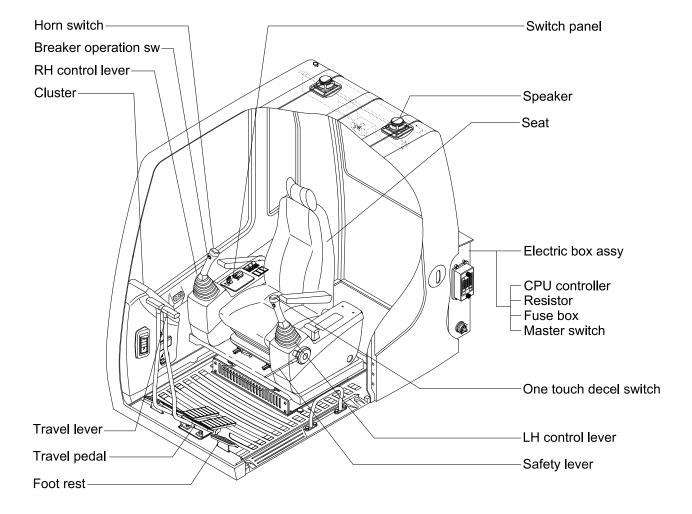
CONTROL DEVICES

1. CAB DEVICES

1) The ergonomically designed console box and suspension type seat provide the operator with comfort.

2) ELECTRONIC MONITOR SYSTEM

- (1) The centralized electronic monitor system allows the status and conditions of the machine to be monitored at a glance.
- (2) It is equipped with a safety warning system for early detection of machine malfunction.



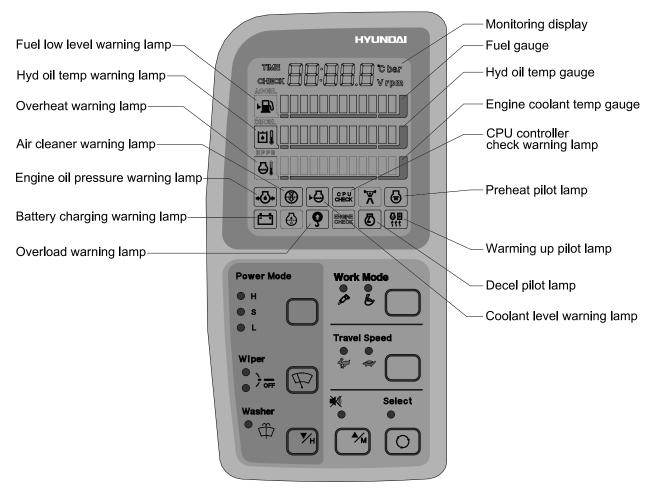
RD11073CD01A

2. CLUSTER(Machine serial No.: -#0265)

1) MONITOR PANEL

The monitor panel consists of gauges and lamps as shown below, to warn the operator in case of abnormal machine operation or conditions for the appropriate operation and inspection.

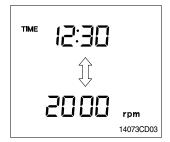
- Gauges: Indicate operating status of the machine.
- · Warning lamp: Indicate abnormality of the machine (Red).
- Pilot lamp : Indicate operating status of the machine(Amber).
- * The monitor installed on this machine does not entirely guarantee the condition of the machine. Daily inspection should be performed according to chapter 6, Maintenance.
- * When the monitor provides a warning immediately check the problem, and perform the required action.



D11073CD02

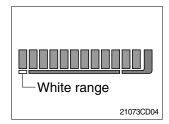
* The warming lamp lights ON and the buzzer sounds when the machine has a problem. In this case, press the buzzer stop switch and buzzer stop, but the warming lamp lights until the problem is cleared.

(1) Monitoring display



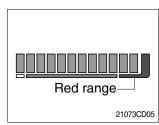
- ① This displays the current time and machine information such as engine rpm, coolant/hydraulic oil temperature, hydraulic oil pressure and also error codes.
- * Refer to the page 4-11 for details.

(2) Fuel gauge



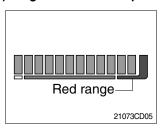
- ① This gauge indicates the amount of fuel in the fuel tank.
- ② Fill the fuel when the white range or warning lamp blinks.
- * If the gauge illuminates the white range or warning lamp blinks even though the machine is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.

(3) Hydraulic oil temperature gauge



- ① This indicates the temperature of hydraulic oil.
- White range : Below 30°C(86°F)
 Green range : 30-100°C(86-212°F)
 Red range : Above 102°C(215.6°F)
 The green range illuminates when operating.
- ③ Keep idling engine at low speed until the green range illuminates before operation of machine.
- When the red range illuminates, reduce the load on the system. If the gauge stays in the red range, stop the machine and check the cause of the problem.

