

**USER MANUAL  
FOR  
*AMF CONTROLLER*  
MODEL - AMF-9920**



**Version - 3.10  
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## **INTRODUCTION**

Smart DG Controller is an advanced Micro controller based DG Protection unit and has been specially designed to meet the harsh requirement of Indian conditions.

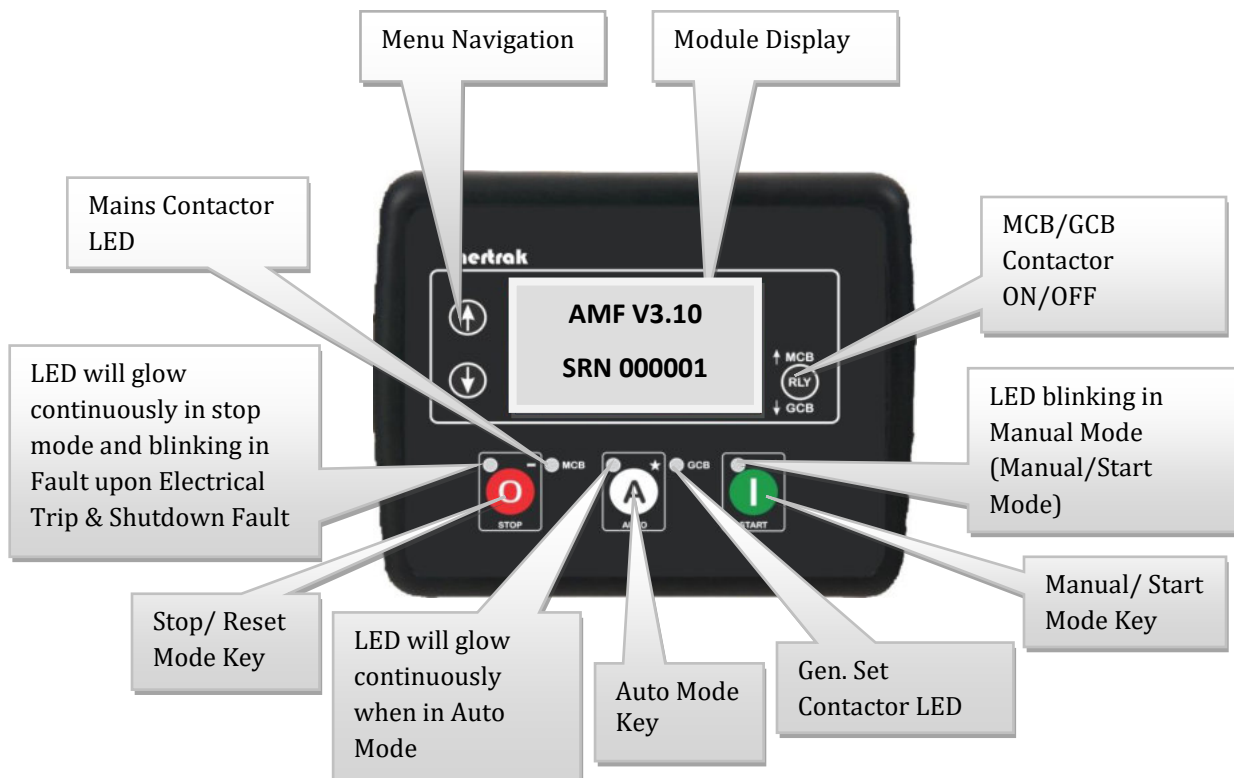
The AMF-9920 series module has been designed to allow the operator to start and stop the generator, and if required, transfer the load to the generator either manually or automatically. Additionally, the AMF-9920 automatically starts and stops the generator set depending upon the status of the mains (utility) supply.

The AMF-9920 module monitors the engine, indicating the operational status and fault conditions, automatically shutting down the engine and giving a true first up fault condition of an engine failure by the LCD display.











## **FEATURES**

- Micro Controller Based Design
- Compact Size , Elegant Design & Easy Install
- Icon based LCD display
- **True RMS Voltage**
- Current and Power monitoring
- USB Communications
- Engine parameter monitoring.
- Remote Start/Stop

## **FRONT PANEL CONFIGURATION**



## PUSH BUTTON-

ICON	DESCRIPTION
	<b><u>STOP/RESET MODE</u></b> This key is used to Stop DG Set in Manual Mode & Reset if any fault Condition Present.
	<b><u>AUTO MODE</u></b> This key is used to set in Auto Mode and for event log exit.
	<b><u>MANUAL/START MODE</u></b> This key is used to start the DG Manually.
 	<b><u>MENU NAVIGATION</u></b> Both key is used to shift from one Page to another Page in Programming mode and used to enter in Event Log History Mode.
	<b><u>MCB/GCB MODE</u></b> By Pressing both  key and  key simultaneously to ON/OFF MCB Contactor & by Pressing both  and  key simultaneously to ON/OFF GCB Contactor.

## DISPLAY PARAMETER

Sr.No.	DISPLAY PARAMETER	DESCRIPTION	Display	DISPLAY SCREEN
1	AMF V3.10 SRN 000001	Display Version	Graphical Display	Screen-1
2	000V L1N 000V 000V L2N 000V 000V L3N 000V	Generator & Mains Voltage (L-N)	Graphical Display	Screen-2
3	000V L1L2 000V 000V L2L3 000V 000V L3L1 000V	Generator & Mains Voltage (L-L)	Graphical Display	Screen-3
4	L1N 000V L2N 000V L3N 000V	Generator Voltage (L-N)	Graphical Display	Screen-4
5	L1L2 000V L2L3 000V L3L4 000V	Generator Voltage (L-L)	Graphical Display	Screen-5
6	00.00 Hz	Generator Frequency	Graphical Display	Screen-6
7	L1N 000V L2N 000V L3N 000V	Mains Voltage(L-N)	Graphical Display	Screen-7
8	L1L2 000V		Graphical	

	L2L3 000V L3L1 000V	Mains Voltage(L-L)	Display	Screen-8
9	00.00Hz	Mains Frequency	Graphical Display	Screen-9
10	L1 00.00A L2 00.00A L3 00.00A	Load Current (A)	Graphical Display	Screen-10
11	00.0% L1 00.00 KW 00.0% L2 00.00 KW 00.0% L3 00.00 KW	Active Power % & Active Power Per Phase (kW)	Graphical Display	Screen-11
12	L1 00.0 KVA L2 00.0 KVA L3 00.0 KVA	Apparent Power (KVA)	Graphical Display	Screen-12
13	L1 0.00 PF L2 0.00 PF L3 0.00 PF	Power Factor	Graphical Display	Screen-13
14	00.00 KW 00.00 KVA 0.00 PF	Combined Active Power Combined Apparent Power Avg. Power Factor	Graphical Display	Screen-14
15	0000.0 kWh 0000.0 kWh	DG kWh Mains kWh	Graphical Display	Screen-15
16	00.00 V	Battery Voltage	Graphical Display	Screen-16
17	00.00 V	Charging Alternator	Graphical Display	Screen-17
18	00.0 Bar	Oil Pressure	Graphical Display	Screen-18
19	000°C	Temperature	Graphical Display	Screen-19
20	000%	Fuel Level	Graphical Display	Screen-20
21	000000:00 00000	Run Hours No of Start	Graphical Display	Screen-21
22	0000:00 R 0000:00 S	Service Hour	Graphical Display	Screen-22
23	0000	Engine Speed	Graphical Display	Screen-23
24	METER SRN 000001 ID 001	Meter Serial No. Communication ID	Graphical Display	Screen-24
25	ALARMS	Fault Alarm	Graphical Display	Screen-25
26	Status	Fault Status	Graphical Display	Screen-26
27	XX:XX:XX XX XX/XX/XX	RTC (Real time Clock)	Graphical Display	Screen-27

### **SPECIFICATION –LED**














LED will glow, whenever the corresponding condition is sensed by the controller.

