MONITORING RELAYS

These relays are best suitable for monitoring balanced or unbalanced supplies, either of single phase, 3-phase 3-wire or 3-phase 4 wire loads powered by generators, UPS, stabilizers, inverters, or Mains (by Electricity Boards / Utilities); in AMF panels, PCCs, distribution boards and for power monitoring of individual loads / motors / pumps.

MODELS

D1 VCR1,
D2 VCT1,
S2 VMR 4, S2 VMR 5,
D2 EFR1, F3 EFR 1, OCS D1,
S2 CMR3, S2 ELR2, S2 CMR5,
S2 FMR1, S1 UVR4, S1 UVR5
RPT D2, RPF D2, CBCT, F3 EFR 2, F3 ELR 2

FEATURES

- Fixed/adjustable under/Over trip settings for parameters.
- Fixed/adjustable trip delays and Power On delays
- Built-in or external power supply
- Resetting – Auto or Manual
- Output contacts : 1 CO or 2 CO
- Choice of enclosures (DIN-Rail, Flush)
- Models with Micro-Controller based design
- Use of SMD Technology
- User-friendly LED indications

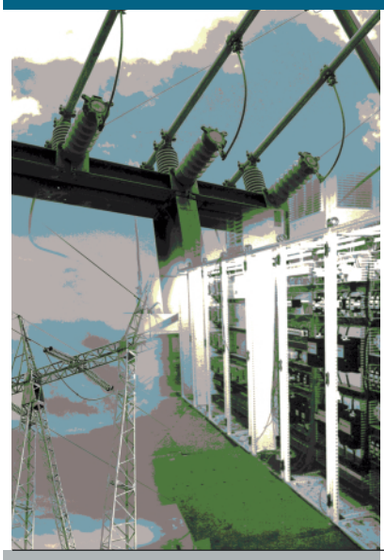
PROTECTIONS / FUNCTIONS

- Under/over Voltage,
- Under/Over Current
- Under/Over Frequency
- Reverse Power
- Earth Fault/Ground Fault
- Earth leakage

Ordering Instructions

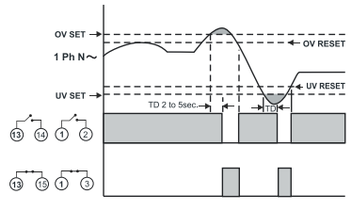
- Product Family Name
- Model Name
- System Supply Voltage & frequency
- Aux. Supply/Control supply voltage
- Current input (1A or 5A)

VOLTAGE MONITORING RELAYS



	D1 VCR1 1 Phase Voltage Monitoring Relay	S1 UVR4 1 Phase Voltage Monitoring Relay	S1 UVR5 3 Phase Voltage Monitoring Relay
			
	Single Phase Under & Over voltage, Auto Reset, Adjustable under / over voltage settings, 2 CO output relay.	Under Voltage Relay for 1 Ph. System, Fixed UV Settings, Adjustable Power ON/ Reset Delay, Auto Reset, 1 CO Output Relay	Under Voltage Relay for 3 Ph. - 4 W System, Fixed UV Settings, Adjustable Power ON/ Reset Delay, Auto Reset, 1 CO Output Relay
Note: Mention specific voltage (Fixed/wide range) in order **System Supply**	110/ 220/ 230/ 240 V AC (+ 20%-25%), 50/60 Hz ± 3%	220 / 230 / 240 VAC ± 20% (L - N), 48 - 63 Hz.	400 VAC ± 20% (3 ø - 4 W), 48 - 63 Hz.
Output Relay Contact	2 CO	1 CO	1 CO
Trip Setting			
Under Voltage	75 - 95% [Variable] of set value	75% fixed of System Supply	75% fixed of System Supply
Over Voltage	105 - 120% [Variable] of set value		
Trip Time Delay	2- 5 Sec (Fixed) (UV/OV)	UV> 300 msec. (fixed) ± 5% + 10 msec	UV> 300 msec. (fixed) ± 5% + 10 msec
Power on Delay		5 to 15 min. Selectable in step of 1 min	5 to 15 min. Selectable in step of 1 min
Reset	Auto Reset	Auto	Auto
Weight	180 gms.	78 gms (Approx.)	78 gms (Approx.)
Dimensions (mm)			
Overall (L x W x D)	76 x 30.5 x 117.5	96 X 17.5 X 60	96 X 17.5 X 60
Mounting	68 mm centre to centre / 35 mm rail mounting	35 mm DIN rail mounting	35 mm DIN rail mounting

