PROCOM®

OPERATING INSTRUCTIONS
COP-Plus
(ANSI CODE 51, 50, 51N, 51G, 50N, 50G, 50BF, 79, 74TC)

Installation Guide

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1.0 Introduction
- The COP Plus Series of Feeder Protection Relays are Designed Using Numerical Technology (Discrete Fast Fourier Transformation.) Reliable & Accurate Tripping is Ensured by Deploying Digital Technique Using DSP. High Sampling Rate of 2000 Sample/Sec Ensures Actual Reproduction of Waveform.
- User Friendly HMI Eases Configuration & Operating Procedure of Relay
- User Programmable Digital Output Provides Flexibility in Selecting Alarm Contact.
- In Addition to Default USB Part one Optional RS-485 Port is also Provided.

2.0 Protection, Supervision Salient Features
- 128x64 Pixel Graphical /display
- Event Recording
- Fault Date Recording
- RTC Stamp on Fault & Event
- Three/Five Digital Input
- Site Selectable 1A/5A CT Secondary Current
- Wide Auxiliary Supply(20 To 300 VDC/50-300VAC)
- Display in Primary/Secondary Values
- Wide Setting Range With Fine Setting Steps
- Front USB Port
- RS-485 communication Port with MODBUS protocol
- Self Supervision

3.0 Output Contact
Cop Plus had upto seven NO Contact. One is reserved for tripping function. Three are programmable for alarm function.
Trip (NO/NC Contact)
- Alarm 1 (NO Contact)
- Alarm 2 (NO Contact)
- Relay ON Contact (NO Contact)
- Alarm 3 (NO Contact)
- Alarm 4 (NO Contact)
- Charging Contact (NO/NC Contact)

4.0 Protection
- Over Current Protection
- Short Port Current Protection
- Earth Fault Protection
- High set Earth Fault Protection
- Ground Fault Protection
- High Ground Fault Protection
- Trip Current Supervision
- Circuit Breaker Failure Protection
- Multiple Shot Auto Re-closer
- Lock Out

■ Tripping Characteristics
   Definite Time - DEFT
   Inverse Time - Extremely Inverse
   Inverse Time - Very Inverse
   Inverse Time - Normal Inverse 0.6
   Inverse Time - Normal Inverse 1.3
   Inverse Time - Normal Inverse 3.0
■ Selective Earth/ground Fault Blocking In Case of single phase voltage supplied on all three phases.
■ All the protections can be programmed to be individually or collectively blocked by external input
■ Remote Trip Input
■ Remote Reset input

5.0 User Interface
5.1 LCD Display
Graphical back-lit LCD Display is provided for parameter and setting display and for easy viewing of measurement, setting, fault and event records, date and time, error message. Back-lit is automatically turned ON when any tripping occurs on particular equipment.

5.2 Touch Keys
The function of relay is controlled be the following keys. Back Switch, Next Switch, Up Switch, Down Switch,
Enter key, Reset Key and Test Key which are provided on the front plate. Front plate with diagram and keys marked will be good

Cop plus has a very sophisticated HMI build into it. These keys play different role under different function of HMI

Switch Symbol	Switch Function	Description
◀ ▶	Back Switch and Next Switch	To enter Edit/View Mode the Back Switch and Next Switch are pressed together.
◀	Back Switch	The Left Arrow Key are used to go backward both when doing the settings and while viewing the settings.

⊙	Next Switch	The Right Arrow key are used to go forward both when doing the settings and while viewing the settings.
⊙	Up Switch	The Up Arrow Key is used to increment the value of parameters in setting mode.
⊙	Down switch	The Down Arrow Key is used to increment the value of parameters in setting mode.
⊙	Enter Switch	Pressing enter key will take the HMI in the sub menu of displayed Menu.
⊙	Test Switch	Test Key is for testing the unit, if this function is enabled in the settings.
⊙	Reset Switch	Reset key is used to reset the fault annunciations. RESET key is used to discard while doing the settings and abort to main menu.
⊙	BC Switch	CB key is used to close the Circuit Breaker (Available in Auto re-closure model only)

Note: At the time of setting if changes are not carried within 20s then the display will reset itself and return to the main menu.

Front Panel and Control :

S.no	LED's	Description
1	I >	This led indicates an over current.
2	I >>	This led indicates a short circuit.
3	Ie >	This led indicates an Earth Fault at lower set.
4	Ie >>	This led indicates an Earth Fault at higher set.
5	CBFP	This led indicates a circuit breaker fault.
6	Lock Out	This led indicated that the Auto Re-closure attempts were not able to clear the faults.
7	TCS	This led indicates a Trip Circuit Failure.
8	Trip	This led indicates a fault occurrence.

LCD Display :
Back-lit LCD display 128 * 64 by 2 lines is provided for Viewing and Editing the parameter, Viewing and Editing the annunciation, Fault records, Event records, Date and Time and also for password changing.

6.0 Setting Procedure / Menus

COP Plus has provision to program the operating parameters.It is user / site configurable. User can view all parameters, fault history, events, adjust clock, reset password and also edit the parameter.
Following is the sequential procedure to edit.View all the menus and submenus.