Tag	LED Status	
	NORMAL	Active
START	OFF	ON
STOP	OFF	ON
AUTO	OFF	ON
GCB	OFF	ON
MCB	OFF	ON











### **ACTION ON FAULTS**

Sr.No.	Name of Faults	Description of Indication
1	FAIL TO START	When after no. of Set attempt , DG not start then FAIL TO START fault occur & Graphical Display
2	LLOP	DG Stop and GCB Contactor OFF & Graphical Display
3	HCT / HWT	DG Stop and GCB Contactor OFF & Graphical Display
4	RWL	DG Stop and GCB Contactor OFF & Graphical Display
5	LOW FUEL	DG Stop and GCB Contactor OFF & Graphical Display
6	EMERGENCY / CANOPY	DG Stop and GCB Contactor OFF & Graphical Display
7	UNDER/OVER VOLTAGE	DG Stop and GCB Contactor OFF & Graphical Display
8	UNDER / OVER SPEED	DG Stop and GCB Contactor OFF & Graphical Display
9	UNDER /OVER FREQUENCY	DG Stop and GCB Contactor OFF & Graphical Display
10	OVER CURRENT	DG Stop and GCB Contactor OFF & Graphical Display
11	UNBALANCE CURRENT	DG Stop and GCB Contactor OFF & Graphical Display
12	CHARGING ALTERNATOR	DG Stop and GCB Contactor OFF & Graphical Display
13	UNDER / OVER BATTERY	DG Stop and GCB Contactor OFF & Graphical Display
14	OVER ACTIVE POWER(KW)	DG Stop and GCB Contactor OFF & Graphical Display
15	SERVICE DUE	ALARM & Graphical Display


## Description of Programming Parameter

Step	Process
1	<p>Press and hold the  and  buttons together to enter the editor  mode. Display shows</p> <p style="text-align: center;"><b>PROGRAMMING MODE</b> <b>PASSWORD</b> <b>0000</b></p>
2	<p>Press  button 1 appear on right side on LCD means first digit from MSB can change from 0-9 by using  button .For Password Enter “1” at first digit.</p> <p style="text-align: center;"><b>PROGRAMMING MODE</b> <b>PASSWORD</b> <b>1000                    1</b></p>
3	<p>Use  button to shift to next digit , now can change value of second digit from 0 to 9 by using  button and enter “0”and so on.</p> <p style="text-align: center;"><b>PROGRAMMING MODE</b> <b>PASSWORD</b> <b>1000                    4</b></p>
4	<p>After entering ‘1000’ Press  button again. If the entered Password is correct then controller shifts to programming page otherwise the controller shows’0000’ and again prompts for entry of password.</p>
5	<p>Press the  or  navigation buttons to cycle through the front panel editor to select the required page in the configuration tables.</p>
6	<p>Press the  to select the next parameter or  to select the previous parameter within the current page.</p>
7	<p>When viewing the parameter to be edited, press the  button, the value begins to flash.</p>



8	Press the  or  buttons to adjust the value to the required setting
9	Press the  button to save the current value, the value ceases flashing.
10	Press and hold the  button to save and exit the editor, the configuration icon  is removed from the display.
11	If User wants to see Event log Fault History then Press  &  button simultaneously (Long Press) to enter in Event Log History Mode, then can see 100 faults history by  &  button. To exit from Event Log History, Long Press  button.

### Operation -

**Auto Mode** - To Enter into Auto mode press  key. When the mains unhealthy condition occurs, first Mains Restoration Delay timer is initiated and genset will be cranked at the end of this delay. Controller will latch the genset contactor when genset loading voltage and frequency are above the Minimum Healthy thresholds after the warm-up time is over. Engine run hours will start incrementing when the genset voltage becomes greater than Minimum Healthy Voltage. During genset running, if the mains voltage returns, return to Mains Delay timer starts. If the mains voltage is healthy over the entire return delay duration, genset contactor gets opened and controller will initiate the stopping sequence and latch the mains contactor after transfer delay.

During start sequence, if the mains voltage recovers or any stop command or shutdown / warning alarm occurs controller will not issue start command. To start the genset it is necessary to clear all the alarms manually and put the controller in Auto mode.

**Manual Mode** – In this mode start and stop key use for starting and stopping DG set.

### **Remote Mode-**

To use Remote mode, follow below points

- 1) Configure one digital input as "Remote Start"
- 2) Configure "Remote Mode" in Parameter 909.
- 3) Put controller in Auto mode

In that case if negative present at configurable digital input, controller activate crank relay for "crank time". DG continue run till Negative present at input and Latch Genset contactor. If mains become healthy contactor shift to mains and stop dg set.

## Current Unbalance Detection:-

- A) Controller doesn't take any action till the current is below 25% of the Over current Set Limit 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 and other phase current exceed set value in % defined then controller consider it as a current unbalance condition.
- C) In case the current unbalance persists for a period greater than the limit specified by with default setting of programmable parameters and between 1-9999 Sec., then controller issues STOP Command.
- D) The Default setting for this feature is "DISABLE".

## Charging Alternator Type:

If Chg. Alternator Type (Parameter no. 422) = 0 , Sense Signal from W Point.

If Chg. Alternator Type (Parameter no. 422) = 1, Controller Provide Excitation from terminal no. 5 (Chg. Alt/Excite) for 10 sec. when DG Start.

If Chg. Alternator Type (Parameter no. 422) = 2, Controller Provide Excitation from terminal no. 5 (Chg. Alt/Excite) Continuously, when DG Start.

