

# EPD Manual

EPD<sup>®</sup>(ENGINE PROTECTION DEVICE)

MODEL : FM2

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Engine, Regulator Products

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## Notice

1. To use this product safely, please do understand operation manuals before use.
2. To prevent personal injury or equipment damage, matters that require attention must be followed.
3. The matters that require attention are "Warning" and "Caution", and the meaning is as follows.



**Warning**

Incorrect use could cause injury or death.



**Caution**

Incorrect use could cause personal injury or equipment damage.

4. The symbols in operation manuals mean as follow



Be careful!, it could damage equipment.



Be careful!, it could cause electric shock.

5. Keep operation manuals close to the product.



**Warning**

1. Do not any wire works when the power is on or the main cable is operated. It could cause electrocution or fire.
2. Do not assemble even if the power is off. The charged current of inside equipment could cause electric shock.
3. Do not touch with a wet hand. It could cause electric shock.
4. Do not touch when wires are damaged. It could cause electric shock.
5. Do set up an earthing device to prevent electric shock.



**Caution**

1. Use rated power to prevent equipment damage or fire.
2. Keep foreign substances out to prevent short circuit or fire.
3. To prevent equipment damage or fire. connect a load appropriate to the input or output capacity.
4. Incorrect wiring could cause equipment damage or fire.
5. Incorrect use could cause personal injury or damage this product and connected products. Only qualified technicians and operators should use this device.
6. A test using high voltage such as a voltage withstand test or an insulation resistance test could cause equipment damage. So separate them before testing.
7. Use a rated fuse and wire to prevent fire. .
8. This device is attached to a generator that vibrates a lot. So fasten it tight
9. Check loose part before installation.

## 1. Introduction

EPD-FM2 is a diesel engine protecting device. When it detects faults, it stops engine and displays trouble parts

## 2. Feature

- 2.1. Stopping engine by overspeed, low oil pressure, and low water
- 2.2. Extra engine trouble display function
- 2.3. Overspeed test switch
- 2.4. Equipped RPM METER output
- 2.5. Generator voltage(default) or MAGNET PICKUP(option) is used with engine rotation signal.
- 2.6. Starter motor is double protected by detecting engine speed and oil pressure switch.
- 2.7. Easy action display lamp
- 2.8. Circuit protection design for SURGE
- 2.9. Durable under dust and damp( SILICON MOLDING )

## 3. Specification

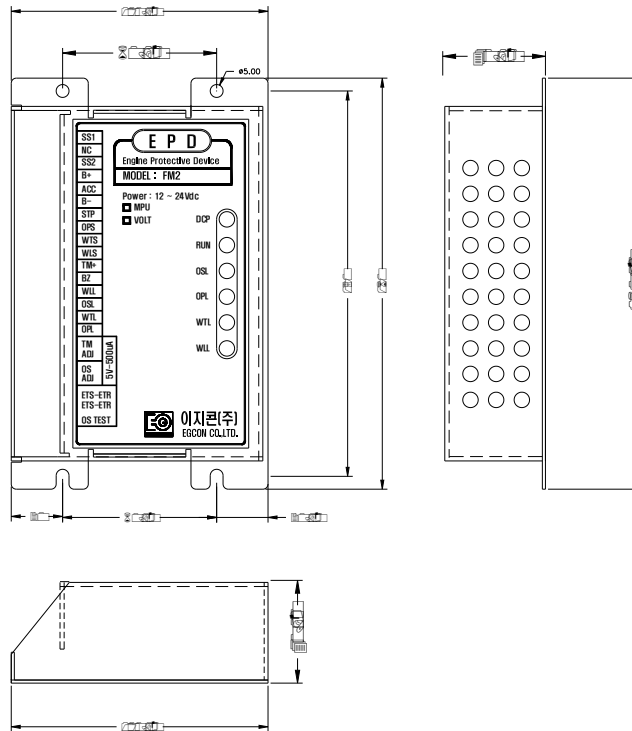
- 3.1. Power Input : 12 Vdc ~ 24 Vdc  $\pm$ 25%
- 3.2. Speed sensor : Generator voltage detecting type(default)→ 0~75 Hz ,7~300 Vac  
MPU detecting type(custom-built)→ 0~7,000 Hz ,4~30 Vac
- 3.3. RPM METER output ; Two types of meters are usable (5V, 500 $\mu$ A)
- 3.4. Output Capacity of Stop Contact : 1A(24Vdc)
- 3.5. Maintaining Time of Stop Contact : About 15 sec

