



OPERATING INSTRUCTIONS EMC-02



Installation Guide

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•1.0 Introduction

EMC range of controller are designed for smaller rating of gensets (below 12.5KVA). Two version of EMC are available for manual & auto operation.

EMC controller not only initiates start & stop sequences but also protect both engine and alternate or against various faults.

dual line LCD displayed clearly indicates measurement & status of gensets LED display also enhance the user friendliness easiness in configurations Setting of various parameters.

All the function are clearing indicated on the lcd display.

Benefits

- IP-65 Protection From Front
- Integrates engine gauges and AC metering into one unit.
- Dual Line Lcd Display For Easy Operation
- Compact Design With Minimal Wiring

Following protection are available as should EMC controller

- Under Voltage
- Over Voltage
- Under Frequency
- Over Frequency
- Over Load
- Low lube Oil Pressure
- Fuel Level - A
- HIGH Temperature (Digital I/P)
- Emergency Off (Digital I/P)
- Fan Current
- Canopy Temperature (Digital I/P)

Following Measurement are Available

- DG Voltage
- Mains Voltage
- DG Frequency
- Load Current (Single Phase)
- Runhour
- Service Due Hour
- Battery Volatge
- Fuel Level

2.0 Functions System

Functions	Description
Protection Shutdown	Automatic preventative engine and genset shutdown in the event of abnormal operating conditions and indication on LED display.
Manual Start	In response to the front panel push button performs a fully sequenced engine start.
Manual Stop	In response to the front panel push button performs a fully sequenced engine stop.
Auto Start	In response to a digital input performs a fully sequenced engine start.
Auto Stop	In response to a digital input performs a fully sequenced engine stop.

3.0 Engine Monitoring

Functions	Description
Speed	Monitors engine speed and shows on LED display.
Battery Voltage	Monitors engine starting battery voltage and shows on LED display.
Battery Charging	Monitors engine battery charging status to ensure battery charging while engine is running.
Oil Pressure	Monitors status of oil pressure switch and shuts down engine if it is activated.
Fuel Level	Monitors status of fuel level switch and shuts down engine if it is activated. Sensor value is also display.
Engine Temperature	Monitors status of engine temperature switch and shuts down engine if it is activated.
Running Hours	Records engine run hours and shows on LED display.

4.0 Alternator AC Monitoring

Functions	Description
AC DG Voltage	Monitors 1 phase of AC voltage and shows its value on LED display
AC Load Current	Monitors 1 phase of AC current and shows its value on LEDdisplay.
Frequency	Monitors 1 phase of AC Frequency and shows its value on LED display
Mains Voltage	EMC-02 ONLY
Battery Voltage	EMC-02 ONLY

5.0 System LED Indications

Functions	Description
Auto	Led lights up when EMC is in Auto mode
Manual	Led lights up when EMC is in Manual mode
Fault	This LED blinks in case of a fault
Manis	Led lights ON when mains voltage available (EMC-02 Only)
DG	Led lights ON when DG voltage available (EMC-02 Only)
Load On DG	Led lights ON when Load is on DG (EMC-02 Only)
Load On Mains	Led lights ON when Load is on Mains (EMC-02 Only)

6.0 AC Inputs

Functions	Description
DG Voltage	DG AC Voltage
Load Current	Load Current Via CT
Mains Voltage	Mains AC Voltage
Fan Current	Fan current from fan

7.0 Analog Inputs

Functions	Description
Battery Voltage	From DG Battery
Fuel Level	From Fuel Sansor

8.0 Digital Inputs

Functions	Description
Low Oil Pressure	Close to common to activate low oil pressure
HET	Close to common to activate high engine temperature
Canopy Temperature	Close to common to activate high Canopy temperature
Low Fuel	Close to common to activate low fuel

9.0 Digital Outputs

Functions	Description
Solenoid Pull To Start	fuel solenoid contact changes from Open to Close at the time of cranking and remains close till the genset is running. For stoppingthe generator this contact opens.
Solenoid Pull To Stop	fuel solenoid contact remains open at the time of cranking and till the genset is running. For stopping the generator this contact closes.
Crank	contact changes from Open to Close during cranking
Hooter	contact changes from Open to Close at the time of Fault
MCB	contact changes from Open to Close at the time of mains on load
GCB	contact changes from Open to Close at the time of load on DG

10.0 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)

11.0 Start / Stop configuration of the DG in various mode

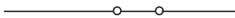
1. Auto Mode :

Auto mode is selected by long pressing (5 sec) the Reset switch, DG can be starts / stops by controller automatically depending upon mains supply.

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, **Start / Stop** pin  DC (-ve)

For stopping the DG, **Start / Stop** pin  DC (-ve)

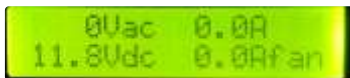


FIGURE : AC VOLTAGE DISPLAY



FIGURE : RUNHOUR



FIGURE : RMP DISPLAY



FIGURE : RMP DISPLAY



FIGURE : OVER FREQUENCY



FIGURE : OVER CURRENT

If any of the alternator or engine measurements move outside operational limits the unit deactivates the Fuel Control Output to shut down the engine, if required and display the respective fault.

Speed Sensing

The unit obtains the speed information from the Generator AC output and shows the AC frequency and the Engine RPM on its LCD display.

12.0 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.