**Auto Load Transfer:** This function only applicable in Manual Mode.

- 1) If "Auto Load Transfer" (Parameter -1162) is 1 (ENABLE-1) than shifting of contactors method change in Manual mode. In this Mode DG Contactor on high priority. If someone start the DG manually, than DG Contactor Latch either Mains Healthy or Fail.
- 2) Enable-2 :- Semi Auto

**CT On Load:** - Measure energy of Mains & DG both depends on Contactor.

**CT On DG:** - Only Measure DG Energy.

## PROGRAMMING PARAMETERS

<b>Configuration Parameters - TIMERS (Page 1)</b>			
<b>INDEX</b>	<b>SETTABLE PARAMETER</b>	<b>RANGE</b>	<b>DEFAULT</b>
101	MAINS RESTORATION TIME	0-999 s	010 s
102	ENGINE START TIME	0-99 s	01 s
103	PREHEAT TIME	0-99 s	05 s
104	CRANK TIME	0-99 s	03s
105	CRANK REST TIME	0-99 s	10 s
106	WARM UP TIME	0-999 s	010 s
107	COOLING TIME	0-999 s	020 s
108	STOP TIME	0-99 s	25 s
109	MCB_GCB CHANGEOVER TIME	0-99 s	01 s
110	BUZZER TIME	0-99 s	60 s
111	LLOP BYPASS TIME	0-99 s	10 s
112	POWER SAVER MODE TIME	0-99 s	60 s
113	FUEL LOGGING TIME	0-99 s	99 s

## **Configuration Parameters – Generator (Page 2)**

<b>INDEX</b>	<b>SETTABLE PARAMETER</b>	<b>RANGE</b>	<b>DEFAULT</b>
201	ALTERNATOR POLES	0- 36	04
202	ENGINE UNDER VOLTAGE TRIP ENABLE	On (1), Off (0)	On(1)
203	ENGINE UNDER VOLTAGE TRIP LEVEL	120-250V	160 V
204	ENGINE UNDER VOLTAGE WARNING ENABLE	On (1), Off (0)	On(1)
205	ENGINE UNDER VOLTAGE WARNING LEVEL	120-250V	180 V
206	ENGINE UNDER VOLTAGE ACTION DELAY	0-99s	10s
207	ENGINE OVER VOLTAGE WARNING ENABLE	On (1), Off (0)	On(1)
208	ENGINE OVER VOLTAGE WARNING RETURN	150-350V	250 V
209	ENGINE OVER VOLTAGE WARNING ALARM	150-350V	260 V
210	ENGINE OVER VOLTAGE TRIP LEVEL	150-350V	265 V
211	ENGINE OVER VOLTAGE ACTION DELAY	0-99s	10s
212	ENGINE UNDER FREQUENCY TRIP ENABLE	On (1), Off (0)	On(1)
213	ENGINE UNDER FREQUENCY TRIP LEVEL	45-60 Hz	47.5Hz
214	ENGINE UNDER FREQUENCY WARNING ENABLE	On (1), Off (0)	On(1)
215	ENGINE UNDER FREQUENCY WARNING LEVEL	45-60 Hz	48 Hz
216	ENGINE UNDER FREQUENCY ACTION DELAY	0-99s	10s
217	ENGINE OVER FREQUENCY WARNING ENABLE	On (1), Off (0)	On(1)
218	ENGINE OVER FREQUENCY WARNING RETURN LEVEL	45-60 Hz	52.5 Hz

219	ENGINE OVER FREQUENCY WARNING ALARM LEVEL	45-60 Hz	52.5 Hz
220	ENGINE OVER FREQUENCY TRIP ENABLE	On (1), Off (0)	On(1)
221	ENGINE OVER FREQUENCY TRIP LEVEL	45-60 Hz	53 Hz
222	ENGINE OVER FREQUENCY ACTION DELAY	0-99s	10s
223	CT PRIMARY	0005-9999	100
224	AMPERE LOAD RATING ( PER PHASE )	0-9999A	80A
225	OVER AMPERE TRIP ENABLE	On (1), Off (0)	On(1)
226	OVER AMPERE ACTION SELECT	0-3	0
227	OVER AMPERE DELAY TIME	0-9999s	10s
228	OVER AMPERE TRIP PERCENTAGE	0-150%	80%
229	UNBALANCE AMPERE TRIP ENABLE	On (1), Off (0)	Off(0)
230	UNBALANCE AMPERE ACTION SELECT	0-3	0
231	UNBALANCE AMPERE DELAY TIME	0-9999s	10s
232	UNBALANCE AMPERE TRIP PERCENTAGE	0-150%	23%
233	KW LOAD RATING (TOTAL)	0-9999 KW	0072
234	OVER KW TRIP ENABLE	On (1), Off (0)	On(1)
235	OVER KW ACTION SELECT	0-3	0
236	OVER KW ACTION LEVEL PERCENTAGE	0-150%	90 %
237	OVER KW DELAY TIME	0 -9999 s	10s

### Configuration Parameters – Mains (Page 3)

<b>INDEX</b>	<b>SETTABLE PARAMETER</b>	<b>RANGE</b>	<b>DEFAULT</b>
301	MAINS AC SYSTEM CONFIGURATION	0 (DG 3P EB 3P)	0 (DG 3P EB 3P)
302	MAINS FAILURE DETECTION ENABLE	On (1), Off (0)	On(1)
303	MAINS UNDER VOLTAGE ENABLE	On (1), Off (0)	On(1)
304	MAINS UNDER VOLTAGE TRIP VOLTAGE LEVEL	120-250 V	160 V
305	MAINS UNDER VOLTAGE RETURN VOLTAGE LEVEL	120-250 V	180 V
306	MAINS UNDER VOLTAGE TRIP OCCURRENCE DELAY	0 -99s	10s
307	MAINS OVER VOLTAGE ENABLE	On (1), Off (0)	On(1)
308	MAINS OVER VOLTAGE RETURN VOLTAGE LEVEL	150-350 V	250 V
309	MAINS UNDER VOLTAGE TRIP VOLTAGE LEVEL	150-350 V	260 V
310	MAINS OVER VOLTAGE OCCURRENCE DELAY	0 -99s	10 s
311	MAINS UNDER FREQUENCY ENABLE	On (1), Off (0)	On(1)
312	MAINS UNDER FREQUENCY TRIP LEVEL	45-60 Hz	47 Hz
313	MAINS UNDER FREQUENCY RETURN LEVEL	45-60 Hz	47.5Hz
314	MAINS UNDER FREQUENCY OCCURRENCE DELAY	0 -99s	10 s
315	MAINS OVER FREQUENCY ENABLE	On (1), Off (0)	On(1)
316	MAINS OVER FREQUENCY RETURN LEVEL	45-60 Hz	52.5 Hz
317	MAINS OVER FREQUENCY TRIP LEVEL	45-60 Hz	53.0 Hz
318	MAINS OVER FREQUENCY OCCURRENCE DELAY	0 -99s	10 s