• Wherever not specified Contact Rating : 5A @ 230 V AC (resistive)



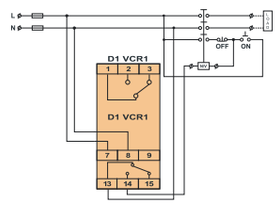


FIG.1

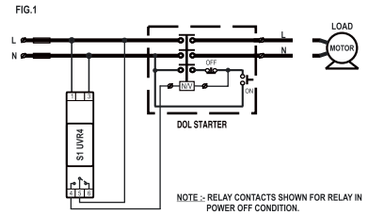
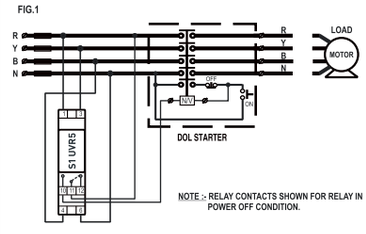


FIG.1



Relay contact position shown in 'Power off' condition

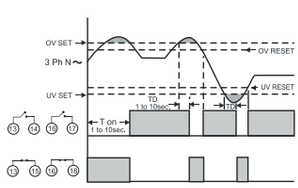
VOLTAGE MONITORING RELAYS

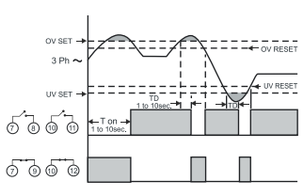
minilec®

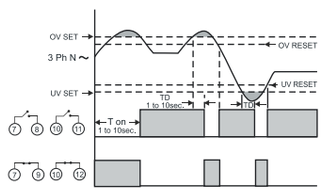
D2 VCT1 Voltage Monitoring Relay	S2 VMR4 Voltage Monitoring Relay, 3Ø-3W	S2 VMR5 Voltage Monitoring Relay, 3Ø-4W
		
3-Phase 3-Wire and 3-Phase 4-Wire (selectable) Under & Over voltage, Microcontroller based design, Auto/Manual Reset, Adjustable under/over voltage settings, Absolute values for UV/OV, adjustable trip delay & ON delay, 2 CO output relay (or selectable 1CO for UV, 1CO for OV) Failsafe-non-failsafe selectable	3-Phase 3-Wire Under & Over voltage, Microcontroller based design, SMD Technology Auto/Manual Reset, Adjustable under/over voltage settings, Absolute values for UV/OV, adjustable trip delay & ON delay, 2 CO output relay (or selectable 1CO for UV, 1CO for OV) Failsafe-non-failsafe selectable	3-Phase 4-Wire Under & Over voltage, Microcontroller based design, SMD Technology, Auto / Manual Reset, Adjustable under/over voltage settings, Absolute values for UV/OV, adjustable trip delay & ON delay, 2 CO output relay (or selectable 1CO for UV, 1CO for OV) Failsafe-non-failsafe selectable
100-120/220-240/380-440V AC -25%+20%,48-63 Hz	100-120/220-240/380-440V AC -25%+20%,48-63 Hz	100-120/220-240/380-440V AC -25%+20%,48-63 Hz
1 CO + 1 CO / 2 CO	1 CO + 1 CO / 2 CO	1 CO + 1 CO / 2 CO

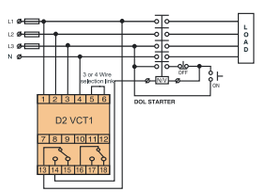
Ph Ph Setting:			
For 380-440V AC	285-425V AC (Variable)	285 - 425V AC (Variable)	
For 220-240V AC	165-225V AC (Variable)	165-225V AC (Variable)	
For 100-120V AC	75-115V AC (Variable)	75-115V AC (Variable)	
Ph N Sensing:			
For 380-440V AC	165-245V AC (Variable)		165-245V AC (Variable)
For 220-240V AC	95-135V AC (Variable)		95-135V AC (Variable)
For 100-120V AC	45-65V AC (Variable)		45-65V AC (Variable)
Ph Ph Sensing:			
For 380-440V AC	400-520V AC (Variable)	400-520V AC (Variable)	
For 220-240V AC	230-290V AC (Variable)	230-290V AC (Variable)	
For 100-120V AC	105-145V AC (Variable)	105-145V AC (Variable)	
Ph N Sensing:			
For 380-440V AC	230-310V AC (Variable)		230-310V AC (Variable)
For 220-240V AC	130-170V AC (Variable)		130-170V AC (Variable)
For 100-120V AC	60-80V AC (Variable)		60-80V AC (Variable)