## 4. Working condition

- 4.1. Operating temperature: -10° ~ 40°C
- 4.2. Storage temperature: -24° ~ 45°C
- 4.3. Relative humidity: 0% ~ 90% with no condensation
- 4.4. Vibration :  
Amplitude-0.35mm,Frequency-0~30Hz
- 4.5. Max operating altitude: 3,000m
- 4.6. Max storage altitude: 4,500m
- 4.7. Max transporting altitude: 10,668m

## 5. Structure

- 5.1. Dimension : W100 \* D160 \* H40 (mm)
- 5.2. Cut-out : W60 \* D150 (mm), 5 $\Phi$  - 4 Holes
- 5.3. weight : about 500g



## 6. Displaying LED

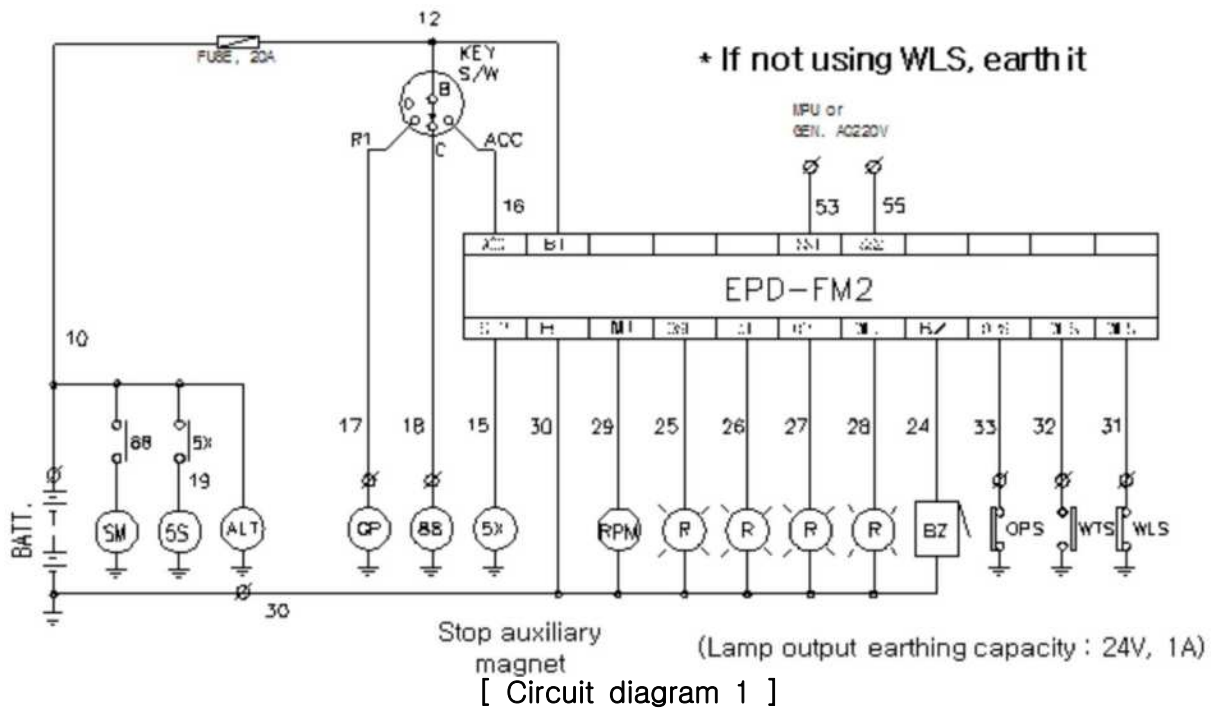
- 6.1. DCP : Power Input(GREEN) – Lighted when power is supplied to terminal B+, B-.
- 6.2. RUN : Engine operation sign(GREEN) – Lighted when engine speed goes over IDLE SPEED.
- 6.3. OSL : Overspeed sign(RED) – Lighted when engine speed goes over overspeed set point.
- 6.4. WTL : Coolant high temperature sign(RED) – Lighted when coolant high temperature switch is CLOSE.
- 6.5. OPL : Lubricant low pressure sign (RED) – Lighted when lubricant pressure switch is CLOSE.
- 6.6. WLL : Coolant shortage sign(RED) –Lighted when coolant is insufficient.

