



## OPERATING INSTRUCTIONS COP-IE, COP-I, COP-E (ANSI –50,51,50N,51N)



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An ISO-9001-2008 certified organization

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<b>1.0</b>	<b>Introduction</b>
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- 16 Bit RISC, state of art, microcontroller based System.
- Fundamental measurement of all measured parameters with 1% accuracy of measured value (Not full scale)  
Backlit LCD Display for easy reading and parameter settings. No need to consult the manual while programming the unit. All system parameters are user programmable
- All the inputs such as AC voltage and auxiliary voltage are completely isolated
- Fast Fourier Transformation to extract fundamental components of current and voltage to avoid spurious tripping
- Housed in 92X92mm Din Standard housing.

<b>2.0</b>	<b>Protection, Supervision Salient Features</b>
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- Three Phase Over current Protection (COP-IE, COP-I)
- Three Phase Short Circuit Protection (COP-IE, COP-I)
- Earth Fault Protection (COP-IE, COP-E)
- High set earth fault protection (COP-IE, COP-E)

### Display and Measurement

- Display of R,Y,B Phase Current, Display of neutral / earth current

### Salient Features

- Wide range SMPS auxiliary supply (supply range from 50 to 300 VAC/DC Or 8-35 VDC)
- Digital fast Fourier transformation.
- Selectable display of current in primary or secondary value
- Two digital inputs for external reset and external blocking.
- One common trip contact
- Three programmable alarm contact
- Selectable auto / manual scroll of measurement

<b>3.0</b>	<b>Output Contact</b>
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Four NO contact Contacts are available, one is reserved for tripping function, three are programmable for alarm function.

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Trip (NO Contact)</li> <li>• Alarm 1 (NO Contact)</li> </ul> | <ul style="list-style-type: none"> <li>• Alarm 2 (NO Contact)</li> <li>• Alarm 3 (NO Contact)</li> </ul> |
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<b>4.0</b>	<b>Front Panel Switch</b>
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COP-IE/IE has four switch provided on its front panel. Switch can have more than one functions assigned to them. The table below describes the operation of these

S.No.	Switch Symbol	Switch Function	Description
1	↑	Next	<b>Normal operation mode:</b> In this mode this scrolls the displayed parameters. <b>Programming Mode:</b> It is used to select the next parameter to be programmed.
2	+	Increment	<b>Programming Mode</b> It's used to increment value of the selected parameters.
3	-	Decrement	<b>Programming Mode</b> It's used to decrement value of the selected parameters.
4	R	Reset	In manual reset option this Key is used to reset the faults LED and Contact output In it is used to reset the LED indication.
5	R & -	Programming Mode Entry	Press "R" Key and than press "-" while the "R" Key is pressed to enter the programming mode.

<b>5.0</b>	<b>Setting Procedure</b>
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COP has provision to program the operating parameters.

Press “R” & “-“ switch simultaneously.

The LCD shall display, “Parameter Mode”

To enter parameter setting mode press  $\uparrow$ .

To go to next menu press  $\rightarrow$ .

The LCD shall display “Set Alarm”.

This menu can be entered by pressing  $\uparrow$ .

To go to next menu press  $\rightarrow$ .

The LCD shall display “Set Blocking”.

This menu can be entered by pressing  $\uparrow$ .

