OPERATING INSTRUCTIONS COP-VFI
(ANSI – 50,51,50N,51N,27,59,81O,81U)

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An ISO-9001-2008 certified organization

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1.0 Introduction

- 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 the inputs, such as AC Voltage and auxiliary voltages are completely isolated.
- All system parameters are user programmable
- Fast Fourier Transformation to extract fundamental components of current and voltage to avoid spurious tripping
- Housed in 92X92mm Din Standard housing.

2.0 Protection, Supervision Salient features

Protection

- Two Stage, Three Phase Under Voltage
- Two Stage Three Phase Over Voltage
- Two Stage Under Frequency
- Two Stage Over Frequency
- Three Phase IDMT Over Current
- Three Phase Short Circuit
- Two Stage Earth fault

Display and Measurements

- Display of R,Y,B Voltage(Phase to Neutral or Phase to Phase)
- Display of R,Y,B Current
  Display of frequency

Additional Functions

- Wide range SMPS auxiliary supply (supply range from 50 to 300 VAC Or 50-400 VDC)
- Digital fast Fourier transformation.
- Selectable display of current and voltage 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

3.0 Contacts

The following Output Contacts (NO) are provided.

- Trip (NO Contact)
- Alarm 1 (NO Contact)
- Alarm 2 (NO Contact)
- Alarm 3 (NO Contact)

4.0 Switches Description

COP-VFI 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	**Normal operation mode**: In this mode this scrolls the displayed parameters. **Programming Mode**: This key is used to select the next parameter to be programmed.
2	✚	Increment	**Programming Mode**: It's used to increment the value of the parameters under programming.

3	▬	Decrement	**Programming Mode**: It's used to decrement the value of the parameter under programming.
4	**R**	Reset	In manual reset option this Key is used to reset the faults flags
5	**R** & --	Programming Mode Entry	Press "R" Key and than press "--" while the "R" Key is pressed to enter the programming mode.

5.0 Setting Procedure

COP -VFI has provision to program the operating parameters.
Press R & -- switches simultaneously.
The LCD shall display, "Parameter Mode"
To enter parameter setting mode press ⬆.
To go to next menu press ✚.
The LCD shall display "Set Alarm".
This menu can be entered by pressing ⬆.
To go to next menu press ✚.
The LCD shall display "Set Blocking".
This menu can be entered by pressing ⬆.

5.1 Parameter Mode

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	0.80	0.5-2.5 I/In	0.05I/In
2	I > Def Time	Definite time delay in seconds, will be valid only when definite time characteristic is selected	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	0.3	0.01-1.50	0.01
4	I > Characteristic	Time delay characteristic for Over current	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.	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	2.0	0.03 – 20 Sec	0.01 Sec
7	I e> in I/In	Desired Earth fault value in % of the rated current	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	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	0.3	0.01- 1.50	0.01
10	I e>	Time delay characteristic for Earth	DEFT	DEFT, Extreme	

