PROCOM®

OPERATING INSTRUCTIONS
EMC-01

Installation Guide

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- **1.0 Introduction**
  Microprocessor based controller for DG Set which can be configured as both automatic or manual controller.
- Display: 16X2 backlit LCD for ease of readout and symbolic representation.
- Fan Current monitoring for canopy fan
- True RMS measurement of all measured parameters with 1% accuracy of measured value.
- Plug in connectors for error free replacement.
- Dimensions 97.8 x 97.8 x 65 mm.

- **2.0 Salient Features, Protection and Supervision**

- **Generator Measurements**
  - 1 Phase Voltage
  - 1 Phase Current
  - Frequency
  - Battery Voltage
  - RPM
  - Run Hour

- **Protection / Supervision DG**
  - Under/Over Voltage
  - Under/Over Frequency
  - Overload
  - LLOP
  - Low Fuel
  - Canopy Temperature
  - Emergency off
  - Fail To Start
  - Fail To Stop

- **3.0 Display / Front Panel**
  16x2 LCD Display for ease of readout. Parameters are displayed in English along with symbolic representation. Normally the display auto scrolls and displays a parameter for 10 seconds, but any time the Next key (↵) can be pressed to select the next parameter window.

- **4.0 Switches Description**

  EMC has 4 switches provided on its front panel.
  The table below describes the operation of these.

Switch Symbol	Switch Function	Description
	Next	**Normal operation mode:** In this mode, it is used to change the parameters being displayed on LCD. **Programming Mode:** Next key is used to select the next parameter to be programmed.
	Increment /Start	This key has dual function **Programming Mode:** It is used to increment the value of the parameters under programming. **Manual mode:** it is used to issue the crank/ start command to DG
	Decrement /Stop	This key has dual function **Programming mode:** It is used to decrement the value of the parameter under programming. **Manual mode:** It is used to issue the stop command to DG
	Reset	This key has dual function • Reset key resets the Hooter and Fault signals. The first press shall reset the hooter and next shall reset the faults. • Toggle between Auto & Manual Mode
	Programming /History Fault Mode Entry	If both the keys are pressed simultaneously the unit will enter in Programming Mode History Fault

- **5.0 LED Annunciations Description:**
  EMC has 3 annunciations on its front panel.
  These either announce the faults or indicate status of the system.

Nomenclature	Description
Auto	Led lights up when EMC is in Auto mode
DG Voltage ON	This indication glows continuously when the generator is running.
Fault	This LED blinks in case of a fault

- **6.0 Digital Input:** EMC has 7 digital input as below

  - Remote Start
  - Remote Stop
  - Emergency
  - Canopy Temperature
  - Auto Start / Stop
  - LLOP
  - Low Fuel

- **7.0 Digital Output:** EMC has 3 digital outputs :

  - Crank
  - Solenoid
  - Hooter

- **8.0 Setting Procedure: How to Enter in Parameter Mode**

  Press Next & Reset switches simultaneously. The LCD shall display, **"Enter Password"** and default password is 123 then press **Next** Switch. For any change in value, press **Start** switch and **Stop switch.** For next parameter, press Next Switch.

- **9.0 Parameter Mode:**
  The following tables give the detailed descriptions. Please note that 20sec of inactivity will take the unit back in normal mode and all the changes done shall be cancelled.

Parameter Name on LCD & Icon	Explanation of Parameter	Factory Setting	Setting Range
Solenoid Type	**Pull To Start** In this mode fuel solenoid contact changes from Open to Close at the time of cranking and remains close till the genset is running. For stopping the generator this contact opens. **Pull To Stop** In this mode fuel solenoid contact remains open at the time of cranking and till the genset is running. For stopping the generator this contact closes for a user programmed time.	Pull to Stop	Pull to Stop Pull to Start
Gen. RPM	Engine RPM Type	1500RPM	1500RPM 3000RPM
Over Current	The current above which the over current fault monitoring will start. The timer for it is as described in 13. This fault is only enabled while the generator is running. On expiry of the timer the generator is stopped	20	1-9999
Over Load Delay	This is the timer for the over load condition either due to over KW or over current. On expiry of this timer the engine shall be stopped	5 Sec	1-999 Sec
Fan High Current	Maximum limit for fan current	2.0	0-3.5
Fan Low Current	Minimum limit for fan current	0.2	0-3.5

