

USER MANUAL
FOR
GENSET CONTROL UNIT

MODEL - EEPL_666 With RS-485

Version 1.0

Date of Release :2/09/2017

Table of Content

Sr. No.	Description	Page No.
1.	Introduction	1
2.	Features	
3.	PUSH Button & Contacts	
4.	Display Parameter	2
5.	LED Indication & Action on faults	3
6.	Programmable Parameter	4-5
7.	Description of Programming Parameter	6-10
8.	Default Setting of Programmable Parameter	11-12
9.	Current Unbalance Detection, Run Hour Calculation & Salient Features	13
10.	Fault Handling Procedure	14
11.	EB Sensing	
12.	Clearing the alarm	
13.	Fan Application	
14.	Do's and Don't	
15.	Wiring Diagram	15
16.	Rear View	
17.	Side View	
18.	General Characteristics	16
19.	Electrical Connection Diagram	

INTRODUCTION

Smart DG Controller is an advanced Micro controller based DG protection unit and has been specifically designed to meet the harsh requirement of Indian conditions. The controller uses a 32 bit Maxim Processor coupled with 21 bit sigma delta ADC to ensure accuracy of data with reliability and repeatability.

FEATURES

- Micro controller Based Design
- Compact Size, Elegant Design & Easy Install
- Designed for water/Air cooled Engine
- Tamper proof Engine Running hour counters with Blinking Option
- Push buttons for display scroll control, fault accept, Fault reset, crank and stop solenoid
- Reverse Polarity Protection

PUSH BUTTON

Stop — Stop Key is used to stop DG.

Start — Start key is used to start DG.

Reset — This key reset led indication and LCD indication when fault occurred.

Accept — This key is use to reset alarm relay

UP — In Programming mode this key is used to change selected digit from 0-9 and in normal mode used as scroll key

Down — In Programming mode this key is used to select digit that user want to change and shift from one parameter setting to another parameter setting. And in normal mode used to freeze display

Contacts — STOP (NO) ALARM/HOOTER(NO)
 START (NO) GCB(NO)

DISPLAY PARAMETERS

Sr. No.	Message	Description
1	Display Version	-
2	R - Phase to neutral voltage	Alphanumeric display
3	Y - Phase to neutral voltage	Alphanumeric display
4	B - Phase to neutral voltage	Alphanumeric display
5	R-Y Voltage	Alphanumeric display
6	Y-B Voltage	Alphanumeric display
7	B-R Voltage	Alphanumeric display
8	R- phase Current	Alphanumeric display
9	Y- phase Current	Alphanumeric display
10	B- phase Current	Alphanumeric display
11	Frequency	Alphanumeric display
12	RPM	Alphanumeric display
13	Fuel level display, BAR graph & Percentage	Alphanumeric display
14	Oil Pressure display, BAR graph	Alphanumeric display
15	Temperature display, BAR graph	Alphanumeric display
16	Power Factor (Individual and combined)	Alphanumeric display
17	Active Power	Alphanumeric display
18	Active Energy	Alphanumeric display
19	Run Hours	Alphanumeric display
20	Service due Hours	Alphanumeric display
21	Battery voltage	Alphanumeric display
22	Engine Cooling System	Alphanumeric display
23	Communication ID	Alphanumeric display
24	Faults log history upto 50	Alphanumeric display
25	Fuel log history upto 10	Alphanumeric display