	Characteristic	fault current		Inverse, Very Inverse, Normal Inverse 0.6, Normal inverse 1.3, Normal Inverse 3.0	
11	I e> > in I/In		1.0	0.3-4.0 I/In	0.1 I/In
12	I e>> Def Time	Desired earth fault high set value in % of the rated current	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	Uv < in V/Vn	Under Voltage value in % of rated Voltage	0.80	0.5-1.7 V/Vn	0.05V/Vn
15	Uv< Def Time	Definite time delay in seconds.	10	0.01 – 20 Sec	0.01 Sec
16	Uv<< in V/Vn	Under Voltage high set value in % of rated Voltage.	0.70	0.5-1.7 V/Vn	0.05V/Vn
17	Uv<< Def Time	Definite time delay in seconds.	10	0.01 – 20 Sec	0.01 Sec
18	Ov> in V/Vn	Over Voltage value in % of rated Voltage.	1.20	0.5-1.7 V/Vn	0.05V/Vn
19	Ov> Def Time	Definite time delay in seconds.	10	0.01 – 20 Sec	0.01 Sec
20	Ov> > in V/Vn	Over Voltage high set value in % of rated Voltage	1.40	0.5-1.7 V/Vn	0.05V/Vn
21	Ov>> Def Time	Definite time delay in seconds.	10	0.01 – 20 Sec	0.01 Sec
22	Input Connection	Voltage connection to the controller is selectable for 3Phase 4 wire 230 V system and for 3Phase 3wire Ph to Ph 415 V connections.	Ph-Neu - 230 V	Ph-Neu-230 V, Ph-Ph-415 V	
23	PT Ratio	Ratio of Voltage transformer, Rated PT Primary Voltage / Rated PT Secondary Voltage	1	1-1200	1
24	No of Cycles Avg	No of cycles for which frequency is measured for fault detection.	10	2-50	1
25	UF<	Under Frequency set value.	47.5	45-70 Hz	0.01 Hz
26	UF<Def Time	Definite time delay in seconds.	10	Tf min – 30 Sec Tf min depends on no. of cycles	0.01 Sec
27	UF<<	Under Frequency high set value.	46.5	45-70 Hz	0.01 Hz
28	UF<< Def Time	Definite time delay in seconds.	5	Tf min – 30 Sec Tf min depends on no. of cycles	0.01 Sec
29	OF>	Over Frequency value	51.0	45-70 Hz	0.01 Hz
30	OF> Def Time	Definite time delay in seconds.	10	0.01 – 20 Sec	0.01 Sec
31	OF>>	Over Frequency high set value.	52.0	45-70 Hz	0.01 Hz
32	OF>> Def Time	Definite time delay in seconds.	10	0.01 – 20 Sec	0.01 Sec
33	Block Voltage V/Vn	Lower limit of input voltage, below which frequency measurement is blocked	0.5	0.25- 1.5 V/Vn	0.01 V/Vn
34	Reset Delay	Delay time for resetting the trip contact, after fault clearance.	1	0.1- 20 Sec	0.1 Sec.

35	Dis I in Pri/Sec	Selection of Current display in primary values or secondary values	Primary	Primary/Secondary	
36	Disp Auto Scroll	Measurement display auto scroll or manual scroll selection	Auto Scroll On	Auto Scroll On / Auto Scroll off	
37	Trip Reset	Reset type for tripped LED indication	Manual	Auto / Manual	

5.2 Set Alarm

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	I >	0	No Alarm activated on I >
Short Circuit	I >>	0	No Alarm activated on I >>
Earth Fault Low set	Ie >	0	No Alarm activated on Ie >
Earth Fault High set	Ie >>	0	No Alarm activated on Ie >>
Over Voltage Low Set	OV >	0	No Alarm activated on OV >
Over Voltage High Set	OV >>	0	No Alarm activated on OV >>
Under Voltage Low Set	UV <	0	No Alarm activated on UV <
Under Voltage High Set	UV <<	0	No Alarm activated on UV <<
Over Frequency Low Set	OF >	0	No Alarm activated on OF >
Over Frequency High Set	OF >>	0	No Alarm activated on OF >>
Under Frequency Low Set	UF <	0	No Alarm activated on UF <
Under Frequency High Set	UF <<	0	No Alarm activated on UF <<

5.3 Set Blocking

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 OV >> are programmed as enabled for blocking input then on shorting terminal 7 and 8 Short circuit and High set overvoltage protection will be blocked/disable.

Following are default settings

Protection Function	Protection Symbol	Blocking enable/ Disable default setting	Remark
Over Current	I >	Disable	Blocking function is disable
Short Circuit	I >>	Disable	Blocking function is disable
Earth Fault Low set	Ie >	Disable	Blocking function is disable
Earth Fault High set	Ie >>	Disable	Blocking function is disable
Over Voltage Low Set	OV >	Disable	Blocking function is disable
Over Voltage High Set	OV >>	Disable	Blocking function is disable
Under Voltage Low Set	UV <	Disable	Blocking function is disable
Under Voltage High Set	UV <<	Disable	Blocking function is disable
Over Frequency Low Set	OF >	Disable	Blocking function is disable
Over Frequency High Set	OF >>	Disable	Blocking function is disable
Under Frequency Low Set	UF <	Disable	Blocking function is disable
Under Frequency High Set	UF <<	Disable	Blocking function is disable

6.0 Auto / Manual Reset of Faults

There are two categories of reset

- 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

7.0 Terminal description

Terminal Number	Description
1	R Phase Voltage
2	Y Phase Voltage
3	B Phase Voltage
4	Neutral
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

