

USER MANUAL FOR
FOR
ENGINE SAFETY UNIT
MODEL - EEPL-333



Version - 1.0

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INTRODUCTION

Smart DG Controller is an advanced Micro controller based Engine Safety Unit and has been specifically designed to meet the harsh requirement of Indian condition. The controller uses a 16 bit 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 and stop solenoid
- Reverse Polarity Protection

DISPLAY PARAMETERS

Sr. No.	Parameter Name	Description
1	Display of "EIPL" as the unit switches ON	–
2	DC Voltage	7-segment LED display auto scroll
3	RPM	7-segment LED display auto scroll
4	Run hours	7-segment LED display auto scroll
5	Service hours	7-segment LED display manual scroll
6	Oil Pressure Display	Bar graph in red and green LED
7	Water Temp./ AC-1/AC-2 Temp. Display	Bar graph in red and green LED
8	Fuel level Display	Bar graph in red, amber and green LED

LED INDICATION& ALARM ON FAULT

SR NO		
1	LLOP	LED Indication and Alarm & DG Stop
2	RWL/Fan F.	LED Indication and Alarm & DG Stop
3	HWT/HCT	LED Indication and Alarm & DG Stop
4	Low fuel	LED Indication and Alarm & DG Stop
5	Emergency/canopy Temp.	LED Indication and Alarm & DG Stop
6	Under/over speed	LED Indication and Alarm & DG Stop
7	Charging alternator	If Enable LED Indication, Alarm, DG stop If Disable only Hooter relay & LED on
8	Low battery	LED Indication
9	Service due hours	LED Indication and Alarm

PROGRAMMABLE PARAMERS

Sr No	7-segment display	Parameter Description
1	WC/AC-1/AC-2	Water Cool or Air Cool
2	L 1400 (RPM LED Glow)	Low RPM
3	H 1600 (RPM LED Glow)	High RPM
4	FL 20.0	Fuel Level in Percentage
5	LB 11.0	Low battery
6	S 1000	Service hours
7	Bzr 03	Buzzer timer
8	St 25	Stop relay timer
9	Lbt 10	LLOP by pass time
10	Ot 60	Delay time for LLOP,HCT,RWL,LFL
11	OF	Delay time for Fan Failure
12	OS	Delay time for Speed
13	OA	Delay time for Charging Alternator
14	Alt E	Alternator enable/disable option
15	FAN E	Fan fault enable/disable option
16	SHrc	Service hour clear option
17	SAVE	Save all settings

DESCRIPTION OF PROGRAMMABLE PARAMETERS

Sr. No.	Steps	Images
1	To Enter into programming mode , Press Scroll and Reset keys simultaneously.	
2	The meter shall prompt for entry of Password	
3	The default password is “1000”	
4	Press ‘scroll’ key and now first digit of MSB start to glow, by using scroll key can change value of selected (glowing) digit from 0 to 9. For password Enter “1” at first digit.	
5	Use reset key to shift to next digit, now second digit start to glow can change value of second digit from 0 to 9 by using scroll key and enter “0”and so on.	
6	After entering ‘1000’ Press reset key again. If the entered password is correct then meter shifts to programming mode otherwise the meter shows ‘0000’ again prompts for entry of password.	
7	Controller goes to set cooling technique whether it is water cooled or AC-1 or AC-2 with the help of step 4&5 can change the cooling technique.	
8	Press reset key, meter goes to set low level of RPM under this limit ESU stop DG set, generate alarm and glow “OS/US” led, default setting of low RPM is “L 1400” With the help of step 4 & 5 can change low value of RPM.	

