

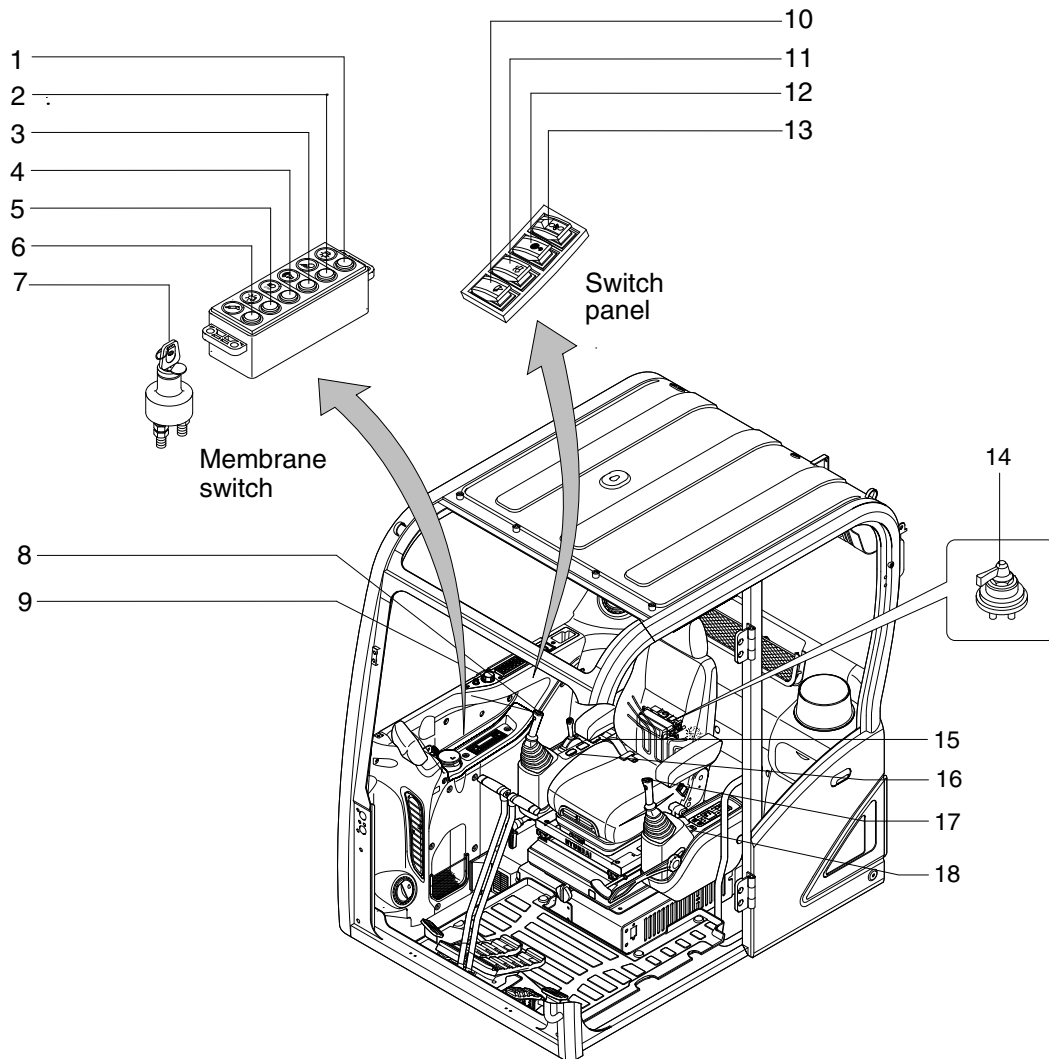
SECTION 4 ELECTRICAL SYSTEM

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SECTION 4 ELECTRICAL SYSTEM

GROUP 1 COMPONENT LOCATION

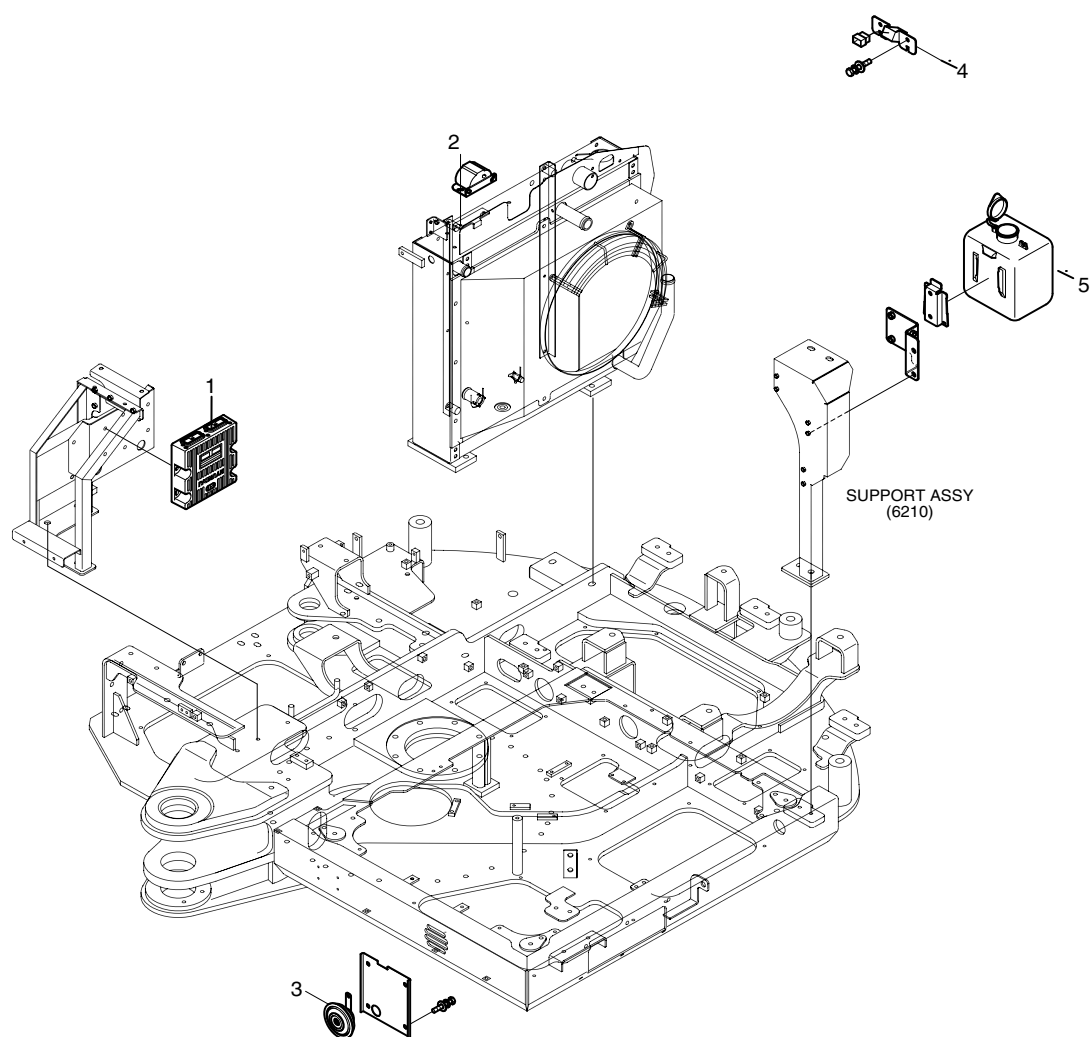
1. LOCATION 1



85A4EL20

- | | | |
|----------------------------------|----------------------------------|--------------------------|
| 1 Head light switch | 7 Start switch | 13 DPF switch |
| 2 Work light switch | 8 Breaker operation switch (opt) | 14 Master switch |
| 3 Travel alarm switch | 9 Accel dial switch | 15 Pattern change switch |
| 4 Cab light switch | 10 Wiper switch | 16 AUX switch |
| 5 Beacon switch | 11 Washer switch | 17 Horn switch |
| 6 Breaker selection switch (opt) | 12 Overload switch (opt) | 18 Quick coupler switch |

2. LOCATION 2



85A4EL03

- 1 Engine control unit
- 2 Driving alarm buzzer
- 3 Horn

- 4 Cover
- 5 Washer tank assy
- 6 Rear view camera assy

GROUP 2 MONITORING SYSTEM (-#0490)

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 are built into the monitor panel, which act as the control portion of the machine control system.

2. CLUSTER

1) STRUCTURE

The cluster consists of LCD and switches as shown below. The LCD is to warn the operator in case of abnormal machine operation or conditions for the appropriate operation and inspection.

Also, The LCD is to set and display for modes, monitoring and utilities with the switches.

The switches or touch screen are to set the machine operation modes.

- ※ The cluster 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 cluster provides a warning immediately check the problem, and perform the required action.



85A4EL21

- ※ The warning lamp pops up, lights ON (on the left-top side) and the buzzer sounds when the machine has a problem.
The warning lamp lights ON until the problem is cleared. Refer to page 4-6 for details.

2) GAUGE

(1) Operation screen

When you first turn starting switch ON, the operation screen will appear.



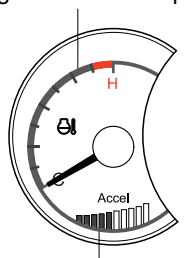
- | | | |
|-----------------------------|--------------------|--------------|
| 1 Engine coolant temp gauge | 3 Fuel level gauge | 5 Accel dial |
| 2 Hydraulic oil temp gauge | 4 Engine rpm | 6 Clinometer |

※ Operation screen type can be set by the screen type menu of the display.

Refer to page 4-21 for details.

(2) Engine coolant temperature gauge

Engine coolant temp gauge



Accel dial gauge

85A3CD101

① This gauge indicates the temperature of coolant.

- Black range : 43°C (104°F) or more and below 110 °C (239 °F)

- Red range : Above 110°C (239°F) or more

② If the indicator is in the red range or  lamp lights ON in red, turn OFF the engine and check the engine cooling system.

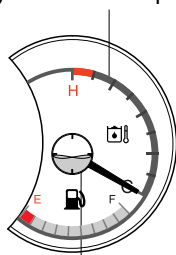
※ If the gauge indicates the red range or  lamp lights ON in red even though the machine is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.

③ Accel dial gauge

Displays the levels (0~9) of the accel dial.

(3) Hydraulic oil temperature gauge

Hydraulic oil temp gauge



Clinometer

85A3CD102

① This gauge indicates the temperature of hydraulic oil.

- Black range : 40-105°C (104-221°F)

- Red range : Above 105°C (221°F)

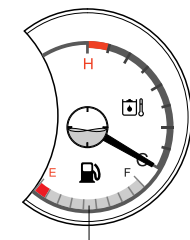
② If the indicator is in the red range or  lamp lights ON in red, reduce the load on the system. If the gauge stays in the red range, stop the machine and check the cause of the problem.

※ If the gauge indicates the red range or  lamp lights ON 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.

③ Clinometer

Displays the gradient information of the machine.

(4) Fuel level gauge

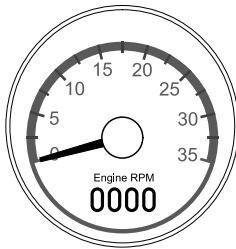


Fuel level gauge

85A3CD103

- ① This gauge indicates the amount of fuel in the fuel tank.
- ② Fill the fuel when the red range, or  lamp lights ON in red.
- ※ If the gauge indicates the red range or  lamp lights ON 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 rpm display



HX603CD35

- ① This displays the engine revolutions per minute.

3) COMMUNICATION ERROR AND LOW VOLTAGE WARNING POP-UP

(1) Communication error pop-up



HX603CD30

- ① Cluster displays this communication error pop-up when it has communication error with MCU.
- ② Communication error pop-up displays at operation screen only. Just buzzer alarm at the other screen.
- ③ If communication with MCU become normal state, it will disappear automatically.

