

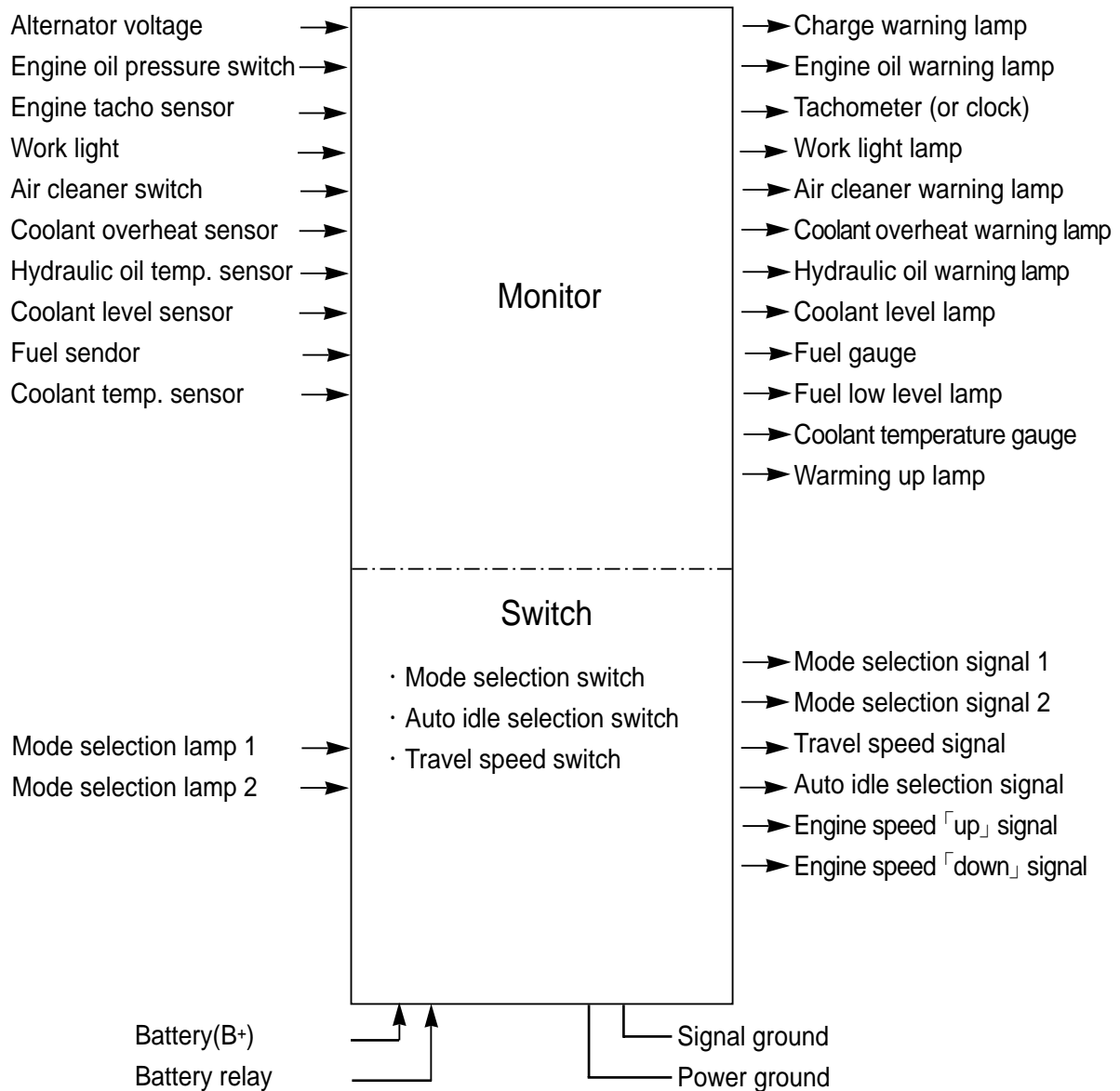
## GROUP 3 MONITORING SYSTEM

### 1. OUTLINE

Monitoring system consists of the monitor part and switch part.