(4) Engine coolant temperature gauge



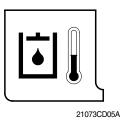
- (1) This indicates the temperature of coolant.
 - White range : Below 30°C(86°F)
 Green range : 30-100°C(86-212°
 Red range : Above 102°C(215.6°F)
- ② The green range illuminates when operating.
- ③ Keep idling engine at low speed until the green range illuminates before operation of machine.
- ④ When the red range illuminates, turn OFF the engine, check the radiator and engine.

(5) Fuel low level warning lamp



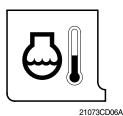
- ① This lamp blinks and the buzzer sounds when the level of fuel is below 28 $\it l$ (7.4U.S. gal).
- ② Fill the fuel immediately when the lamp blinks.

(6) Hydraulic oil temperature warning lamp



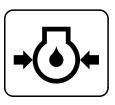
- ① This warning lamp operates and the buzzer sounds when the temperature of hydraulic oil is over 102°C(215.6°F).
- ② Check the hydraulic oil level when the lamp blinks.
- ③ Check for debris between oil cooler and radiator.

(7) Overheat warning lamp



- ① This lamp blinks and the buzzer sounds when the temperature of coolant is over the normal temperature 102°C(215.6°F).
- ② Check the cooling system when the lamp blinks.

(8) Engine oil pressure warning lamp



21073CD07

- ① This lamp blinks and the buzzer sounds after starting the engine because of the low oil pressure.
- ② If the lamp blinks during engine operation, shut OFF engine immediately. Check oil level.

(9) Air cleaner warning lamp



21073CD08

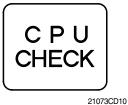
- ① This lamp blinks and the buzzer sounds when the filter of air cleaner is clogged.
- ② Check the filter and clean or replace it.

(10) Coolant level warning lamp



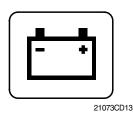
- ① This lamp blinks and the buzzer sounds when the coolant is below LOW in the reservoir tank of radiator.
- ② Check the reservoir tank when the lamp blinks.

(11) CPU controller check warning lamp



- ① Communication problem between CPU controller and cluster makes the lamp blinks and the buzzer sounds.
- ② Check if any fuse for CPU burnt off.
- ③ If not check the communication line between them.

(12) Battery charging warning lamp



- ① This lamp blinks and the buzzer sounds when the starting switch is ON, it is turned OFF after starting the engine.
- ② Check the battery charging circuit when this lamp blinks during engine operation.

(13) Overload warning lamp



21073CD15

① When the machine is overload, the overload warning lamp blinks during the overload switch is ON.

(14) Decel pilot lamp



21073CD17

- ① Operating auto decel or one touch decel makes the lamp ON.
- ② The lamp will be ON when pushing one touch decel switch on the LH RCV lever.

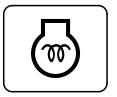
(15) Warming up pilot lamp



21073CD18

- ① This lamp is turned ON when the coolant temperature is below $30^{\circ}C(86^{\circ}F)$.
- ② The automatic warming up is cancelled when the engine coolant temperature is above 30 °C, or when 10 minutes have passed since starting.

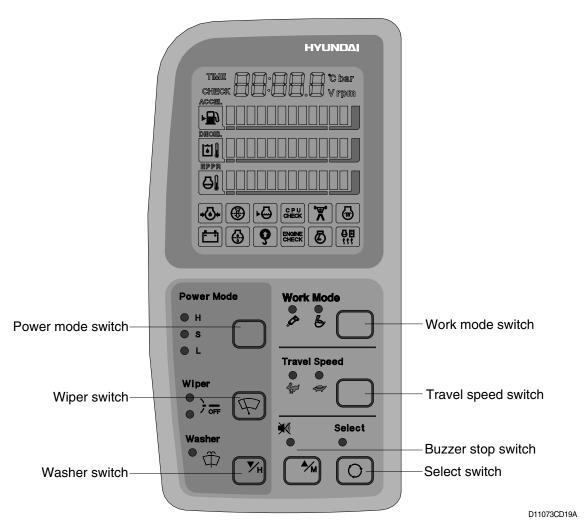
(16) Preheat pilot lamp



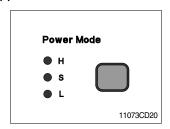
21073CD12

- ① Turning the start key switch ON position starts preheating in cold weather.
- ② Start the engine as this lamp is OFF.

2) SWITCH PANEL

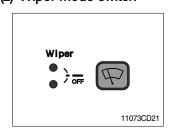


(1) Power mode switch



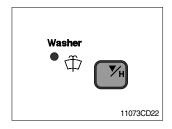
- ① This switch is to select the machine power mode, which shifts from high power work to standard power work and light power work in a raw by pressing the switch.
 - **H** : This is used for high power work
 - · S : This is used for standard power work
 - · L : This is used for light power work
- * Refer to the page 4-7 for details.