Fan Current Delay	This is the timer for fan current trip.	5	1-100
Generator O/V	Max. Permissible Generator voltage, above this the Generator voltage is treated unhealthy & the Generator is stopped on voltage fault.	270V	50-300V
Generator U/V	Min. permissible Generator voltage, below this the Generator voltage is treated unhealthy & the Generator is stopped on voltage fault.	180V	50-300V
Gen Voltage Delay	Duration for which generator Over/Under voltage condition can be tolerated before stopping the Generator.	10 Sec	1-999 Sec
Generator O/F	Max. Permissible Generator frequency, above this the Generator frequency is treated unhealthy & the Generator is stopped on frequency fault.	65Hz	25-70Hz Disable*
Generator U/F	Min. permissible Generator frequency, below this the Generator frequency is treated unhealthy & the Generator is stopped frequency fault.	45Hz	Disable* 25-70Hz
Gen Freq Delay	Duration for which Generator Over /Under frequency condition can be tolerated before stopping the Generator.	5 Sec	1-999 Sec.
Pickup Voltage	This parameter specifies the generator voltage at which it is presumed to have started and crank has to be terminated	100V	80-150V
Pickup RPM	The engine stalling RPM. This parameter defines the RPM above which the engine will not stall and hence can be treated as running. This is used to detect the engine running condition after crank.	800	600-3500

Mains Monitoring Delay	Duration for which Mains Over/Under voltage condition can be tolerated before starting the Generator.	10	1-999 Sec
Mains Restoration Time	The time for which Mains should be continuously healthy before stopping the Generator and load transferred to Mains.	10 Sec	1-999 Sec
Recool Time	The time for which generator is allowed to run on no load before switching off	30 Sec	0-999Sec
Fuel Trip Delay	Monitoring time of fuel level after which fuel level trip is generated.	10 Sec	1-999 Sec
LLOP Trip Delay	Monitoring time of lube oil pressure after which LLOP trip is generated.	5 Sec	0-999 Sec
Canopy Temperature Trip Delay	Monitoring time of canopy temperature after which canopy temperature trip is generated.	5 Sec	0-999 Sec
Hooter ON Time	Duration for which the hooter shall be ON, if not externally reset, while announcing a fault.	30Sec	1-999 Sec
Crank ON Time	Maximum crank time	5 Sec	1-999 Sec
Crank Gap Time	The delay between two successive cranks	5 Sec	1-999 Sec
Crank Attempts	The maximum number of cranks that shall be issued to start the Engine	3	1-10

Solenoid ON time	The time for which stop solenoid will be kept active while stopping the engine	22 Sec	1-999Sec
Disp Auto Scroll	Setting ON will enable Auto Scroll of display. **OFF: No scroll and next parameter can be viewed by pressing next switch**	ON	ON/OFF
Service due hour	Time, in hours, for next service due warning.	500	10-999

10.0 Start / Stop configuration of the DG in various mode :

1. **Auto Mode** :

Auto mode is selected by long pressing (10 sec) the **Reset** switch, DG can be starts / stops by toggle switch at the **Auto Start / Stop** pin.

For starting the DG,

Auto Start / Stop pin  DC (-ve)

once the **Auto Start / Stop** pin connect the DC(-ve).The engine is automatically started after mains monitoring time.

For stopping the DG,

Auto Start / Stop pin  DC (-ve)

once the **Auto Start / Stop** pin disconnect the DC(-ve).The engine is automatically stopped after mains restoration time.

2. **Manual Mode** : In this mode, DG can be start / stop either front switch or remote switch.