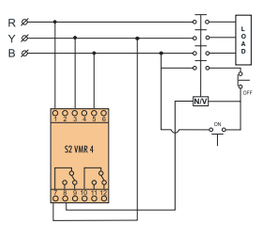
1-10 Sec (Variable) UV/OV/NF	1-10 Sec. (Variable)	1-10 Sec. (Variable)
1-10 Sec (Variable)	1-10 Sec (Variable)	1-10 Sec (Variable)
Auto/ Manual Reset	Auto / Manual Reset	Auto / Manual Reset
300 gms (Approx.)	110 gms (Approx.)	110 gms (Approx.)
76 X 56.5 X 117.5	90 X 35 X 60	90 X 35 X 60
67 x 46 / 35 mm rail mounting	35 mm Rail Mounting	35 mm Rail Mounting

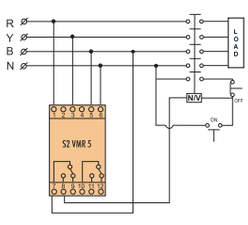










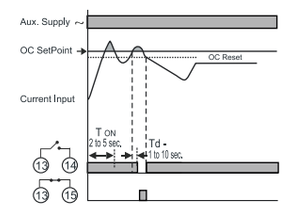


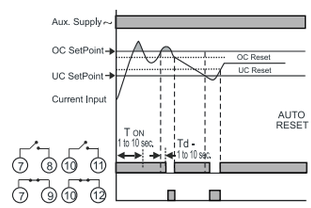
Relay position shown in 'Power off' condition

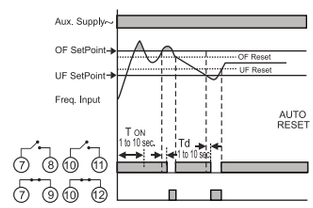
Note: S2 Series - RoHS Product available on request.

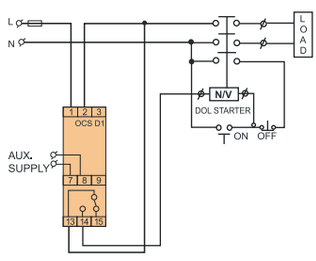
	OCS D1 1 Phase Over Current Relay	S2 CMR5 1 Phase Current Monitoring Relay	S2 FMR1 Frequency Monitoring Relay
			
	Single phase over current Auto reset, Input 1A or 5 A through CT, Adjustable over current trip settings, Adjustable trip delay, 1 CO output relay	Single phase under & over current Microcontroller based design, SMD technology, Auto/Manual reset, Input 1A/5A through CT, 250mA /500mA direct, zero current sensing, Adjustable under / over current trip settings, adjustable trip delay & ON delay, 2 CO output relay Failsafe-non-failsafe mode selectable	Single phase under & over frequency, Microcontroller based design, SMD technology, Auto reset, Adjustable under/over frequency trip settings, Adjustable trip delay & ON delay, 2 CO output relay Failsafe-non-failsafe mode selectable
Supply Voltage Note: Mention specific voltage (Fixed/wide range) in order Auxiliary Supply	110-120/220-240/380-440 V AC ±20%, 12 V DC/24/30 V DC±10%	100-120 / 220-240 / 380-440 VAC ± 20% 100-120 / 220-240 / 415 VAC ± 20%, 24 VDC ± 20%	100-120/220-240/380-440 V AC ± 20%, 38-72 Hz In Built
Ext. Input	1 Amp / 5 Amp (Secondary) CT or 250/500 mA	1 Amp / 5 Amp (Secondary) CT or 250mA/ 500 mA	—
Output contact	1 CO	2 CO	1 CO + 1 CO / 2 CO
Trip setting EF Trip Setting	—	—	—
Under Current / Under Frequency	N.A.	10 % - 100% (Variable) of Input	40 Hz - 60 Hz (Variable)
Over Current / Over Frequency	50% -140% (adjustable) of CT sec	50% - 140% (Variable) of Input	50 Hz - 70 Hz (Variable)
Power On Delay	3.5 secs ± 1.5 sec (fixed)	1 - 10 Sec. (Adjustable) ± 1%	1 - 10 Sec.(Adjustable) ± 1 Sec.
Trip Time Delay	1 - 10 secs (adjustable)	1 - 10 Sec. (Adjustable) ± 1%	1 - 10 Sec.(Adjustable) ± 1 Sec.
Resetting	Auto	Auto / Manual	Auto / Manual
Weight	250 gms.	140 gms.	130 gms
Dimensions (mm) Overall (L x W x D)	76 x 30.5 x 117.5	90 X 35 X 60	90 X 35 X 60
Mounting (L x W)	68mm centre to centre / 35mm rail Mounting	35 mm Rail Mounting	35 mm Rail Mounting