(2) Wiper mode switch



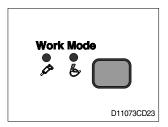
- ① This switch is used to operate wiper.
 - · Press the switch once to operate wiper.
 - Press the switch once more to intermittently operate wiper low speed.
 - · Press the switch once more to turn off wiper.
- * Wiper motor doesn't operate with front sliding door open.
- If wiper does not operate with the switch in the ON position, turn the switch off immediately. Check the cause.
 If the switch remains ON, it can result in motor failure.

(3) Washer switch



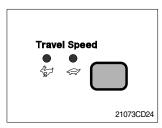
- ① The washer liquid is sprayed and the wiper is operated only while pressing this switch.
- ② The indicator lamp is turned ON when operating this switch.

(4) Work mode switch



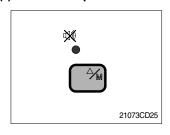
- ① This switch is to select the machine operation mode, which shifts from general operation mode to heavy operation mode and breaker mode in a raw by pressing the switch.
 - · 🖢 : Heavy duty work mode
 - · 🔊 : Breaker operation mode
- * Refer to the page 4-7 for details.

(5) Travel speed control switch



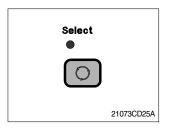
① This switch is to control the travel speed which is changed to high speed(Rabbit mark) by pressing the switch and low speed(Turtle mark) by pressing it again.

(6) Buzzer stop switch



- ① When the starting switch is turned ON first, normally the alarm buzzer sounds for 2 seconds during lamp check operation.
- ② The red lamp lights ON and the buzzer sounds when the machine has a problem. In this case, press this switch and buzzer stops, but the red

(7) Select switch



- ① This switch is used to select the monitor display function.
- Refer to the page 4-11 for details.
- ② If the switch is pressed for 3 seconds in time display mode, it moves to time adjusting function, and you can adjust the time as below.
 - · Hour by auto decel() switch
 - Minute by buzzer stop() switch.

lamp lights until the problem is cleared.

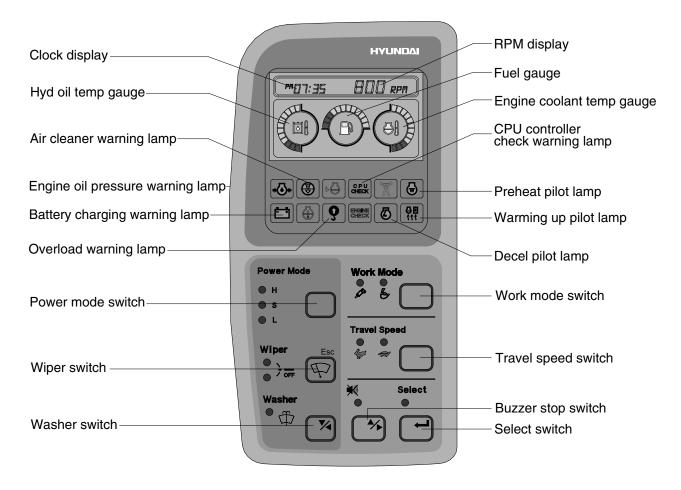
3 After time set, the switch is pressed, it returns to clock display.

■ CLUSTER(Machine serial No. : #0266-)

1. MONITOR PANEL

The monitor panel consists of gauges and lamps as shown below, to warn the operator in case of abnormal machine operation or conditions for the appropriate operation and inspection.

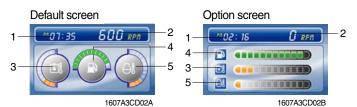
- · Gauges : Indicate operating status of the machine.
- · Warning lamp: Indicate abnormality of the machine (Red).
- · Pilot lamp : Indicate operating status of the machine(Amber).
- * The monitor installed on this machine does not entirely guarantee the condition of the machine. Daily inspection should be performed according to chapter 6, Maintenance.
- * When the monitor provides a warning immediately check the problem, and perform the required action.



RD8075MS08

* The warming lamp lights ON and the buzzer sounds when the machine has a problem. In this case, press the buzzer stop switch and buzzer stop, but the warming lamp lights until the problem is cleared.

2. LCD main operation display



- 1 Time display
- 2 RPM display
- 3 Hydraulic oil temperature gauge
- 4 Fuel level gauge
- 5 Engine coolant temperature gauge

1) Time display



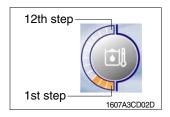
- ① This displays the current time.
- * Refer to the page 3-8-6 to set time for details.

2) RPM display



① This displays the engine rpm.

3) Hydraulic oil temperature gauge

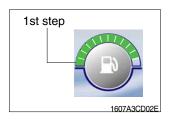


① This gauge indicates the temperature of hydraulic oil in 12 step gauge.

1st step : Below 30°C(86°F)
 2nd~10th step : 30-105 °C(86-221°F)
 11th~12th step : Above 105°C(221°F)

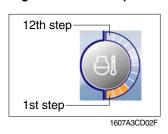
- ② The gauge between 2nd and 10th steps illuminates when operating.
- ③ Keep idling engine at low speed until the gauge between 2nd and 10th steps illuminates, before operation of machine.
- When the gauge of 11th and 12th steps illuminates, reduce the load on the system. If the gauge stays in the 11th~12th steps, stop the machine and check the cause of the problem.