Press "Back Switch ⊙ & Next Switch ⊙ simultaneously."
The LCD shall display, "Edit Parameter"

A. Edit Parameter
Edit Parameter is password protected.
To enter 'Edit Parameter' mode, press enter key ⊙
The LCD shall display, "Enter Password".

Enter Password. The default password is 123. Press enter ⊙ key .For any change in value, press Up switch ⊙ and Down switch ⊙
For next parameter, press Next Switch ⊙ .We can also view the previous parameter,by pressing Back Switch ⊙

B. Edit Annunciations

After Edit Parameter, press Up Switch ⊙
The LCD shall display "Edit Annunciation".
Cat_COP-Plus-Ver 1.0 01.01.2015
Edit Annunciation is password protected.
Edit Annunciation can modify / viewed by pressing enter key ⊙

C. Edit Block Function

After Edit Annunciation, press Up Switch ⊙
The LCD shall display "Edit Block Function".
Edit Block Function is password protected.
Edit Annunciation can modify / viewed by pressing enter key ⊙

D. View Parameter

After Edit Block Function, press Up Switch ⊙
The LCD shall display "View Parameter".
View Parameter can be viewed by pressing enter key ⊙

E. View Annunciation

After View Parameter, press Up Switch ⊙
The LCD shall display "View Annunciation".
View Annunciation can be viewed by pressing enter key ⊙

F. Display History

After View Annunciation, press Up Switch ⊙
The LCD shall display "Display History".
Trip record / history can be viewed by pressing enter key ⊙
COP-Plus keep a record of last 32 tripping with date and time stamp.
Tripping records are updated on first in first out basis.

F. Display Event

After Display History, press Up Switch ⊙
The LCD shall display "Display Event".
Trip record / history can be viewed by pressing enter key ⊙
COP-Plus keep a record of last 32 events with date and time stamp.
Event records are updated on first in first out basis.

F. Adjust Clock

After Display Event, press Up Switch ⊙
The LCD shall display "Adjust Clock".
Time and Date can be modified by pressing enter key ⊙

F. Reset Password
After Adjust Clock, press Up Switch ⊙
The LCD shall display "Reset Password".
Password can be modified by pressing enter key ⊙
COP-Plus will request for the present password, after feeding correct
password change password will be requested and the password will be
replaced by new password on pressing Up Switch ⊙
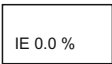
Default Display:
After Power ON or when the RESET is done, it will show the following
display :

ⓟ **PROCOM** VER 1. 08	This window will flash momentarily showing the following display. Then the control will go automatically to next window which is shown below :
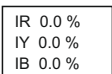
IR 0.0 % IY 0.0 % IB 0.0 %	This will display the current in all phases in terms of percentage if the display set to display value in secondary. After 10 sec the display will automatically scroll to next display window or press Enter key ⊙ can be used to manually switch to next window.

IE 0.0 %	This will display the earth fault current in terms of percentage. By pressing enter key , the display will show as :
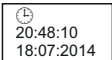
🕘 20:48:10 18:07:2014	This will the display the time and date.

6.1 Parameter Setting
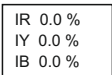
IR 0.0 % IY 0.0 % IB 0.0 %	This is default window showing the actual Primary Load Current as per CT ratio.

Press the Back Switch ⊙, and the Next Switch ⊙
simultaneously, the display will show as follows:
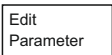
Edit Parameter	In this mode, we can edit the different parameter setting as per our convenience. To enter this mode, press enter key ⊙
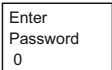
Enter Password 0	Enter password by using Up⊙ Switch and ⊙ the Down Switch

If the password is wrong, the display will be :

Wrong Password

After displaying this, it will return to the main menu.

If the password is correct, the display will be :

I >In I / In 0.50

By using Up Switch ⊙ and the Down Switch ⊙ , the desired value can be set. The value can be set from 0.10 to 9.99 in steps of 0.01 I/In.

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

I > Def Time 0.30

By using Up Switch ⊙ and the Down Switch ⊙ , the desired value can be set. The value can be set from 0.03 to 150.0 in steps of 0.01 sec.

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

I >Time Multiple 0.30

By using Up Switch ⊙ and the Down Switch ⊙ , the desired value can be set. The value can be set from 0.10 to 2.50 in steps of 0.01.

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

I > Characteristic DEFT

By using Up Switch ⊙ and the Down Switch ⊙ , the desired characteristic can be set. It can be set as DEFT / Extremely Inv / Very Inverse / Normal Inv 0.6 / Normal Inv 1.3 / Normal Inv 3.0

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

I >>in I/In 4.0

By using Up Switch ⊙ and the Down Switch ⊙ , the desired value can be set. The value can be set from 0.2 to 30.0 in steps of 0.1 I/In.

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

I >> Def Time 0.03

By using Up Switch ⊙ and the Down Switch ⊙ ,the desired value can be set. The value can be set from 0.03 to 20.0 in steps of 0.01 sec.