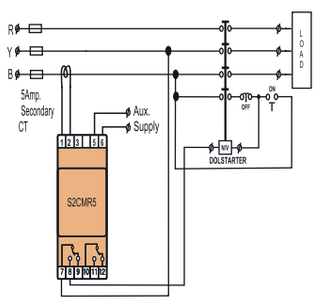
• Wherever not specified Contact Rating : 5A @ 230 V AC (resistive)

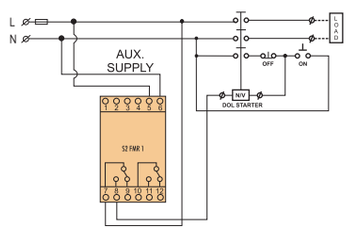




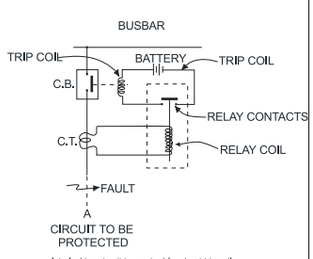








Application
D2 EFR1, S2 CMR3, S2 CMR4, F3EFR1, F3ELR1 can be used for breaker tripping



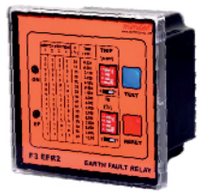
Interlocking circuit is required for shunt trip coil as shunt coil require pulse only for tripping, incase of contineous power shunt coil burns.

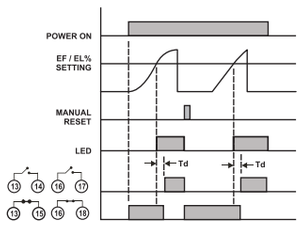
Relay contact position shown in 'Power off' condition

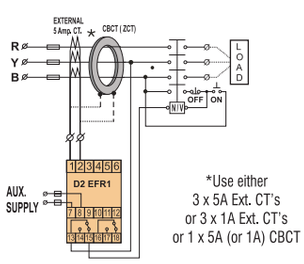
Note: S2 Series - RoHS Product available on request.
CCS D2 Model Available on request.

GROUND FAULT MONITORING RELAYS

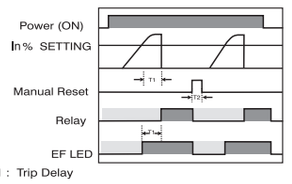
minilec®

D2 EFR1/F3 EFR1 Earth Fault Relay	F3 EFR2 Earth Fault Relay	S2 CMR3 Earth / Ground Fault Relay	S2 ELR2/F3 ELR 2 Earth Leakage Relay
			