4) Fuel level gauge



- ① This gauge indicates the amount of fuel in the fuel tank.
- ② Fill the fuel when the 1st step or fuel icon blinks in red.
- If the gauge illuminates the 1st step or fuel icon blinks in red even though the machine is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.

5) Engine coolant temperature gauge



① This gauge indicates the temperature of coolant in 12 step gauge.

1st step : Below 30°C(86°F)
2nd~10th step : 30-105 °C(86-221°F)
11th~12th step : Above 105°C(221°F)

- ② The gauge between 2nd and 10th steps illuminates when operating.
- ③ Keep idling engine at low speed until the gauge between 2nd and 10th steps illuminates, before operation of machine.
- When the gauge of 11th and 12th steps illuminates, turn OFF the engine, check the radiator and engine.

3. Warning of main operation screen

1) Warning display

(1) Engine coolant temperature





- This lamp blinks and the buzzer sounds when the temperature of coolant is over the normal temperature 105°C(221°F).
- Check the cooling system when the lamp blinks.

(2) Fuel level





- This lamp blinks and the buzzer sounds when the level of fuel is below 28 *l* (7.4U.S. gal).
- Fill the fuel immediately when the lamp blinks.

(3) Hydraulic oil temperature





- This warning lamp operates and the buzzer sounds when the temperature of hydraulic oil is over 105 °C(221 °F).
- Check the hydraulic oil level when the lamp blinks.
- Check for debris between oil cooler and radiator.

(4) All gauge





- This lamp blinks and the buzzer sounds when the all gauge is abnormal.
- Check the each system when the lamp blinks.

(5) Communication error



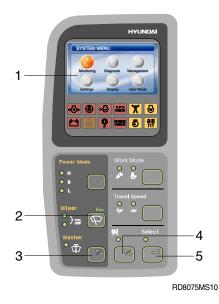
- Communication problem between MCU controller and cluster makes the lamp blinks and the buzzer sounds.
- Check if any fuse for MCU burnt off.
 If not check the communication line between them.

2) Pop-up icon display

| No | Switch | Selected mode | Display |
|----|-------------------|--------------------------|---------------|
| 1 | Power mode switch | High power work mode | 500 am |
| | | Standard power work mode | "09:25 600 am |
| | | Light power work mode | 500 m |

| No | Switch | Selected mode | Display |
|----|-----------------------------|---------------|--|
| 2 | Travel speed control switch | Low speed | ************************************** |
| | | High speed | ************************************** |

3) LCD



1 : LCD

2 Escape,
Return to the previous menu

3 Down/Left Direction

4 : Up/Right Direction

5 Select(Enter)
Activate the currently chosen item

(1) Main menu



1 Menu information

: Monitoring , Equipment, Switch, Output

: Diagnosis Current error, Recorded error

4 : Maintenance

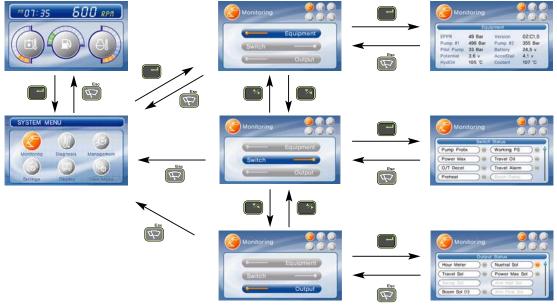
: Settings
Time set Dual mode
System lock(Reserved)

6 : Display Operation skin, Brightness, Language

7 : User mode(null)