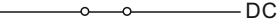
Front Switch : In this mode the engine can be starts by pressing the start switch at the front panel and stop by pressing the stops switch at the front panel.

Remote Switch:

For starting the DG,

Remote Start pin DC (-ve)

For stopping the DG,

Remote Stop pin  DC (-ve)

- **11.0 Faults**

EMC keeps a log of last 64 Faults. There are two categories of faults

- Internal Faults
- External faults

- **11.1 Internal Faults**

Internal faults are the faults, which do not need any external signals and are detected by the system itself. They are:

- Generator Fails to Start.
- Generator Frequency Unhealthy.
- Generator Fails to Stop.
- Generator Voltage Unhealthy
- Over Load

- **11.2 External Faults**

Those faults which cannot be sensed by the unit itself (these faults are not reflected by the generator voltage) and are to be provided externally. They are:

- LLOP
- Emergency
- Fuel
- Canopy Temperature

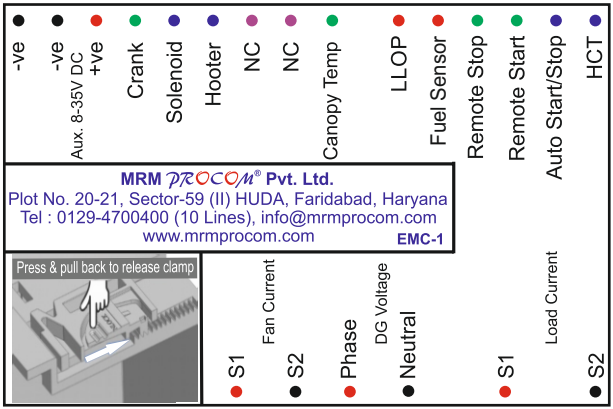
- **11.3 Fault Reset**

Internal Faults & LLOP fault:
All internal faults and LLOP fault can be reset by pressing (R) switch after the generator is stopped. External Fault except LLOP fault:
These faults cannot be reset till the engine is running and/or fault conditions persist. Once the faults are rectified, the fault can be reset by pressing Reset switch ®. In case the engine fails to stop “STOP KEY” can be pressed for manual attempt to stop engine.

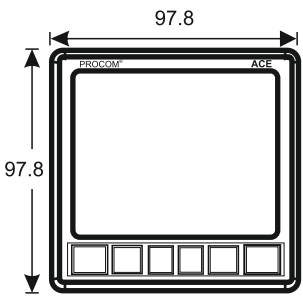
- **12.0 Technical Specifications**

AC voltage withstand	330 VAC (Phase to neutral)
Measurement Accuracy	
Voltages & Current	1% of Reading
Power & Energies	2% of Reading
Surge 1.2/50Usec	2.5KV
Battery Voltage	9-35 V DC
DC Interruption time	0.4 Sec
Cut out Dimensions	92mm X 92mm
Depth	41.8 mm
Digital Input Level	Battery Voltage (Negative)
Digital Output	Battery Voltage (Negative)

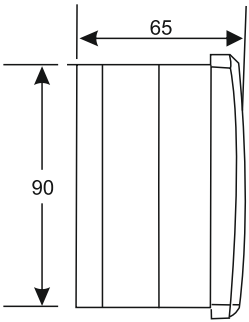
Connect the wires as per the labelling done in back sticker:



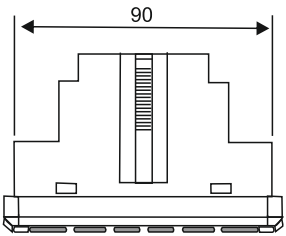
- **13.0 Dimensions**



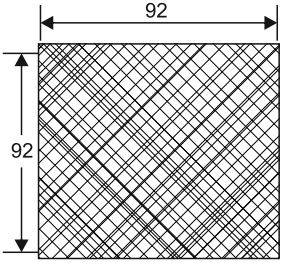
Front View



Left View



Top View



Panel Cutout

All dimensions are in mm.

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