SCER+



ZAR VAFM



ZAR VANE

Ordering Information

Model Name	Description
ZAR SCER	ZAR SCER with single RCT input
ZAR SCER+	ZAR SCER with two RCT inputs
ZAR VAFM / VADI	ZAR VA with RCT, current and voltage input(one each)

Model Name	1 CO	1 CO + 1CO	2 CO
ZAR SCER	√	√	√
ZAR SCER+	×	√	×
ZAR VAFM / VADI	×	√	×
ZAR VANE / NEVA	×	√	×
Auxiliary supply voltage	(✓)		
60 - 300V AC DC			
20 - 60V DC / 20 - 40V AC			
Size	(✓)		
DIN Rail Mount			
Panel mount 96X96			

Note: - No need to specify secondary current as it is programmable from 1A to 5A for ZAR VANE / NEVA model.

× : Not Applicable

ZAR VANE / NEVA can be used for Earth to Neutral Voltage measurement (Voltage Measurement range is 1 to 5 VAC)

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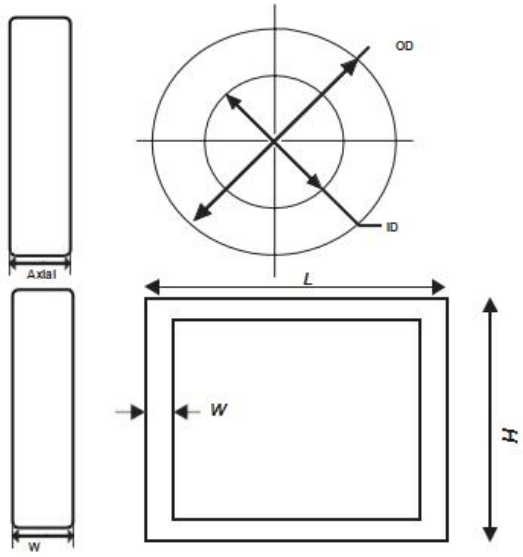
Residual Current Transformer - ZIS RCT

- Compact design
- Encapsulated
- Light in weight

Dimensions

Dimension (in mm)				
RCT	**OD**	**ID**	**Axial**	**Current Ranges**
ZIS RCT - 73/30(50)	73	30	50	30mA to 30A
ZIS RCT - 95/50(40)	95	50	40	30mA to 30A
ZIS RCT - 135/85(30)	135	85	30	30mA to 30A
ZIS RCT - 165/130(30)	165	130	30	500mA to 30A



Specifications

RCT Type : Closed toroidal

Turns Ratio : 600/1

Rated Current : 30A

Rated Voltage : 720 V maximum

System Frequency : 50 Hz or 60 Hz

Insulation Voltage : 3kV for 1 minute

Distance Between RCT and ZAR : < 1 meters

Operating Temperature : -10°C to +55°C

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