9	<p>Press reset key, meter goes to set High level of RPM, above this limit ESU stop DG set, generate alarm and glow “OS/US” led, default high level of RPM is “H 1600”. With the help of step 4 & 5 can change value of high level of RPM.</p>
10	<p>Press reset key meter goes to set percentage of fuel level , under this limit ESU stop DG set, generate alarm and glow “low fuel” LED, default values “FL 20.0” With the help of step 4 & 5 can change value of percentage of fuel level.</p>
11	<p>Press reset key, meter goes to set low battery value, under this limit ESU glow “low bat” led and default battery voltage is “LB 11.0 V”. With the help step 4 & 5 can change value of low level of battery value.</p>
12	<p>Press reset key, meter goes to set Service hours default service hours is “S1000”. With the help of step 4 & 5 can change value of service hours.</p>
13	<p>Press reset key meter goes to set buzzer timer default buzzer timer is “b2r 03” min. Timer is in minute. with the help of step 4&5 can change value of buzzer time.</p>
14	<p>Press reset key, meter goes to set Stop relay time, default stop timer is “St 25” sec. Timer is in seconds. With the help of step 4 & 5 can change value of stop time.</p>

15	Press reset key, meter goes to set LLOP bypass time default bypass time is “Lbt 25”. Timer is in seconds. With the help of step 4 & 5 can change value of LLOP bypass time.
16	Press reset key, meter goes to set delay time for LLOP, HCT, RWL, LFL default delay time is “Ot 60”. Timer is in seconds. With the help of step 4 & 5 can change value of occurrence time.
17	Press reset key, meter goes to fan fault delay time, default delay time is “OF 10”. Timer is in seconds. With the help of step 4 & 5 can change value of fan fault delay time.
18	Press reset key, meter goes to speed delay time, default speed delay time is “OS 10”. Timer is in seconds. With the help of step 4 & 5 can change value of speed delay time.
19	Press reset key, meter goes to charging alternator delay time, default charging alternator delay time is “OA 10”. Timer is in seconds. With the help of step 4 & 5 can change value of charging alternator delay time.
20	Press reset key, meter goes to enable disable option of charging Alternator mode (“Alt E”), (“E” indicate enable & “d” indicate Disable), default is enable. Use ‘scroll’ key to change enable / disable feature.

21	<p>Press reset key, meter goes to enable disable option of Fan fault (“FAN d), (“E” indicate enable & “d” indicate Disable), default is enable. Use ‘scroll’ key to change enable / disable feature.</p>
22	<p>Press reset key, meter goes to clear service hour’s mode (“SHRC”). To clear service hours press scroll key display show “SHRC ?”, again press scroll key display show “SHRC s” (“S” for sure), again press scroll key ESU clear service hours and generate message “SHRC d”(“d” for done)</p>
23	<p>Press reset key, meter goes to save option for all parameters. Press scroll key display show “y” by using reset key select the option of “Y & N” (Yes / No). Finally press scroll key message display “done”</p>

DEFAULT SETTING OF PROGRAMMABLE PARAMETERS

Sr. No.	Parameters	Explanation of Parameters	Default setting	Setting range
1	Cooling Technique	Water cool or Air cool	WC	WC/AC-1 /AC-2
2	RPM Low	Minimum RPM limit, below this RPM treated unhealthy generate alarm and DG Stop.	1400	1200 - 1500
3	RPM High	Maximum RPM limit, above this RPM treated unhealthy generate alarm and DG Stop.	1600	1500 - 1800
4	Low Fuel Alarm	Low Fuel Alarm in % , Below this stop DG and generate alarm, auto reset if condition ok	20.0%	0-99%
5	Battery Low	Minimum battery voltage limit below this Low Bat LED glow.	11.0	1-36
6	Service Due Hour	Time in hours after service is due	1000	1-9999
7	Buzzer Time	Time duration for which buzzer relay is on.	03 Min	1-99 Min
8	DG Stop Time	Time duration for which stop relay is on.	25 Sec	5-99 Sec
9	LLOP Bypass Time	Time duration after that LLOP fault start to sense.	10 Sec	5-99 Sec
10	Occurrence Time	Controller detects the fault signal for occurrence time. If fault is continuous controller stop the DG and generate Alarm, Delay Time is common for LLOP, HCT, RWL, & LFL	60 Sec	1-99 Sec
11	OF	Delay time for Fan Failure	10 Sec	1-99 Sec
12	OS	Delay time for Speed	10 Sec	1-99 Sec
13	OA	Delay time for Charging Alternator	10 Sec	1-99 Sec
14	Chg Alternator fail	Alternator fail setting (E-Enable / d-disable)	E	E/d
15	Fan fault	Fan fault setting (E-Enable / d-disable)	E	E/d
16	Service Hour Clear	This screen is used to clear Service hour .		
17	Parameter Save	This screen is used to save all the parameter as given below.		