<b>6.0</b>	<b>Parameter Mode</b>
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Sl. .No	Display	Explanation of parameter	Factory setting	Setting Range	Setting step
1	I > in I/In	Desired over current value in % of the rated current (Not available in COP-E)	0.80	0.1-2.5 I/In	0.05I/In
2	I > Def Time	Definite time delay in seconds, will be valid only when definite time characteristic is selected (Not available in COP-E)	10 Sec	0.01 – 150 Sec	0.01 Sec
3	I > Time Multiplier	Inverse time multiplier, will be valid only when Inverse time characteristic is selected (Not available in COP-E)	0.3	0.01-1.50	0.01
4	I > Characteristic	Time delay characteristic for Over current (Not available in COP-E)	DEFT	DEFT, Extreme inverse, Very Inverse, Normal Inverse 0.6, Normal inverse 1.3, Normal Inverse 3.0	
5	I >> in I/In	Desired short circuit values in % of the rated current. (Not available in COP-E)	2.0	0.5-12.0 I/In	0.1 I/In
6	I >> Def Time	Definite time delay in seconds, will be valid only when definite time characteristic is selected (Not available in COP-E)	2.0	0.03 – 20 Sec	0.01 Sec
7	I e> in I/In	Desired Earth fault value in % of the rated current (Not available in COP-I)	0.20	0.05-2.5 I/In	0.05I/In
8	I e> Def Time	Definite time delay in seconds, will be valid only when definite time characteristic is selected (Not available in COP-I)	10 Sec	0.03 – 150 Sec	0.01 Sec
9	I e> Time Multiplier	Inverse time multiplier, will be valid only when Inverse time characteristic is selected (Not available in COP-I)	0.3	0.01- 1.50	0.01

## COP-IE,IE Numerical IDMT Relay

10	I e> Characteristic	Time delay characteristic for Earth fault current (Not available in COP-I)	DEFT	DEFT, Extreme Inverse, Very Inverse, Normal Inverse 0.6, Normal inverse 1.3, Normal Inverse 3.0	
11	I e>> in I/In	Desired earth fault high set value in % of the rated current (Not available in COP-I)	1.0	0.3-4.0 I/In	0.1 I/In
12	I e>> Def Time	Time delay setting for earth fault high set (Not available in COP-I)	0.6	0.02 – 20 Sec	0.01 Sec
13	CT Ratio	Ratio of current transformer, Rated CT Primary current / Rated CT Secondary current	100	1-2500	1
14	Reset Delay	Delay time for resetting the trip contact, after fault clearance.	1	0.1- 20 Sec	0.1 Sec.
15	Dis I in Pri/Sec	Selection of Current display in primary values or secondary values	Primary	Primary/Secondary	
16	Disp Auto Scroll	Measurement display auto scroll or manual scroll selection	Auto Scroll On	Auto Scroll On / Auto Scroll off	
17	Trip Reset	Reset type for tripped LED indication	Manual	Auto / Manual	

### 7.0 External Alarm Contact

Alarm Contact 1,2 & 3 can be programmed / activated on different protection functions e.g. for activating alarm 1 on over current, set 1. **By default no alarm is active.** If the alarms are required, they have to be programmed at the time of installing the relay.  
The protections on which alarms can be programmed are:

Protection Function	Protection Symbol	Activated Alarm, default setting	Remark
Over Current (Not available in COP-E)	I >	0	No Alarm activated on I >
Short Circuit (Not available in COP-E)	I >>	0	No Alarm activated on I >>
Earth Fault Low set (Not available in COP-I)	Ie >	0	No Alarm activated on Ie >
Earth Fault High set (Not available in COP-I)	Ie >>	0	No Alarm activated on Ie >>

### 8.0 Set Blocking Function

Group of Selected protection function can be disabled on activation of blocking input (By externally shorting terminal 7 and 8)e.g. If . I >> and I >> are programmed as enabled for blocking input then on shorting terminal 7 and 8 and High set over and under voltage protection will be blocked/disable.

Protection Function	Protection Symbol	Blocking enable/ Disable default setting	Remark
Over Current (Not available in COP-E)	I >	Disable	Blocking function is disable
Short Circuit (Not available in COP-E)	I >>	Disable	Blocking function is disable
Earth Fault Low set (Not available in COP-I)	Ie >	Disable	Blocking function is disable
Earth Fault High set (Not available in COP-I)	Ie >>	Disable	Blocking function is disable

<b>9.0</b>	<b>Reset – Auto / Manual</b>
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User can programme COP-I either as auto reset or manual reset relay.