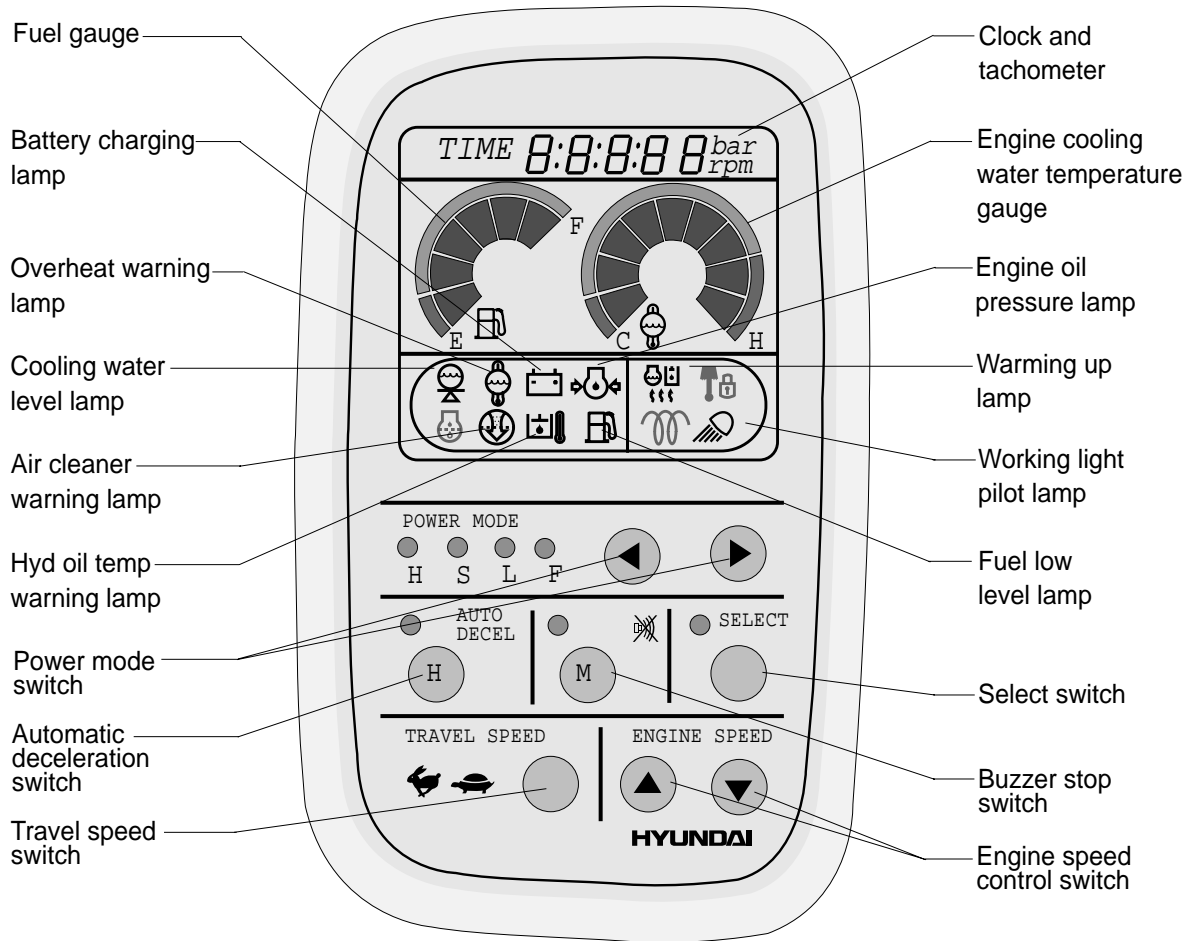
The monitor part gives warnings when any abnormality occurs in the machine and informs the condition of the machine.

Various select switches built into the monitor panel, and it acts as the control portion of the machine control system.



## 2. CLUSTER

### 1) Monitor panel



## 2) CLUSTER CHECK PROCEDURE

### (1) Start key : ON

- ① Check monitor initial 3 seconds
  - a. All lamps light up.
  - b. Buzzer sound.
- ② Check monitor after 3 seconds : indicate machine condition
  - a. Tachometer : 0 rpm
  - b. Fuel gauge : All light up below appropriate level
  - c. Engine cooling water temperature gauge : All light up below appropriate level
  - d. Warning lamp
    - ※ In case, the engine oil pressure lamp and battery charging lamp go on, but it is not abnormal.
    - ※ When engine cooling water temperature below 30°C , the warming up lamp light up.
- ③ Switch portion
  - a. Mode selection : "S" mode
  - b. Auto decel LED : ON
  - c. Travel speed switch : Lo(turtle)

### (2) Start of engine

- ① Check machine condition
  - a. Tachometer indicate at present rpm
  - b. Gauge and warning lamp : indicate at present condition.
    - ※ When normal condition : All warning lamp "OFF"
  - c. Mode selection : "S" mode
  - d. Auto decel : ON(about 1200rpm)
  - e. Travel speed : Lo(turtle)
- ② When warming up operation
  - a. Warming up lamp : ON
  - b. 10 seconds after engine started, mode selection changes from "S" to "F" mode and engine speed also increases from auto decel speed to "F" mode speed (Auto decel LED : ON)
    - ※
- ③ When abnormal condition
  - a. The lamp lights up and the buzzer sounds.