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

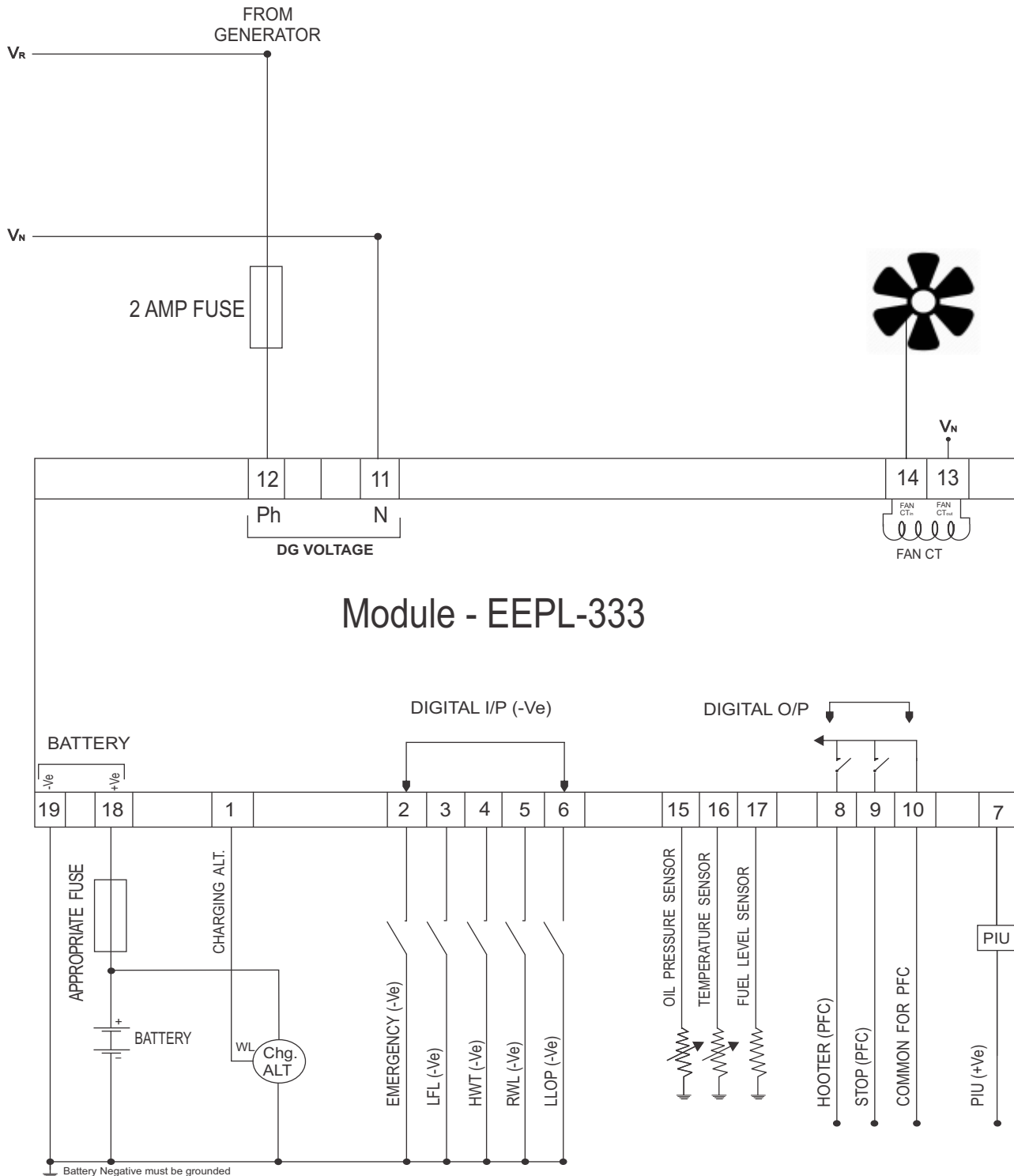
3) DC Battery voltage > Set “low Battery voltage” (Sr. no. 11 in programmable parameter)