## 7. Terminal and capacity

| Terminal | Manual  | rating   |
|----------|---|--|
| B+       | “ + ” input of storage battery                      | 8Vdc ~ 30Vdc, Max 3A   |
| ACC      | Input of KEY S/W ACC(single stage)                  |  |
| B-       | “ - ” input of storage battery                      |  |
| TM+      | " + " output of RPM METER                           | FS : 5V , 500uA  |
| WTS      | Switch input of coolant temperature                 | NORMAL OPEN , connect DC-  |
| WLS      | Switch input of coolant level                       | NORMAL CLOSE , connect DC-   |
| OPS      | Switch input of lubricant pressure                  |  |
| SS1,SS2  | Input of engine operation signal                    | Generator voltage: 0~75 Hz, 7~300 Vac<br>MPU signal : 0~7,000 Hz ,4~20 Vac |
| OSL      | When engine speeds over, “ + ” output               | B+ voltage output, Max 1A  |
| WTL      | When coolant is with high temperature, “ + ” output |  |
| OPL      | When engine oil pressure is low, “ + ” output       |  |
| WLL      | When coolant is insufficient, “ + ” output          |  |
| STP      | Sign output of engine stop                          |  |
| BZ       | Sign output of complete breakdown                   |  |

### 8. Test preparation

- 8.1. Set a circuit at EPD input/output terminals like below [Circuit diagram1]
- 8.2. KEY S/W : OFF
- 8.3. WTS (high temperature switch) : OPEN
- 8.4. OPS (Oil pressure switch) : CLOSE
- 8.5. WLS (Coolant level switch) : CLOSE



### 9. Symbol explanation

- EPD : ENGINE PROTECTIVE DEVICE
- ETS : When stopping an engine, power supply type to a solenoid
- ETR : When operating an engine, power supply type to a solenoid
- MPU : MAGNETIC PICKUP
- OPS : Oil pressure switch
- WTS : Coolant temperature switch
- RPM : Revolution speedometer
- GP : Preheating plug
- SM : Starter motor
- 5S : Stop solenoid
- 5X : Stop assistant relay
- 88 : Starting auxiliary magnet
- 88X : Starting output relay

### 10. Test

- 10.1. In [Circuit diagram 1], when putting KEY S/W on ACC, B+ output comes out from a STP terminal with a ETR stop way and the output doesn't come out with a ETS stop way.
- 10.2. Engine stop
  - ETR :When turning a KEY S/W off, B+ output of a STP terminal is shut off.
  - ETS :When turning a KEY S/W off, B+ voltage outputs for the set time.


10.3. When engine protection circuit(overspeed, high temperature, low oil pressure, low water) operates in normal condition, the applied lamp turns on and engine stopping output comes out according to ETR-ETS setting

### 11. DIP S/W and other buttons explanation

11.1. S/T : When pressing an overspeed PUSH BUTTON, simulated overspeed is set on speed inputting interface inside EPD regardless of input value of actual speed. So RPM(Hz) METER indicates the maximum speed and overspeed circuit of EPD operates that lights OSL and stops the engine.

11.2. O/S : Overspeed adjustment

- It is a regulator to adjust operation speed of overspeed protection circuit.
- Value is set to 60 Hz, 2100 rpm(120%)

|   |   |
|---|---|
|  | <p><b>Caution</b> Over speed regulator is set precisely in factory. If it is adjusted in a field, that could cause malfunction or non protection. So do not adjust it in a field.</p> |
|---|---|