LED INDICATION & ACTION ON FAULTS

Sr.No.	Name of Faults	Description of Indication
1	LLOP	LED Indication, alarm, DG stop & GCB Contactor ON for 3 sec & Alphanumeric Display
2	RWL / Fan F.	LED Indication, alarm, DG stop & GCB Contactor ON for 3 sec & Alphanumeric Display
3	HCT/HWT	LED Indication, alarm, DG stop & GCB Contactor ON for 3 sec & Alphanumeric Display
4	Low fuel level (LFL)/Comm. Fail	LED Indication, alarm, DG stop & GCB Contactor ON for 3 sec & Alphanumeric Display / LED Blink for Communication Fail.
5	Emergency/canopy Temp.	LED Indication, alarm, DG stop & GCB Contactor ON for 3 sec & Alphanumeric Display
6	Under /over voltage/over current	LED Indication, alarm, DG stop & GCB Contactor ON for 3 sec & Alphanumeric Display / LED Blink, alarm, DG stop & GCB Contactor ON for 3 sec & Alphanumeric Display
7	Over / Under Speed	LED Indication, alarm, DG stop & GCB Contactor ON for 3 sec & Alphanumeric Display
8	Charging Alternator	If Enable LED Indication, alarm, DG stop & GCB Contactor ON for 3 sec & Alphanumeric Display, If Disable only Hooter relay & LED on
9	Low Battery	Led indication
10	Service due hours	Led indication and alarm
11	Remote	if 12V Negative Signal applied on terminal no 38.
12	Current Unbalance	Current unbalance detects by using maximum current among three phase & Alphanumeric Display

PROGRAMMABLE PARAMETERS

Sr.No.	16X2 LCD display	Parameter Description
1	Engine Cooling / Water Cooled	Water cooled /Air Cool Temp Rng-1/ Air Cool Temp Rng-2
2	Phase Selection 3p Phase	1P/3P Phase selection
3	Ct Primary 0005	CT primary setting
4	Rpm Low 1400	Low RPM
5	Rpm High 1600	High RPM
6	Voltage Low 160	Low voltage
7	Voltage High 280	High voltage
8	Over Current 0010	Over Current
9	Unbalance Amp % 50%	Unbalance AMP %
10	LFL Setting L 20.0	Fuel level setting in %
11	Battery Low 11.0	Low battery
12	Service Due Hours 1000	Service due hours
13	Dg Stop Time 25 SEC	DG stop time
14	Buzzer Time 03 Min	Buzzer time
15	LLOP Bypass Time 10 SEC	LLOP by Pass Time
16	LLOP Delay 10 SEC	LLOP Action time after fault detected Continuously delay time for LLOP fault.

17	RWL Delay	RWL Action time after fault detected continuously for RWL delay time
18	HCT Delay	HCT Action time after fault detected continuously for HCT delay time
19	LFL Delay	LFL Action time after fault detected continuously for LFL delay time
20	Voltage Delay	Under/Over Volt Action time after fault detected continuously for UOV delay time
21	Speed Delay	RPM Action time after fault detected continuously for RPM delay time
22	Chg ALT Delay	Charging Alt./V Belt Action time after fault detected continuously for ALT delay time
23	Ampere Delay	Over Amp Action time after fault detected continuously for Oamp delay time
24	FAN fault Delay	FAN Action time after fault detected continuously for fan fault delay time
25	UnbL Amp Delay	Unbalance ampere Action time after fault detected continuously for Uamp delay time
26	Alternator Fail Enable	Alternator enable disable option
27	Fuel Log Time 02 MIN	Fuel Log Time
28	Fan Fault Enable	Fan fault enable / disable option
29	Remote Selection	Remote Mode enable / disable option
30	Communication ID	To set desired communication ID
31	Service Hour Clear	Service hour clear option
32	Parameter Save	

DESCRIPTION OF PROGRAMING PARAMETERS

Sr.No.	Steps
1	To enter in to programming mode press up and down keys simultaneously
2	The meter shall prompt for entry of password.
3	The default password is “1000”
4	Press ‘Down” key and now 1 appear on right side on LCD means first digit from MSB can change from 0-9 by using up key. For password Enter “1” at first digit.
5	Use Down key to shift to next digit, now can change value of second digit from 0 to 9 by using up key and enter “0” and so on. enter ‘1000’
6	After entering ‘1000’ press down key again. If the entered password is correct then meter shifts to programming mode otherwise the meter shows ‘0000’ and again prompts for entry of password.
7	GCU goes to set engine cooling setting. With the help of step 4&5 can change selection of engine cooling either Water cool or Air cool Temp Rng-1 & Air cool Temp Rng-2
8	Press down key, meter goes to set phase selection setting either 1 Phase or 3 Phase with the help of step 4&5 can change value of phase setting
9	Press down key, meter goes to set CT Primary setting. With the help of step 4&5 can change value of CT setting