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)

WIRING DIAGRAM FOR ENGINE SAFETY UNIT



Note 1 -These ground Connections must be on the Engine block ,and must be to the Sensor Bodies.

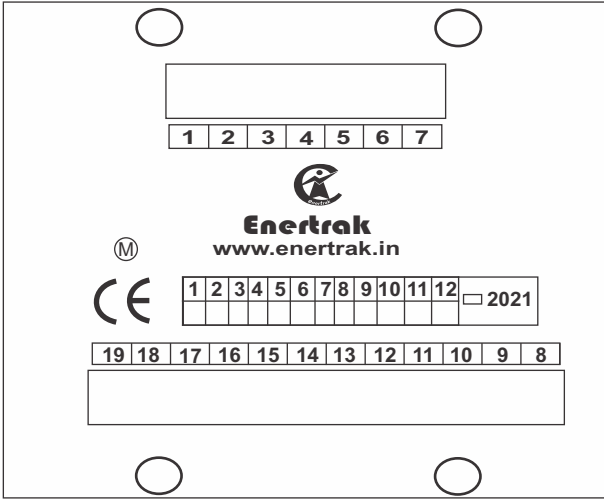
DIMENSIONS

96mm X 96mm X 65mm

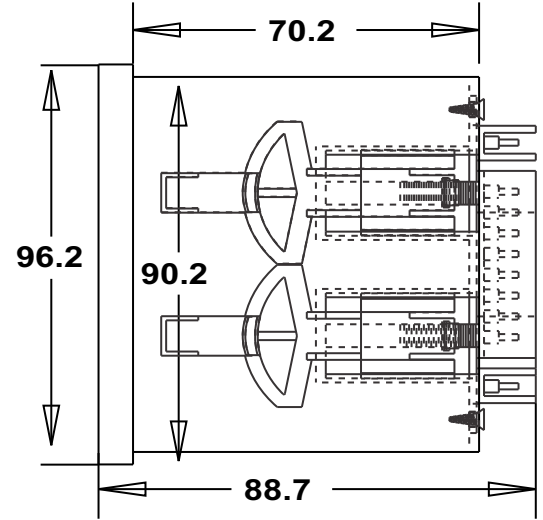
PANEL CUT OUT

92mm X 92mm

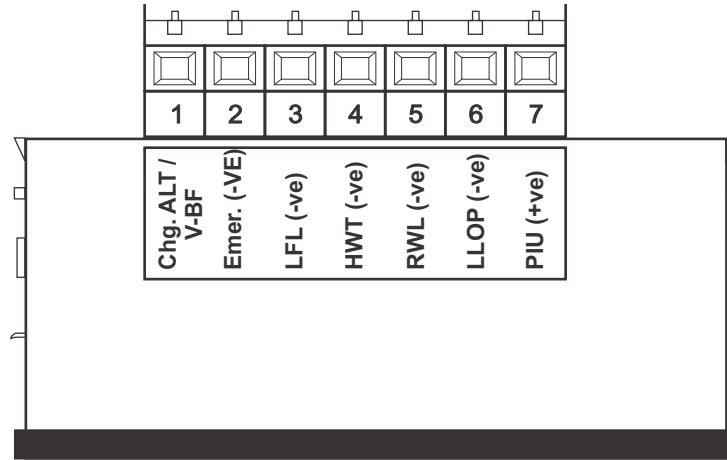
Rear View



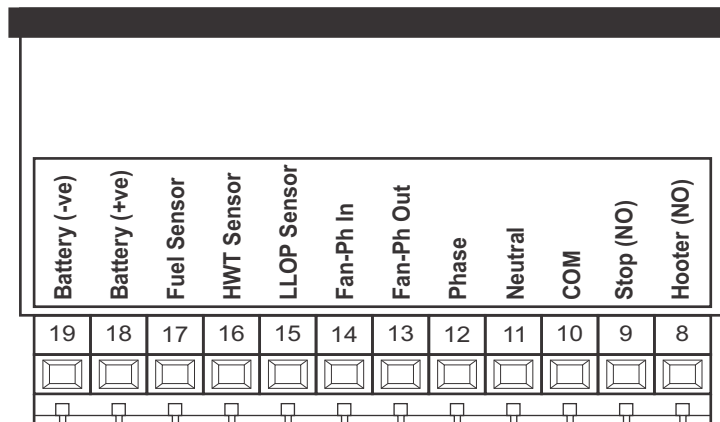
Side View



Top View



Bottom View



FAULT HANDLING PROCEDURE

- **LLOP** - In case of negative (ground) at LLOP terminal meter detect fault and glow LLOP LED for occurrence time. After that generate alarm and stop DG 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 for occurrence time after that generate alarm and stop DG.
- **HWT/HCT** - In case of negative (ground) at HWT/HCT terminal meter detect fault and glow HWT/HCT LED for occurrence time after that generate alarm and stop DG.
- **LFL (Low Fuel)** - 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 for occurrence time after that generate alarm and stop DG.
- **Emergency/Canopy Temp.** - In case of negative (ground) at emergency terminal meter detect fault and glow emergency / canopy Temp. LED and generate alarm and stop DG.
- **PIU (+Ve)** - In case of positive signal at PIU terminal Meter detect signal and glow PIU LED and stop DG.

