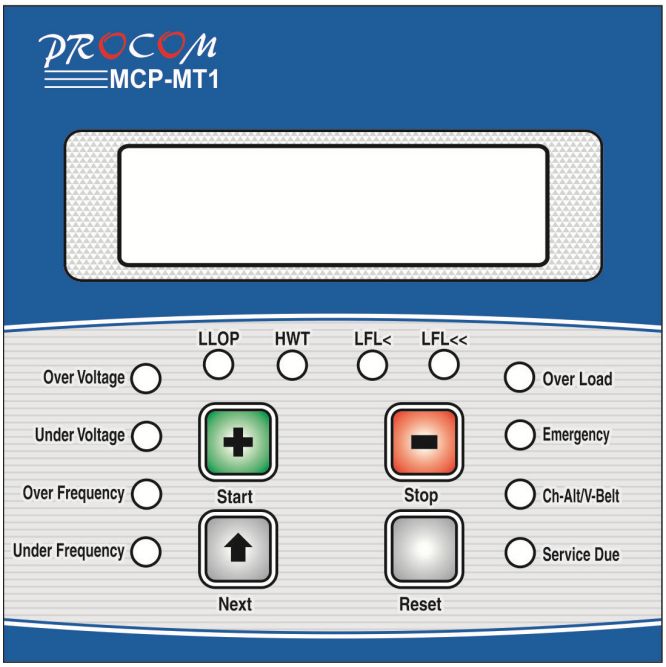
OPERATING INSTRUCTIONS MCP-MT1



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Index

1.0 Introduction

- 16 Bit RISC, state of art, microcontroller based System.
- True RMS measurement of all measured parameters with 1% accuracy of measured value (Not full scale)
- Backlit LCD Display for easy reading and parameter settings. No need to consult the manual while programming the unit.
- All the inputs, such as Mains, Generator and Battery voltages are fully isolated, providing the freedom to design a totally isolated system. This avoids and prevents malfunctioning/ burning of the unit.
- Fully operational up to 4V. Can withstand a voltage dip up to 0V for 1sec.
- All system parameters are user programmable
- Measurement and display of LLOP, Fuel Level and HWT
- Records last 20 faults
- Suitable for all types of engines
- All digital inputs are optically isolated for enhanced reliability
- All outputs are through potential free contacts for system stability and reliability
- All contacts are protected by TVS to strengthen the EMI/EMC capabilities of the unit.
- Housed in 92X92mm Din Standard housing.

2.0 Protection, Supervision Salient features

- Voltage monitoring and protection for under/over voltage and over speeding.
- Oil Pressure
- HWT
- Ch Alt/ V-Belt
- Over Load
- Emergency
- Low Fuel

3.0 Measurement & Display

MCP-MT1 equipped with LCD display and displays

- Generator voltage
- Generator Frequency
- Generator Current
- Battery Voltage
- Generator Run Hour
- RPM
- Oil Pressure in KG/cm
- Radiator Temp in degree centigrade
- Fuel Level in %
- Programmed settings
- KW
- PF
- KWhr
- Service time

Normally the display auto scrolls and displays a set of parameter for 10 seconds, but any time the Next key (↑) can be pressed to select the next parameter window.

4.0 Annunciations

MCP-MT1is equipped with the following annunciations for system status and faults:

- LLOP
- HWT
- Fuel
- Ch Alt/ V-Belt
- DG Under Voltage
- DG Over Voltage
- DG Over/Under Frequency
- DG Overload
- Emergency
- Service Due

5.0 Contacts

The following digital Output are provided. Annunciation contacts are available in models requested with Annunciation features.

- Crank (NO Contact)
- Hold Solenoid & Fuel Pump (NO Contact)
- Heater (NO Contact)
- Hooter (NO Contact)
- Pull Solenoid (NO Contact)

6.0 Timers

MCP-MT1 is equipped with the following timers:

- Generator voltage supervision timer
- Generator over speed supervision timer
- Generator Over load supervision time
- Stop Solenoid on time
  Fuel supervision time
- LLOP supervision time
- HWT supervision time
- RWL supervision time
- Hooter Reset Time
- Heater Timer
- Crank Timer

7.0 Switches Description

MCP-MT1 has 4 switched are provided on its front panel. Switch can have more than one functions assigned to them. The table below describes the operation of these.

S.No.	Switch Symbol	Switch Function	Description
1	⬆	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.
2	✚	Increment	**Programming Mode**: It is used to increment the value of the parameters under programming. **Normal operation mode**: It is used to Start the Engine
3	▬	Decrement	**Programming Mode**: It is used to decrement the value of the parameter under programming. **Normal operation mode**: It is used to Stop the Engine
4	**R**	Reset	Reset key resets the Hooter and Fault signals. The first press shall reset the hooter and next shall reset the faults. A long press of 1 Sec shall reset both.
5	**R** & ⬆	Programming Mode Entry	Press "R" Key and than press "⬆" while the "R" Key is pressed to enter the programming mode.

