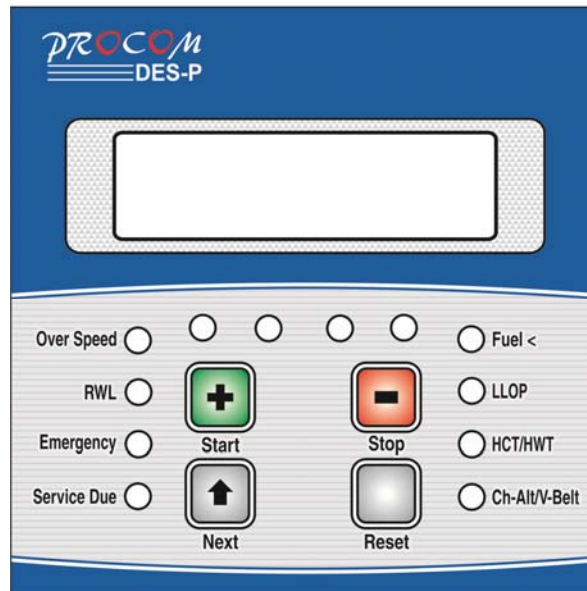




## OPERATING INSTRUCTIONS DES-P



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## DES-P Digital Engine Supervisor

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## 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 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

- Oil Pressure
- HWT
- RWL
- Emergency
- Low Fuel
- Charging Alternator Fail/V-Belt
- Choice of selective sensor measurement display

## 3.0 Measurement & Display

DES-P equipped with LCD display and displays

- Battery Voltage
- Generator Run Hour
- RPM
- Oil Pressure in KG/cm<sup>2</sup>
- Water Temp in degree centigrade
- Fuel Level in %
- Programmed settings
- Service Hour

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

DES-P is equipped with the following annunciations for system status and faults:

- LLOP
- HWT
- Low Fuel
- RWL
- Charging Alternator/ V-Belt
- Emergency

## 5.0 Contacts

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

- Crank (NO Contact)
- Solenoid (NO Contact)
- Hooter (NO Contact)
- Electrical Feed for Charger ON (+12V)

## 6.0 Timers

DES-P is equipped with the following timers:

- Stop Solenoid on time
- Fuel supervision time
- LLOP Supervision Time
- HWT supervision time
- RWL supervision time
- Hooter Reset Time
- Service Time Hour
- Ch- Alt on contact timer
- Crank Time
- Over Speed Supervision Time

## 7.0 Switches Description

DES-P has 4 switches 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                   | <b>Normal operation mode:</b> In this mode, it is used to change the parameters being displayed on LCD.<br><b>Programming Mode:</b> Next key is used to select the next parameter to be programmed. |
| 2     | +             | Increment              | <b>Programming Mode:</b> It is used to increment the value of the parameters under programming.<br><b>Normal operation mode:</b> It is used to Start the Engine                                     |
| 3     | -             | Decrement              | <b>Programming Mode:</b> It is used to decrement the value of the parameter under programming.<br><b>Normal operation mode:</b> 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.

DES-P is an engine monitoring and supervisor unit.

The engine can be Started/Stopped from the front panel of DES-P or externally by means of key Switch etc. The Start / stop from the front or remote is one touch operation, meaning that once the switch is pressed the Crank/ fuel solenoid shall be operational till the “Crank Time / Stop Sol Time” , as programmed, has expired . DES-P automatically detects that the engine on conditions by monitoring engine speed . 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