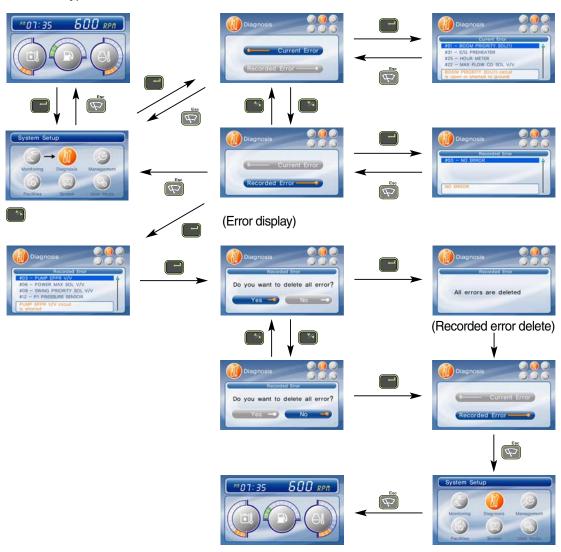
(2) Display map

① Monitoring



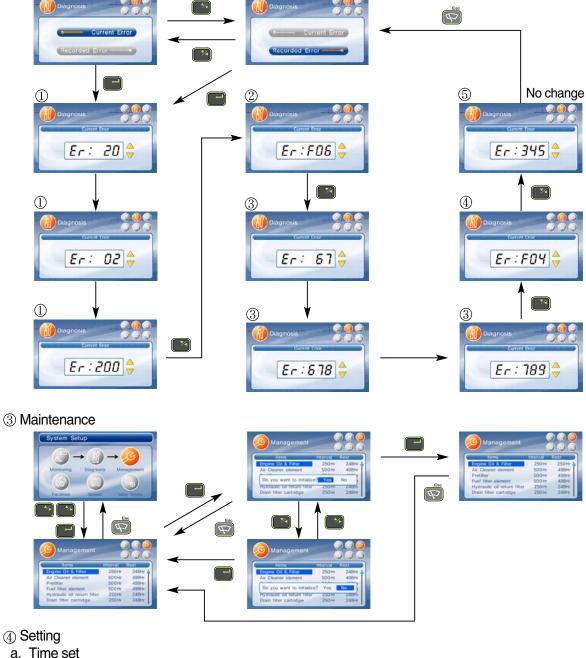
② Diagnosis

a. Protocol type 1



b. Protocol type 2

- If there are more than 2 error codes, each one can be displayed by pressing or switch respectively.
- 3 error codes (①ŚPN200200, ②FMI06, ③SPN6789, ④FMI04, ⑤345) display.



a. Time set



b. System lock - Reserved

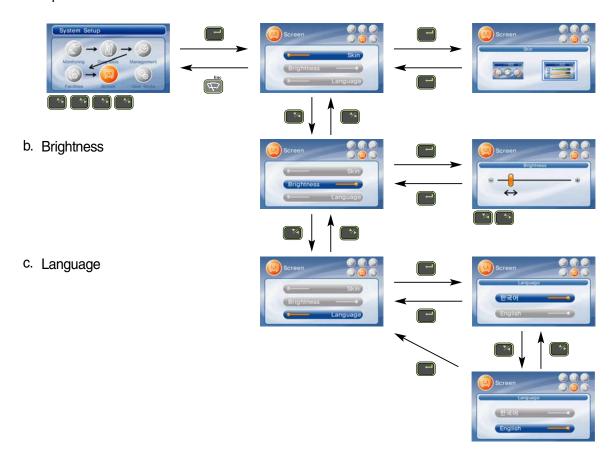
c. Dual mode

- Changing the MCU mode



⑤ Display

a. Operation skin



4) Warning and pilot lamp

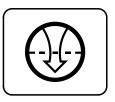
(1) Engine oil pressure warning lamp



21073CD07

- ① This lamp blinks and the buzzer sounds after starting the engine because of the low oil pressure.
- ② If the lamp blinks during engine operation, shut OFF engine immediately. Check oil level.

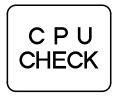
(2) Air cleaner warning lamp



21073CD08

- ① This lamp blinks and the buzzer sounds when the filter of air cleaner is clogged.
- ② Check the filter and clean or replace it.

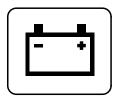
(3) MCU controller check warning lamp



21073CD10

- ① If any fault code is received from MCU controller, this lamp blinks and the buzzer sounds.
- ② Check the communication line between MCU controller and cluster.

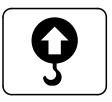
(4) Battery charging warning lamp



21073CD13

- ① This lamp blinks and the buzzer sounds when the starting switch is ON, it is turned OFF after starting the engine.
- ② Check the battery charging circuit when this lamp blinks during engine operation.

(5) Overload warning lamp



21073CD15

① When the machine is overload, the overload warning lamp blinks during the overload switch is ON.

(6) Decel pilot lamp



21073CD17

- ① Operating auto decel or one touch decel makes the lamp ON.
- ② The lamp will be ON when pushing one touch decel switch on the LH RCV lever.

(7) Warming up pilot lamp



21073CD18

- ① This lamp is turned ON when the coolant temperature is below $30^{\circ}C(86^{\circ}F)$.
- ② The automatic warming up is cancelled when the engine coolant temperature is above 30 °C, or when 10 minutes have passed since starting.

(8) Preheat pilot lamp



21073CD12

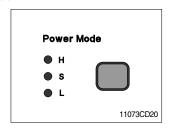
- ① Turning the start key switch ON position starts preheating in cold weather.
- ② Start the engine as this lamp is OFF.