- Auto Reset : The trip contact will reset automatically after Reset Delay, Indication will reset automatically after clearance of fault and expiry of reset delay.
- Manual Reset : The trip contact will reset automatically after Reset Delay, Indication will reset after pressing the reset button.

<b>10.0</b>	<b>Terminal Description</b>
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Terminal Number	Description
1	Not Connected
2	Not Connected
3	Not Connected
4	Not Connected
5	CT – Earth Current
6	CT – Earth Current
7	Common for external reset and blocking
8	External Block
9	External Reset
10	Auxiliary Supply
11	Auxiliary Supply
12	Not Connected
13	Trip NO Contact
14	Trip NO Contact
15	Alarm 1 NO
16	Alarm 2 NO
17	Alarm 3 NO
18	Common terminal for Alarm 1,2 & 3.
19,20	R Phase CT
21,22	Y Phase CT
23,24	B Phase CT

<b>11.0</b>	<b>Model Selection Chart</b>
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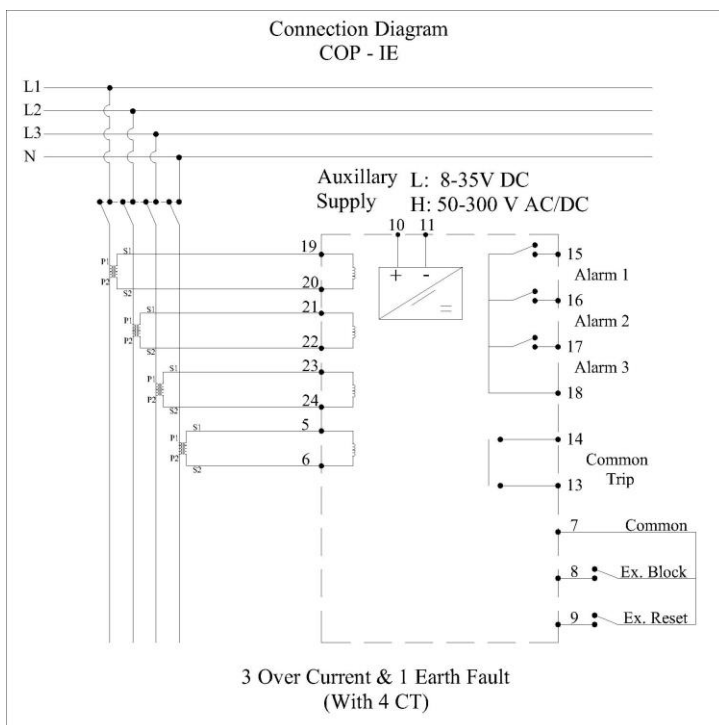
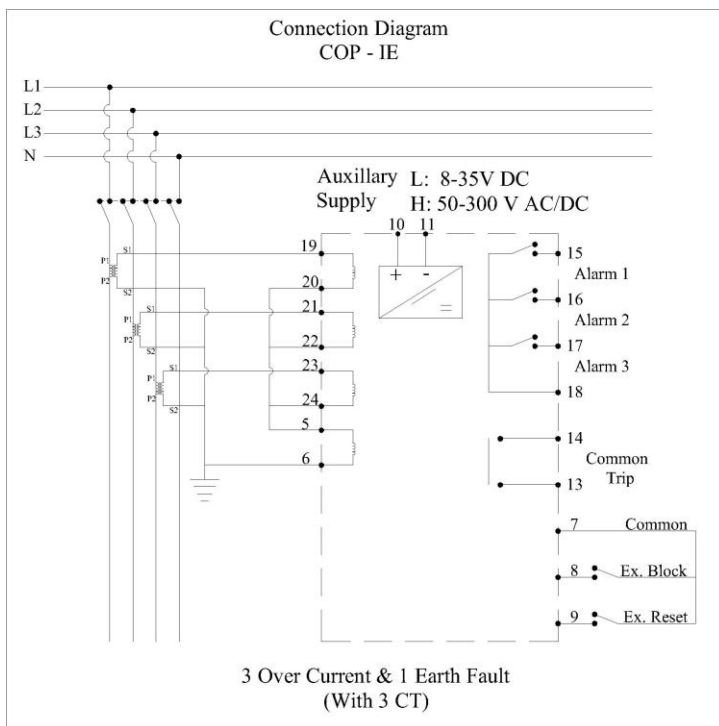
Type	Protection	Rated Current	Auxilliary Voltage
COP	IE : Overcurrent, short circuit, Earth Fault & high set in earth fault I : Overcurrent & Sort circuit E : Earth fault & high set in earth fault	1 : Secondary 1A 5 : Secondary 5A	L: 8-35 VDC H: 50-300 VAC/DC