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

| EF Measure Type
51G EXT Earth CT | By using Up Switch ⊙ and the Down Switch ⊙ , the desired value can be set. The type can be set as either 51G EXT Earth CT or 51N Internal Cal. |

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

| Ie >In I / In
0.20 | By using Up Switch ⊙ and the Down Switch ⊙ , the desired value can be set. The value can be set from 0.10 to 10.0 in steps of 0.01 I/In. |

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

| Ie > Def Time
0.30 | By using Up Switch ⊙ and the Down Switch ⊙ , the desired value can be set. The value can be set from 0.03 to 150.0 in steps of 0.01 sec. |

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

| Ie >Time
Multiple
0.30 | By using Up Switch ⊙ and the Down Switch ⊙ , the desired The value can be set from 0.1 to 1.50 in steps of 0.01 |

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

| Ie >
Characteristic
Deft | By using Up Switch ⊙ and the Down Switch ⊙ , the desired can be set.It can be set from DEFT / Extremely Inv / Very Inverse / Normal Inv 0.6 / Normal Inverse 1.3 / Normal Inv 3.0 |

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

| Ie >>in I/In
0.5 | By using Up Switch ⊙ and the Down Switch ⊙ ,the desired value can be set. The value can be set from 0.2 to 10.0 in steps of 0.1 I/In. |

| Ie >> Def time
0.3 | By using Up Switch ⊙ and the Down Switch ⊙ ,the desired value can be set. The value can be set from 0.2 to 20.0 in steps of 0.1 I/In. |

Press the Next Switch ⏵ to view the next parameter, display will show as follows:

CT Ratio 1

By using Up Switch ⏶ and the Down Switch ⏷ , the desired value can be set. The value can be set from 1 to 9999 in steps of 1.

Press the Next Switch ⏵ to view the next parameter, display will show as follows:

CT Secondary 5A

By using Up Switch ⏶ and the Down Switch ⏷ , the desired value can be set. The value can be set either 5 Amp or 1 Amp.

Press the Next Switch ⏵ to view the next parameter, display will show as follows:

Trip Ckt Sup Disabled

By using Up Switch ⏶ and the Down Switch ⏷ , the desired type can be set. It can be set either as Disabled or Enabled.

Press the Next Switch ⏵ to view the next parameter, display will show as follows:

CB Failure Ann. Disabled

By using Up Switch ⏶ and the Down Switch ⏷ , the desired type can be set. It can be set either as Disabled or Enabled.

Press the Next Switch ⏵ to view the next parameter, display will show as follows:

CB F Dealay 0.50

By using Up Switch ⏶ and the Down Switch ⏷ , the desired value can be set. The value can be set from 0.05 to 2.00 in steps of 0.01

Press the Next Switch ⏵ to view the next parameter, display will show as follows:

Single Phasing Disabled

By using Up Switch ⏶ and the Down Switch ⏷ , the desired type can be set. It can be set either as Disabled or Enabled.

Press the Next Switch ⏵ to view the next parameter, display will show as follows:

Test Function Disabled

By using Up Switch ⏶ and the Down Switch ⏷ , the desired type can be set. It can be set either as Disabled or Enabled.

Press the Next Switch ⏩ to view the next parameter, display will show as follows:

No. of AR Shots
0

By using Up Switch ⏶ and the Down Switch ⏷, the desired value can be set. The value can be set from 0 to 4 in steps of 1

Press the Next Switch ⏩ to view the next parameter, display will show as follows:

AR Shot 1 DT
2.0

By using Up Switch ⏶ and the Down Switch ⏷, the desired value can be set. The value can be set from 0.5 to 250 in steps of 0.1

Press the Next Switch ⏩ to view the next parameter, display will show as follows:

AR Shot 2 DT
2.0

By using Up Switch ⏶ and the Down Switch ⏷, the desired value can be set. The value can be set from 0.5 to 250 in steps of 0.1

Press the Next Switch ⏩ to view the next parameter, display will show as follows:

AR Shot 3 DT
2.0

By using Up Switch ⏶ and the Down Switch ⏷, the desired value can be set. The value can be set from 0.5 to 250 in steps of 0.1

Press the Next Switch ⏩ to view the next parameter, display will show as follows:

AR Shot 4 DT
2.0

By using Up Switch ⏶ and the Down Switch ⏷, the desired value can be set. The value can be set from 0.5 to 250 in steps of 0.1

Press the Next Switch ⏩ to view the next parameter, display will show as follows:

Reclaim Time
15

By using Up Switch ⏶ and the Down Switch ⏷, the desired value can be set. The value can be set from 10 to 500 in steps of 1.

Press the Next Switch ⏩ to view the next parameter, display will show as follows:

Close Pulse Time 1.0

By using Up Switch ⏶ and the Down Switch ⏷, the desired value can be set. The value can be set from 0.1 to 20.0 in steps of 0.1

Press the Next Switch ⏩ to view the next parameter, display will show as follows:

Reset Delay 0.5	By using Up Switch ⊙ and the Down Switch ⊙ , the desired value can be set. The value can be set from 0.1 to 1.0 in steps of 0.1 sec.

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

Disp Auto Scroll Auto Scroll On	By using Up Switch ⊙ and the Down Switch ⊙ ,the desired type can be set. The type can be set either as Auto Scroll On or Auto Scroll Off.

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

Dis in Pri/Sec Secondary	By using Up Switch ⊙ and the Down Switch ⊙, the desired type can be set. The type can be set either as Primary / Secondary.

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

Trip Reset Auto	By using Up Switch ⊙ and the Down Switch ⊙ , the desired type can be set. The type can be set either as Auto / Manual.