8.0 Operation.

MCP-MT1 is an engine monitoring and supervisor unit.
The engine can be Started/Stopped from the front panel of MCP-MT1 or externally by means of key Switch etc. The stop from the front or remote is one touch operation, meaning that once the switch is pressed the engine will be stopped, the process of stopping continues till the "Stop Sol Time" , as programmed, has expired . MCP-MT1 automatically detects that the engine on conditions by monitoring the generator voltage and starts monitoring the engine for under/over voltage, LLOP, HWT and emergency faults etc. On detection of any of these faults for the pre-programmed duration the engine is automatically shut down and fault along with run hour is recorded in non-volatile memory.
The run hour time of engine is recorded in internal non-volatile memory.

9.0 Setting Procedure

MCP-MT1 has provision to program the operating parameters, resetting the service hours and viewing the last 20 fault history.

Press R & ⬆ switches simultaneously.

The LCD shall display, "Enter Para Mode"

To enter parameter setting mode press ⬆.

To go to next menu press ✚.

The LCD shall display "View Fault Records".

This menu can be entered by pressing ⬆.

To go to next menu press ✚.

The LCD shall display "Reset Service Hours".

This menu can be entered by pressing ⬆.

Pressing ✚, shall reset the service hours. Pressing ▬ shall terminate the menu.

9.1 Parameter Mode

Sl.No	Display	Explanation of parameter	Factory setting	Setting Range
1	Generator O/ V	Max. permissible voltage, above this the voltage is treated unhealthy & the Generator is stopped.	270V	80-300 V
2	Generator U/V	Min. permissible voltage, below this the voltage is treated unhealthy & the Generator is stopped .	180V	80-300 V
3	Gen Sup Delay	The time for which the Generator voltage should, continuously be unhealthy to generate a fault condition.	30Sec	1-999 Sec.
4	CT Ratio	Available in models having provision for /5 CTs. Not required for Procom Make CTs	1	1-999
5	Generator O/C*	Max. permissible current, above this the Current is treated unhealthy & the Generator is stopped.	6(For /5 CTs) 42A(for Procom Cts)	1-999(for /5 Cts) 1-199 A (for Procom CTs)
6	Gen O/C Delay	The time for which the Generator Current should, continuously be unhealthy to generate a fault condition.	5Sec	1-999 Sec.
7	Generator S/C*	Max. permissible current, above this the Current is treated unhealthy & the Generator is stopped.	10 A(For /5 CTs) 84 A(for Procom Cts)	1-999(for /5 Cts) 1-199 A (for Procom CTs)
8	Gen S/C Delay	The time for which the Generator Current should, continuously be unhealthy to generate a fault condition.	5Sec	1-999 Sec.
9	Generator O/F*	Over frequency setting	65 Hz	40 – 80 Hz
10	Gen O/F Delay	Monitoring time for Over frequency	5 Sec	1-999Sec
11	Generator U/F*	Under frequency setting	45 Hz	40 – 80 Hz
12	Gen U/F Delay	Monitoring time for Under frequency	10 Sec	1-999Sec
13	Available Sensor	This select the installed sensors in the Gensets. The display shall only display the parameters for the sensor installed and uninstalled sensor	All sensors	All sensors, Fuel &HWT, Fuel & LLOP,

		data shall not be displayed. The protection for the function with no measurement sensor installed shall be through switch. Eg. If Oil pressure sensor is not installed the unit shall provide protection for LLOP through oil pressure switch and not through the oil pressure sensor (linear measurement)		LLOP & HWT, Fuel Only, HWT Only, LLOP Only, No sensor
14	Fuel< Level in %	Level of fuel at which the audio visual warning is issued without initiating shut down.	25%Sec	10-100%
15	Fuel < delay	Monitoring time of Fuel < Fault	5 Sec	1-999Sec
16	Fuel< < Level in %	Level of fuel at which the Engine shall shut down	15%Sec	10-100%
17	LowLube Pressure	Level of LLOP at which the Engine shall shut down	2.0 Kg /Cm2	0-8.5 Kg /Cm2
18	High Water Temp	Temperature of water at which the Engine shall shut down	80	0-150 Degree centigrade
19	Sensor Type	A : For engines other than SDEC B : SDEC Engine	A	A,B
17	Fuel << delay	Monitoring time of Fuel << Fault	5 Sec	1-999Sec
19	LLOP delay	Monitoring time of LLOP Fault	5 Sec	1-999 Sec
20	HWT delay	Monitoring time of HWT Fault	5 Sec	1-999 Sec
21	Charging Delay	Duration for which Ch Alt/ Vbelt signal should be active to be recognized as fault. This fault is only enabled while the DG is ON.	5 Sec	1-999 Sec
22	Hooter Reset Time	Time for which the Hooter is active if not reset manually	30 Sec	1-999Sec
23	Stop Sol On Time	Time for which the fuel solenoid is activated for shutting the engine	30Sec	1-100Sec
24	Choke Pre Time	Activate choke prior to crank for set duration.	Disable	1-999Sec
25	Gen Pick Up Vol	Voltage of generator above which the generator is assumed to be ON.	100V	80-150V
26	Service Time Hr	Time, in hours, after which the service is due.	250Hrs	1-999 Hrs
27	Disp Auto Scroll	Setting ON will enable Auto Scroll of display. OFF: No scroll and next parameter can be viewed by pressing next	ON	ON/OFF
28	Engine RPM	Engine RPM selection.	1500	1500/3000
29	Crank Time	Maximum Duration of crank time	5	1-100Sec
30	Comm 232 Or SMS	Selection of communication mode either on RS232, Or SMS via GSM modem	RS232	RS232/ SMS
31	Start SMS	Activated only in SMS communication mode for activating / disabling the SMS communication	Disable	Enable/ Disable
32	Crank Cut Method	Only Voltage based / Voltage or LOP based	Voltage	Voltage/ LOP Or Voltage