### Configuration Parameters – Engine (Page 4)

<b>INDEX</b>	<b>SETTABLE PARAMETER</b>	<b>RANGE</b>	<b>DEFAULT</b>
401	ENGINE START ATTEMPTS	0 -9	3
402	CRANK DISCONNECT OIL PRESSURE ENABLE	On (1), Off (0)	Off (0)
403	CRANK DISCONNECT OIL PRESSURE LEVEL	0.0-9.9	01.0
404	CRANK DISCONNECT FREQUENCY LEVEL	45-60Hz	45 Hz
405	CRANK DISCONNECT RPM LEVEL	1350-1800	1200
406	DG UNDER RPM ENABLE	On (1), Off (0)	On (1)
407	DG UNDER RPM TRIP LEVEL	1350	1350
408	DG UNDER RPM TRIP DELAY	0-99s	10s
409	DG OVER RPM TRIP LEVEL	1600	1600
410	DG OVER RPM TRIP DELAY	0 -99s	10s
411	DG LOW BATTERY ACTION	0-3	2
412	DG LOW BATTERY TRIP VOLTAGE LEVEL	8.0-12.0	11.0
413	DG LOW BATTERY RETURN VOLTAGE LEVEL	8.0-12.0	12.0
414	DG LOW BATTERY DELAY	0 -99s	10s

415	DG HIGH BATTERY ACTION	0-3	2
416	DG HIGH BATTERY RETURN VOLT LEVEL	12.0-18.0V	15.0V
417	DG HIGH BATTERY TRIP LEVEL	12.0-18.0V	16.0 V
418	DG HIGH BATTERY DELAY	0 -99s	10s
419	DG CHARGING ALTERNATOR ACTION	0-3	1
420	DG CHARGING ALT. TRIP VOLT. LEVEL	0-35.0V	04.0 V
421	DG CHARGING ALTERNATOR DELAY	0 -99s	10s
422	CHG ALT TYPE	0-2	2
423	FAN FAULT ENABLE	On (1), Off (0)	Off (0)
424	GSM COM	On (1), Off (0)	Off (0)

### **Configuration Parameters – Digital Inputs (Page 5)**

<b>INDEX</b>	<b>SETTABLE PARAMETER</b>	<b>RANGE</b>	<b>DEFAULT</b>
501	<b>DIGITAL INPUT A SOURCE</b> (LLOP/HWT/LFL/RWL/CANOPY/EMG /REMOTE START/ EARTH FAULT/DOOR OPEN/SIMULATE AUTO/SIMULATE START/SIMULATE STOP/SIMULATE MAINS/MAINS FAIL)	0(Input Source)	Canopy
502	DIGITAL INPUT A POLARITY	On (1), Off (0)	Off (0)
503	DIGITAL INPUT A ACTION	0-3	0
504	DIGITAL INPUT A DELAY	0 -99s	10s
505	<b>DIGITAL INPUT B SOURCE</b> (LLOP/HWT/LFL/RWL/CANOPY/EMG /REMOTE START/ EARTH FAULT/DOOR OPEN/SIMULATE AUTO/SIMULATE START/SIMULATE STOP/SIMULATE MAINS/MAINS FAIL)	0(Input Source)	EMERGENCY
506	DIGITAL INPUT B POLARITY	On (1), Off (0)	Off (0)
507	DIGITAL INPUT B ACTION	0-3	0
508	DIGITAL INPUT B DELAY	0 -99s	10s
509	<b>DIGITAL INPUT C SOURCE</b> (LLOP/HWT/LFL/RWL/CANOPY/EMG /REMOTE START/ EARTH FAULT/DOOR OPEN/SIMULATE AUTO/SIMULATE START/SIMULATE STOP/SIMULATE MAINS/MAINS FAIL)	0(Input Source)	LLOP
510	DIGITAL INPUT C POLARITY	On (1), Off (0)	Off (0)
511	DIGITAL INPUT C ACTION	0-3	0
512	DIGITAL INPUT C DELAY	0 -99s	10s

513	<b>DIGITAL INPUT D SOURCE</b> (LLOP/HWT/LFL/RWL/CANOPY/EMG /REMOTE START/ EARTH FAULT/DOOR OPEN/SIMULATE AUTO/SIMULATE START/SIMULATE STOP/SIMULATE MAINS/MAINS FAIL)	0(Input Source)	HWT
514	DIGITAL INPUT D POLARITY	On (1), Off (0)	Off (0)
515	DIGITAL INPUT D ACTION	0-3	0
516	DIGITAL INPUT D DELAY	0 -99s	10s
517	<b>ANALOGUE INPUT A (SET AS DIGITAL) SOURCE</b> (LLOP/HWT/LFL/RWL/CANOPY/EMG /REMOTE START/ EARTH FAULT/DOOR OPEN/SIMULATE AUTO/SIMULATE START/SIMULATE STOP/SIMULATE MAINS/MAINS FAIL)	0(Input Source)	LFL
518	ANALOGUE INPUT A (SET AS DIGITAL) SOURCE POLARITY	On (1), Off (0)	Off (0)
519	ANALOGUE INPUT A (SET AS DIGITAL) SOURCE ACTION	0 -3	0
520	ANALOGUE INPUT A (SET AS DIGITAL) SOURCE DELAY	0 -99s	10s
521	<b>ANALOGUE INPUT B (SET AS DIGITAL) SOURCE</b> (LLOP/HWT/LFL/RWL/CANOPY/EMG /REMOTE START/ EARTH FAULT/DOOR OPEN/SIMULATE AUTO/SIMULATE START/SIMULATE STOP/SIMULATE MAINS/MAINS FAIL)	0(Input Source)	RWL
522	ANALOGUE INPUT B (SET AS DIGITAL) SOURCE POLARITY	On (1), Off (0)	Off (0)
523	ANALOGUE INPUT B (SET AS DIGITAL) SOURCE ACTION	0-3	0
524	ANALOGUE INPUT B (SET AS DIGITAL) SOURCE DELAY	0 -99s	10s
525	<b>ANALOGUE INPUT C (SET AS DIGITAL) SOURCE</b> (LLOP/HWT/LFL/RWL/CANOPY/EMG /REMOTE START/ EARTH FAULT/DOOR OPEN/SIMULATE AUTO/SIMULATE START/SIMULATE STOP/SIMULATE MAINS/MAINS FAIL)	0(Input Source)	REMOTE
526	ANALOGUE INPUT C (SET AS DIGITAL) SOURCE POLARITY	On (1), Off (0)	Off (0)
527	ANALOGUE INPUT C (SET AS DIGITAL) SOURCE ACTION	0-3	0
528	ANALOGUE INPUT C (SET AS DIGITAL) SOURCE DELAY	0 -99s	10s

### **Configuration Parameters – Analogue Inputs (Page 6)**

<b>INDEX</b>	<b>SETTABLE PARAMETER</b>	<b>RANGE</b>	<b>DEFAULT</b>
601	ANALOGUE INPUT A SENSOR TYPE	Pressure	Pressure (3)
602	ANALOGUE INPUT A SENSOR SELECTION	Eicher	Eicher
603	ANALOGUE INPUT A LOW OIL PRESSURE ENABLE	0	0
604	ANALOGUE INPUT A LOW OIL PRESSURE TRIP POINT	00.0-9.9	1.0
605	ANALOGUE INPUT A LOW OIL PRESSURE OPEN ENABLE	0	0