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

Device Id 1	By using Up Switch ⊙ and the Down Switch ⊙ , the desired value can be set. The value can be set from 1 to 247.

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

Baud Rate 9600	By using Up Switch ⊙ and the Down Switch ⊙ , the desired value can be set. The value can be set as 1200/2400/4800/9600/19200.

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

Parity None	By using Up Switch ⊙ and the Down Switch ⊙ , the desired parity can be set. It can be set as Even, Odd, None.

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

| No of Stop Bits 1 | By using Up Switch ⊙ and the Down Switch ⊙ , the desired value can be set. The value can be set as 1 or 2. |

Press the Next Switch ⊙ to go to the main menu.

6.2 To edit annunciation parameter :

After Edit Parameter, press Up Switch ⊙ , the display will show as follows:

| Edit Annunciation | In this mode, we can edit the different parameter setting as per our convenience. To enter this mode, press enter key ⊙ . The display will show as: |

| Enter password 0 | Enter password by using Up Switch ⊙ and Down Switch ⊙ Press the enter key ⊙ , the display will show as follows: |

If the password is wrong, the display will be :

| Wrong Password | After displaying this, it will return to the main menu. |

If the password is correct, the display will be :

| Announce I > On A1 Contact | By using Up Switch ⊙ and the Down Switch ⊙ , the desired contact can be set. It can be set as A1 / A2 / A3 / A4 / Not Announced |

Press the Next Switch ⊙ to view the next parameter, display will show as follows: .

| Announce I >> On A1 Contact | By using Up Switch ⊙ and the Down Switch ⊙ ,the desired contact can be set. It can be set as A1 / A2 / A3 / A4 / Not Announced. |

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

| Announce Ie> On A1 Contact | By using Up Switch ⊙ and the Down Switch ⊙ , the desired contact can be set. It can be set as A1 / A2 / A3 / A4 / Not Announced. |

Press the Next Switch ⓓ to view the next parameter, display will show as follows:

| Ann. CB Failure On A2 Contact | By using Up Switch ⓐ and the Down Switch ⓓ , the desired contact can be set. It can be set as A1 / A2 / A3 / A4 / Not Announced. |

Press the Next Switch ⓓ to view the next parameter, display will show as follows:

| Ann. Look Out On A3 Contact | By using Up Switch ⓐ and the Down Switch ⓓ , the desired contact can be set. It can be set as A1 / A2 / A3 / A4 / Not Announced. |

Press the Next Switch ⓓ to view the next parameter, display will show as follows:

| Ann. Trip Ckt On A4 Contact | By using Up Switch ⓐ and the Down Switch ⓓ , the desired contact can be set. It can be set as A1 / A2 / A3 / A4 / Not Announced. |

Press the Next Switch ⓓ to go the main menu.

6.3 To Edit Block Function:
After Edit Annunciation , press Up Switch ⓐ,the display will show as follows:

| Edit Block Function | In this mode, we can block the different current area as per our convenience. To enter this mode, press enter key ⓔ |

Enter password by using Up Switch ⓐ and Down Switch ⓓ

Press the enter key ⓔ , the display will show as follows:

| Wrong Password | After displaying this, it will return to the main menu. |

If the password is correct, the display will be :

<table>
<tr><td>Block 1>
Disabled</td><td>By using Up Switch ⊙ and the Down Switch ⊙ , the desired over current can be blocked. It can be set as enabled or disabled.</td></tr>
</table>

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

<table>
<tr><td>Block 1>>
Disabled</td><td>By using Up Switch ⊙ and the Down Switch ⊙ , the desired short circuit current can be blocked. It can be set as enabled or disabled.</td></tr>
</table>

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

<table>
<tr><td>Block I E >
Disabled</td><td>By using Up Switch   and the Down Switch   , the desired Earth fault lower set values can be blocked. It can be set as enabled or disabled.</td></tr>
</table>

Press the Next Switch ⊙ to view the next parameter, display will show as follows:

<table>
<tr><td>Block I E >>
Disabled</td><td>By using Up Switch ⊙ and the Down Switch ⊙ , the desired Earth fault lower set values can be blocked. It can be set as enabled or disabled.</td></tr>
</table>

Press the Next Switch ⊙ to go to the main menu.

6.5 To View Parameter
After Edit Block Function, press Up ⊙ Switch to View Parameter. In this mode, we can only view the readings of the parameter, no change in value is allowed here.

6.6 To View Annunciation
After View Parameter, press Up Switch ⊙ to View Annunciation. In this mode, we can only view the readings of the annunciation, no change in value is allowed here.