5) SWITCH PANEL



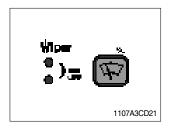
RD8075MS11

(1) Power mode switch



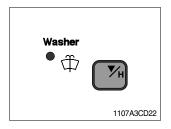
- ① This switch is to select the machine power mode, which shifts from high power work to standard power work and light power work in a raw by pressing the switch.
 - · **H** : High power work mode
 - · S : Standard power work mode
 - \cdot L : Light power work mode

(2) Wiper mode switch



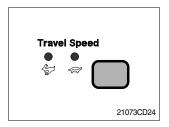
- ① This switch is used to operate wiper.
 - · Press the switch once to operate wiper.
 - Press the switch once more to intermittently operate wiper low speed.
 - · Press the switch once more to turn off wiper.
- Wiper motor doesn't operate with front sliding door open.
- If wiper does not operate with the start switch in the ON position, turn the switch off immediately. Check the cause. If the switch remains ON, it can result in motor failure.

(3) Washer switch



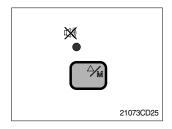
- ① The washer liquid is sprayed and the wiper is operated only while pressing this switch.
- ② The indicator lamp is turned ON when operating this switch.

(4) Travel speed control switch



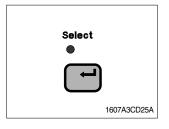
① This switch is to control the travel speed which is changed to high speed(Rabbit mark) by pressing the switch and low speed(Turtle mark) by pressing it again.

(5) Buzzer stop switch



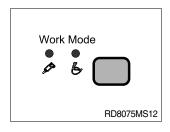
- ① When the starting switch is turned ON first, normally the alarm buzzer sounds for 2 seconds during lamp check operation.
- ② The red lamp lights ON and the buzzer sounds when the machine has a problem. In this case, press this switch and buzzer stops, but the red lamp lights until the problem is cleared.

(6) Select switch



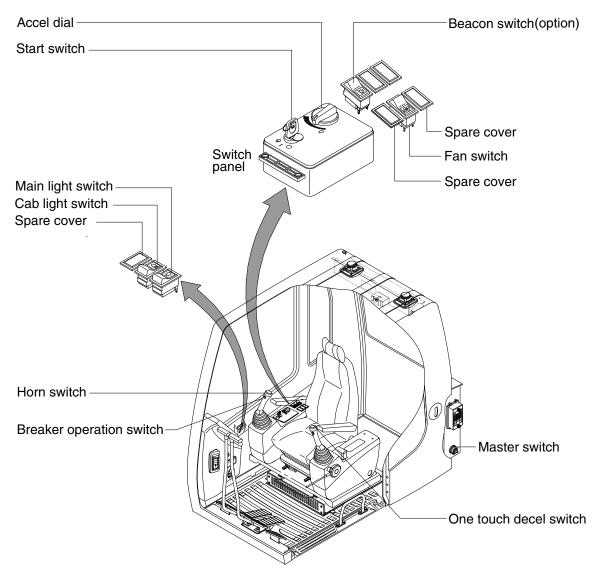
- ① This switch is used to enter main menu and sub menu for LCD.
- * Refer to the page 3-8-4 for details.

(7) Work mode switch



- ① This switch is to select the machine operation mode, which shifts from general operation mode to breaker mode by pressing the switch.
 - · 💪 : General work mode
 - · 🔊 : Breaker operation mode

3. SWITCHES



RD11073CD26A

1) STARTING SWITCH



- (1) There are three positions, OFF, ON and START.
 - · (OFF) : None of electrical circuits activate.
 - · | (ON) : All the systems of machine operate.
 - · (START) : Use when starting the engine. Release key immediately after starting.
- * Key must be in the ON position with engine running to maintain electrical and hydraulic function and prevent serious machine damage.

2) MASTER SWITCH



- (1) This switch is used to shut off the entire electrical system.
- (2) I: The battery remains connected to the electrical system.
 - **O**: The battery is disconnected to the electrical system.
- Never turn the master switch to O(OFF) with the engine running. It could result in engine and electrical system damage.

3) ACCEL DIAL SWITCH



- (1) There are 10 dial setting.
- (2) Setting 1 is low idle and setting 10 is high idle.
 - · By rotating the accel dial to right: Engine speed increases
 - · By rotating the accel dial to left : Engine speed decreases

4) MAIN LIGHT SWITCH



- (1) This switch use to operates the head light and work light by two step.
 - · First step : Head light and cluster illumination lamp comes ON.
 - Second step: Work light comes ON. Also, the below indicator lamp comes ON.

5) CAB LIGHT SWITCH



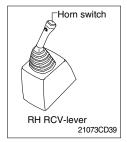
(1) This switch is used to turns ON the cab light on the cab.

6) BEACON SWITCH(Option)



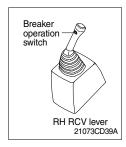
- (1) This switch turns ON the rotary light on the cab.
- (2) The below indicator lamp is turned ON when operating this switch.

7) HORN SWITCH



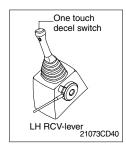
This switch is at the top of right side control lever.
 On pressing, the horn sounds.

8) BREAKER OPERATION SWITCH



(1) On pressing this switch, the breaker operates only when the breaker selection switch on the switch panel is selected.