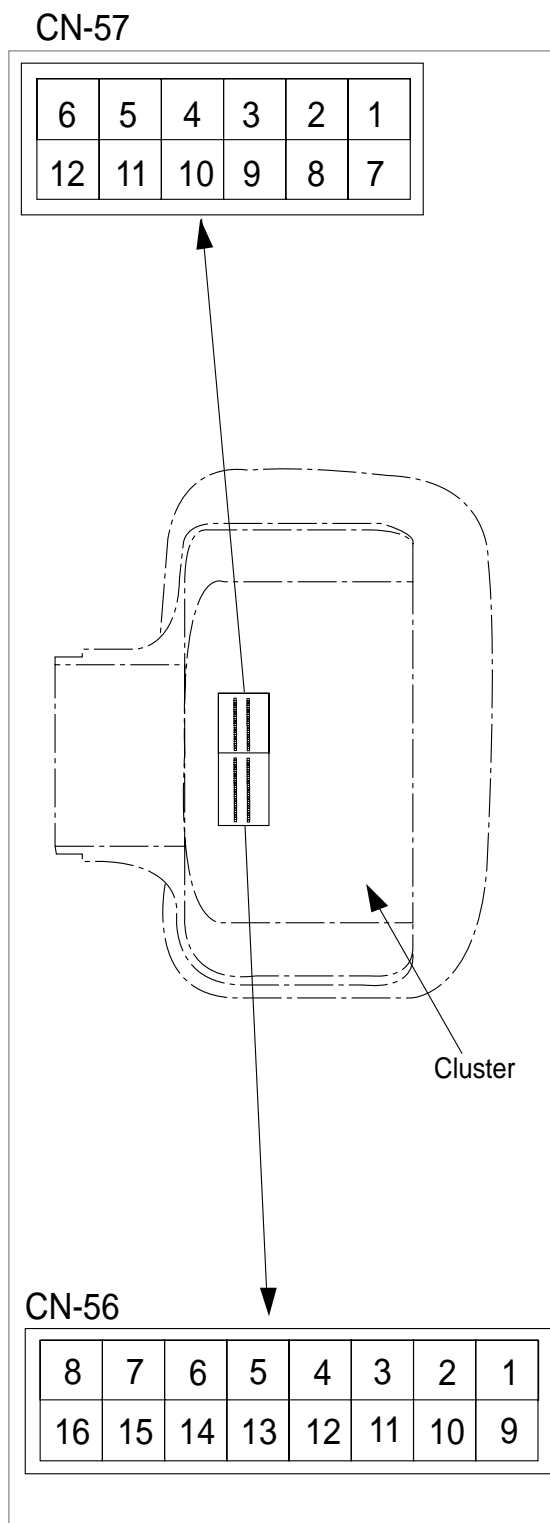
### 3. CLUSTER CONNECTOR

#### 1) CN-57 CONNECTOR

No.	Signal	Input / output
1	Engine speed 「down」	output
2	Engine speed 「up」	output
3	Engine coolant gauge	input
4	Fuel gauge	input
5	Power source(24v)	-
6	Power source(B <sup>+</sup> )	-
7	Travel speed selection	output
8	Mode selection 2	output
9	Mode selection 1	output
10	Engine rpm	input
11	Power ground	-
12	Signal ground	-

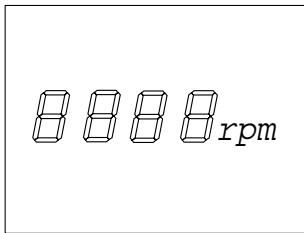
#### 2) CN-56 CONNECTOR

No.	Signal	Input / output
1	Mode LED 1	input
2	Mode LED 2	input
3	Null	-
4	Null	-
5	Null	-
6	Coolant level sensor	input
7	Battery charging warning	input
8	Auto decel selection	output
9	Head light	input
10	Work light	input
11	Null	-
12	Hyd. oil overheat warning	input
13	Engine oil pressure warning	input
14	Air cleaner clog warning	input
15	Coolant overheat warning	input
16	Warming up	output