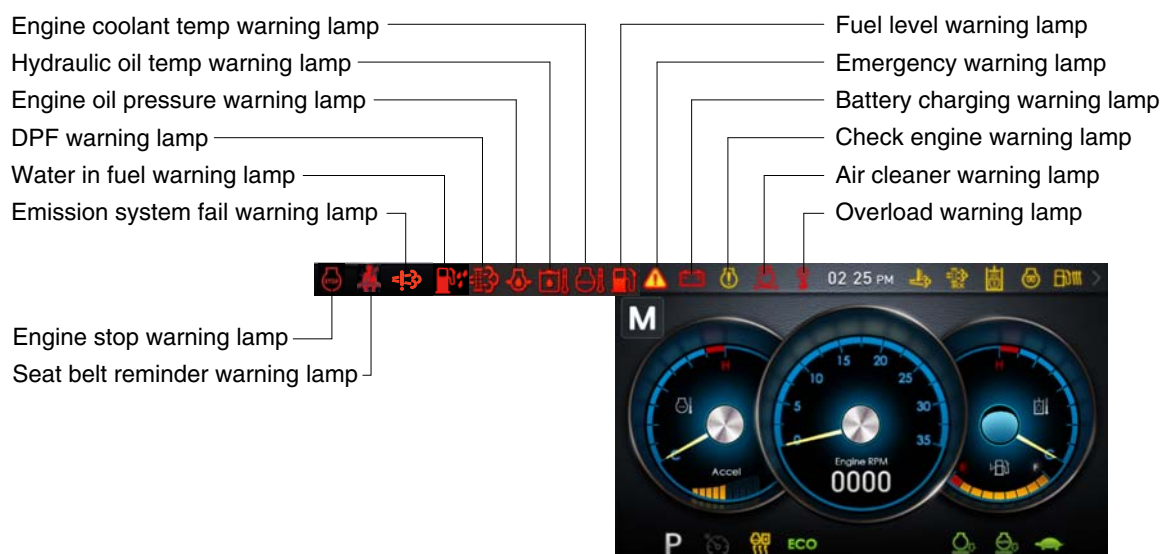
(2) Low voltage warning pop-up



HX603CD31

- ① Cluster displays this low voltage warning pop-up when the battery voltage is low.
- ② Low voltage warning pop-up displays at operation screen only. Just buzzer alarm at the other screen.
- ③ This pop-up will disappear with using touch screen or buzzer stop switch. While the battery voltage is low, buzzer sounds every minute.
- ④ When the battery voltage is higher than 11.5 V, the pop-up off.

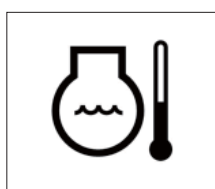
4) WARNING LAMPS



85A3CD104

- ※ Each warning lamp on the left-top of the LCD pops up on the center of LCD and the buzzer sounds when the each warning is happened. The pop-up warning lamp moves to the original position and lights ON when the buzzer stop switch is pushed or the pop-up is touched. And the buzzer stops. Refer to page 4-13 for the switch.
- ※ When the warning lamps light ON more than 6, you can check all lamps with next page button (◀, ▶) near the warning lamps.

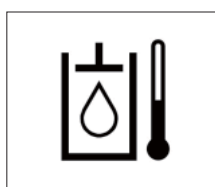
(1) Engine coolant temperature warning lamp



290F3CD61

- ① The  lamp pops up on the center of LCD and the buzzer sounds when the engine coolant temperature is over 110°C or more.
- ② The pop-up  lamp moves to the original position and lights ON when the buzzer stop switch is pushed or pop-up is touched. Also, the buzzer stops and  lamp keeps ON.
- ③ Check the cooling system when the lamp keeps ON.

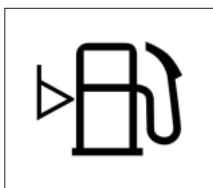
(2) Hydraulic oil temperature warning lamp



290F3CD62

- ① The  lamp pops up on the center of LCD and the buzzer sounds when the hydraulic oil temperature is over 105°C or more.
- ② The pop-up  lamp moves to the original position and lights ON when the buzzer stop switch is pushed or pop-up is touched. Also, the buzzer stops and  lamp keeps ON.
- ③ Check the hydraulic oil level and hydraulic oil cooling system.

(3) Fuel level warning lamp



290F3CD63

- ① This warning lamp lights ON and the buzzer sounds when the level of fuel is below 9%.
- ② Fill the fuel immediately when the lamp is ON.

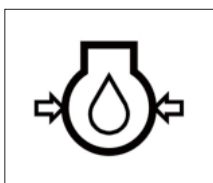
(4) Emergency warning lamp



290F3CD64

- ① This lamp pops up and the buzzer sounds when each of the below warnings are happened.
 - MCU input voltage abnormal
 - Accel dial circuit abnormal or open
- ※ **The pop-up warning lamp moves to the original position and lights ON when the buzzer stop switch is pushed or pop-up is touched. Also the buzzer stops.**
This is same as following warning lamps.
- ② When this warning lamp lights ON, machine must be checked and serviced immediately.

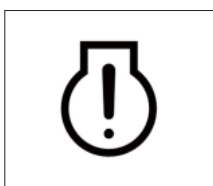
(5) Engine oil pressure warning lamp



290F3CD65

- ① This lamp lights ON when the engine oil pressure is low.
- ② If the lamp lights ON, shut OFF the engine immediately. Check oil level.

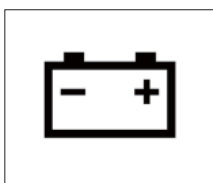
(6) Check engine warning lamp



290F3CD66

- ① This lamp lights ON when the communication between MCU and engine ECM on the engine is abnormal, or if the cluster received any fault code from engine ECM.
- ② Check the communication line between them.
If the communication line is OK, then check the fault codes on the cluster.
- ③ Also, this lamp pops up when the level of DPF soot is high.
- ※ Refer to the page 4-8 for the DPF warning lamp.

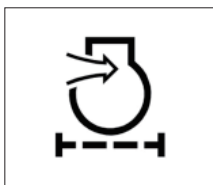
(7) Battery charging warning lamp



290F3CD67

- ① This lamp lights ON when the battery charging voltage is low.
- ② Check the battery charging circuit when this lamp is ON.

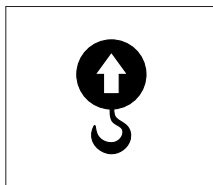
(8) Air cleaner warning lamp



290F3CD68

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

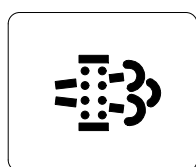
(9) Overload warning lamp (opt)



HX603CD80

- ① When the machine is overload, the overload warning lamp lights ON during the overload switch is ON. (if equipped)
- ② Reduce the machine load.
Initiate a manual regeneration

(10) DPF (diesel particulate filter) warning lamp

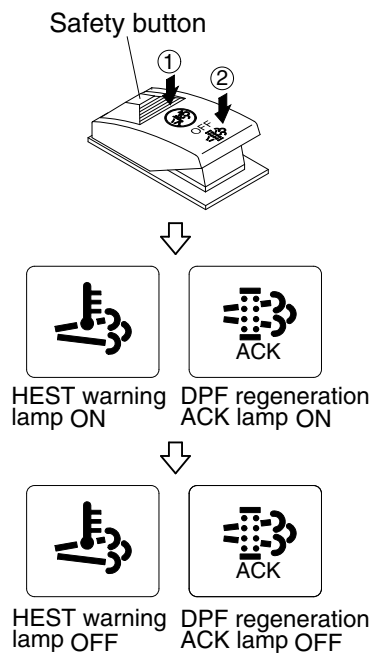


2609A3CD19

- ① This warning lamp lights ON or OFF when the regeneration is needed.
 - ② This warning lamp lights ON while DPF regeneration inhibit switch is in "Regeneration inhibited" state, when stationary regeneration is permitted.
 - ③ This warning lamp lights ON during reset regeneration standby or in back up mode.
 - ④ This warning lamp lights flash during reset regeneration standby DPF regeneration inhibit switch is in "Regeneration inhibited" state.
- ※ Consequences of delaying regeneration
- Poor performance caused by increasing exhaust gas pressure.
 - Higher fuel consumption
 - Shorter filter lifetime

Condition	Warning lamp			Remedy
	DPF 	Check engine  (pop up)	Stop engine  (pop up)	
Normal	Off	Off	Off	· Automatic regeneration
Soot low	On	Off	Off	· Push DPF switch to OFF position if DPF switch is in inhibit position. (see 4-40 page) · Engine power may be reduced automatically (soot medium)
Soot midium	Blink	Off	Off	
Soot high	On	On	Off	· Engine power and speed will be reduced automatically · Initiate a manual regeneration
Stop	On	Off	On	· Stop the engine immediatary. · Please contact your HD Hyundai Construction Equipment service center or local dealer.

※ Manual regeneration method of DPF



559A3CD143

※ Manual regeneration applies if the machine is in a fireproof area.

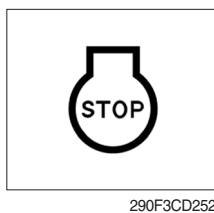
- ① Stop and park the machine.
- ② The accel dial to the lowerest position and operate the engine in idling.
- ③ Pull the safety button and push the switch to position ② to initiate the manual regeneration of DPF.

※ Refer to the page 4-29 for the switch operation.

※ The engine speed may increase gradually to high idle rpm and DPF regeneration begins and it will take approximately 25~30 minutes.

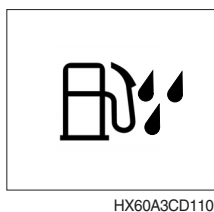
- ④ When the manual regeneration starts, the DPF warning lamp turns OFF and the regeneration acknowledge lamp and HEST warning lamp will light ON during the regeneration function is operating.
- ⑤ The regeneration acknowledge lamp and HEST warning lamp will light OFF when the regeneration function is completed.

(11) Stop engine warning lamp



- ① If the lamp lights ON, stop the engine immediately and check the engine.
 - ② Check the fault codes on the monitor.
- ※ Please contact your HD Hyundai Construction Equipment service center or local dealer.

(12) Water in fuel warning lamp



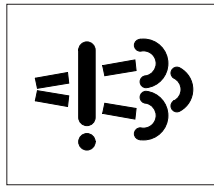
- ① This warning lamp lights ON when water is in fuel.
- ② Check the water separator.

(13) Seat belt reminder warning lamp



- ① When operator don't fasten the seat belt, the seat belt reminder warning lamp pops up and the buzzer sounds.
- ② Fasten the seat belt.
- ③ The warning lamp lights ON until fasten the seat belt and the buzzer sounds for 30 seconds.