10	<p>Press Down key, meter goes to set low level of RPM under this limit GCU stop DG set, generate alarm and glow “OS/US” led and display show on LCD, default low value of RPM is “RPM Low 1400”. With the help of step 4&5 can change low value of RPM</p>
11	<p>Press Down key, meter goes to set high level of RPM, above this limit GCU stop DG set, generate alarm and glow “OS/US” led and display show on LCD, default high value of RPM is “RPM Low 1600”. With the help of step 4&5 can change high value of RPM</p>
12	<p>Press Down key, meter goes to set low voltage level setting under this limit GCU stop DG set, generate alarm and glow “OV/UV” led and display show on LCD, default setting is “VOLTAGE LOW 160”. With the help of step 4 &5 can change value of low voltage.</p>
13	<p>Press Down key, meter goes to set high voltage level above this limit GCU stop DG set, generate alarm and glow “OV/UV” led and display show on LCD, default setting is “VOLTAGE HIGH 280”. With the help of step 4 &5 can change value of high voltage.</p>
14	<p>Press Down key, meter goes to set over current level above this limit GCU stop DG set, generate alarm and glow “OV/UV” led and display show on LCD, default setting is “OVER CURRENT 0010”. With the help of step 4 &5 can change value of over current.</p>

15	<p>Press Down key, meter goes to set unbalanceAmp 50% setting. With the help of step 4 &5 can change selection of unbalance Amp, default setting “unbal % 20” unbalance feature work when load in any phase greater then 25% of set limit in “over current” setting</p>
16	<p>Press Down key, meter goes to set percentage of fuel level, under this limit GCU stop DG set, generate alarm and glow “low fuel” led and display show on LCD, default value is “ LFL SETTING 20.0”.</p> <p>With the help of step 4 &5 can change value of percentage of fuel level.</p>
17	<p>Press Down key, meter goes to set low battery value, under this limit GCU glow “low bat” led and display show on LCD, default battery voltage is “BATTERY LOW 11.0V”. With the help of step 4 &5 can change value of low level of battery value</p>
18	<p>Press Down key, meter goes to set service hours, default service hours is “SERVICE DUE HOUR 1000”,</p> <p>With the help of step 4 &5 can change value of service hours. When service hour complete GCU glow service due LED & generate alarm.</p>
19	<p>Press Down key, meter goes to set stop relay timer, default stop timer is “DG STOP TIME 25 SEC”.,</p> <p>Timer is in seconds. With the help of step 4 &5 can change value of stop time.</p>
20	<p>Press Down key, meter goes to set buzzer timer, default buzzer timer is “BUZZER TIME 03 MIN”.,</p> <p>Timer is in minutes. With the help of step 4 &5 can change value of stop time.</p>
21	<p>Press Down key, meter goes to set LLOP bypass timer, default LLOP bypass timer is “LLOP BYPASS TIME 25 SEC”., Timer is in seconds. With the help of step 4 &5 can change value of LLOP bypass time.</p>

22	<p>Press Down key, meter goes to set LLOP delay time default LLOP Delay time is “LLOP Delay TIME 10 SEC”., Timer is in seconds. With the help of step 4 &5 can change value of LLOP delay time. Use above step to change the supervision (delay time) of following faults.</p> <p>RWL DELAY (10 SEC) HCT DELAY (10 SEC) LFL DELAY (10 SEC) VOLTAGE DELAY (10 SEC) SPEED DELAY (10 SEC) CHG ALT DELAY (10 SEC) AMPERE DELAY (10 SEC) FAN FAULT DELAY (10 SEC) UNBL AMP DELAY (15 Min)</p> <p>Note : Unbalance Amp (UNBL Amp) Delay Time is in Min.</p>
23	<p>Press Down key, meter goes to enable/ disable option of charging Alternator mode (“ALTERNATOR FAIL DISABLE”), default setting is enable. Use up key to change enable / disable feature . If charging alternator disable does not effect on run hours</p>
24	<p>Press down key, meter goes to fuel log time, default fuel log time is “FUEL LOG TIME 02 MIN”. With the help of step 4& 5 change value of fuel log time.</p>
25	<p>Press down key, meter goes to enable / disable option of fan fault (“FAN FAULT DISABLE) default is Enable ‘up’ key to change enable / disable feature.</p>
26	<p>Press down key, meter goes to enable / disable option of Remote (“REMOTE DISABLE”) default is Enable ‘up’ key to change enable / disable feature.</p>
27	<p>Press down key, meter goes to communication ID setting default Communication ID is “001”. With the help of step 4& 5 change value of communication ID.</p>

Note:- For Unbalance AMP%, User can Enable/Disable “Current unbalance” by entering “9812” password using step 1,4 & 5.