Earth fault/Ground fault monitoring of 3 phase systems Manual Reset, Input 1A or 5A through CBCT, Adjustable earth fault trip setting, adjustable trip delay, 2 CO relay output	Earth fault/Ground fault monitoring of 3 phase systems Manual Reset, Input 1A or 5A through CBCT, Adjustable earth fault trip setting, adjustable trip delay, 2 CO relay output	Earth fault/Ground fault monitoring of 3 phase systems, Microcontroller based design, SMD technology, Manual Reset, Input 1A or 5A through CBCT, Adjustable earth fault trip setting, Adjustable trip delay & ON delay, 2 CO relay output Failsafe-non-failsafe selectable	Earth leakage monitoring of 3 phase systems, Microcontroller based design, SMD technology, Manual Reset, Input through CBCT, Adjustable trip setting, Adjustable trip delay & ON delay, 2 CO relay output Failsafe-non-failsafe selectable
24-30 VDC / 110-240 V AC / DC / 380-440 V AC ± 20%	24 / 30VDC ±10%, 110-240VAC/DC ±20% 380 / 415 / 440VAC ±20%,50Hz	100-120/220-240/380-440 V AC ± 20%, 48-63 Hz 100-120/220 -240 / 415 V AC / 24V DC ± 20%	100-120/220-240/380-440 V AC ± 20%, 48-63 Hz 100-110/240 / 415 V AC / 24V DC ± 20%
1A or 5A (Selectable) CBCT Secondary	1 A / 5 A (Selectable) CBCT Secondary	1A or 5A (Selectable) CBCT Secondary	300mA CBCT Secondary
1 CO (2 CO) (Pick up on Fault)	2 CO	2 CO	2 CO
10% - 100 % (adjustable) of CT sec	5 % - 80% (adjustable) of Rated Current Input	10% - 100% of Rated Current Input (Variable)	10% - 100% of Rated Current Input (Variable)
N.A.	N.A.	N.A.	N.A.
N.A.	N.A.	N.A.	N.A.
N.A.	N.A.	1 -10 Sec.(Adjustable)	1 -10 Sec.(Adjustable)
0.1-1.0 / 1-10 Sec. (Adjustable)	0.025 - 10 Sec.	0.1 - 1 Sec.(Adjustable)	0.1 Sec to 1 Sec.(Adjustable)
Manual / Remote (Selectable)	Manual / Remote	Manual	Manual
550gms.	300 gms.	140 gms	140 gms
76 x 56.5 x 117.5	96 x 96 x 80	90 X 35 X 60	90 X 35 X 60
67 x 46 / 35 mm rail Mounting	90 x 90	35 mm Rail Mounting	35 mm Rail Mounting



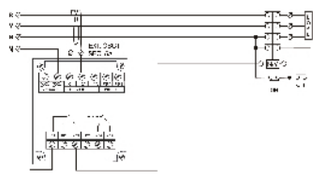


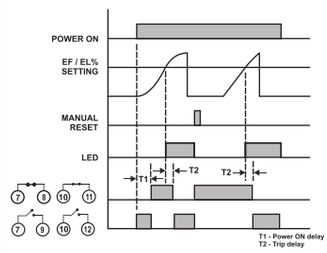
*Use either
3 x 5A Ext. CT's
or 3 x 1A Ext. CT's
or 1 x 5A (or 1A) CBCT



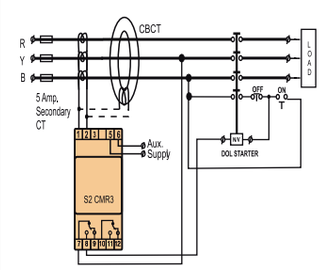
T1 : Trip Delay

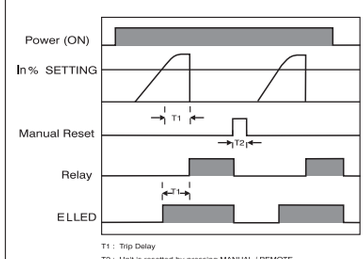
T2 : Unit is resetted by pressing MANUAL / REMOTE reset push button switch.





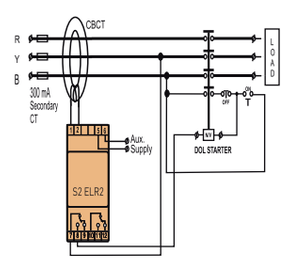
T1 - Power ON delay
T2 - Trip delay





T1 : Trip Delay

T2 : Unit is resetted by pressing MANUAL / REMOTE reset push button switch.



Contact us for F3ELR2 Connection Diagram.

Relay contact position shown in 'Power off' condition

Note: S2 Series - RoHS Product available on request.

RPT D2
Reverse Power Relay,(3Ø-3W)

3-phase 3-wire generators reverse power monitoring
Auto/Manual reset,
Reverse power (current) trip settings adjustable,
ON delay and trip delay adjustable,
2 CO output relay

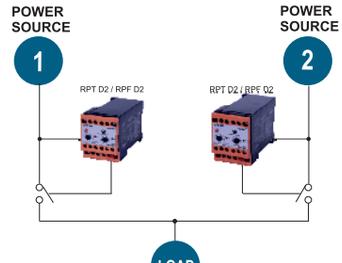
RPF D2
Reverse Power Relay,(3Ø-4W)