606	ANALOGUE INPUT A OIL PRESSURE DELAY	0-99s	10s
607	ANALOGUE INPUT B SENSOR TYPE	Temperature	Temperature (4)
608	ANALOGUE INPUT B SENSOR SELECTION	Eicher	Eicher
609	ANALOGUE INPUT B TEMPERATURE ENABLE	0	0
610	ANALOGUE INPUT B TEMPERATURE TRIP POINT	0-999	120
611	ANALOGUE INPUT B TEMPERATURE OPEN ENABLE	0	0
612	ANALOGUE INPUT B TEMPERATURE DELAY	0-99s	10s
613	ANALOGUE INPUT C SENSOR TYPE	Fuel	Fuel (2)
614	ANALOGUE INPUT C SENSOR SELECTION	Eicher	Eicher
615	ANALOGUE INPUT C SENSOR LFL ENABLE	0	0
616	ANALOGUE INPUT C SENSOR LFL TRIP POINT	0-999	10
617	ANALOGUE INPUT C SENSOR OPEN ENABLE	On (1), Off (0)	Off (0)
618	ANALOGUE INPUT C SENSOR LFL DELAY	0-99s	10s

### **Configuration Parameters – Output (Page 7)**

<b>INDEX</b>	<b>SETTABLE PARAMETER</b>	<b>RANGE</b>	<b>DEFAULT</b>
701	<b>DIGITAL OUTPUT A SOURCE</b> (FUEL/ENERGISE TO STOP/MCB OPEN/GCB OPEN/MCB CLOSE/GCB CLOSE/BUZZER/CHOKE/ALT PULSE/LFL/AS IDLE RELAY/As Fail to Start/ As Fail to Stop)	OUTPUT SOURCE	Fuel
702	DIGITAL OUTPUT A POLARITY	On (1), Off (0)	On (1)
703	<b>DIGITAL OUTPUT B SOURCE</b> (START)	Start	Start
704	DIGITAL OUTPUT B POLARITY	On (1), Off (0)	On (1)
705	<b>DIGITAL OUTPUT C SOURCE</b> (FUEL/ENERGISE TO STOP/MCB OPEN/GCB OPEN/MCB CLOSE/GCB CLOSE/BUZZER/CHOKE/ALT PULSE/LFL/AS IDLE RELAY/As Fail to Start/ As Fail to Stop)	OUTPUT SOURCE	MCB Close
706	DIGITAL OUTPUT C POLARITY	On (1), Off (0)	On (1)
707	<b>DIGITAL OUTPUT D SOURCE</b> (FUEL/ENERGISE TO STOP/MCB OPEN/GCB OPEN/MCB CLOSE/GCB CLOSE/BUZZER/CHOKE/ALT PULSE/LFL/AS IDLE RELAY/As Fail to Start/ As Fail to Stop)	OUTPUT SOURCE	GCB Close
708	DIGITAL OUTPUT D POLARITY	On (1), Off (0)	On (1)
709	<b>DIGITAL OUTPUT E SOURCE</b> (FUEL/ENERGISE TO STOP/MCB OPEN/GCB OPEN/MCB CLOSE/GCB CLOSE/BUZZER/CHOKE/ALT PULSE/LFL/AS IDLE RELAY/As Fail to Start/ As Fail to Stop)	OUTPUT SOURCE	Buzzer



710	DIGITAL OUTPUT E POLARITY	On (1), Off (0)	On (1)
711	<b>DIGITAL OUTPUT F SOURCE</b> (FUEL/ENERGISE TO STOP/MCB OPEN/GCB OPEN/MCB CLOSE/GCB CLOSE/BUZZER/CHOKE/ALT PULSE/LFL/AS IDLE RELAY/As Fail to Start/ As Fail to Stop)	OUTPUT SOURCE	Choke
712	DIGITAL OUTPUT F POLARITY	On (1), Off (0)	On (1)

### **Configuration Parameters – (Page 8)**

<b>INDEX</b>	<b>SETTABLE PARAMETER</b>	<b>RANGE</b>	<b>DEFAULT</b>
801	LAMP TEST AT START	On(1) ,Off (0)	On(1)
802	POWER SAVER MODE ENABLE	On(1) ,Off (0)	On(1)

### **Configuration Parameters – Maintenance (Page 9)**

<b>INDEX</b>	<b>SETTABLE PARAMETER</b>	<b>RANGE</b>	<b>DEFAULT</b>
901	OIL MAINTENANCE ENABLE	On(1) ,Off (0)	On (1)
902	OIL_SERVICE DUE ACTION	0-3	2
903	OIL MAINTENANCE HOURS	0-9999h	50h
904	DG START PROTECTION	On(1) ,Off (0)	On(1)
905	POWER ON DG MODE	0-AUTO 1- MANUAL 2- STOP	STOP
906	TEST MODE	0-999	050
907	ENGINE MAX RUN TIME	0-999 min	0
908	ENGINE REST TIME	0-999 min	0
909	SELECT MODE (0- REMOTE MODE ,1- NO REMOTE)	0-1	1
910	CT POSITION	CT ON DG/CT ON LOAD	CT ON LOAD

### **Configuration Parameters – SCHEDULER (Page 10)**

<b>INDEX</b>	<b>SETTABLE PARAMETER</b>	<b>RANGE</b>	<b>DEFAULT</b>
1001	Enable Scheduler	On (1), Off (0)	Off (0)
1002	Schedule Run Load	On(1) ,Off (0)	On(1)
1003	Scheduler Period	Week (0) , Month (1)	
1004	Scheduler 1 Start Time	0	
1005	Scheduler 1 Start Day	1-7	
1006	Scheduler 1 Start Week	1-4 , L	

1007	Scheduler 1 Stop Time	0	
1008	Scheduler 2 Start Time	0	
1009	Scheduler 2 Start Day	1-7	
1010	Scheduler 2 Start Week	1-4, L	
1011	Scheduler 2 Stop Time	0	
1012	Scheduler 3 Start Time	0	
1013	Scheduler 3 Start Day	1-7	
1014	Scheduler 3 Start Week	1-4, L	
1015	Scheduler 3 Stop Time	0	
1016	Scheduler 4 Start Time	0	
1017	Scheduler 4 Start Day	1-7	
1018	Scheduler 4 Start Week	1-4, L	
1019	Scheduler 4 Stop Time	0	
1020	Scheduler 5 Start Time	0	
1021	Scheduler 5 Start Day	1-7	
1022	Scheduler 5 Start Week	1-4, L	
1023	Scheduler 5 Stop Time	0	
1024	Scheduler 6 Start Time	0	
1025	Scheduler 6 Start Day	1-7	
1026	Scheduler 6 Start Week	1-4, L	
1027	Scheduler 6 Stop Time	0	
1028	Scheduler 7 Start Time	0	
1029	Scheduler 7 Start Day	1-7	
1030	Scheduler 7 Start Week	1-4, L	
1031	Scheduler 7 Stop Time	0	
1032	Scheduler 8 Start Time	0	
1033	Scheduler 8 Start Day	1-7	
1034	Scheduler 8 Start Week	1-4, L	
1035	Scheduler 8 Stop Time	0	