11.3. TM+ : RPM(Hz) METER ADJ.

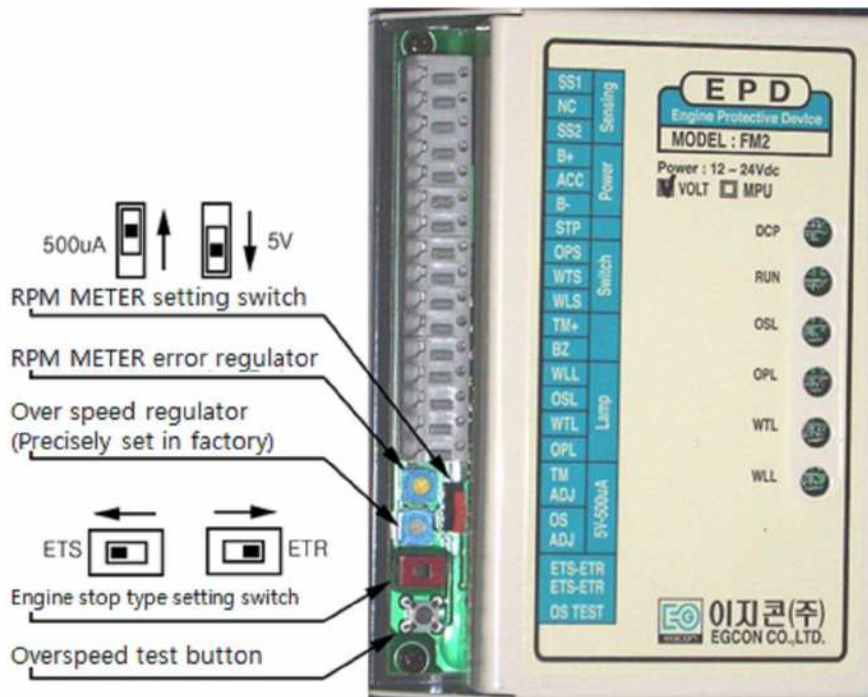
- It is a RPM(Hz) METER regulating resistance. METER indicating value goes up with turning it clockwise.

11.4. RPM(Hz) METER FS set

- It is a switch selecting RPM METER FS. Set it like below [Picture1].
- Able to set 5V or 500uA

11.5. ETS/ETR set

- It is a switch selecting a engine stop type. Set it like below [Picture1].
- Able to set ETR or ETS type



[Picture 1]

## 12. Trouble causes and solutions.

| Symptom   | Cause   | Solution  |
|---|---|---|
| Power does not work.<br>(Control power lamp is not lighted) | DC breaker is OPEN.                               | CLOSE DC breaker.   |
|   | DC AVR fuse is burnt out                          | Replace the fuse with a same capacity one.  |
|   | Incorrect connection.                             | Correct wiring work with the circuit diagram.   |
|   | Dead battery                                      | Charge up the dead battery for more than 5hrs.  |
| Engine does not stop.                                       | Wrong ETR-ETS selecting.                          | Select a correct ETR-ETS  |
|   | Starting magnet is broken.                        | Replace the starting magnet.  |
|   | Stop solenoid is broken.                          | Replace the stop solenoid.  |
|   | Disconnected wire or incorrect connection.        | Correct wiring work with the circuit diagram.   |
| Engine does not start.<br>(Started but dead right away)     | Incorrect OPS connection.                         | Correct wiring work with the circuit diagram.   |
| Engine operates but RPM meter doesn't work                  | Incorrect OPS connection or wire disconnection    | Correct wiring work with the circuit diagram..  |
|   | Incorrect generator voltage or wire disconnection | Correct wiring work with the circuit diagram..  |
|   | Incorrect RPM meter output setting                | Check the rated input of RPM meter and set appropriate output.<br>(There are 5V and 500uA type) |



ENGINE, GENERATOR CONTROL ENTERPRISE

# EGCON®

## 엔진, 발전기 제어 전문기업

### PRODUCTS ITEM

- AVR / 자동전압조정기
- ABC / 자동발전기충전기
- GCU / 발전기제어장치
- ECU / 엔진제어장치
- ESD / 엔진속도검출기
- EPD / 엔진보호장치
- SCR / 동기검출기
- BCU / ACB 제어장치
- ACU / ATS 제어장치
- MPU / 속도검출센서
- GCP / 발전기 운전반
- ECP / 엔진 운전반
- ATS / ATS 운전반
- FGP / 별치형 운전반



AVR  
MODEL : 635/631



ABC  
MODEL : SMP



ABC  
MODEL : SMF



ECU  
MODEL : DG1



GCU  
MODEL : MP2



DMM  
MODEL : 961



ACU  
MODEL : MP3



ETS  
MODEL : Y, B TYPE



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