<p>28</p>	<p>Press down key, meter goes to clear service hour's mode (SERVICE HOUR CLEAR".) To clear service hours press up key display show "SERVICE HOUR CLEAR", Again press up key display show "SERVICE HOUR CLEAR SURE", Again press up key GCU clear service hours and generate message "SERVICE HOUR CLEAR ok".</p>
<p>29</p>	<p>Press down key, meter goes to save for all parameters "PARAMETER SAVE".Press up key display show "YES", by using down key can change YES or NO options. By using UP key save all setting message display done</p>

Note 1:- For Unbalance AMP%, User can Enable/Disable "Current unbalance" by entering "9812" password using step 1,4 & 5.

DEFAULT SETTING OF PROGRAMMABLE PARAMETER

The following various programmable parameters user can set using the same process as use in programming mode

Sr. No	Parameters	Explanation of Parameters	Default setting	Setting range
1	Engine Cooling Water Cooled	Engine Cooling Selection	Water	Water /Air cool Temp Rng-1/ Air cool Temp Rng-2
2	Phase Selection Phase	Phase Selection	3P	1P/3P
3	CT Primary	CT primary setting	0005	5 - 9999
4	RPM Low	Minimum RPM limit, below that RPM treated unhealthy and stop DG, generate alarm, GCB relay on for 3 sec, LED indication, LCD display.	1400	1200 -1500
5	RPM High	Maximum RPM limit, Above that RPM treated unhealthy and stop DG, generate alarm, GCB relay on for 3 sec, LED indication, LCD display.	1600	1500 -1800
6	Voltage Low	Minimum Voltage limit, below that voltage treated unhealthy and stop DG, generate alarm, GCB relay on for 3 sec, LED indication, LCD display.	160	80 - 350
7	Voltage High	Maximum voltage limit, Above that voltage treated unhealthy and stop DG, generate alarm, GCB relay on for 3 sec, LED indication, LCD display.	280	80 - 350
8	Over Current	Maximum Current limit, Above that current treated unhealthy and stop DG, generate alarm, GCB relay on for 3 sec, LED indication, LCD display.	0010	1 - 9999
9	Unbalance Amp%	In unbalance amp condition stop DG, generate alarm, GCB relay on for 3 sec, LCD display. unbalance feature work when load in any phase greater then 25% of set limit in "over current" setting	50	1 - 99
10	Low Fuel	Low fuel alarm in %, Below that controller stop DG, generate alarm, GCB relay on for 3 sec, LED indication,LCD display and auto reset if condition is OK.	20.0	1 - 99
11	Battery Low	Minimum battery voltage limit below this Low Battery LED glow.	11.00	1 - 36
12	Service Due Hour	Time in hours after service is Due.	1000	1 - 9999
13	DG Stop Time	Time duration for which stop relay is on.	25 Sec	5 - 99sec
14	Buzzer Time	Time duration for which buzzer relay is on.	03 Min	1-99min
15	LLOP Bypass Time	Time duration after that LLOP fault start to detect.	10 Sec	5-99 sec