**Configuration Parameter – Sensor & Timers (Page -11)**

<b>INDEX</b>	<b>SETTABLE PARAMETER</b>	<b>RANGE</b>	<b>DEFAULT</b>
1101 -1120	Resistance R01 TO R10	0-1500 Ω	
	Pressure P01 TO P10	0-10	
1121-1140	Resistance R01 TO R10	0-1500 Ω	
	Temperature T01 TO T10	0-300	
1141-1160	Resistance R01 TO R10	0-1500 Ω	
	FUEL L01 TO L10	0-100%	
1161	Modbus ID	001	001
1162	Auto Load Transfer	0 (Disable) 1(Enable-1) 2(Enable-2)	Off (0)
1163	Engine Selection	CAN/CONVENTIONAL	Conventional
1164	Display Contrast	0-99	85
1165	Ideal Timer	0-999 Sec	000 Sec
1166	Stop Selection	0/1	1
1167	Alternator detect delay	0-99 Sec	05 Sec
1168	DG Stop Switch Cool down	On(1) ,Off (0)	On(1)
1169	Safety Monitoring Delay	0-99 Sec	10 Sec
1170	Return To Mains Delay	0-999 Sec	10 Sec
1171	Additional Stop Timer	0-99 Sec	05 Sec
1172	DG Pickup Voltage	0-240V	80V
1173	Over Speed Threshold %	100-200 %	120%
1174	Monitoring LOP Analog before Crank	On(1) ,Off (0)	Off (0)
1175	Monitoring LOP Digital before Crank	On(1) ,Off (0)	Off (0)
1176	Disconnect Crank LLOP Digital Input	On(1) ,Off (0)	Off (0)
1177	Digital Input A Activation	0-3	3
1178	Digital Input B Activation	0-3	3
1179	Digital Input C Activation	0-3	3
1180	Digital Input D Activation	0-3	3
1181	Analog Input A Activation	0-3	3
1182	Analog Input B Activation	0-3	3
1183	Analog Input C Activation	0-3	3
1184	Service Hour Clear	Yes/No	

**SENSOR TYPE****AC SYSTEM**

<b>SENSOR TYPE</b>		<b>AC SYSTEM</b>	
<b>Index</b>	<b>Type</b>	<b>Index</b>	<b>Type</b>
0	None	0	3-Phase DG, 3-Phase Mains
1	Digital Input	1	1- Phase DG , 1-Phase Mains
2	Fuel Sensor	2	3-Phase DG, 1-Phase Mains
3	Pressure Sensor	3	1-Phase DG, 3-Phase Mains
4	Temperature Sensor		

**DIGITAL INPUT POLARITY****DIGITAL OUTPUT POLARITY**

<b>OUTPUT POLARITY</b>	
<b>Index</b>	<b>Polarity</b>
0	De-Energies
1	Energies

<b>DIGITAL INPUT POLARITY</b>	
<b>Index</b>	<b>Polarity</b>
0	Close to Activate
1	Open to Activate

**ACTION**

<b>ACTION</b>	
<b>Index</b>	<b>Action</b>
0	Electrical Trip
1	Shutdown
2	Warning Alarm
3	NONE

**ACTIVATION**

<b>ACTION</b>	
<b>Index</b>	<b>Activation</b>
0	Never
1	From Engine Start
2	From Monitoring
3	Always

## ***INPUT SOURCES***











0	LLOP
1	HWT
2	LFL
3	RWL
4	CANOPY
5	EMERGENCY
6	Remote Start
7	Earth Fault
8	Door Open
9	Simulate Auto
10	Simulate Start
11	Simulate Stop
12	Simulate Mains
13	Mains Fail Input

## ***OUTPUT SOURCES***

0	Fuel Relay
1	Start Relay
2	Energize To Stop
3	Open Mains Output
4	Open Gen Output
5	Close Mains Output
6	Close Gen Output
7	Buzzer
8	Choke
9	ALT Pulse
10	LFL
11	IDLE Relay
12	As Fail to Start
13	As Fail to Stop





## **INSTRUMENTATION ICONS**

When viewing instrumentation pages, an icon is displayed in the **Inst. Icon** section to indicate what section is currently being displayed.

<b>Icon</b>	<b>Details</b>
	The default home page which displays generator voltage and mains voltage
	Generator voltage and frequency instrumentation screen
	Mains voltage and frequency instrumentation screen
	Load power instrumentation screen
	Engine speed instrumentation screen
	Hours run instrumentation screen
	Battery voltage instrumentation screen
	Oil pressure instrumentation screen
	Coolant temperature instrumentation screen
	Current time held in the unit


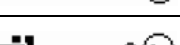
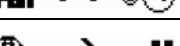
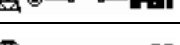
## **MODE ICON**

An icon is displayed in the **Mode Icon** section to indicate the mode the controller is currently in.

<b>Icon</b>	<b>Details</b>
	Auto Mode.
	Manual Mode
	Remote Mode
<b>DG RUN</b>	Engine Running Mode.
	Appears when the unit is in the front panel editor.

## **LOAD SWITCHING ICON**










An icon is displayed in the **Load Switching Icon** section to indicate the current operation status of the controller.

<b>Icon</b>	<b>Details</b>
	The generator breaker is open.
	The generator breaker is closed.
	The mains breaker is open.
	The mains breaker is closed.

## **WARNING ALARM ICONS**




Warnings are non-critical alarm conditions and do not affect the operation of the generator system, they serve to draw the operators attention to an undesirable condition.

By default, warning alarms are self-resetting when the fault condition is removed.

Icon	Fault	Description
	<b>Charge Failure</b>	The auxiliary charge alternator voltage is low as measured from the W/L terminal.
	<b>Low Fuel Level</b>	The level detected by the fuel level sensor is below the low fuel level pre-set pre-alarm setting.
	<b>Battery Under Voltage</b>	The DC supply has fallen below or risen above the low volts pre-set pre-alarm setting.
	<b>Battery Over Voltage</b>	The DC supply has risen above the high volts pre-set pre-alarm setting.
	<b>Generator Under Voltage</b>	The generator output voltage has fallen below the pre-set pre-alarm setting after the Safety On timer has expired.
	<b>Generator Over Voltage</b>	The generator output voltage has risen above the pre-set pre-alarm setting.
	<b>Generator Under Frequency</b>	The generator output frequency has fallen below the pre-set pre-alarm setting after the Safety On timer has expired.
	<b>Generator Over Frequency</b>	The generator output frequency has risen above the pre-set pre-alarm setting.
	<b>Over Current</b>	The measured current has risen above the configured trip level.










## **ELECTRICAL TRIP ALARM ICONS**







Electrical trips are latching and stop the Generator but in a controlled manner. On initiation of the electrical trip condition the module de-energizes the '**Genset Contactor Output**' to remove the load from the generator. Once this has occurred the module starts the Cooling timer and allows the engine to cool off-load before shutting down the engine.