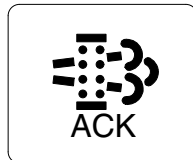
(14) Emission system fail warning lamp



300A3CD15

- ① This warning lamp indicates there are faults related to the emission system.
- ② The lamp lights ON when each of the below warnings is happened.
 - a. The EGR valve malfunctions.
 - b. Electrical malfunction of the EGR control sensors. (disconnection, short)
 - c. Tampering with the EGR control sensors.
- ③ **This warning lamp can be shown together with DPF warning lamp or engine fail lamp or engine stop warning lamp when diagnosis DPF systems.**
- ※ **Please contact your HD Hyundai Construction Equipment service center or local dealer.**

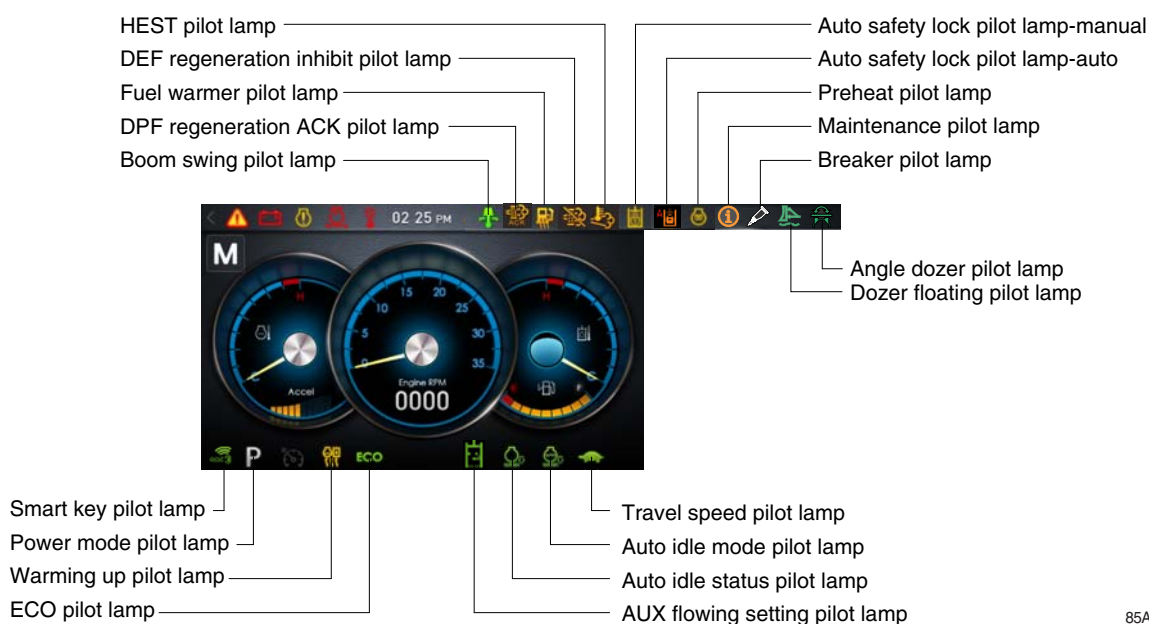
(15) DPF regeneration acknowledge warning lamp



559A3CD10

- ① This warning lamp lights ON stationary regeneration is in process.
- ② This warning lamp lights ON, when stationary regeneration is in process after DPF regeneration request switch is pressed and hold for more than 3 seconds.
- ③ This warning lamp lights flash when stationary regeneration standby or regeneration interlock switch is in "regeneration permitted (interlock enabled) status.
- ④ This warning lamp lights flash while stationary regeneration standby or back mode, when DPF regeneration inhibit switch in "Regeneration permitted" status and regeneration interlock switch is in regeneration permitted status.

5) PILOT LAMPS



※ When the pilot lamps light ON more than 3, you can check all lamps with next page button (◀, ▶).

(1) Mode pilot lamps

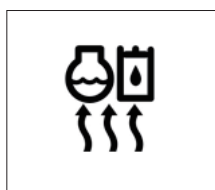
No	Mode	Pilot lamp	Selected mode
1	Power mode		Heavy duty power work mode
			Standard power mode
2	Travel mode		Low speed traveling
			High speed traveling
3	Auto idle mode		Auto idle mode
			Auto idle status

(2) Preheat pilot lamp



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

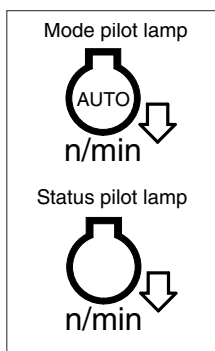
(3) Warming up pilot lamp



290F3CD80

- ① This lamp is turned ON when the coolant temperature is below 30°C (86°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 the engine.

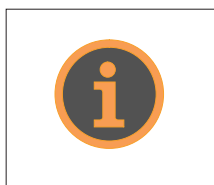
(4) Auto idle status/ mode pilot lamp



85A3CD106

- ① The auto idle mode pilot lamp will be ON when the idle mode is selected.
- ② The auto idle status pilot lamp will be ON when all levers and pedals are at neutral position, and the auto idle mode is selected.
- ③ One of the lever or pedal is operated, the status lamp will be OFF and the engine speed returns to the previous conditions.

(5) Maintenance pilot lamp

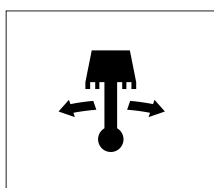


85A3CD110

- ① This lamp will be ON when the consuming parts are needed to change or replace. It means that the change or replacement interval of the consuming parts remains below 30 hours.
- ② Check the message in maintenance information of main menu. Also, this lamp lights ON for 3 minutes when the start switch is ON position.

※ Refer to page 4-28.

(6) Boom swing pilot lamp

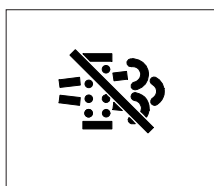


HX603CD82

- ① This lamp is ON when the boom offset switch is pressed.

※ Refer to the operator's manual page 3-42-1.

(7) DPF regeneration inhibit warning lamp

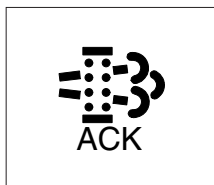


85A3CD107

- ① This warning lamp indicates, when illuminated, the DPF switch is pushed inhibit position, therefore automatic and manual regeneration can not occur.

※ Refer to page 4-40 for the DPF switch.

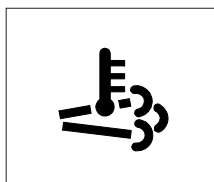
(8) DPF regeneration acknowledge warning lamp



85A3CD108

- ① This warning lamp will light ON during the regeneration function is operating.
- ② Also, this lamp will light OFF when the regeneration function is completed.

(9) HEST (High exhaust system temperature) warning lamp



85A3CD109

- ① This warning lamp indicates, when illuminated, that exhaust temperatures are high due to regeneration of the DPF.
- ② The lamp will also illuminate during a manual regeneration.
- ③ When this lamp is illuminated, be sure the exhaust pipe outlet is not directed at any surface or material that can melt, burn, or explode.

▲ When this lamp is illuminated, the exhaust gas temperature could reach 600°C [1112°F], which is hot enough to ignite or melt common materials, and to burn people.

※ The lamp does not signify the need for any kind of equipment or engine service; It merely alerts the equipment operator to high exhaust temperatures. It will be common for the lamp to illuminate on and off during normal equipment operation as the engine completes regeneration.

(10) Smart key pilot lamp (opt)



300A3CD36

- ① This lamp will be ON when the engine is started by the start button.
- ② This lamp is red when the authentication fails, green when succeeds.

※ Refer to the page 4-22.

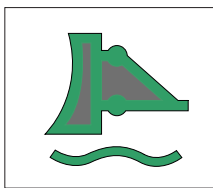
(11) ECO pilot lamp



85A3CD111

- ① This lamp will be ON when the ECO switch is pressed.
- ② The machine will be operated in economy conditions.

(12) Dozer floating pilot lamp

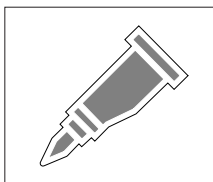


85A3CD112

① This lamp will be ON when the dozer floating lever is pressed.

※ Refer to the operator's manual 3-42-1.

(13) Breaker pilot lamp



85A3CD116

① This lamp will be ON as conditions below.

- The breaker selection switch is pressed on the membrane switch.
- The AUX switch is pressed to OFF positions.

※ Refer to page 4-38 and 4-40.

(14) Angle dozer pilot lamp (opt)

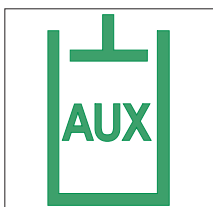


85A3CD113

① This lamp will be ON when the AUX switch is pressed to ANGLE DOZER positions.

※ Refer to page 4-40.

(15) AUX flowing setting pilot lamp



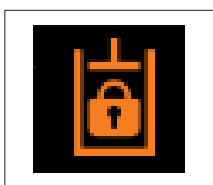
85A3CD114

① This lamp will be ON as conditions below.

- The AUX flow setting is selected Enables in the cluster.
- The AUX switch is pressed to AUX positions.

※ Refer to page 4-33 and 4-40.

(16) Auto safety lock pilot lamp-manual



85A3CD114

① This lamp will be ON when the safety lever is in the lock positions.

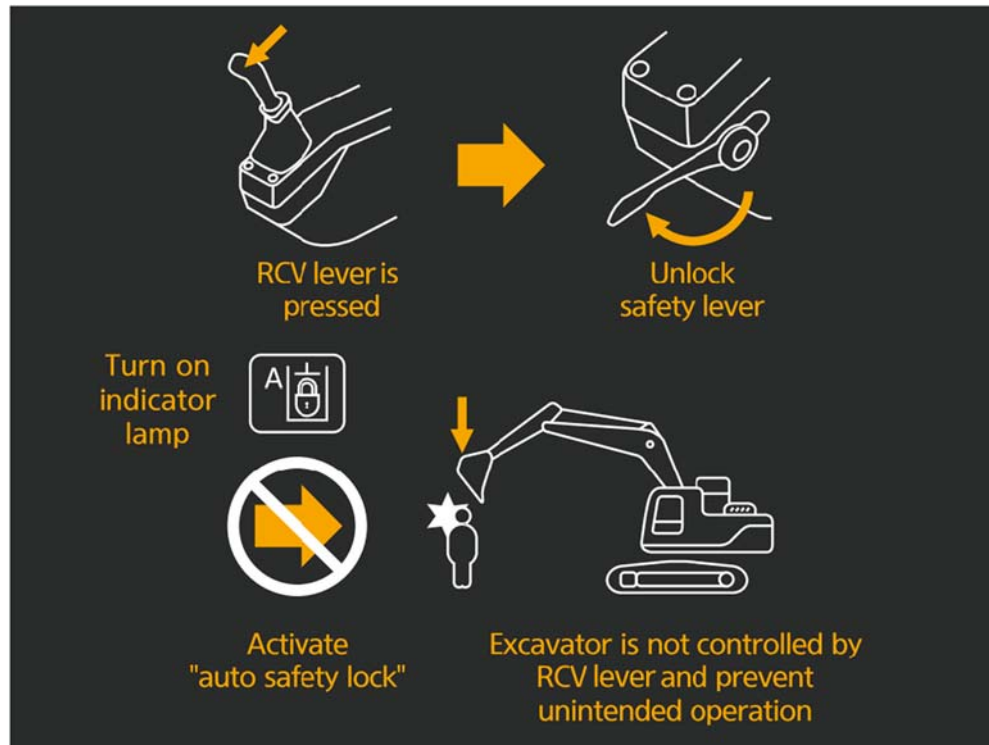
※ Refer to page 4-43.

(17) Auto safety lock pilot lamp-auto



300A3CD37

- ① Auto safety lock system prevents unintended operation of the machine in order to improve safety.
- ② Only if safety lever is locked, engine is started.
- ③ If operator unlock safety lever when RCV lever is pressed, machine is not controlled by RCV lever.



300A3CD38

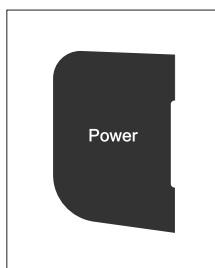
6) SWITCHES



85A3CD117

※ When the switches are selected, the pilot lamps are displayed on the LCD. Refer to the page 4-11 for details.

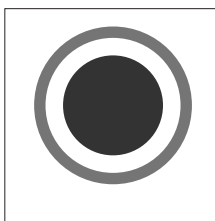
(1) Power mode switch



85A3CD117A

- ① This switch is to select the machine power mode and selected power mode pilot lamp is displayed on the pilot lamp position.
 - P : Heavy duty power work.
 - S : Standard power work.
- ② The pilot lamp changes S → P → S in order.