<b>12.0</b>	<b>Technical specification</b>
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AC voltage withstand	330 VAC, Continuously, (Phase to neutral)
Frequency Range	40-70 Hz
Rated Current	1A /5A
Current withstand	4 times rated current
Measurement Accuracy	
Voltage & Current	± 2%
Frequency	± 0.05 Hz.
Surge 1.2/50Usec	2.5KV
Auxiliary Voltage	8-35V/DC OR 50-300 V AC/DC
Contact Rating	230 VAC, 5A
Cut out Dimensions	90mm X 90mm
Depth	120mm

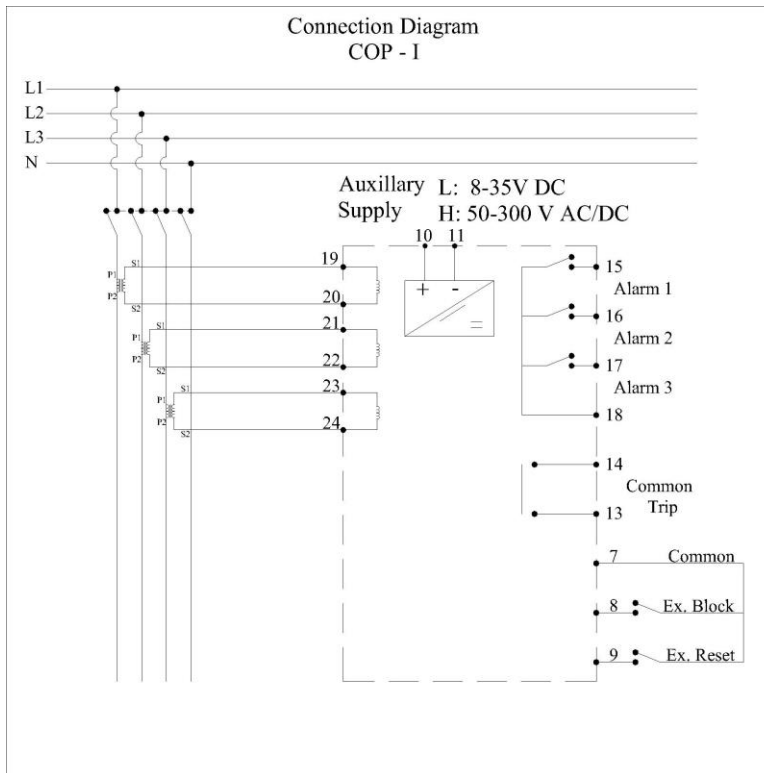
### 13.0 Connection Diagram

COP-IE- 3 Phase Over curent, short circuit and earth fault protection

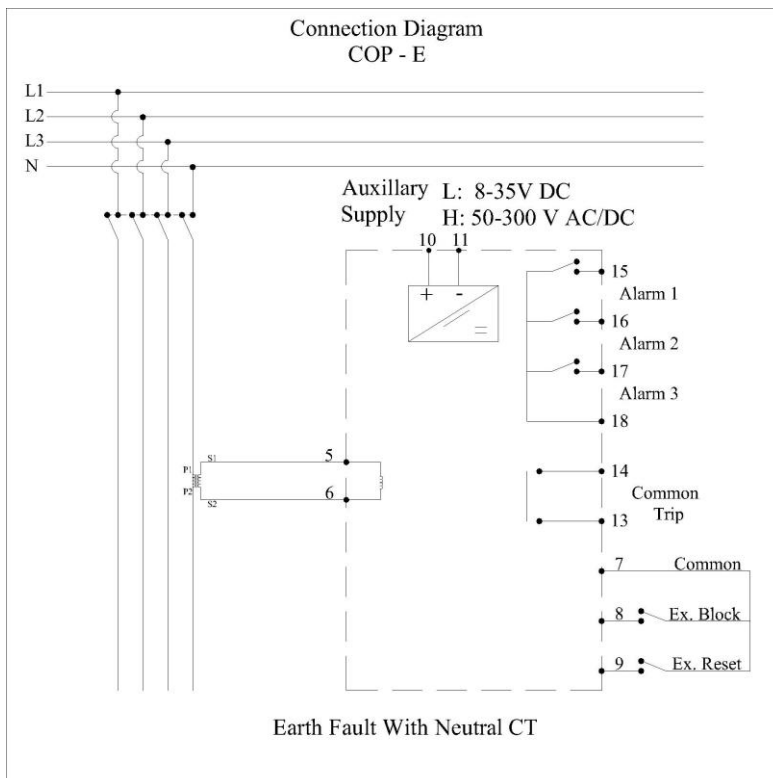


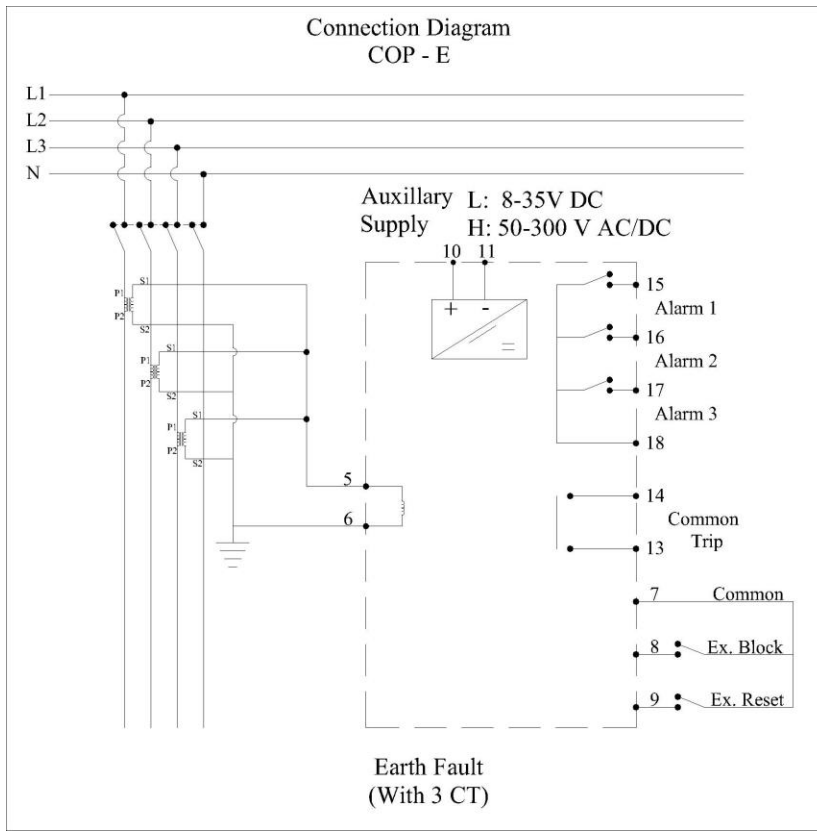


## COP-I Over-Curent and Short Circuit Protection



## COP-E Earth Fault Protection





It is our endeavour to constantly upgrade our products, hence specifications are subject to change without any notice.