Icon	Fault	Description
	<b>Low Fuel Level</b>	The level detected by the fuel level sensor is below the low fuel level pre-set alarm setting.
	<b>Over Current</b>	The measured current has risen above the configured trip level for a configured duration.
	<b>kW Overload</b>	The measured kW has risen above the configured trip level for a configured duration.

## **SHUTDOWN ALARM ICONS**

Shutdown alarms are latching and immediately stop the Generator. On initiation of the shutdown Condition the module de-energizes the '**Genset Contactor Output**' to remove, the load from the generator. Once this has occurred, the module shut down the generator immediately.

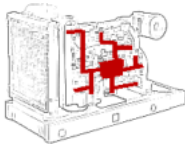
<b>Icon</b>	<b>Fault</b>	<b>Description</b>
	<b>Fail To Start</b>	The engine has failed to start after the configured number of start attempts
	<b>Low Oil Pressure</b>	The module detects that the engine oil pressure has fallen below the low oil pressure pre-alarm setting level after the Safety On timer has expired.
	<b>Engine High Temperature</b>	The module detects that the engine coolant temperature has exceeded the high engine temperature pre-alarm setting level after the Safety On timer has expired.
	<b>Under Speed</b>	The engine speed has fallen below the under speed pre alarm setting
	<b>Over Speed</b>	The engine speed has risen above the over speed pre alarm setting
	<b>Charge Failure</b>	The auxiliary charge alternator voltage is low as measured from the W/L terminal.
	<b>Low Fuel Level</b>	The level detected by the fuel level sensor is below the low fuel level pre-set alarm setting.
	<b>Generator Under Voltage</b>	The generator output voltage has fallen below the pre-set alarm setting. After the Safety On timer has expired.
	<b>Generator Over Voltage</b>	The generator output voltage has risen above the pre-set alarm setting.

<b>Icon</b>	<b>Fault</b>	<b>Description</b>
	<b>Generator Under Frequency</b>	The generator output frequency has fallen below the pre-set alarm setting after the Safety On timer has expired.
	<b>Generator Over Frequency</b>	The generator output frequency has risen above the pre-set alarm setting.
	<b>Over Current</b>	The measured current has risen above the configured trip level for a configured duration.
	<b>kW Overload</b>	The measured kW has risen above the configured trip level for a configured duration.
	<b>Oil Sender Open Circuit</b>	The oil pressure sensor has been detected as being open circuit.
	<b>Coolant Temperature Sender Open Circuit</b>	The coolant temperature sensor has been detected as being open circuit.



## **Communication Port**

### **CAN INTERFACE**



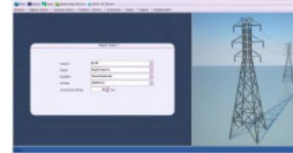
- A) Modules are fitted with the CAN interface as standard and are capable of receiving engine data from engine CAN controllers compliant with the CAN standard.
- B) CAN enabled engine controllers monitor the engine's operating parameters such as engine speed, oil pressure, engine temperature
- C) This allows generator controllers to access these engine parameters with no physical connection to the sensor device.

## **USB CONNECTION**

The USB port is provided to give a simple means of connection between a PC and the controller.

The various operating parameters (such as output volts, oil pressure, etc.) of the remote generator are available to be viewed or changed.

- Configuration PC Software



- USB cable Type a OR Type B



## **DO'S AND DON'T**

- 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 back 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.
- Check all mechanical parts are fitted correctly and that all electrical connections (including earths) are sound.
- The unit DC supply is fused and connected to the battery and that it is of the correct polarity

## **GENERAL CHARACTERISTICS**

Rating /Phase /Class	3X230V , 50 Hz ,1Ph/3Ph
Minimum Supply Voltage	8V
Maximum Supply Voltage	32V
AC Current Input	-/5A 50/60Hz,1-3Ph
Display Type	Graphical LCD display
Size	138.50 x 113X40mm
Panel Cut Out	118 x 92mm
Accuracy	Class 1.0
Frequency Range	45Hz to 55Hz

### **TERMINAL DESCRIPTION**

<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
<b>1</b>	DC Supply Input (-Ve)	<b>17</b>	Digital Input D
<b>2</b>	DC Supply Input (+Ve)	<b>18</b>	CAN Port H/485 A
<b>3</b>	DC Output A	<b>19</b>	CAN Port L/485 B
<b>4</b>	DC Output B (START)	<b>20</b>	CAN Port Screen/ NO CONNECTION
<b>5</b>	Charge Alt. / Excite	<b>21</b>	Generator L1 (U) Voltage Monitoring
<b>6</b>	DC Output C	<b>22</b>	Generator L2 (V) Voltage Monitoring
<b>7</b>	DC Output D	<b>23</b>	Generator L3 (W) Voltage Monitoring
<b>8</b>	DC Output E	<b>24</b>	Generator Neutral (N) Input
<b>9</b>	DC Output F	<b>25</b>	Mains L1 (R) Voltage Monitoring
<b>10</b>	Sensor Common Return	<b>26</b>	Mains L2 (S) Voltage Monitoring
<b>11</b>	Oil Pressure Input	<b>27</b>	Mains L3 (T) Voltage Monitoring
<b>12</b>	Coolant Temperature Input	<b>28</b>	Mains Neutral (N) Input
<b>13</b>	Fuel Level Input	<b>29</b>	R-CT
<b>14</b>	Digital Input A	<b>30</b>	Y-CT
<b>15</b>	Digital Input B	<b>31</b>	B-CT
<b>16</b>	Digital Input C	<b>32</b>	CT Common

## Monitoring Mode

In monitoring mode the screen will scroll automatically after a predefined time or one can use the “Navigation UP/DOWN Keys” to scroll/browse the screens.