(2) Select switch



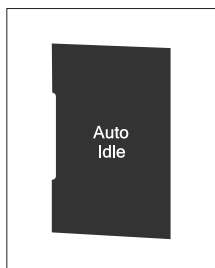
85A3CD117B

- ① This switch is used to select or change the menu and input value.
- ② Knob push
 - Long (over 2 sec) : Return to the operation screen
 - Medium (0.5~2 sec) : Return to the previous screen
 - Short (below 0.5 sec) : Select menu
- ③ Knob rotation

This knob changes menu and input value.

 - Right turning : Down direction / Increase input value
 - Left turning : Up direction / Decreased input value

(3) Auto idle/ buzzer stop switch



85A3CD117C

① This switch is used to activate or cancel the auto idle function.

※ **Refer to the page 4-12 for details.**

② The buzzer sounds when the machine has a problem.

In this case, push this switch and buzzer stops, but the warning lamp blinks until the problem is cleared.

(4) Buzzer stop switch

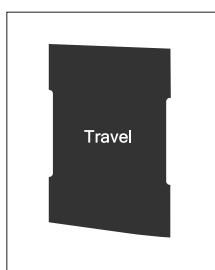


85A3CD117D

① The buzzer sounds when the machine has a problem.

In this case, push this switch and buzzer stops, but the warning lamp blinks until the problem is cleared.

(5) Travel speed control switch

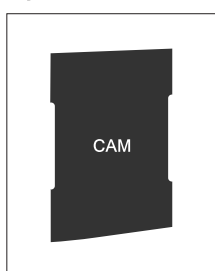


85A3CD117E

① This switch is used to select the travel speed alternatively.

-  : Low speed
-  : High speed

(6) Escape/ Camera switch

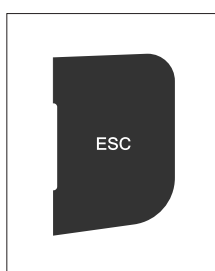


85A3CD117F

① In the operation screen, pushing this switch will display the view of the camera on the machine (if equipped).

※ **Please refer to page 4-33 for the camera.**

(7) Escape switch



85A3CD117G

① This switch is used to return to the previous menu or parent menu.

7) MAIN MENU

· Operation screen



85A3CD159



HX603CD32B



HX603CD32C

Tap
M or
Press
ESC/
CAM

Main menu screen



85A3CD118

Sub menu screen



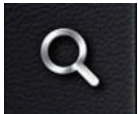
85A3CD119



85A3CD120

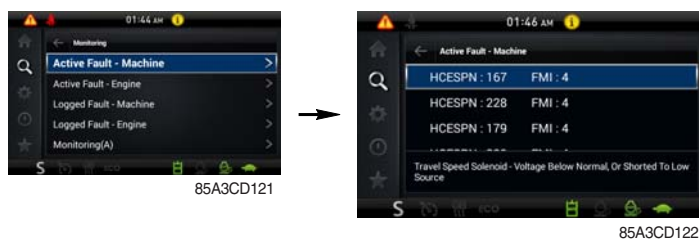
※ Please refer to select switch, page 4-16 for selection and change of menu and input value.

(1) Structure

No	Main menu	Sub menu	Description
1	 Monitoring 55I3CD51AK	Active fault - Machine Active fault - Engine Logged fault - Machine Logged fault - Engine Monitoring (Analog) Monitoring (Digital) - Input Monitoring (Digital) - Output	MCU ECU MCU ECU Machine information Switch status Output status
2	 Management 55I3CD51BK	ESL mode setting Automatic engine shutdown Change password AUX flow setting Option attach Maintenance information Machine Information A/S phone number Service menu	ESL mode setting, Smart key setting One time, Always, Disabled Password change 2 way, 4 way Setting option attachment Replacement, Change interval oils and filters Cluster, MCU, Engine, Machine A/S phone number, A/S phone number change Delete logged faults, Software download, Operating hour, power shift DPF filter replacement, AVCU setting
3	 Display 55I3CD51CK	Clock Screen type Brightness setting Unit setting Language Calibration	Clock A type, B type, C type Manual, Auto Temperature, Pressure 12 language Calibrating the touch screen
4	 Utilities 55I3CD51DK	Camera setting Mode Video	Number of active, Display order, Camera No. Operation mode select Play music and video file

(2) Monitoring

① Active fault - Machine



- The active faults of the MCU can be checked by this menu.

② Active fault - Engine



- The active faults of engine ECU can be checked by this menu.

③ Logged fault - Machine/ Engine



- The logged faults of the MCU or engine ECU can be checked by this menu.
- Only for the service person.

④ Monitoring (Analog)



- The machine status such as the engine rpm, oil temperature, voltage and pressure etc. can be checked by this menu.

⑤ Monitoring (Digital) - Input



- The switch status can be confirmed by this menu.
- The activated switches are blue light ON.

⑥ Monitoring (Digital) - Output



- The output status can be confirmed by this menu.
- The output pilot lamps are blue light ON.

(3) Management

① ESL mode setting



· ESL mode setting

- ESL : Engine Starting Limit
- ESL mode is designed to be a theft deterrent or will prevent the unauthorized operation of the machine.
- If the ESL mode was selected Enable, the password will be required when the start switch is turned ON.

- **Disable** : Not used ESL function

Enable (always) : The password is required whenever the operator starts engine.

Enable (Interval) : The password is required when the operator starts engine first.

But the operator can restart the engine within the interval time without inputting the password.

The interval time can be set maximum 2 days.

※ **Default password** : 00000

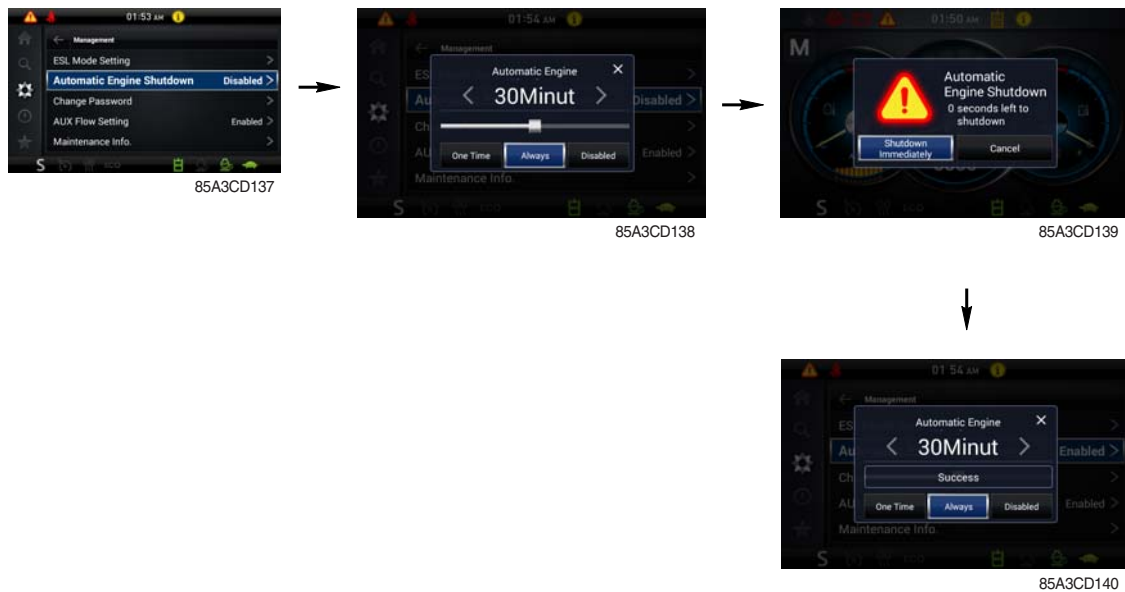
※ **Password length** : 5~10 digit

- **Smart key (option)** : Smart key is registered when equipped with optional smart key. If smart key is not inside of the cabin, authentication process fails and the password entering is needed.

※ **Engine Starting Condition**

Case	ESL Mode	Smart Key	Condition
1	Disable	Disable	- With registered tag : Engine can be started without password input. - Without registered tag : Engine can be started without password input.
2	Disable	Enable	If Smart Key is enabled, ESL Mode is automatically enabled. This Case 2 work the same as the Case 4.
3	Enable	Disable	- With registered tag : Engine can be started with password input. - Without registered tag : Engine can be started with password input.
4	Enable	Enable	- With registered tag : Engine can be started without password input. - Without registered tag : Engine can be started with password input.

② Automatic engine shutdown



The automatic engine shutdown function can be set by this menu.

a. Once (one time)

- Automatic shutdown function set Once when key-on or engine operation condition.
 - Key-off when the shutdown button clicks after pop-up the automatic stop icon.
 - Shift automatic shutdown function to Disable when the cancel button clicks after pop-up the automatic stop icon.
- Keep Disable for the automatic shutdown function when key-off after key-on again or start engine.

b. Always (continuous use)

- Automatic shutdown function set Always when key-on or engine operation condition.
 - Key-off when the shutdown button clicks after pop-up the automatic stop icon.
 - Shift automatic shutdown function to Disable when the cancel button clicks after pop-up the automatic stop icon.
- Keep Always for the automatic shutdown function when key-off after key-on again or start engine.

c. Disable

- Disable the engine automatic shutdown function.

③ Change password

- The password is 5~10 digits.



Enter the current password



Enter the new password



The new password is stored in the MCU.



Enter the new password again

④ AUX flow setting

a. Option attach selection



(a) (b) (c)

R559A3CD42O

- Three kinds of option attachment can be selected by this menu.

(a) Rotary Grapple (Equipped with 4 way option)

(b) Grapple (Equipped with 2 or 4 way option)

(c) Auger (Equipped with 2 or 4 way option)

※ There are two user modes (type A or B) in each option attach.

b. Proportional flow control setting

User can set preferable value of each option attachment by this menu.

a) Rotary setting



- Select Rotary
RCV, button and flow
can be set by this menu



- RCV setting
 - Enable set LH or RH RCV for rotary operation.
 - Example :
Select LH for rotary ->
RH set for grapple automatically.

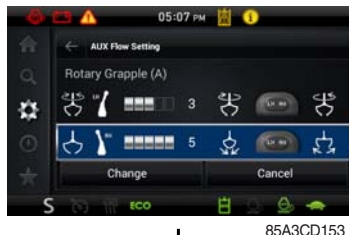


- Button setting (CW rotation)
 - Enable set LH or RH button for CW or CCW rotation.
 - Example :
Select LH for CW rotation ->
RH set for CCW rotation automatically



- Flow setting
 - Enable set from level 1 to level 5.
 - Example :
Select level 3.
 - Press Yes after flow setting.

b) Grapple setting



- Select grapple
RCV, button and flow can be set by this menu



- RCV setting
 - Enable set LH or RH RCV for grapple operation.
 - Example :
Select RH for grapple ->
LH set for rotary automatically.



- Button setting (Close)
 - Enable set LH or RH button for close or open.
 - Example :
Select RH for Close ->
LH set for open automatically



- Flow setting
 - Enable set from level 1 to level 5.
 - Example :
Select level 1.
 - Press Yes after flow setting.



HX603CD430

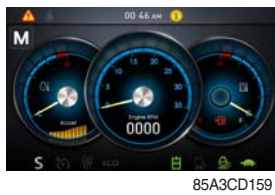


85A3CD157

- Save setting value
 - Enable save setting value by pressing change (Change) button.

- Setting value saved once, it memorized in each icon and the last setting value is activated.
- Saved setting can be used by pressing Icon button only.
- There are two kinds (A and B) in each option attach setting and six kinds of option attach setting can be saved totally (2 of 4 way, 4 of 2 way).

c. Confirmation



Previous setting value can be checked by following procedure.