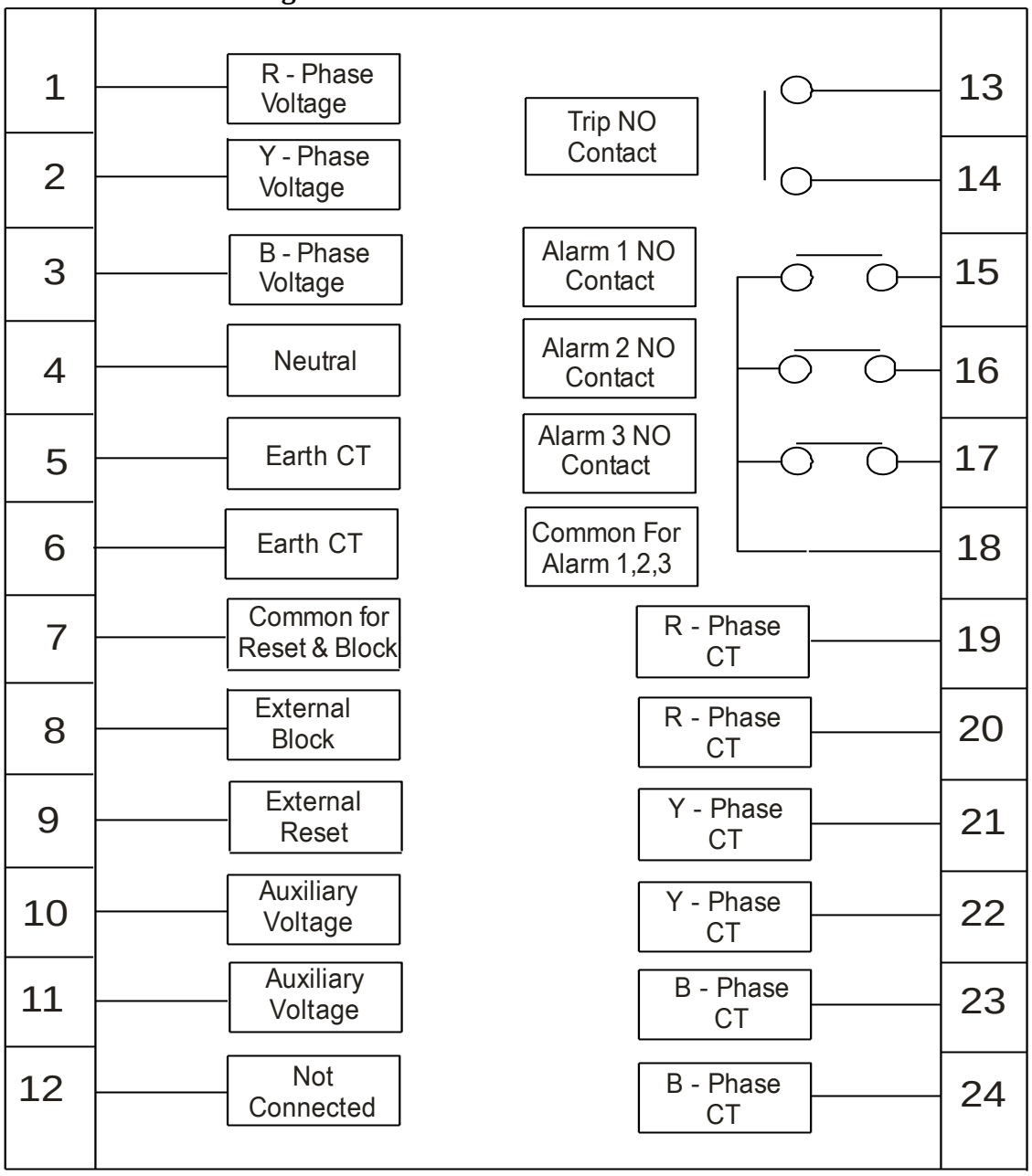
8.0 Model Selection

The nomenclature for selecting the model is as follows:
COP-VFI-
- 110 for 110 V System, 230/400 for 230/400 V AC system
- 5/1 (5 : 5A CT, 1: 1A CT)
- L/H (L : Auxiliary supply from 16-70 VDC/AC, H: Auxiliary supply from 50-300 VDC/AC)

9.0 Specifications

AC voltage withstand	330 VAC (Phase to neutral)
Measurement Accuracy	
Voltage & Current	± 2%
Frequency	± 0. 05 Hz.
Surge 1.2/50Usec	2.5KV
Auxiliary Voltage	16 to 70 V AC/DC OR 60-300 V AC/DC
Contact Rating	230 VAC, 5A
Cut out Dimensions	90mm X 90mm
Depth	120mm

10.0 Connection Diagram



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