16	LLOP DELAY	Controller detects the fault signal for LLOP Delay time, if fault is continuous, controller stop the DG, generate alarm & GCB relay on for 3 sec.	10 Sec	1-99 sec
17	RWL DELAY	Controller detects the fault signal for RWL Delay time, if fault is continuous, controller stop the DG, generate alarm & GCB relay on for 3 sec.	10 Sec	1-99 sec
18	HCT DELAY	Controller detects the fault signal for HCT Delay time, if fault is continuous, controller stop the DG, generate alarm & GCB relay on for 3 sec.	10 Sec	1-99 sec
19	LFL DELAY	Controller detects the fault signal for LFL Delay time, if fault is continuous, controller stop the DG, generate alarm & GCB relay on for 3 sec.	10 Sec	1-99 sec
20	VOLTAGE DELAY	Controller detects the fault signal for Voltage Delay time, if fault is continuous, controller stop the DG, generate alarm & GCB relay on for 3 sec.	10 Sec	1-99 sec
21	SPEED DELAY	Controller detects the fault signal for speed delay time, if fault is continuous, controller stop the DG, generate alarm & GCB relay on for 3 sec.	10 Sec	1-99 sec
22	CHG ALT DELAY	Controller detects the fault signal for CHG ALT delay time, if fault is continuous, controller stop the DG, generate alarm & GCB relay on for 3 sec.	10 Sec	1-99 sec
23	AMPERE DELAY	Controller detects the fault signal for Ampere delay time, if fault is continuous, controller stop the DG, generate alarm & GCB relay on for 3 sec.	10 Sec	1-99 sec
24	FAN FAULT DELAY	Controller detects the fault signal for FAN fault delay time, if fault is continuous, controller stop the DG, generate alarm & GCB relay on for 3 sec.	10 Sec	1-99 Sec
25	UNBL AMP DELAY	Controller detects the fault signal for UNBL AMP delay time, if fault is continuous, controller stop the DG, generate alarm & GCB relay on for 3 sec.	15 Min	1-99 Min.
26	ALTERNATOR FAIL	Chg Alternator fail setting	Enable	Enable/disable
27	FUEL LOG TIME	Fuel log time setting	02 Min	1-99 Min
28	FAN FAULT	Fan fault setting	Enable	Enable/disable
30	Remote Selection	Remote Mode setting	Disable	Enable/disable
30	MODBUS ID	RS-485 Comm. ID thru Modem (*Note-2)	Disable	255
29	Service Hour Clear	This screen is used to clear service hour .		

Note 2:- For MODBUS ID, User can Enable/Disable "ID". if Disable then set 255 & if Enable then set 1-247 as controller ID for Communication.

Current Unbalance Detection

- A) Controller does not take any action till the current is below 25% of the over current set limit (Sr. no. 8 of programmable parameter) in three Phase.
- B) Controller monitors the current and upon any phase current exceeding 25% compares it with other phase currents and if the difference between max current & other phase current exceed set value in % defined at Sr. no. 9 in programmable parameters, then controller consider it as a current unbalance condition.
- C) In case the current unbalance persists for a period greater then the limit specified by setting with Sr. no. 25 in default setting of programmable parameters and between 1-99 minutes, then controller issues STOP command.
- D) The default setting for this feature is “DISABLE”.

Run Hour Calculation

- A) Run Hour register is incremented when following inputs are present (interlocked):-
 - 1) 230 Vac O/p of DG
 - 2) O/p of Charging Alternator
 - 3) DC Battery voltage > Set “low Battery voltage” (Sr. no. 11 in programmable parameter)
- B) In case the alternator feature is in “Disable Mode” then Run Hour will increase with following inputs are present (interlocked) :-
 - 1) 230 Vac O/p of DG
 - 2) DC Battery voltage > Set low Battery voltage (Sr. no. 11 in programmable parameter)

Salient Features:-

Option with Remote LED (REMOTE Function)

- 1. Engine will run till 12V Negative Signal is available at terminal no 37, This function is only applicable if 12V Negative Signal is given at terminal no 38 & “Remote Selection” setting should be Disable in programming mode.
- 2. GENSET will STOP if Negative Signal removed from terminal no 37. This function is only applicable if 12V Negative Signal is given at terminal no 38 & “Remote Selection” setting should be Disable in programming mode.
- 3. Engine will also run if Start command Signal received from web application, This function is only applicable if 12V Negative Signal is given at terminal no 38 & “Remote Selection” setting should be ‘Enable’ in programming mode.
- 4. GENSET will also STOP if Stop command Signal received from web application. This function is only applicable if 12V Negative Signal is given at terminal no 38 & “Remote Selection” setting should be ‘Enable’ in programming mode.

MODE Function:-

- 1. GENSET will switch to Remote mode, if 12V Negative Signal applied on terminal no 38.
- 2. GENSET will switch to Manual mode, if 12V Negative Signal removed from terminal no 38.