6.7 To View Display History:
After Edit Block Function, press Up Switch ⊙ ,the display will show as follows:

<table>
<tr><td>Display
History</td><td>To view the record of last faults occurred, press enter key ⊙ .</td></tr>
</table>

The Faults which occurred previously are displayed. Some of the Examples are:
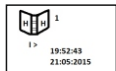
Whenever the fault occured, an fault is generated and will be shown in display history block with respective time and date. This is the random time and date for the example purpose.
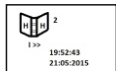
Whenever the fault occured, an fault is generated and will be shown in display history block with respective time and date. This is the random time and date for the example purpose.
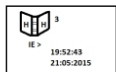
Whenever the fault occured, an fault is generated and will be shown in display history block with respective time and date. This is the random time and date

6.6 To View Display Event:

After Display History, press Up Switch ⊙ ,the display will show as follows:

To view the list of events occurred, press enter key ⊕ , the display will show as

The events which occurred previously are displayed. Some of the Examples are:
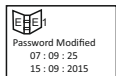
Whenever the password is changed, an event is generated and will be shown in display event block with respective time and date. This is the random time and date for the example purpose.
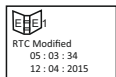
Whenever the time and date is changed, an event is generated and will be shown in display event block with respective time and date. This is the random time and date for the example purpose.
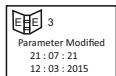
Whenever the value of parameter is changed, an event is generated and will be shown in display event block with respective time and date. This is the random time and date for the example purpose

6.7 To View Adjust Clock:

After Display Event, press Up Switch ⊙ ,the display will show as follows:
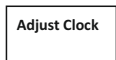
Adjust Clock   To change the time and date, press enter key ⊕ . The display will show as:

	This is the random time and date for the example purpose. The values can be change by using up arrow key ⬆ and down arrow key ⬇ .To switch from seconds to minutes or minutes to hours, press enter key, the cursor will move according to that and once time is changed, the date page is displayed as:
🕒 20 : 16 : 48	

	This is the random time and date for the example purpose. The values can be change by using up arrow key ⬆ and down arrow key ⬇ . To switch from seconds to minutes or minutes to hours, press enter ⬇ key, the cursor will move according to that.
🕒 16 : 07 : 2015	

6.8 To Reset Password

After Adjust Clock, press Next Switch ⊙, the display will show as follows:

Reset Password	To Reset the password, press enter key ⬇ , display will show as :
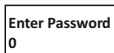
Enter Password 0	Enter the current password by using the up arrow key ⬆ and down arrow key ⬆ The display will show as :
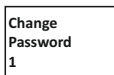
Change Password 1	Enter the new password which you want to set by using the up arrow key ⬆ and down arrow key ⬆, press enter key ⬇ , the display will show as :
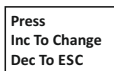
Press Inc To Change Dec To ESC	Press up arrow key ⬆ to update the password else pressdown arrow key ⬆ to escape from the page. The display will show as :
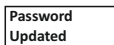
Password Updated	It means password is updated.

7.0 Setting Procedure Parameter Mode

Display	Explanation of parameter	Factory setting	Setting Range	Setting step
I > in I/In	Desired over current value in % of the rated current	0.50	0.1-10.00 I/In	0.01I/In
I > Def Time	Definite time delay in seconds, will be valid only when definite time characteristic is selected	0.30 Sec	0.10 – 150 Sec	0.01 Sec

Display	Explanation of parameter	Factory setting	Setting Range	Setting step
I > Time Multiplier	Inverse time multiplier, will be valid only when Inverse time characteristic is selected	0.3	0.10- 2.50	0.01
I > Characte ristic	Time delay characteristic for Over current	DEFT	DEFT, Extreme inverse, Very Inverse, Normal Inverse 0.6, Normal inverse 1.3, Normal Inverse 3.0	
I > > in I/In	Desired short circuit values in % of the rated current.	4.0	0.2-30.0 I/In	0.1 I/In
I >> Def Time	Definite time delay in seconds, will be valid only when definite time characteristic is selected	0.03	0.03 – 20 Sec	0.01 Sec
EF measure type	Earth fault measurement method	51G ext earth CT	51G ext earth CT 51N internal cal.	
I e> in I/In	Desired Earth fault value in % of the rated current	0.20	0.10-10.0 I/In	0.01 I/In
I e> Def Time	Definite time delay in seconds, will be valid only when definite time characteristic is selected	0.30 Sec	0.03 – 150 Sec	0.01 Sec
I e> Time Multiplier	Inverse time multiplier, will be valid only when Inverse time characteristic is selected	0.3	0.1 - 1.50	0.01

I e> Characteristic	Time delay characteristic for Earth fault current	normal inverse 3.0	DEFT, Extreme Inverse, Very Inverse, Normal Inverse 0.6, Normal inverse 1.3, Normal Inverse 3.0	
I e> > in I/In	Desired earth fault high set value in % of the rated current	0.5	0.2-10.0 I/In	0.1 I/In
I e>> Def Time	Time delay setting for earth fault high set	0.03	0.02 – 20 Sec	0.01 Sec
CT Ratio	Ratio of current transformer, Rated CT Primary current / Rated CT Secondary current	1	1-9999	1
CT-Secondary	Rated CT secondary current	5A	5A, 1A	
Trip Ckt Sup.	Trip Circuit supervision	Disabled	Enabled/disabled	
CB Failure Ann	Circuit Breaker Failure Protection	Disabled	Enabled/disabled	
CB F Delay	Delay time of CB	0.50	0.05-2.00	0.01
Single Phasing	Single Phasing Enable/Disable	Disabled	Enabled/disabled	
Test Function	Test Function Enable/Disable	Disabled	Enabled/disabled	
No. of AR Shots	No. of short for Auto reclosure	0	1-4	1
AR Shot 1 DT	Dead Time of AR short 1	2.0	0.5-250	0.1