9) ONE TOUCH DECEL SWITCH



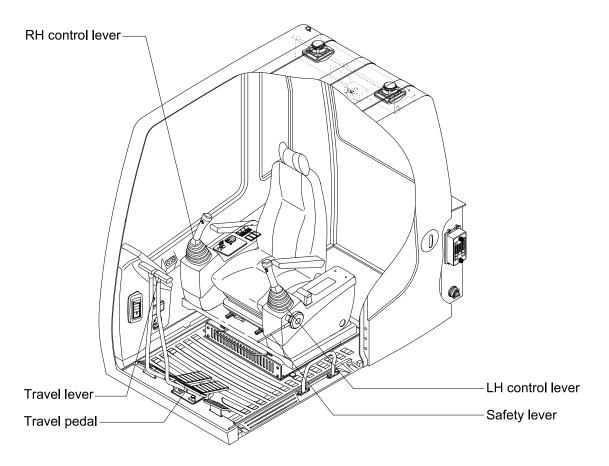
- (1) This switch is used to actuate the deceleration function quickly.
- (2) The engine speed is increased to previous setting value by pressing the switch again.

12) FAN SWITCH



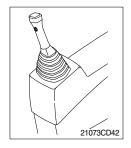
(1) This switch is used to operate fan.

4. LEVERS AND PEDALS



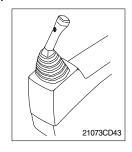
RD11073CD41A

1) LH CONTROL LEVER



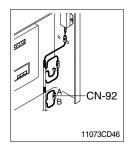
- (1) This joystick is used to control the swing and the arm.
- (2) Refer to operation of working device in chapter 4 for details.

2) RH CONTROL LEVER



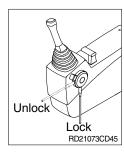
- (1) This joystick is used to control the boom and the bucket.
- (2) Refer to operation of working device in chapter 4 for details.

3) EMERGENCY ENGINE STARTING CONNECTOR



- (1) If the CPU controller is removed, the engine does not start.
- (2) Before starting the engine, connect the connector CN-92 A with B.
- » Do not connect these connectors when the CPU is not removed.

4) SAFETY LEVER



- (1) All control levers and pedals are disabled from operation by locating the lever to lock position as shown.
- Be sure to lower the lever to LOCK position when leaving from operator's seat.
- (2) By pull lever to UNLOCK position, machine is operational.
- Do not use the safety lever for handle when getting on or off the machine.

5) TRAVEL LEVER



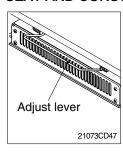
- (1) This lever is mounted on travel pedal and used for traveling by hand. The operation principle is same as the travel pedal.
- (2) Refer to traveling of the machine in chapter 4 for details.

6) TRAVEL PEDAL



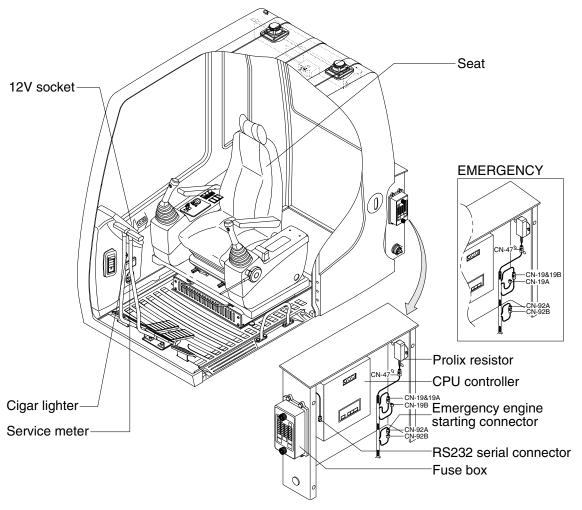
- (1) This pedal is used to move the machine forward or backward.
- (2) If left side pedal is pressed, left track will move.
 If right side pedal is pressed, right track will move.
- (3) Refer to **traveling of machine** in chapter 4 for details.

7) SEAT AND CONSOLE BOX ADJUST LEVER



- (1) This lever is used to move the seat and console box to fit the contours of the operator's body.
- (2) Pull the lever to adjust forward or backward over 170mm(6.7").

5. OTHERS



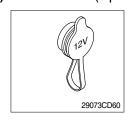
RD11073CD22A

1) CIGAR LIGHTER



- (1) This can be used when the engine starting switch is ON.
- (2) The lighter can be used when it springs out in a short while after being pressed down.
- Service socket
 Use cigar lighter socket when you need emergency power.
 Do not use the lighter exceeding 24V, 100W.

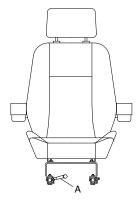
2) 12V SOCKET(Option)



(1) Utilize the power of 12V as your need and do not exceed power of 12V, 30W.

3) SEAT

The seat is adjustable to fit the contours of the operator's body. It will reduce operator fatigue due to long work hours and enhance work efficiency.