**Display Version**



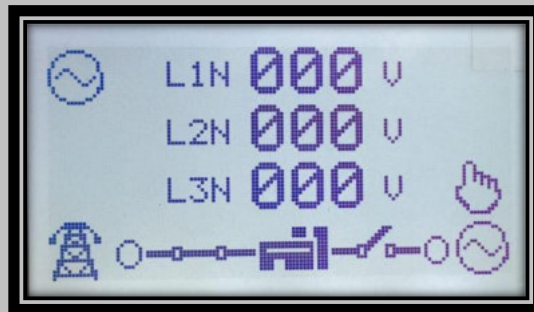
**Generator & Mains Voltage (L-N)**



**Generator & Mains Voltage (L-L)**



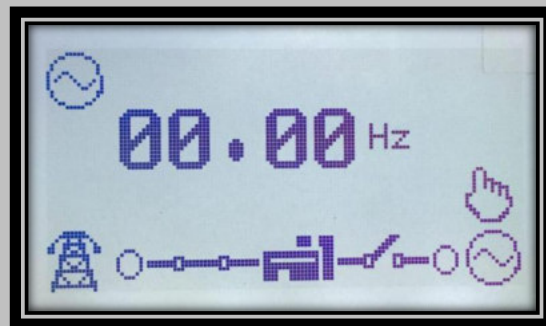
**Generator Voltage (L-N)**



**Generator Voltage (L-L)**



**Generator Frequency**



**Mains Voltage ( L-N )**



**Mains Voltage ( L-L )**



**Mains Frequency**



**Load Current**



**Active Power**



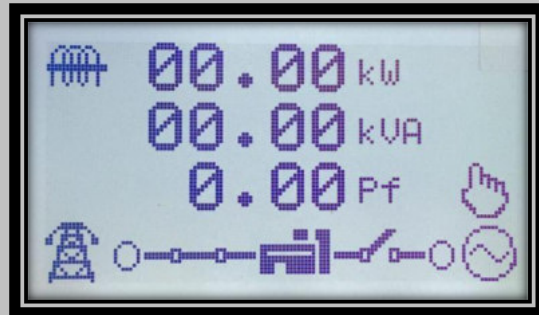
**Apparent Power**



**Power Factor**



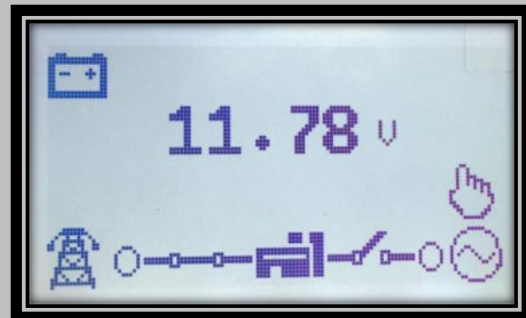
**Combined Active Power ,Apparent Power & Avg. Power Factor**



**DG kWh & Eb kWh**



**Battery Voltage**



**Charging Alternator**



**Oil Pressure**





**Temperature**



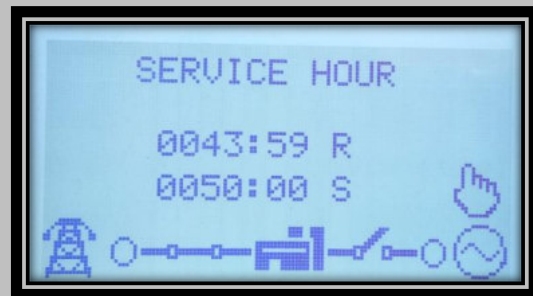
**Fuel Level**



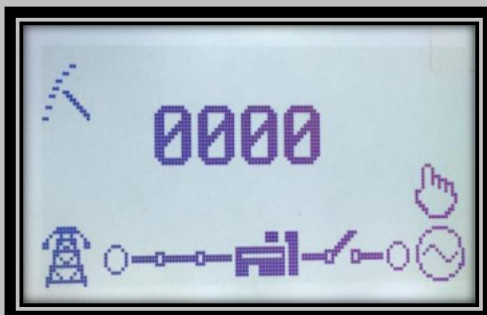
**Run Hours & No of Start**



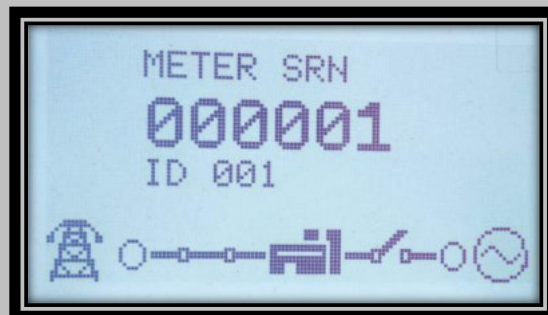
**Service Hour**



**Engine Speed**

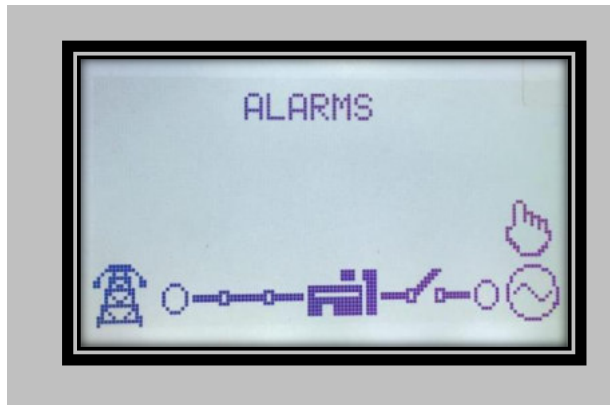


**Meter Serial & Communication ID**

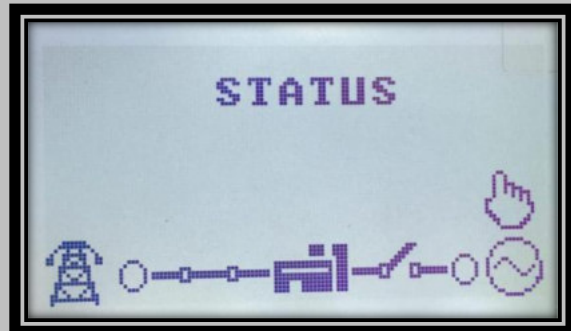




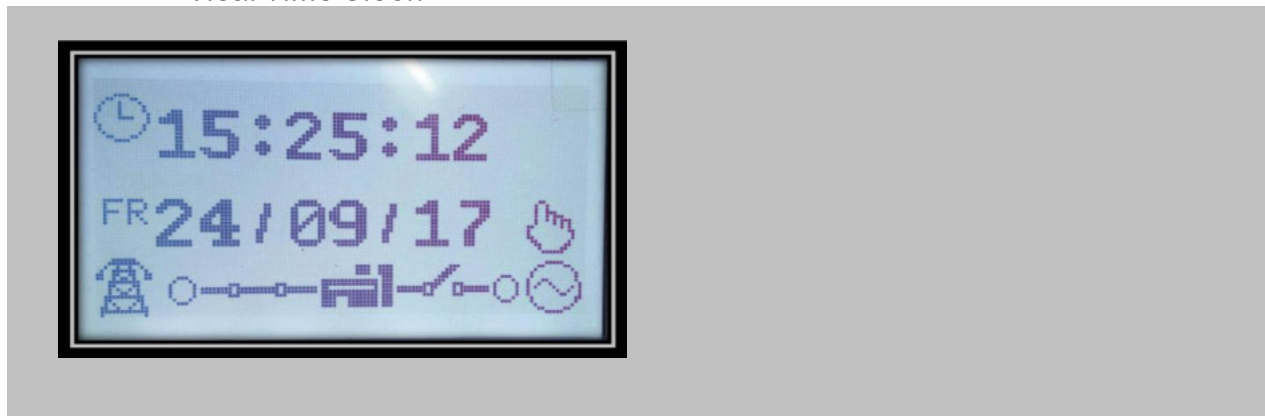
**Fault Alarm**



**Status**



**Real Time Clock**



**Enertrak**

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**Mobile No. - 8233000062**