FAN APPLICATION

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

- If fan current < 200 mA, then alarm generate & stop DG.
- If 200 mA < fan current < 2A, then there is no fault.
- If fan current > 2A, then alarm generate and stop DG.

CLEARING THE ALARM

- When a Fault occurs the cause of a Fault is shown by led indication and generate alarm.
- When we press the accept button then alarm relay reset.
- When we press reset button then LED indication off.

DO AND DON'T

- Take top Sticker as reference before connecting any wire to the back terminal
- Follow the connection as per POKA-YOKE.

- 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.

GENERAL CHARACTERISTICS

Rating/phase/Class	230V , 50Hz, 1Ph
Size	96X96X65 MM
Panel Cutout	92X92 MM
Display Type	7-segment LED display
Auxiliary Supply	8-36 Vdc (Default 12V recommended)
Power Supply	Switch Mode Power Supply
Parameters	Auto/Push Mode
	RPM, dc voltage, run hours, service hours.
Class of Accuracy	1.0

ELECTRICAL CONNECTION DIAGRAM

Engine Safety Unit		EEPL-333	
Ter. No.	Description	Ter. No.	Description
1	Cht. ALT / V-BF	8	Hooter (NO)
2	EMER. (-ve)	9	Stop (NO)
3	LFL (-ve)	10	COM
4	HWT (-ve)	11	Neutral
5	RWL (-ve)	12	Phase
6	LLOP (-ve)	13	Fan-Ph Out
7	PIU (+ve)	14	Fan-Ph In
		15	LLOP Sensor
		16	HWT Sensor
		17	Fuel Sensor
		18	Battery (+ve)
		19	Battery (-ve)