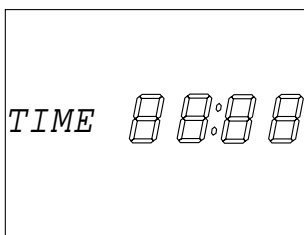
## 4. CLUSTER FUNCTION

### 1) TACHOMETER



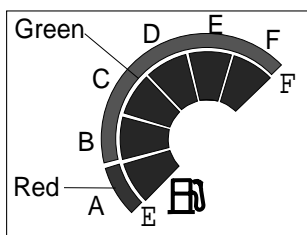
- ① Tachometer displays the number of engine revolutions.
- ② Refer selection button for the selection and adjustment.

### 2) CLOCK



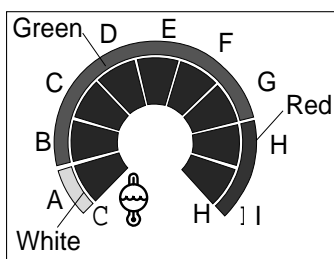
- ① Clock displays the current time by electric digital timer(LCD).
- ② Refer selection button for the selection and adjustment.

### 3) FUEL GAUGE



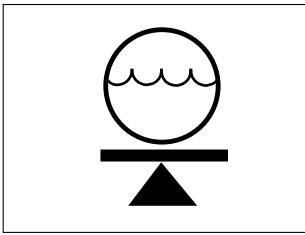
- ① This gauge indicates the amount of fuel in the fuel tank.
  - Segment A : Approximately 24 l (Warning lamp display)
  - Segment B : Approximately 45 l
  - Segment C : Approximately 77 l
  - Segment D : Approximately 110 l
  - Segment E : Approximately 141 l
  - Segment F : Approximately 172 l
  - Quantity of fuel tank : Approximately 200 l .

### 4) ENGINE COOLANT TEMPERATURE GAUGE



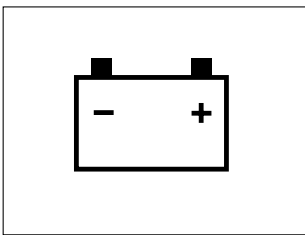
- ① This gauge indicates the temperature of coolant.
  - Segment A : Approximately 40~60°C (White)
  - Segment B : Approximately 60~67°C (Green)
  - Segment C : Approximately 67~74°C (Green)
  - Segment D : Approximately 74~81°C (Green)
  - Segment E : Approximately 81~88°C (Green)
  - Segment F : Approximately 88~95°C (Green)
  - Segment G : Approximately 95~102°C (Green)
  - Segment H : Approximately 102~110°C (Red)
  - Segment I : Approximately 110~ (Red)

### 5) COOLANT LEVEL WARNING LAMP



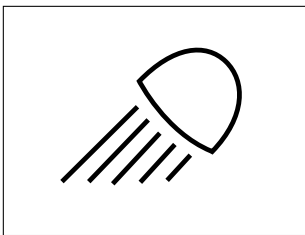
- ① This lamp is turned ON when the cooling water is below LOW in the reservoir tank of radiator.
- ② Check if the cooling water level is between FULL and LOW in the reservoir tank of radiator after opening the engine cover, and check if there is mixture of oil and cooling water.

### 6) BATTERY CHARGING LAMP



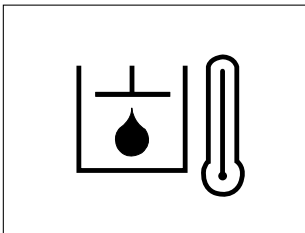
- ① Check if the charging lamp is OFF during engine operation. If the lamp is turned ON, it is not charged.
- ② This lamp is ON before starting the engine, it is turned OFF after starting the engine. Check the battery charging circuit when this lamp comes ON.

### 7) WORKING LIGHT LAMP



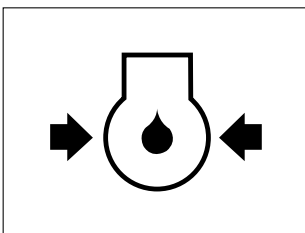
- ① When the working light switch is turned ON, the working light mounted on boom and the working light indicator lamp light ON.