DES-P 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      | Engine Max RPM                    | Max. permissible RPM, above this the RPM is treated unhealthy & the Generator is stopped.  | 1650            | 300-3000   |
| 2      | Engine O/RPM Delay                | The time for which the Generator RPM should, continuously be unhealthy to generate a fault condition.  | 10Sec           | 1-999 Sec.   |
| 4      | Engine Vbelt RPM                  | Max. permissible Vbelt RPM, above this the RPM is treated unhealthy & the Generator is stopped.  | 300             | 300-600  |
| 5      | V belt Delay                      | The time for which the Vbelt RPM should, continuously be unhealthy to generate a fault condition.  | 10Sec           | 1-999 Sec.   |
| 6      | Available Sensor                  | This select the installed sensors in the Gensets. The display shall only display the parameters for the sensor installed and uninstalled sensor 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) | All sensors     | All sensors, Fuel &HWT, Fuel & LLOP, LLOP & HWT, Fuel Only, HWT Only, LLOP Only, No sensor |
| 7      | Fuel Level in %                   | Level of fuel at which the Engine shall shut down  | 11%             | 10-100%  |
| 8      | Low Lube Pressure                 | Level of LLOP at which the Engine shall shut down  | 1.0 Kg /Cm2     | 0-8.5 Kg /Cm2  |
| 9      | High Water Temp                   | Temperature of water at which the Engine shall shut down   | 95              | 0-150 Degree centigrade  |
| 10     | Sensor Type                       | Select sensor as in accordance with engine   | A               | A,B  |
| 11     | Fuel << delay                     | Monitoring time of Fuel Fault  | 5 Sec           | 1-999Sec   |
| 12     | LLOP delay                        | Monitoring time of LLOP Fault  | 5 Sec           | 1-999 Sec  |
| 13     | HWT delay                         | Monitoring time of HWT Fault   | 5 Sec           | 1-999 Sec  |
| 14     | Rad. Water Delay                  | Time for which Radiator water level has to be active before issuing shut down command  | 5 Sec           | 1-999 Sec  |
| 15     | Hooter Reset Time/ Heater On time | Time for which the Hooter is active if not reset manually/ Time for which heater is to be switched on before crank   | 30 Sec          | 1-999Sec   |
| 16     | Stop Sol On Time                  | Time for which the fuel solenoid is activated for shutting the engine  | 20Sec           | 1-100Sec   |
| 17     | Gen Pick Up Vol                   | Voltage of generator above which the generator is assumed to be ON.  | 100V            | 80-150V  |
| 18     | Service Time Hr                   | Time, in hours, after which the service is due.  | 250Hrs          | 1-999 Hrs  |

|    |                  |   |        |          |
|----|------------------|---|--------|----------|
| 19 | Disp Auto Scroll | Setting ON will enable Auto Scroll of display.<br>OFF: No scroll and next parameter can be viewed by pressing next  | ON     | ON/OFF   |
| 20 | Emer Sol Time    | This setting is to protect the fuel solenoid in case the Stop button or Emergency is kept pressed. In such a case the solenoid shall be released after this time. | 22 Sec | 1-100Sec |
| 21 | RPM Ratio        | Gear ratio multiplier for charging alternator.  | 1.00   | 0.5-1.5  |
| 22 | Crank Time       | Maximum Permissible Crank Time  | 5 Sec  | 1-25 Sec |

*\* 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 recording shall not display any fault data.

## 9.3 Resting Service Hours.

Service due, warning is issued by DES-P, by flashing the Ser LED. This LED shall keep flashing till it is not reset by entering this mode. Pls refer Para 9 for procedure to reset service hour

## 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 engine 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 engine this contact closes for a user programmed time.

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

## 10.0 Faults

There are two categories of faults

- Internal Faults
- External faults

### 10.1 Internal Faults

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

- LLOP
- Fuel
- HWT

### 10.2 External Faults

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

- RWL

### 10.3 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.

### 11.0 Terminal description

| Terminal Number | Description               |
|-----------------|---------------------------|
| 1               | Not Connected             |
| 2               | Not Connected             |
| 3               | Not Connected             |
| 4               | Not Connected             |
| 5               | LLOP Sensor               |
| 6               | HWT Sensor                |
| 7               | Fuel Sensor               |
| 8               | RWL                       |
| 9               | Charging Alternator Input |
| 10              | Auxiliary supply +ve      |
| 11              | Auxiliary supply -ve      |
| 12              | Crank NO Contact          |
| 13              | Solenoid NO Contact       |
| 14              | Charging Alternator On    |
| 15              | Hooter                    |
| 16              | Common for All Contacts   |
| 17              | Remote Start              |
| 18              | Remote Stop               |
| 19              | Not Connected             |
| 20              | Not Connected             |
| 21              | Not Connected             |
| 22              | Not Connected             |
| 23              | Not Connected             |
| 24              | Not Connected             |