AR Shot 2 DT	Dead Time of AR short 2	2.0	0.5-250	0.1
AR Shot 3 DT	Dead Time of AR short 3	2.0	0.5-250	0.1
AR Shot 4 DT	Dead Time of AR short 4	2.0	0.5-250	0.1
Reclaim Time	Time of Reclaim	15	10-500	1
Close Pulse Time	Time of Close Pulse	1.0	0.1-20.0	0.1
Reset Delay	Delay time for reset-ting the trip contact, after fault clearance.	0.5	0.1-1.0Sec	0.1 sec.
Disp AutoScroll	Measurement display auto scroll or manual scroll selection	Auto Scroll On	Auto Scroll On / Auto Scroll off	
Dis I in Pri/Sec	Selection of Current display in primary values or secondary values	Secondary	Primary/Secondary	
Trip Reset	Reset type for tripped LED indication	Auto	Auto / Manual	
Device ID	Device Identification Number	5	1-247	1
Baud Rate	Communication Baud Rate	9600	1200, 2400, 4800, 9600, 9200	
Parity	Parity Bit	None	Even, Odd, None	
No. of Stop Bits	No of stop bit	1	1-2	1

*Available only in model with auto-reclosure

8.0 External Alarm Contact

1.0 Alarm Contact 1,2, 3 & 4 can be programmed / activated on different protection functions

Protection Function	Protection Symbol	Activated Alarm, default setting	Remark
Announce I >	I >	1	Alarm 1 activated on I >
Announce I >>	I >>	1	Alarm 1 activated on I >>
Announce I E>	Ie >	1	Alarm 1 activated on Ie >
Announce IE >>	Ie >>	1	Alarm 1 activated on Ie >>
Ann CB Failure	CBFP	2	Alarm 2 activated on CB
Ann Lock Out	LR	3	Alarm 3 activated on Lock out
Ann Trip Ckt.	TCS	4	Alarm 4 activated on trip circuit

9.0 Reset – Auto / Manual

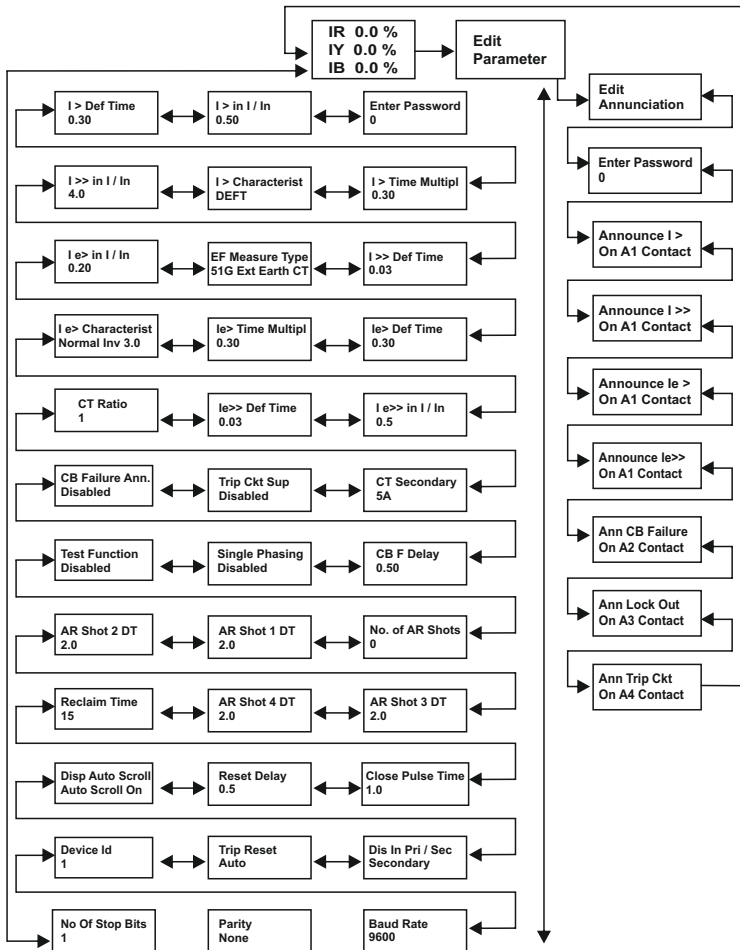User can programme COP-Plus either as auto reset or manual reset relay.

- Auto Reset : The trip contact & Indication will reset automatically after clearance of fault and expiry of reset delay.