- Menu > Management > AUX flow setting

a) Rotary setting

- Rotary RCV : LH
- Rotary flow level : 3
- CW rotation : LH
- CCW rotation : RH

b) Grapple setting

- Grapple RCV : RH
- Grapple flow level : 3
- Open : LH
- Close : RH

AUX flowing setting pilot lamp () is activated on the lower side of the main screen as below conditions.

- The AUX switch is pressed to the AUX position and the AUX flow setting is selected Enabled.

⑤ Maintenance information



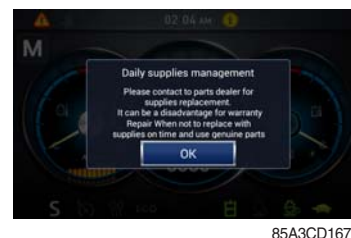
- Elapse : Maintenance elapsed time.
- Interval : The change or replace interval can be changed in the unit of 50 hours.
- History-Hour : Maintenance replacement history.
- Replacement : The elapsed time will be reset to zero (0).
- **Change or relpace interval**

No	Item	Interval
1	Engine oil	500
2	Final gear oil	1000
3	Hydraulic oil	5000
4	Hydraulic oil pilot line filter	1000
5	Hydraulic oil return filter	1000
6	Engine oil filter	500
7	Fuel filter	500
9	Pre-filter	500
10	Hydraulic tank air breather	1000
11	Air cleaner	500
12	Radiator coolant	2000

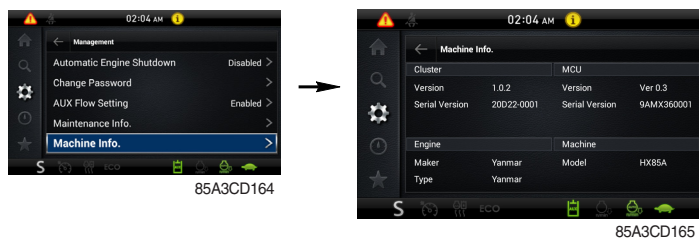
- User cab be set to pop-up the replacement parts that residual time is less than 50 hours based on the replacement interval.
 - Pop-up the replacement parts list once when start switch is key-on.



- Please contact to parts dealer for supplies replacement. It can be a disadvantage for warranty repair when not to replace with supplies on time and use genuine parts.



⑥ Machine Information



- This can confirm the identification of the cluster, MCU, engine and machine.

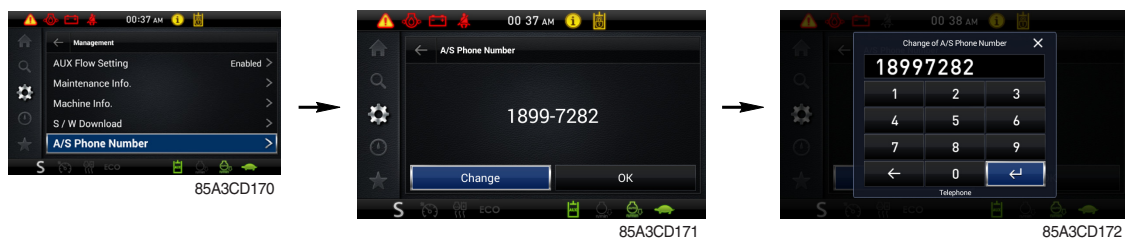
⑦ S/W download



- Display and update software version about operating system, application, image and font through this menu.

※ Do not turn off the start switch when update process is proceeding.

⑧ A/S phone number



- The A/S phone number can be checked and changed.

⑨ Service menu



- Delete logged fault : Logged faults of MCU or engine ECU can be deleted. (only when the engine is stopped)
- Operating hours : Operating hours since the machine line out can be checked.
- Power shift : Set power shift mode (standard/option)
- RPM & Fuel : The engine rpm or fuel gauge can be display on the center of the cluster operation screen.
- PRM number : The engine rpm number can be display or not on the center of the cluster operation screen.
- DPF filter replacement : Engine ECM parameter can be initialized when the DPF cleaning process is finished.
- AVCU setting : Selection of the 2 way, 4 way, angle dozer can be set when the machine line out.

(4) Display

① Clock



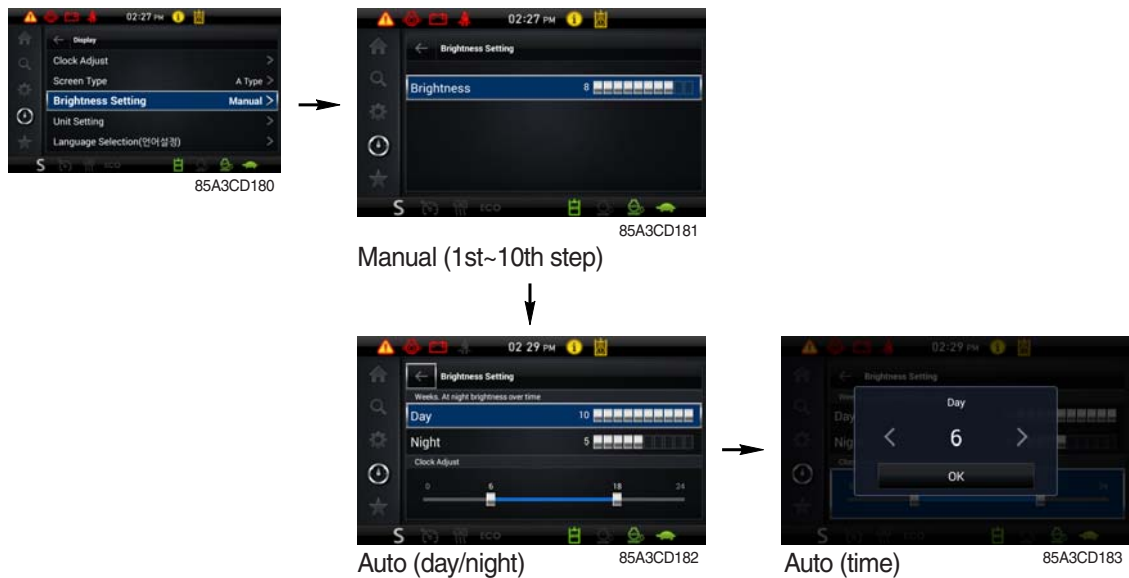
- The first line's three spots "****-**-**" represent Year/Month/Day each.
- The second line shows the current time. (AM, PM/0:00~12:59)

② Screen type



- The screen type (A,B,C) of the LCD can be selected by this menu.

③ Brightness setting calibration



- If "Auto" is chosen, brightness for day and night can be differently set up. Also, users can define which day time interval. (Set day starting time and ending time)

④ Unit setting



- Temperature : °C ↔ °F
- Pressure : bar ↔ MPa ↔ kgf/cm² ↔ psi

⑤ Language



- User can select preferable language and all displays are changed the selected language.

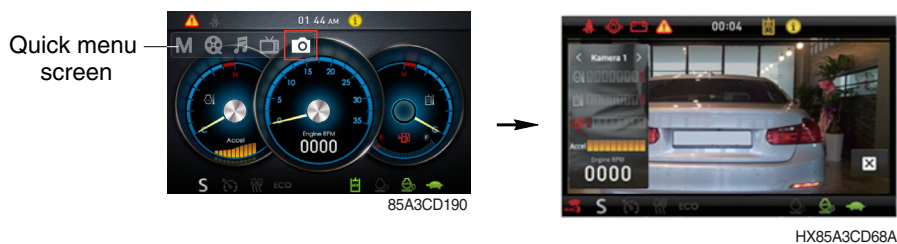
(5) Utilities

① Camera setting

- Three cameras can be installed on the machine and the display order can be set by this menu.
- If the camera was not equipped, this menu is not useful.



- In the operation screen, if the ESC/CAM switch is pushed, rear view camera display or stop.
- Turning the select switch in clockwise direction, the next ordered will be shown and in counter-clockwise direction, the previously ordered will be shown. Also, you can change camera channel using touch the screen.
- Push the select switch or touch the screen, the displayed screen will be enlargement.



② Mode



- When this cluster's buttons are not work, you can control using touch screen instead of these buttons.
- You can only control in this mode screen.

③ Video

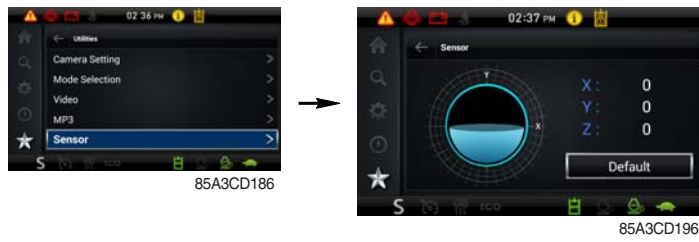
- Play MP4 or codec file of external hard disk through USB port.
- The USB port is located under the cluster.



- Over 1100 engine rpm, the screen turns into the operation screen with MP4 or codec file playing for the safety.

No.	Function	Control	No.	Function	Control
1	Display list	Touch	6	After 10 sec	Touch
2	Before 10 sec	Touch	7	Stop	ESC switch or touch
3	Previous track	Touch	8	Mute	Touch
4	Play/pause	Touch	9	Sound volume	Select switch or touch
5	Next track	Touch	10	Playing time	-

④ Clinometer



- When the machine is on the flatland, if tap the "initialization", the values of X, Y, Z reset "0".
- You can confirm tilt of machine in cluster's operating screen.

⑤ Manual



- You can read the manual of the cluster on the monitor.

GROUP 2 MONITORING SYSTEM (#0491-)

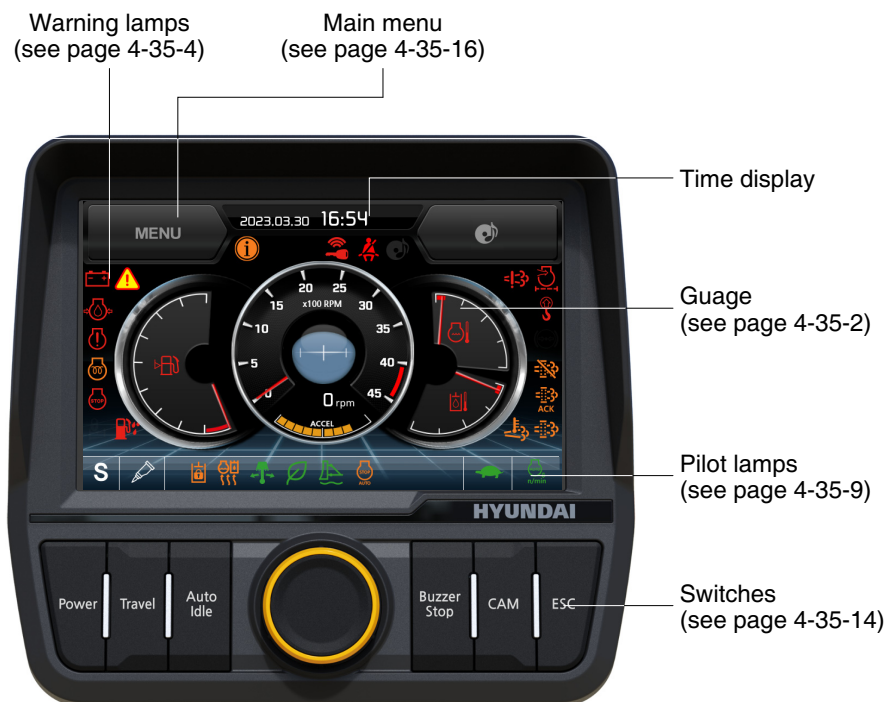
1) STRUCTURE

The cluster consists of LCD and switches as shown below. The LCD is to warn the operator in case of abnormal machine operation or conditions for the appropriate operation and inspection.

Also, The LCD is to set and display for modes, monitoring and utilities with the switches.

The switches or touch screen are to set the machine operation modes.

- ※ The cluster 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 cluster provides a warning immediately check the problem, and perform the required action.