### 8) HYDRAULIC OIL OVERHEAT WARNING LAMP



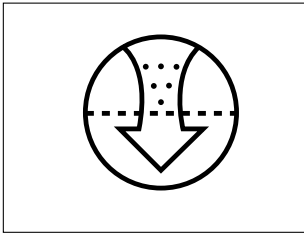
- ① This warning lamp operates and the buzzer sounds when the temperature of hydraulic oil is over 105°C.
- ② Check the coolant when the lamp is turned ON.

### 9) ENGINE OIL PRESSURE WARNING LAMP



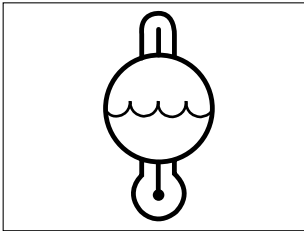
- ① This lamp is turned OFF before starting the engine but turned ON after starting the engine as the pressure caused from the engine oil pump lubricates each part.

### 10) AIR CLEANER WARNING LAMP



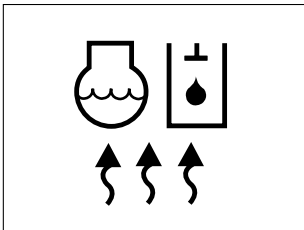
- ① This lamp operates by the vacuum caused inside when the filter of air cleaner is clogged which supply air to the engine.
- ② Check the filter and wash or replace it when the lamp operates.

### 11) OVERHEAT WARNING LAMP



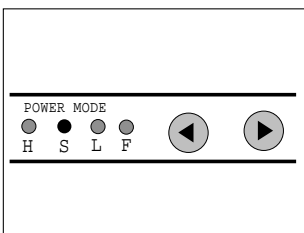
- ① This lamp is turned ON when the temperature of cooling water is over the normal temperature(110℃)and lose the cooling function.
- ② Check the cooling water when the lamp is on.

### 12) WARMING UP LAMP



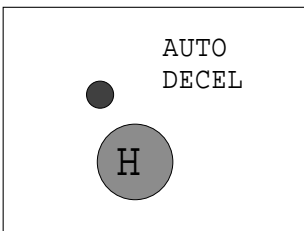
- ① This lamp is turned ON when the coolant temperature is below 30℃.
- ② The automatic warming up is cancelled when the engine coolant temperature is above 30℃, or when 10 minutes have passed since starting.

### 13) MODE SELECTION SWITCH



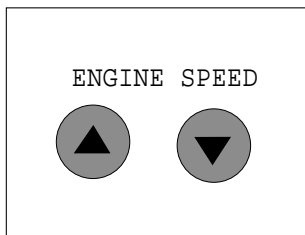
- ① The lamp of selected mode is turned ON by pressing the right switch(◀, ▶), when selecting the mode to use.
  - H : This is used for heavy-duty work.
  - S : This is used for ordinary work.
  - L : This is used for light-duty work.
  - F : This is used for light-duty work, especially for finishing work.

### 14) AUTO DECELERATION SWITCH



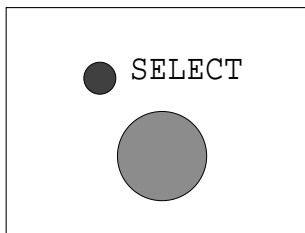
- ① This switch is used to actuate the auto-deceleration function so the engine speed is lowered automatically when temporary stop or stand-by for dump is required.
- ② It is actuated(turned ON) by one touch, and cancelled by the repeat touch.

### 15) ENGINE SPEED CONTROL SWITCH



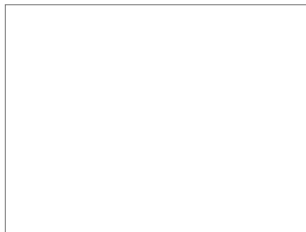
- ① This switch is to control the engine speed which is increase the engine speed by pressing「▲」switch and decrease the engine speed by pressing「▼」switch.

### 16) SELECTION SWITCH(tachometer and clock)



- ① This switch is used to select the tachometer or clock.
- ② The switch is pressed, each function is selected by turns.
- ③ The switch is pressed for 3 seconds, it is selected time adjusting function.
  - Hour : Auto decel switch
  - Minute : Buzzer stop switch
- ④ After time set, the switch is pressed, it is returned clock.

### 17) BUZZER



The buzzer sounds when the warning lamp lights ON.