Remote LED Function:-

- 1. If 12V Negative Signal Applied on terminal no 38, Remote LED will ON.
- 2. If 12V Negative Signal Applied on terminal no 37, Remote LED will BLINK.

RS-485 Description

- 1. RS-485 to be used for communication thru Modem only.

FAULT HANDLING PROCEDURE

- LLOP** - In case of negative (ground) at LLOP terminal meter detect fault and glow LLOP LED and display show on LCD for set value in LLOP delay. after that generate alarm, stop DG & GCB relay ON for 3 Sec. In LLOP fault meter sense the signal after set time in “LLOP bypass time”.
- RWL** - In case of negative(ground) at RWL terminal meter detect fault and glow RWL led and display show on LCD for set value in RWL delay. after that generate alarm stop DG and GCB relay ON for 3 Sec.
- HWT/HCT** - In case of negative at HWT/HCT terminal meter detect fault and glow HWT /HCT LED and display show on LCD for set value in HCT delay after that generate alarm, stop DG and GCB relay ON for 3 Sec.
- LFL** - In case of negative (ground) at LFL terminal meter detect fault and also detect fault if oil in tank is below the set value in “LFL SETTING 20”, glow LFL led and display show on LCD for set value in LFL delay. after that alarm generate, stop DG & GCB relay ON for 3 Sec. Can't start DG if Digital Fault.
- Emergency** - In case of negative (ground) at emergency terminal meter detect fault and glow emergency led and display show on LCD. Generate alarm, Stop DG and GCB relay ON for 3 Sec.
- Canopy Temp.** - In case of negative (ground) at canopy terminal meter detected fault and glow canopy led and display show on LCD. Generate alarm, stop DG & GCB relay ON for 3 Sec.

EB SENSING

- Controller sense the mains for 10 sec if Eb is healthy for 10sec continuously GCB relay turn ON for 3 Sec. and after recool time (1 min) EDGC stop DG set. If DG selection is 3 phase mains sensing through 3 phase. If DG selection is 1 phase mains sensing through 1 phase.

CLEARING THE ALARM

- When a Fault occurs the cause of a Fault is shown by display message and LED indication and start alarm.
- When we press the Accept button then alarm stop.
- When we press Reset button then LED & LCD indication will off.

FAN APPLICATION

Controller sense fan current when DG running in air cooled mode.

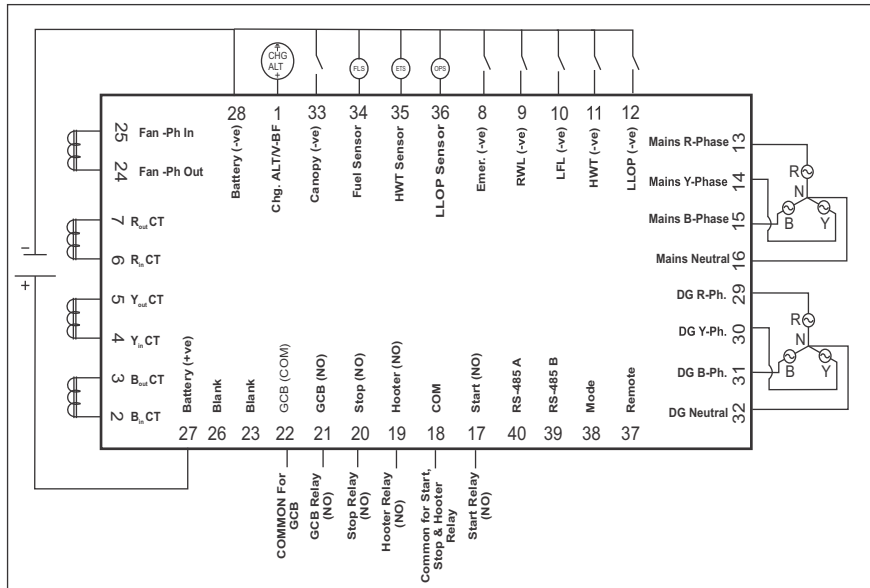
- If fan current < 200 mA, then generate alarm, stop DG & GCB relay ON for 3 Sec.
- If 200 mA < fan current < 2A, then there is no fault.
- If fan current > 2A, then generate alarm, stop DG & GCB relay ON for 3 Sec.