85A4EL04

- ※ The warning lamp pops up, lights ON (on the left-top side) and the buzzer sounds when the machine has a problem.

The warning lamp lights ON until the problem is cleared. Refer to page 4-35-4 for details.

2) GAUGE

(1) Operation screen

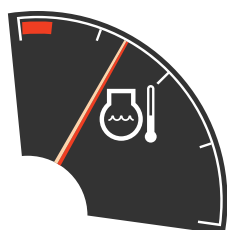
When you first turn starting switch ON, the operation screen will appear.



HX60A3CD101A

- | | | |
|-----------------------------|--------------------|--------------|
| 1 Engine coolant temp gauge | 3 Fuel level gauge | 5 Accel dial |
| 2 Hydraulic oil temp gauge | 4 Engine rpm gauge | 6 Clinometer |

(2) Engine coolant temperature gauge



290F3CD53

- ① This gauge indicates the temperature of coolant.
 - Black range : General state
 - Red range : Engine overheated state
- ② If the indicator is in the red range or  lamp lights ON in red, turn OFF the engine and check the engine cooling system.
- ※ If the gauge indicates the red range or  lamp lights ON even though the machine is in the normal condition range, check the electric device as this can be caused by poor connection of sensor or connector, and poor grounding of the instrument, etc.

(3) Hydraulic oil temperature gauge



290F3CD54

- ① This gauge indicates the temperature of hydraulic oil.
 - Black range : 40-105°C (104-221°F)
 - Red range : Above 105°C (221°F)
- ② If the indicator is in the red range or  lamp lights ON in red, reduce the load on the system. If the gauge stays in the red range, stop the machine and check the cause of the problem.
- ※ If the gauge indicates the red range or  lamp lights ON in red even though the machine is in the normal condition range, check the electric device as this can be caused by poor connection of sensor.

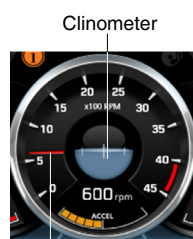
(4) Fuel level gauge



HX60A3CD55A

- ① This gauge indicates the amount of fuel in the fuel tank.
 - Black range : 11% or more
 - Red range : below 11%
- ② Fill the fuel when in the red range, or  lamp lights ON in red.
- ※ If the gauge indicates the red range or  lamp lights ON in red even though the machine is in the normal condition range, check the electric device as this can be caused by poor connection of sensor.

(5) Engine rpm gauge and clinometer



Engine rpm

HX60A3CD105K

- ① This displays the engine speed.
- ② This displays the tilt of machine.

(6) Accel dial gauge



290F3CD59

- ① This gauge indicates the level of accel dial from 0 to 10 step.

3) COMMUNICATION ERROR AND LOW VOLTAGE WARNING POP-UP

(1) Communication error pop-up



HX60A3CD107A

- ① Cluster displays this communication error pop-up when it has communication error with MCU.
- ② Communication error pop-up displays at operation screen only. Just buzzer alarm at the other screen.
- ③ If communication with MCU become normal state, it will disappear automatically.

(2) Low voltage warning pop-up



HX60A3CD108

- ① Cluster displays this low voltage warning pop-up when the battery voltage is low.
- ② Low voltage warning pop-up displays at operation screen only. Just buzzer alarm at the other screen.
- ③ This pop-up will disappear with using touch screen or buzzer stop switch. While the battery voltage is low, buzzer sounds every minute.
- ④ When the battery voltage is higher than 11.5 V, the pop-up off.

4) WARNING LAMPS



85A3CD218

※ Each warning lamp on the left-top of the LCD pops up on the center of LCD and the buzzer sounds when the each warning is happened. The pop-up warning lamp moves to the original position and lights up when the buzzer stop switch is pushed or the pop-up is touched. And the buzzer stops. Refer to page 4-35-15 for the switch.

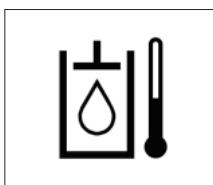
(1) Engine coolant temperature warning lamp



290F3CD61

- ① The  lamp pops up on the center of LCD and the buzzer sounds when the engine coolant temperature is over 110°C or more.
- ② The pop-up  lamp moves to the original position and lights up when the buzzer stop switch is pushed or pop-up is touched. Also, the buzzer stops and  lamp keeps ON.
- ③ Check the cooling system when the lamp keeps ON.

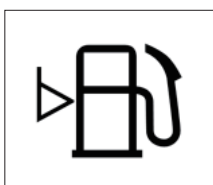
(2) Hydraulic oil temperature warning lamp



290F3CD62

- ① This warning lamp pops up on the center of LCD and the buzzer sounds when the hydraulic oil temperature is over 105°C.
- ② The pop-up  lamp moves to the original position and lights ON when the buzzer stop switch is pushed or pop-up is touched. Also, the buzzer stops and  lamp keeps ON.
- ③ Check the hydraulic oil level and hydraulic oil cooling system.

(3) Fuel level warning lamp



290F3CD63

- ① This warning lamp lights up and the buzzer sounds when the level of fuel is below 11%.
- ② Fill the fuel immediately when the lamp is ON.

(4) Emergency warning lamp



290F3CD64

① This warning lamp pops up and the buzzer sounds when each of the below warnings occurs.

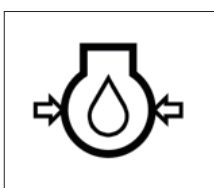
- MCU input voltage abnormal
- Accel dial circuit abnormal or open

※ The pop-up warning lamp moves to the original position and lights ON when the buzzer stop switch is pushed or pop-up is touched. Also the buzzer will stop.

This is same as following warning lamps.

② When this warning lamp lights up, machine must be checked and serviced immediately.

(5) Engine oil pressure warning lamp



290F3CD65

① This lamp lights up when the engine oil pressure is low.

② If the lamp lights up, shut OFF the engine immediately. Check oil level.

(6) Check engine warning lamp

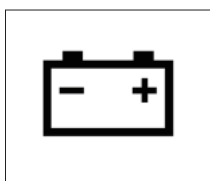


290F3CD66

① Warning lamp is turned ON when the engine must be checked.

※ When the warning lamp is turned ON, stop the machine and find the cause for repair.

(7) Battery charging warning lamp

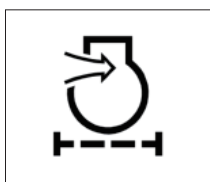


290F3CD67

① This warning lamp lights up when the battery charging voltage is low.

② Check the battery charging circuit when this lamp lights up.

(8) Air cleaner warning lamp

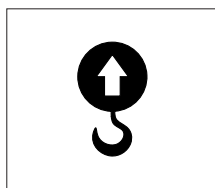


290F3CD68

① This warning lamp lights up when the air cleaner is clogged.

② Check, clean or replace the filter.

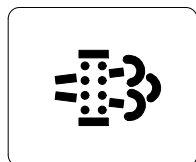
(9) Overload warning lamp (opt)



HX603CD80

- ① When the machine is overloaded, the overload warning lamp lights up when the overload switch is ON. (if equipped)
- ② Reduce the machine load.

(10) DPF (diesel particulate filter) warning lamp



2609A3CD19

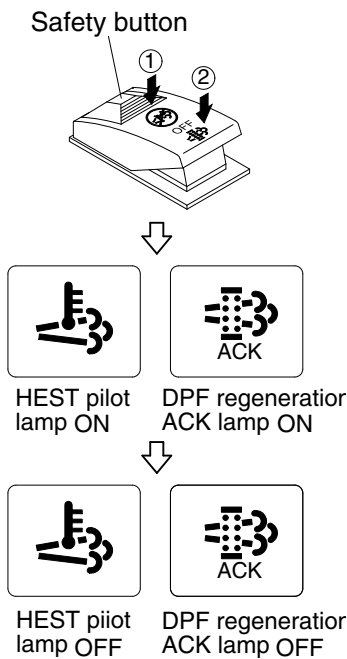
- ① This warning lamp lights up or go off when the regeneration is needed.
- ② This warning lamp lights up while DPF regeneration inhibit switch is in "Regeneration inhibited" state, when stationary regeneration is permitted.
- ③ This warning lamp lights up during reset regeneration standby or in back up mode.
- ④ This warning lamp blinks during reset regeneration standby DPF regeneration inhibit switch is in "Regeneration inhibited" state.

※ Consequences of delaying regeneration

- Poor performance caused by increasing exhaust gas pressure.
- Higher fuel consumption
- Shorter filter lifetime

Condition	Warning lamp			Remedy
	DPF 	Check engine  (pop up)	Stop engine  (pop up)	
Normal	Off	Off	Off	· Automatic regeneration
Soot low	On	Off	Off	· Push DPF switch to OFF position if DPF switch is in inhibit position. (see 3-39 page) · Engine power may be reduced automatically (soot medium)
Soot midium	Blink	Off	Off	
Soot high	On	On	Off	· Engine power and speed will be reduced automatically · Initiate a manual regeneration
Stop	On	Off	On	· Stop the engine immediatary. · Please contact your HD Hyundai Construction Equipment service center or local dealer.

※ Manual regeneration method of DPF



85A3CD213

※ **Manual regeneration must be operated in a fireproof area.**

① Stop and park the machine.

② The accel dial to the lowest position and operate the engine in idling.

③ Pull the safety button and push the switch to position ② to initiate the manual regeneration of DPF.

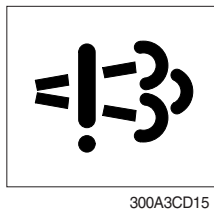
※ **Refer to page 4-40 for the switch operation.**

※ **The engine speed may increase gradually to high idle rpm and DPF regeneration begins and it will take approximately 25~30 minutes.**

④ When the manual regeneration starts, the DPF warning lamp light go off and the regeneration acknowledge lamp and HEST warning lamp will light up while the regeneration function is operating.

⑤ The regeneration acknowledge lamp and HEST warning lamp will light OFF when the regeneration function is completed.

(11) Emission system fail warning lamp



① This warning lamp indicates there are faults related to the emission system.

② The lamp lights up when each of the below warnings is happened.

a. The EGR valve malfunctions.

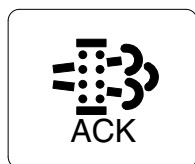
b. Electrical malfunction of the EGR control sensors.
(disconnection, short)

c. Tampering with the EGR control sensors.

③ **This warning lamp can be shown together with DPF warning lamp or engine fail lamp or engine stop warning lamp when DPF system is diagnosed.**

※ **Please contact your HD Hyundai Construction Equipment service center or local dealer.**

(12) DPF regeneration acknowledge warning lamp



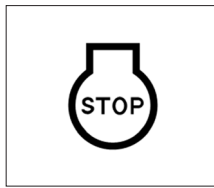
① This warning lamp lights up stationary regeneration is in process.

② This warning lamp lights up, when stationary regeneration is in process after DPF regeneration request switch is pressed and hold for more than 3 seconds.

③ This warning lamp blinks when stationary regeneration standby or regeneration interlock switch is in "regeneration permitted (interlock enabled) status.

④ This warning lamp blinks while stationary regeneration standby or back mode, when DPF regeneration inhibit switch in "Regeneration permitted" status and regeneration interlock switch is in regeneration permitted status.

(13) Stop engine warning lamp



290F3CD252

- ① If this warning lamp lights up, stop the engine immediately and check the engine.
 - ② Check the fault codes on the monitor.
- ※ **Please contact your HD Hyundai Construction Equipment service center or local dealer.**

(14) Water in fuel warning lamp



HX60A3CD110

- ① This warning lamp lights up when the water separator is full of water or malfunctioning.
- ② When this lamp lights up, stop the machine and drain water from the water separator.