### 12.0 Model Selection

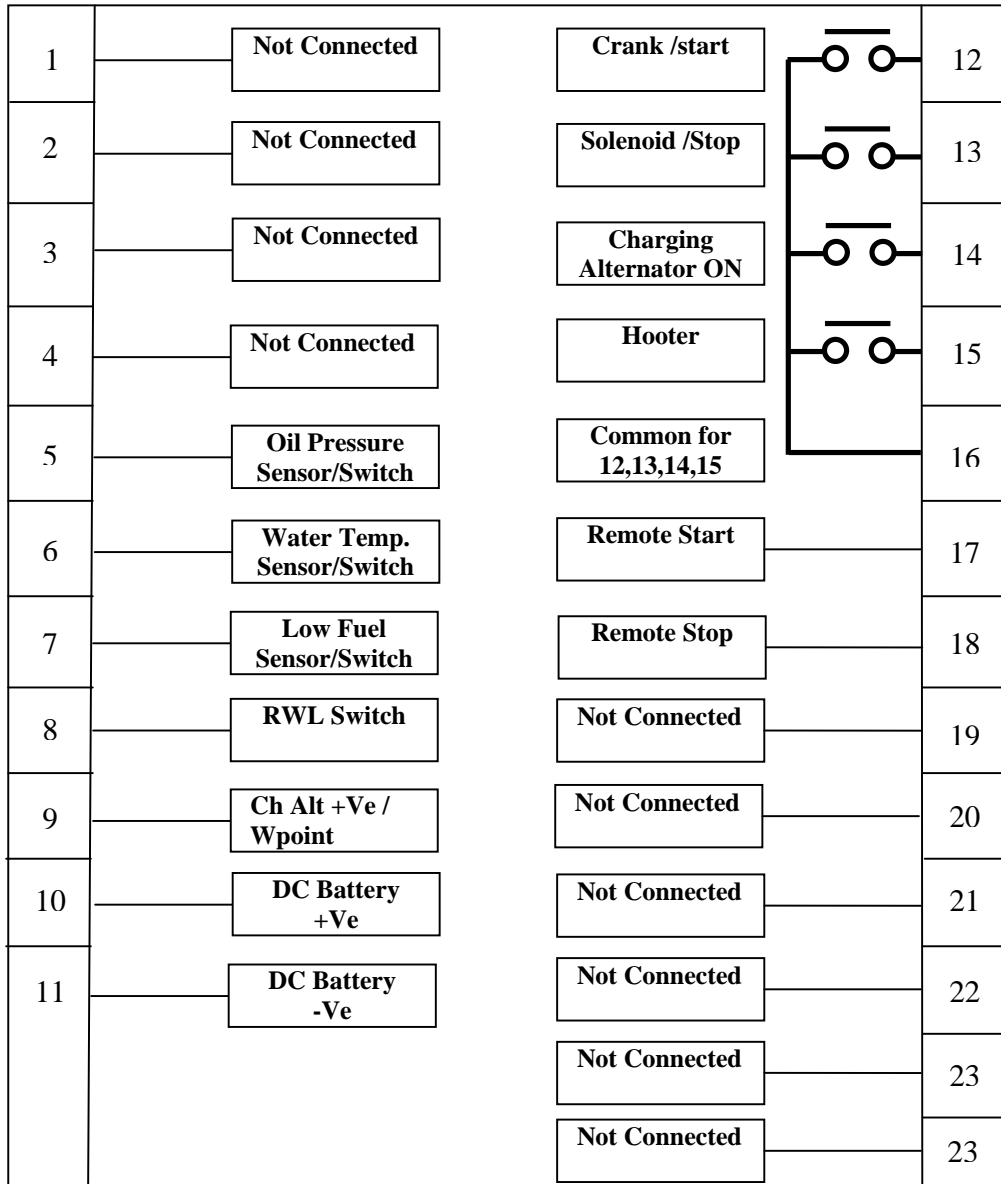
The nomenclature for selecting the model is as follows:  
DES-P

### 13.0 Specifications

- 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 -Ve except Charging Alt, which is battery + Ve



**14.0 Connection Diagram :**



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