Name on LCD & Icon	Explanation of Parameter	Factory Setting	Setting Range
Solenoid Type	<p>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.</p> <p>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.</p>	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	1-999 Sec
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
Fuel Sensor Type	Select the installed sensor for fuel	Type A	Type A Sam-0 Sam-1 Electronics Linear
Start Stop Keys	Select how to start / stop the engine in manual mode	Front Keys	Remote Switch Front Keys
Service Due Hr	Time, in hours, for next service due warning.	500 hr	10-999 Hrs
Mains O/V	Max. permissible mains voltage, above this the mains voltage is treated unhealthy & generator is started	270 V	50-300V
Mains U/V	Min. permissible voltage, below this the voltage is treated unhealthy & generator is started	180	80-300V
Mains Monitoring Delay	Duration for which mains over/under voltage condition can be tolerated before starting the generator.	10 Sec	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	0-999 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 Sec	1-10
Warm Up Time	The load is transferred to generator after expiry of this time	5 Sec	0-999 Sec
GCB to MCB Delay	User programmable delay when the load is transferred from generator to mains.	5 Sec	1-10 Sec
Solenoid ON time	The time for which stop solenoid will be kept active while stopping the engine	22 Sec	1-999Sec
Fuel Trip Delay	Monitoring time of fuel level after which fuel level trip is generated.	10 Sec	1-999Sec
Fuel Switch Polarity	The polarity of fuel switch can be changed either normally open or normally close.	Normally Open	Normally Open Normally Close


LLOP Switch Trip Delay	Monitoring time of LLOP pressure after which LLOP trip is generated.	5 Sec	1-999 Sec
LLOP switch Polarity	The polarity of fuel switch can be changed either normally open or normally close.	Normally Open	Normally Open Normally Close
Canopy Temp Delay	Monitoring time of canopy temp after which canopy temp trip is generated.	5 Sec	1-999 Sec
Canopy Temp switch Polarity	The polarity of canopy temp switch can be changed either normally open or normally close.	Normally Open	Normally Open Normally Close
HET Delay	Monitoring time of HET after which HET trip is generated.	5 Sec	1-999 Sec
HET Delay Switch Polarity	The polarity of HET switch can be changed either normally open or normally close.	Normally Open	Normally Open Normally Close
Emer. Switch Polarity	The polarity of Emer. switch can be changed either normally open or normally close.	Normally Open	Normally Open Normally Close

- The unit is a complex electronic device and caution should be taken to ensure correct wiring before power is applied.
- The unit is fitted with a 10 way Molex Minifit or equivalent socket connector for which mating plugs can be selected from Amp PE or TPK range.
- The unit is also fitted with a 2 way Mate-N-Lok or equivalent socket connector for which mating plug can be selected from Molex or Tyco range.

13.0 Display History

EMC keeps a log of last 64 Faults. These Faults are stamped along with RunHour.

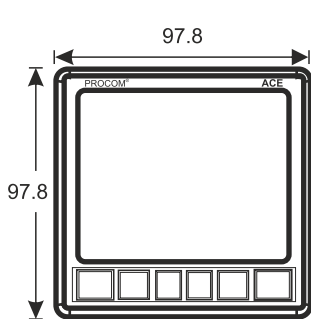
14.0 Wiring Details

1	GND		
2	Sensor GND		
3	+ve		
4	Crank		
5	Solenoid		
6	Hooter		
7	GCB		
8	MCB		
9	Emergency		
10	HET		
11	Fuel Sensor		
12	Fuel Switch		
13	LLOP Switch		
14	Can Temp.		
15	Start/Stop		
<p align="center">MRM <i>PROCOM</i>® Pvt. Ltd. Plot No. 20-21, Sector-59 (II) HUDA, Faridabad, Haryana Tel : 0129-4700400 (10 Lines), info@mrmprocom.com www.mrmprocom.com</p>			<p align="center"><small>press & pull back to release clamp</small></p> 
26	NC		
25	NC		
24	Mains Vol		
23	Mains Vol		
22	Fan Current		
21	Fan Current		
20	Gen Vol		
19	Gen Vol		
18	Ct2		
17	NC		
16	Ct1		

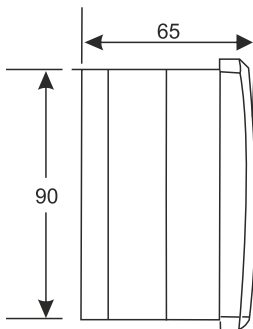
15.0 Low Fuel Sensors Data

S.No.	Fuel In %	Resistance In ohms				
		Type A	Sam_0	Sam_1	Electronics	Linear
1	0	0	14	10	10	10
2	5	5	18	18.5	19.5	18.5
3	10	10	22	27	29	27
4	17	17	29.5	35.5	38.5	35.5
5	20	34	37	44	48	44
6	25	51	55.5	52.5	57.5	52.5
7	30	68	74	61	67	61
8	35	85	92	69.5	76.5	69.5
9	40	102	110	78	86	78
10	45	110.5	124.5	86.5	95.5	86.5
11	50	119	139	95	105	95
12	55	127.5	149	103.5	114.5	103.5
13	60	136	159	112	124	112
14	65	144.5	165	120.5	133.5	120.5
15	70	153	171	129	143	129
16	75	157.7	172.5	137.5	152.5	137.5
17	80	162.3	174	146	162	146.5
18	85	167	176	154.5	171.5	149.5
19	90	171.7	178	163	181	153
20	95	176.3	181	171.5	190.5	166.5
21	100	180	184	180	200	180

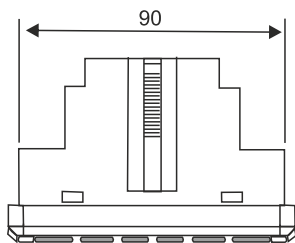
16.0 Dimensions



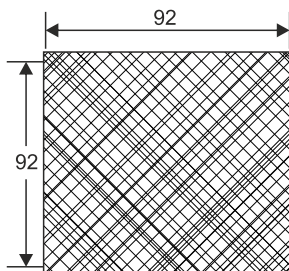
Front View



Left View



Top View



Panel Cutout

All dimensions are in mm.

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