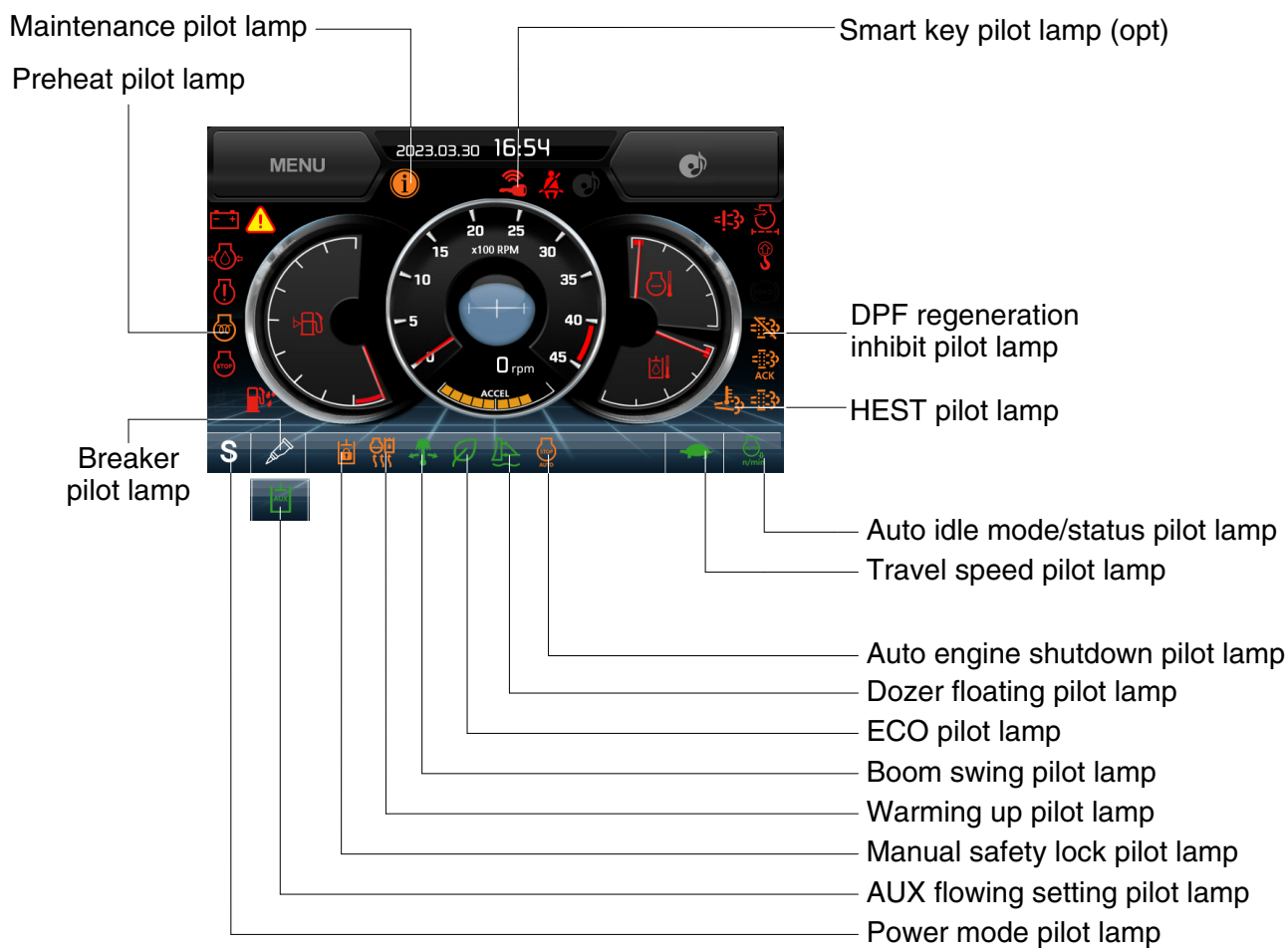
(15) Seat belt reminder warning lamp



300A3CD25

- ① When operator does not fasten the operator's seat belt, the seat belt reminder warning lamp lights up and the buzzer sounds.
- ② Fasten the seat belt.

5) PILOT LAMPS



85A3CD217

(1) Mode pilot lamps

No	Mode	Pilot lamp	Selected mode
1	Power mode		Heavy duty power work mode
			Standard power mode
2	Travel mode		Low speed traveling
			High speed traveling
3	Auto idle mode		Auto idle mode
			Auto idle status

(2) Preheat pilot lamp



290F3CD79

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

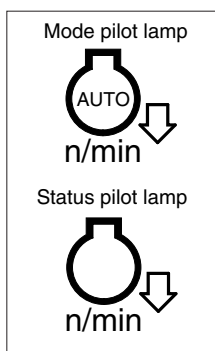
(3) Warming up pilot lamp



290F3CD80

- ① This lamp lights up when the coolant temperature is below 30°C (86°F).
- ② The automatic warming up is cancelled when the engine coolant temperature is above 30°C (86°F), or when 10 minutes have passed since starting the engine.

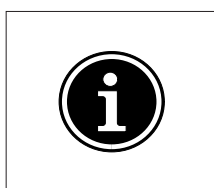
(4) Auto idle mode/status pilot lamp



85A3CD106

- ① The auto idle mode pilot lamp will light up when the idle mode is selected.
- ② The auto idle status pilot lamp will be ON when all levers and pedals are in the neutral position, and the auto idle mode is selected.
- ③ One of the lever or pedal is operated, the status lamp will go OFF and the engine speed returns to the previous conditions.

(5) Maintenance pilot lamp

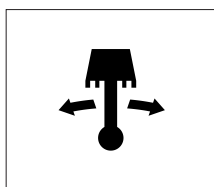


HX60A3CD116

- ① This lamp lights up when consumable parts are in need of replacement. It means that the change or replacement interval of parts is 30 hours from the required change interval.
- ② Check the message in maintenance information of main menu. Also, this lamp lights up for 3 minutes when the start switch is switched to the ON position.

※ Refer to page 4-35-20.

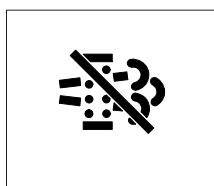
(6) Boom swing pilot lamp



HX603CD82

- ① This lamp lights up when the boom offset switch is pressed.

(7) DPF regeneration inhibit pilot lamp

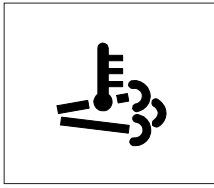


85A3CD107

- ① This pilot lamp indicates, the DPF switch is pushed to the inhibit position, therefore automatic and manual regeneration can not occur.

※ Refer to page 4-40 for the DPF switch.

(8) HEST (High exhaust system temperature) pilot lamp



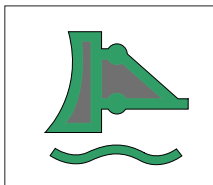
85A3CD109

- ① This pilot lamp indicates, when illuminated, that exhaust temperatures are high due to regeneration of the DPF.
- ② The lamp will also illuminate during a manual regeneration.
- ③ When this lamp is illuminated, be sure the exhaust pipe outlet is not directed at any surface or material that can melt, burn, or explode.

⚠ When this lamp is illuminated, the exhaust gas temperature could reach 600°C [1112°F], which is hot enough to ignite or melt common materials, and to burn people.

※ The lamp does not signify the need for any kind of equipment or engine service; It merely alerts the equipment operator to high exhaust temperatures. It is common for the lamp to illuminate on and off during normal equipment operation as the engine completes regeneration cycles.

(9) Dozer floating pilot lamp

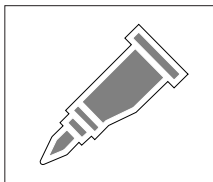


85A3CD112

- ① This lamp will be light up when the dozer floating lever is pressed.

※ Refer to the operator's page 3-42-1.

(10) Breaker pilot lamp



85A3CD116

- ① This lamp will be light up as conditions below.
 - The breaker selection switch is pressed on the membrane switch.
 - The AUX switch is pressed to OFF positions.

※ Refer to page 4-39 and 4-40.

(11) AUX flowing setting pilot lamp

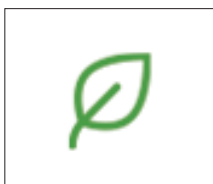


85A3CD114

- ① This lamp will be light up as conditions below.
 - The AUX flow setting is selected Enables in the cluster.
 - The AUX switch is pressed to AUX positions.

※ Refer to page 4-35-20 and 3-39.

(12) ECO pilot lamp



85A3CD111A

- ① This lamp will light up when the ECO switch is pressed.
- ② The machine will be operated in economy conditions.

(13) Manual safety lock pilot lamp



140WA3CD37

① This lamp lights up when the safety knob is set to the LOCK position.

※ Refer to the operator's page 3-42 for the safety knob.

(14) Auto safety lock pilot lamp



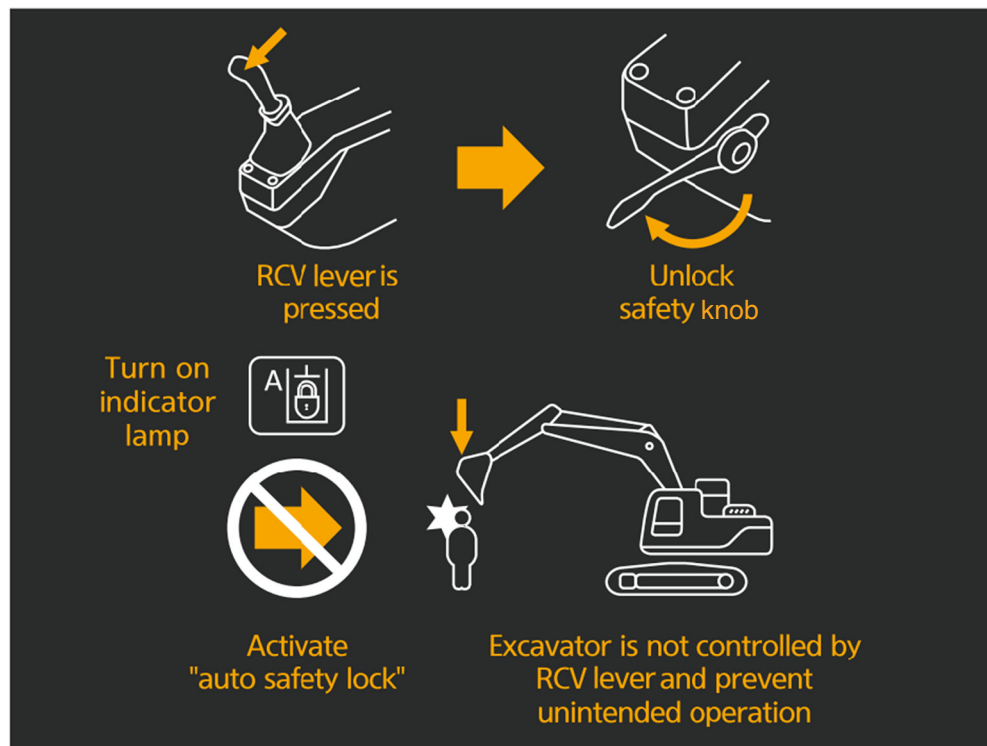
300A3CD37

① Auto safety lock system prevents unintended operation of the machine in order to improve safety.

② Engine will only start if safety knob is locked.

③ If operator unlock safety knob when RCV lever is pressed, machine is not controlled by RCV lever.

⚠ If operator unlocks safety knob while any control/function is being operated, the machine will move violently. This could cause serious injury, death or damage to property.



300A3CD38A

(15) Auto engine shutdown pilot lamp

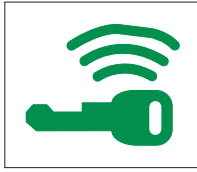


220A3CD202A

① This lamp lights up when the auto engine shutdown is activated.

※ Refer to page 4-35-25.