**** This parameter can be disabled while programming***

9.2 Fault History.

To view the last 20 fault history enters in this mode as explained above. Maximum of last 20 faults along with Run Hour stamp shall be displayed on the LCD. The first row shall display the fault and the next row shall display the run hour at which the fault has occurred. The next

fault can be viewed by pressing "NEXT". The mode shall exit to normal mode after the last fault recording is displayed. Absence of any fault recoding shall not display any fault data.

9.3 Resting Service Hours.

Service due, warning is issued by MCP-MT1, by flashing the Ser LED. This LED shall keep flashing till it is not reset by entering this mode.

9.4 Programming Solenoid Mode

For changing the solenoid mode first press (R) (reset) button, than press + button while the reset button is pressed.

Fuel Solenoid 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.

Stop Solenoid 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.

Don't change the mode while generator is running. It's a good practice to switch OFF and than switch ON the battery supply after changing this mode.

10.0 Communication Setup.

MCP-MT1 can be used in 2 modes of communication:

a) RS232 mode. For connection to a PC or a MODEM.
b) SMS Mode. If a GSM modem, with SIM, is connected to the RS232 link of the unit, the unit shall be able to send alarm through SMS. The Genset can also be controlled remotely via SMS.

10.1 Setting the phone number on the Controller

To set or modify the phone numbers on the controller, please follow the procedure as below:

a) Switch off the unit. Press "Reset" and "Next " Keys and switch on the power.
b) The first telephone number shall be displayed.
c) The "X" on the first row of the display indicates the digit that can be modified.
d) To modify the digit press "—" key. This will decrement the digit and roll over.
e) To move to next digit press "+" key.
f) To go to next number press "Next" Key.
g) Pressing " Reset " key any time will store the numbers.
h) To disable a number set the first digit to 0.
i) The first 2 numbers can be used to control the Genset.
j) The alarm SMS shall go to all the programmed phone numbers.

11.0 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 Voltage Unhealthy.
- Generator Over & under frequency.
- Generator Over Load
- LLOP
- Fuel
- HWT

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:

- Emergency
- Ch Alt / V-belt

11.3 Fault Reset

All internal faults can be reset by pressing (R) switch after the generator is stopped. In case the engine fails to stop "STOP KEY" can be pressed for manual attempt to stop engine.

12.0 Terminal description

Terminal Number	Description
1	Generator Phase Voltage
2	Generator Neutral
3-4	Generator Current (CT connection)
5-6	NC (Blank)
7	Emergency
8	Remote Start
9	Remote Stop
10-11	Heater Contact
12-13	Pull solenoid contact
14	Hooter
15	Common for Hooter & hold solenoid/fuel pump
16	Hold solenoid and fuel pump
17-18	Crank
19	Battery +ve
20	Battery -ve
21	Ch alt fail I/P
22	Fuel Sensor & Switch
23	HWT Sensor & Switch
24	LLOP Sensor & Switch

13.0 Model Selection

The nomenclature for selecting the model is as follows:
MCP-MT1

-K :-Additional measurement &display of KW & KWh
-6500T: For Procom make CT or INCT for /5 Cts

S.No	Desired Features	Model Name
1	KW and Procom make Cts	MCP-MT1-K-6500T
2	No KW and /5 Cts	MCP-MT1-INCT

- **Procom make CTs can accommodate upto 199 Amps for current higher than these use /5 configuration**

14.0 Specifications

AC voltage withstand	330 VAC (Phase to neutral)
Measurement Accuracy	
Voltage & Current	1%
Power & KWh	2%
Surge 1.2/50Usec	2.5KV
Battery Voltage	Suitable for 12V/24 VDC System
Min. voltage to power on	9V
Min Running Voltage after Power on	4V
Max. Battery Voltage	35V
DC Interruption time	1 Sec.
Digital Output	+ 12V
Cut out Dimensions	92mm X 92mm
Depth	120mm
Digital Input Level	Battery Voltage (Negative) except Charging Alt, which is battery supply

It is our endeavour to constantly upgrade our products, hence specifications are subject to change without any notice.