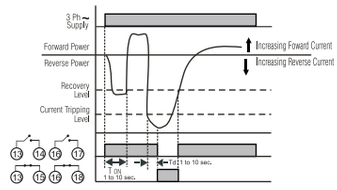
Single phase or 3-phase 4-wire generators reverse power monitoring
Auto/Manual reset, Reverse power (current) trip settings adjustable, for all 3 Ph- Neutral monitoring use three relays, 2 CO output relay

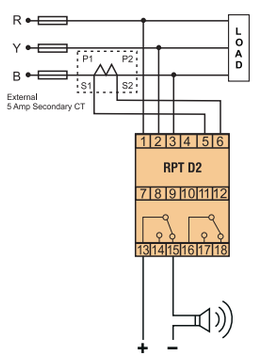
Tape Insulated Ring Type CBCT

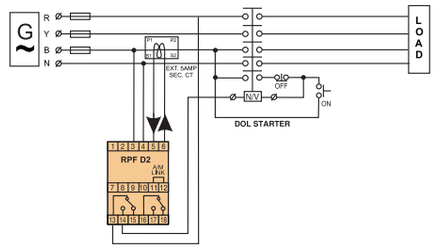
	RPT D2	RPF D2
Supply Voltage		
Note: Mention specific voltage (Fixed/wide range) in order. System	100-120 / 220-240 / 380-440 V AC ±20%	100-120 / 220-240 / 380-440 V AC ±20%
Auxiliary	Built-in	Built-in
Ext. Input	5A CT Secondary & R,Y, B	5A CT Secondary & B, Neutral
Output contact	2 CO	2 CO
Trip setting		
Under Frequency	—	—
Over Frequency	—	—
Reverse Power	2% - 20% (adjustable)	2% - 20% (adjustable)
Power On Delay	1 - 10 secs. (adjustable)	1 - 10 secs. (adjustable)
Trip Time Delay	1 - 10 secs. (adjustable.)	1 - 10 secs. (adjustable)
Resetting	Auto / Manual	Auto / Manual
Weight	460 gms.	460 gms.
Dimensions (mm)		
Overall (L x W x D)	76 x 56.5 x 117.5	76 x 56.5 x 117.5
Mounting (L x W)	67 x 46 ⬚ / 35 mm Rail Mounting	67 x 46 ⬚ / 35 mm Rail Mounting

• Wherever not specified Contact Rating : 5A @ 230 V AC (resistive)









Relay contact position shown in 'Power off' condition

General Specifications
1. System Voltage - up to 440 V AC
2. System Frequency - 50 Hz
3. Operating Temperature - 0 - 60°C.
4. Humidity - Up to 95% R.H.
5. Rated Burden - < 3 VA
6. Inner Diameter - 50 / 100 / 120 / 150 / 200 / 220 / 250 / 300 mm or any other customize size as per the requirement.
7. Outer Diameter - As per the relay requirement (Primary/ Fault & secondary current) & ID.
8. Mounting - for smaller range clamps can be provided for CBCT up to 50 mm ID & for higher range ID of CBCT, external arrangement needs to be done.

Ordering Information
1) CT ratio (Primary & Secondary Current).
2) Inner Diameter.
3) Outer Diameter.
4) Type of CBCT - Resign cast or Tape wound or Moulded.
5) Minilec Relay Model Name.

Introduction & Application
CORE BALANCE CURRENT TRANSFORMERS (CBCT) is a sensor to sense earth fault current in conjunction with an EARTH FAULT RELAY to protect the system when an EARTH FAULT occurs on one or more phases. The CBCT is mounted externally & load carrying conductors are passed through CBCT. The CBCT inner diameter is large enough to pass all the three bus-bars or the three phase cables, unlike a metering CT where only one bus-bar or cable passes through the CT. As the VECTOR SUM of the three currents at any given time is ZERO, the resultant magnetic field through the core of the CT is zero. This is the healthy situation of the system. If required Neutral also can be passed through CBCT in case of 3 phases, 4 wire system. Ideally Vector Sum will remain zero in case of fault free systems.

In the event of an Earth Fault occurring in any of the phases, the current in that phase rises, inducing a resultant magnetic flux in the CT secondary, energizing the relay & tripping the system.

The current at CBCT secondary will depend on the actual earth fault current level & hence unbalanced loading does not affect the functioning of Earth fault relay.

Salient Features
- All current ratio's are available to match Minilec EFR / ELR.
- Light Weight.
- Compact in size.
- Cost Effective.