DO'S AND DON'T

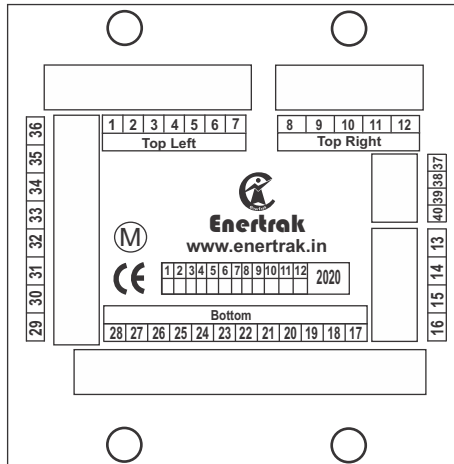
Take top Sticker as reference before connecting any wire to the back terminal

- Before connecting any wire to the back terminal please ensure that wire must be inserted at proper terminal.
- After connecting all the wire to the back connector. once again match all the wires with the top terminal sticker.
- Don't miss match any wire in the back green terminal.
- For servicing purpose take out the green female connector very carefully by entering uniform pressure on the connector from all sides.

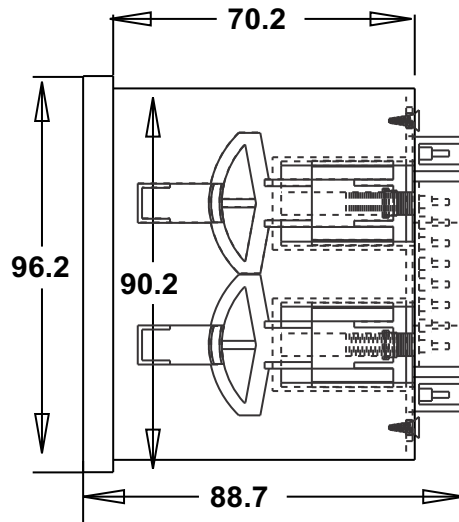
Wiring Diagram



Rear View



Side View



GENERAL CHARACTERISTICS

Rating/phase/Class	3X230V , 50Hz, 1Ph /3Ph
Size	96X96X65 MM
Panel Cutout	92X92 MM
Display Type	16X2 Alphanumeric LCD Display
Auxiliary Supply	8-36 Vdc (Default 12V Recommended)
Power Supply	Switch Mode Power Supply
Parameters	Auto/Push Mode
	R-Phase to neutral voltage, Y-Phase, to neutral voltage, B-Phase to neutral voltage, R-Y voltage, Y-B voltage, B-R voltage, R-Phase current, Y-phase current, B-phase current, Frequency, RPM Combined kW, Combined PF, kWh, DC voltage, Run Hours, Oil Pressure, Temperature, Fuel Level, 50 history fault, 10 fuel logs.
Class of Accuracy	1.0

ELECTRICAL CONNECTION DIAGRAM

DG Controller				EEPL_666			
Ter. No.	Description	Ter. No.	Description	Ter. No.	Description	Ter. No.	Description
1	Cht. ALT / V-BF	13	Mains R-Phase	17	Start (NO)	29	DG R-Phase
2	B _{in} CT	14	Mains Y-Phase	18	COM	30	DG Y-Phase
3	B _{out} CT	15	Mains B-Phase	19	Hooter (NO)	31	DG B-Phase
4	Y _{in} CT	16	Mains Neutral	20	Stop (NO)	32	DG Neutral
5	Y _{out} CT			21	GCB (NO)	33	Canopy (-ve)
6	R _{in} CT			22	GCB (COM)	34	Fuel Sensor
7	R _{out} CT			23	Blank	35	HWT-Sensor
8	EMER. (-ve)			24	Fan-Ph Out	36	LLOP-Sensor
9	RWL (-ve)			25	Fan-Ph In	37	Remote
10	LFL (-ve)			26	Blank	38	Mode
11	HWT (-ve)			27	Battery (+ve)	39	RS-485 B
12	LLOP (-ve)			28	Battery (-ve)	40	RS-485 A