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

10.0 Model Selection Chart

PROTECTION	ANSI Code	COP+I	COP+1E	COP+IEG	COP+IK	COP+IEK	COP+IEGK
IDMT Over Current Protection	51	■	■	■	■	■	■
Short Circuit Protection	50	■	■	■	■	■	■
Earth Fault Protection (Seperate CT)	51N			■			■
Earth Fault Protection Calculated	51G		■	■			■
High Set Earth Fault Protection(Seperate CT)	50N		■	■		■	■
High Set Earth Fault Protection(Calculated)	50G			■			■
Circuit Breaker Failure Protection	50BF	■	■	■	■	■	■
Auto Reclosure (Optional)	79				■	■	■
Trip Circuit Protection(Optional)	74TC	■	■	■	■	■	■
Front USB Part		■	■	■	■	■	■
RS-485 Communication Port(Optional)		■	■	■	■	■	■
Digital Input(Optional)		3	3	3	5	5	5
Digital Output		6	6	6	7	7	7

11.0 Flow chart
Flow Chart - To Edit Parameter & To Edit Annunciation

| IR 0.0 % |
| IY 0.0 % |
| IB 0.0 % |

→ **Edit Parameter**

Edit Annunciation

| I > Def Time 0.30 | ↔ | I > in I / In 0.50 | ↔ | Enter Password 0 |

Enter Password 0

| I >> in I / In 4.0 | ↔ | I > Characterist DEFT | ↔ | I > Time Multipl 0.30 |

Announce I > On A1 Contact

| I e> in I / In 0.20 | ↔ | EF Measure Type 51G Ext Earth CT | ↔ | I >> Def Time 0.03 |

Announce I >> On A1 Contact

| I e> Characterist Normal Inv 3.0 | ↔ | Ie> Time Multipl 0.30 | ↔ | Ie> Def Time 0.30 |

Announce Ie > On A1 Contact

| CT Ratio 1 | ↔ | Ie>> Def Time 0.03 | ↔ | I e>> in I / In 0.5 |

Announce Ie>> On A1 Contact

| CB Failure Ann. Disabled | ↔ | Trip Ckt Sup Disabled | ↔ | CT Secondary 5A |

Ann CB Failure On A2 Contact

| Test Function Disabled | ↔ | Single Phasing Disabled | ↔ | CB F Delay 0.50 |

Ann Lock Out On A3 Contact

| AR Shot 2 DT 2.0 | ↔ | AR Shot 1 DT 2.0 | ↔ | No. of AR Shots 0 |

Ann Trip Ckt On A4 Contact

| Reclaim Time 15 | ↔ | AR Shot 4 DT 2.0 | ↔ | AR Shot 3 DT 2.0 |

| Disp Auto Scroll Auto Scroll On | ↔ | Reset Delay 0.5 | ↔ | Close Pulse Time 1.0 |

| Device Id 1 | ↔ | Trip Reset Auto | ↔ | Dis In Pri / Sec Secondary |

| No Of Stop Bits 1 | | Parity None | | Baud Rate 9600 |

Flow Chart - To View Parameter & To View Annunciation

IR 0.0 %		View
IY 0.0 %	→	Parameter
IB 0.0 %		

View Parameter flow (left side):

| I > Def Time 0.30 | ↔ | I > in I / In 0.50 | ↔ | Enter Password 0 |

| I >> in I / In 4.0 | ↔ | I > Characterist DEFT | ↔ | I > Time Multipl 0.30 |

| Ie > in I / In 0.20 | ↔ | EF Measure Type 51G Ext Earth Ct | ↔ | I>> Def Time 0.03 |

| Ie> Characterist Normal Inv 3.0 | ↔ | Ie > Time Multipl 0.30 | ↔ | Ie > Def Time 0.30 |

| CT Ratio 1 | ↔ | Ie >> Def Time 0.03 | ↔ | I e >> in I / In 0.5 |

| CB Failure Ann. Disabled | ↔ | Trip Ckt Sup Disabled | ↔ | CT Secondary 5A |

| Test Function Disabled | ↔ | Single Phasing Disabled | ↔ | CB F Delay 0.50 |

| AR Shot 2 DT 2.0 | ↔ | AR Shot 1 DT 2.0 | ↔ | No. of AR Shots 0 |

| Reclaim Time 15 | ↔ | AR Shot 4 DT 2.0 | ↔ | AR Shot 3 DT 2.0 |

| Disp Auto Scroll Auto Scroll On | ↔ | Reset Delay 0.5 | ↔ | Close Pulse Time 1.0 |

| Device Id 1 | ↔ | Trip Reset Auto | ↔ | Dis In Pri / Sec Secondary |

| No of Stop Bits 1 | | Parity None | | Baud Rate 9600 |

View Annunciation flow (right side):