RD21073CD16

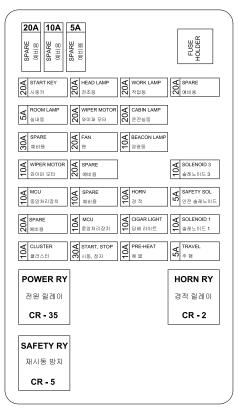
(1) Forward/Backward adjustment(A)

- ① Pull lever A to adjust seat forward or backward.
- ② The seat can be moved forward and backward over 140mm(5.5") in 7 steps.

(2) Reclining adjustment(B)

Pull lever B to adjust seat back rest.

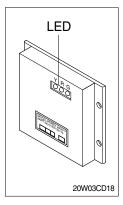
4) FUSE BOX



- (1) The fuses protect the electrical parts and wiring from burning out.
- (2) The fuse box cover indicates the capacity of each fuse and circuit it protects.
- * Replace a fuse with another of the same capacity.
- A Before replacing a fuse, be sure to turn OFF the starting switch.

RD11073CD55

5) CPU CONTROLLER

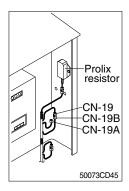


- (1) To match the engine torque with the pump absorption torque, CPU controller varies EPPR valve output pressure, which control pump discharge amount whenever feedbacked engine speed drops under the reference rpm of each mode set.
- (2) Three LED lamps on the CPU controller display as below.

| LED lamp | Trouble | Service |
|--------------------------|--------------------------------------|---|
| G is turned ON | Normal | - |
| G and R are turned ON | Trouble on CPU or ROM | Change the controller |
| G and Y are turned ON | Trouble on serial communication line | Check if serial communication lines between controller and cluster are disconnected |
| Three LED are turned OFF | Trouble on CPU controller power | Check if the input power wire (24V, GND) of controller is disconnected |
| | | · Check the fuse |

G: green, R: red, Y: yellow

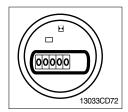
6) PROLIX RESISTOR(Option)



- (1) This resistor is used to continuous working in case of malfunction of the CPU controller.
- Never connect connector CN-19 with connector CN-19B when CPU controller is in normal operation.

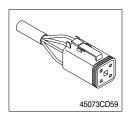
Normal : CN-19 connect with connector CN-19A
 Emergency : CN-19 connect with connector CN-19B

7) SERVICE METER



- (1) This meter shows the total operation hours of the machine.
- (2) Always ensure the operating condition of the meter during the machine operation. Inspect and service the machine based on hours as indicated in chapter 6, maintenance.

8) RS232 SERIAL CONNECTOR



(1) CPU controller communicates the machine data with Lap top computer through RS232 connector.

9) UPPER WINDSHIELD

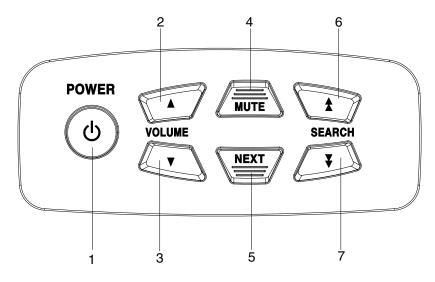


- (1) Perform the following procedure in order to open the upper windshield.
- ① Release both latches(1) in order to release the upper windshield.
- ② Hold both grips that are located at the bottom of the windshield frame and at the top of the windshield frame push the windshield upward.
- ③ Hold both grips that are provided on the windshield frame and back into the storage position until auto lock latch(2) is engaged, move the levers of both latches(1) into the locked position. Push the levers toward the rear of the cab in order to hold the windshield in storage position.



- (2) Perform the following procedure in order to close the upper windshield.
- ① Move the lever of the auto lock latch(2) in the direction of the arrow in order to release the auto lock latch.
- ② Reverse step ① through step ③ in order to close the upper windshield.

11) REMOTE CONTROLLER



4507A3CD90

(1) Power ON/OFF button



① Press ① to switch ON the set. Press ① for more than 2seconds to switch OFF the set.

(2) Volume button(up)



 \cdot Short press : Volume up one step

· Long press : Volume up continuous

(3) Volume button(down)



· Short press : Volume down one step

· Long press : Volume down continuous.

(4) Source & mute button



- · Short press : Change source(Radio/CD)
- · Long press : To mute or cancel mute.

(5) Next button



① Tuner mode

Short press : Preset upLong press : Band up

② Cassette mode

· Short press : Reverse(before the end of the tape)

· Long press : No function

③ CD mode

Short press : Track 1Long press : Scan track

(6) Search button(up)



① Tuner mode

Short press : Search up one stepLong press : Search up continuous

② Cassette & CD mode

Short press : Next trackLong press : Fast forward

(7) Search button(down)



① Tuner mode

Short press : Search down one stepLong press : Search down continuous

② Cassette & CD mode

Short press : Previous trackLong press : Fast rewind