View Annunciation

Enter Password 0

Announce I> On A1 Contact

Announce I>> On A1 Contact

Announce Ie> On A1 Contact

Announce Ie>> On A1 Contact

Ann CB Failure On A2 Contact

Ann Lock Out On A3 Contact

Ann Trip Ckt On A4 Contact

Flow Chart - To Display History

Flow Chart - To Display Event

Note : Event 1 To Events 32 Can Be Viewed Respectively

Flow Chart - To Adjust Clock
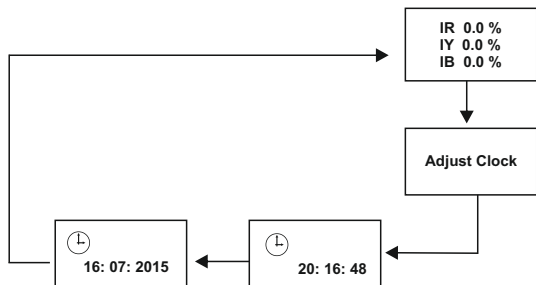
Flow Chart - To Reset password
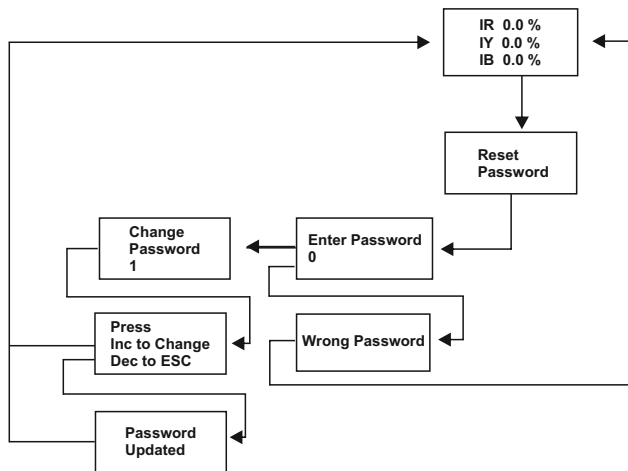
12.0 Communication

The word communication, as the word symbolise itself, it is basically the communication of COP with PC via RS-232 or RS-485 protocol to know the values of data stored or list of events or faults records. We can also send the values of parameter or reset it or send the default values as per the application made. The software provide us great facilities to view all the readings or allow us to do changes very conveniently and it is very secure also.

Whenever the application is open, it requires login information for the security purpose. The display will be :

By entering the user name and password, click OK then the new screen is displayed as :

Whenever the device is connected to the PC, a comport is generated, check the device manager for the port name, enter the Communication Port ,Baud Rate, Data Bits, Parity, Stop Bits and then press OK.The display will show as:

In this main form, we can select the model via select model, the display will be :

By pressing the show read button, all the values stored in meter will be displayed. The save button is used to save all the readings.

We can also change the values and press send button to pass the values into the COP. By pressing Clear butrton, we can clear all the values in text boxes and drop down list. By pressing Close button, the form will be closed.

In the main form, by clicking the event login menu strip the display will be:

By clicking Fault Record, the faults generated will be displayed in the form as :

By clicking the Event record, the list of events generated will be displayed on the form as :

By clicking the read data, the values will be displayed on the form as :

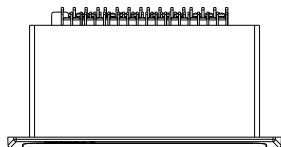## 13.0 Connection Diagram / Terminal arrangement
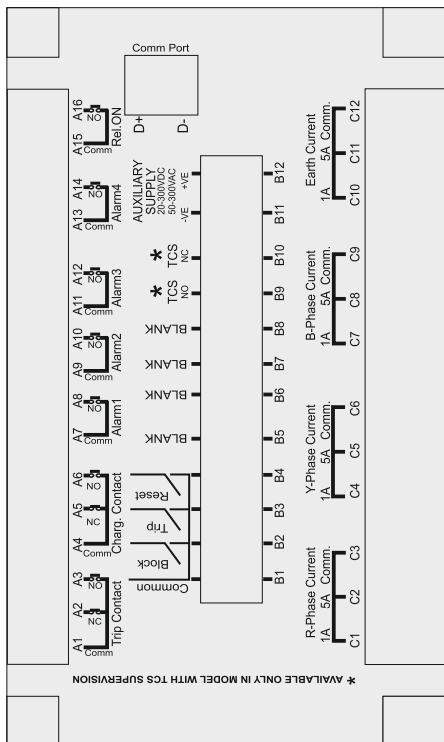
It is our endeavour to constantly upgrade our products, hence specifications are subject to change without any notice.

In case of Digital input, particular block is activated marked as DZ, depending upon the condition either trip contact is activated or relay contact is activated.
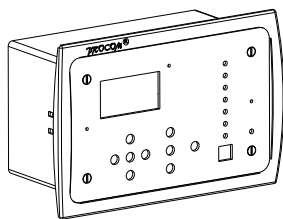
14.0 Technical specification

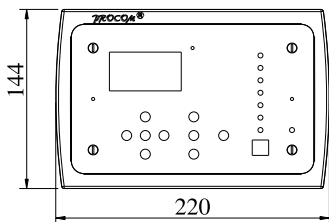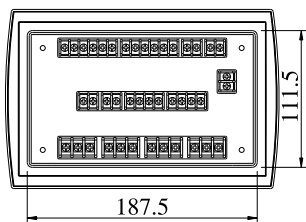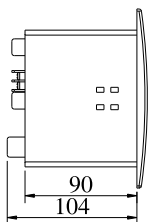|	
Frequency Range	40-70 Hz
Rated Current	1A /5A
Current withstand	10 times rated current
Measurement Accuracy	
• Voltage & Current	± 2%
• Frequency	± 0. 05 Hz.
Surge 1.2/50Usec	2.5KV
Auxiliary Voltage	20-300VDC & 50-300VAC
Contact Rating	230 VAC, 5A
Cut out Dimensions	190mm X 114mm
Depth	104mm

15.0 Dimensional Details :

Top View

Isometric View
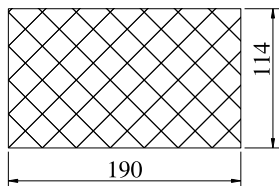

Front View

144
220

Rear View

111.5
187.5

Side View

90
104

Cut Out Size

114
190