(16) Smart key pilot lamp (opt)



300A3CD36A

- ① This lamp lights up when the engine is started by the start button.
- ② This lamp is red when the authentication fails, it will be green when authentication is successful.

※ Refer to page 4-35-24.

(17) Angle dozer pilot lamp (opt)



85A3CD113

- ① This lamp will be light up when the AUX switch is pressed to ANGLE DOZER positions.

※ Refer to page 4-40.

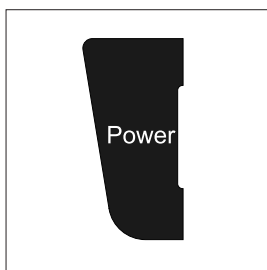
6) SWITCHES



85A3CD219

※ When the switches are selected, the pilot lamps are displayed on the LCD. Refer to page 4-35-9 for details.

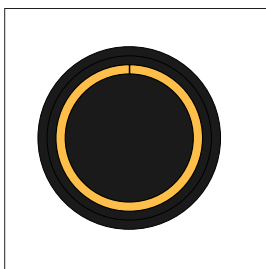
(1) Power mode switch



HX60A3CD118

- ① This switch is to select the machine power mode and when pressed, the power mode pilot lamp will be displayed on the section of the monitor.
 - P : Heavy duty power work.
 - S : Standard power work.
- ② The pilot lamp changes S → P → S in this order.

(2) Select switch



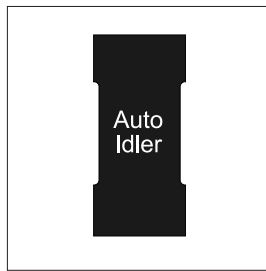
HX60A3CD119

- ① This switch is used to select or change the menu or input value.
- ② Knob push
 - Short (below 0.5 sec) : Select menu
- ③ Knob rotation

This knob changes menu and input value.

 - Right turning : Down direction / Increase input value
 - Left turning : Up direction / Decreased input value

(3) Auto idle switch

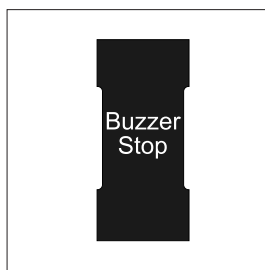


HX60A3CD120

① This switch is used to activate or cancel the auto idle function.

※ Refer to page 4-35-10 for details.

(4) Buzzer stop switch

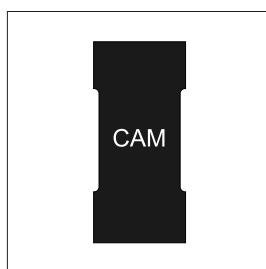


HX60A3CD121

① The buzzer sounds when the machine has a problem.

In this case, push this switch and buzzer stops, but the warning lamp lights up until the problem is cleared.

(5) Camera switch

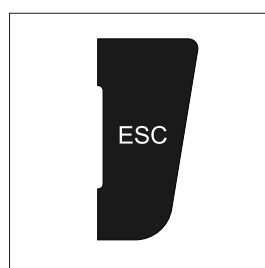


HX60A3CD122

① In the operation screen, pushing this switch will display the view of the camera on the machine (if equipped).

※ Please refer to page 4-35-32 for the camera.

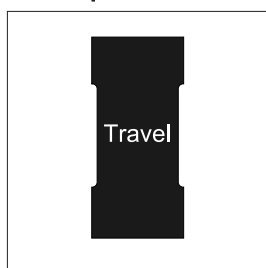
(6) Escape switch



HX60A3CD123

① This switch is used to return to the previous menu or parent menu.

(7) Travel speed control switch



HX60A3CD104

① This switch is used to select the travel speed alternatively.

-  : Low speed
-  : High speed

※ Do not change the setting of the travel speed switch while machine is moving. Machine stability may be adversely affected.

⚠ Serious injury or death can result from sudden changes in machine stability.

7) MAIN MENU

Main menu screen



HX60A3CD124A



Sub menu screen

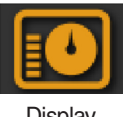


HW60AH3CD125A

※ Please refer to the select switch, page 4-35-14 for selection and change of menus and input values.

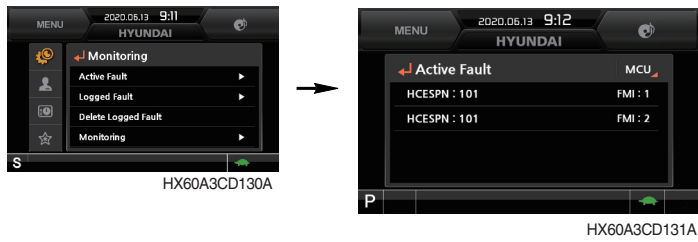
※ In the operation screen, tap MENU or press the select switch to access the sub-menu screen.

(1) Structure

No	Main menu	Sub menu	Description
1	 Monitoring	Active fault - Machine Active fault - Engine Logged fault - Machine/engine Delete logged fault Monitoring - Machine Monitoring - Switch Monitoring - Output	MCU ECU MCU, ECU MCU, ECU Engine rpm, oil temp, voltage and pressure etc. Digital switch status Digital output status
2	 Management	Maintenance information Breaker flow level AUX flow setting ESL mode setting Auto engine shutdown Change password Machine information A/S phone number Cluster update CAN update Service menu	Elapsed time, Change interval, Replacement etc. Breaker flow level setting Option atch selection, Proportional flow control setting, Confirmation ESL mode setting One time, Always, Disable Password change Cluster, MCU, Engine, Machine A/S phone number, A/S phone number change Application, System Program download, Update Power shift, Operating hour, Gauge type, Rpm, AVCU set, Language update etc
3	 Display	Clock Brightness Unit Language	Current time set Manual, Auto Temperature, Pressure, Flow, Distance, Volumn 22 kinds
4	 Utilities	Entertainment Camera setting Clinometer setting Manual Emergency mode	Video/music file playing Setup of number of active cameras, display sequences, and camera numbers Initializing slope sensor Display cluster manual Back-up switch for failed cluster switch and accel dial

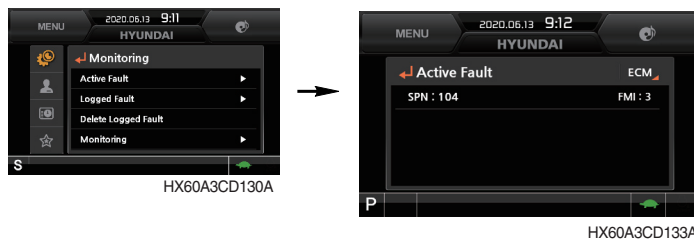
(2) Monitoring

① Active fault - Machine



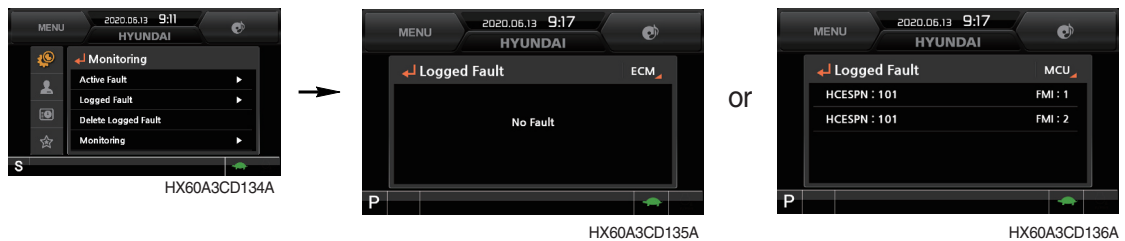
- The active faults of the machine MCU can be checked by this menu.

② Active fault - Engine



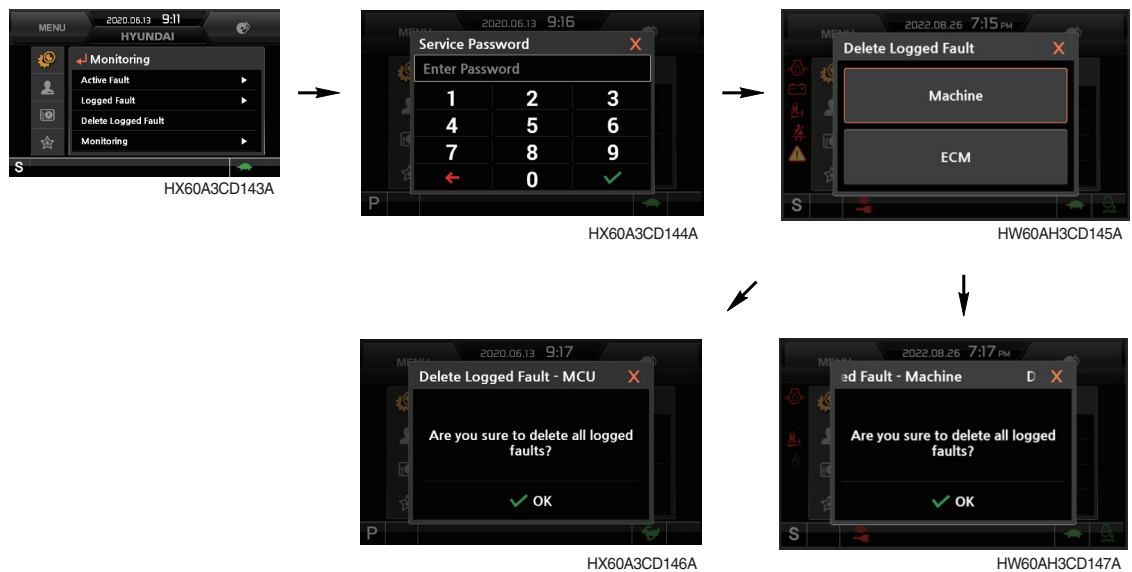
- The active faults of the engine ECU can be checked by this menu.

③ Logged fault - Machine/ Engine



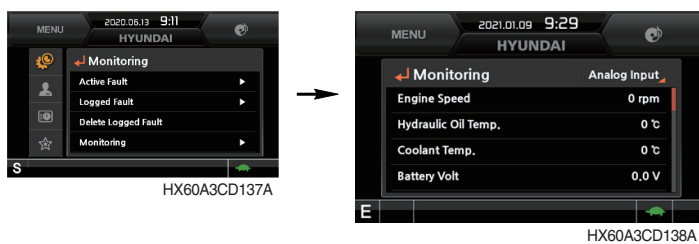
- The logged faults of the machine MCU or engine ECU can be checked by this menu.
- This menu can be used only HCE service man.

④ Delete logged fault



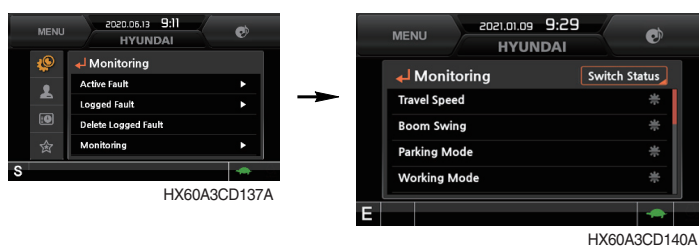
- The logged faults of the MCU, engine ECU can be deleted by this menu.
(It is possible under the engine stop conditions)

⑤ Monitoring (machine status)



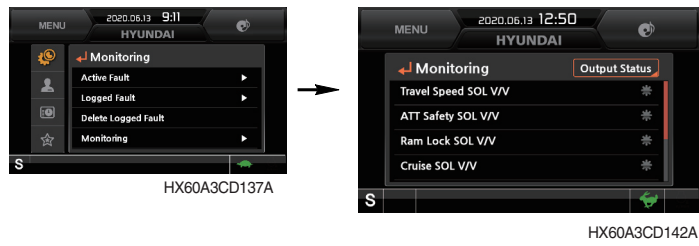
- The machine status such as the engine rpm, oil temperature, voltage and pressure etc. can be checked by this menu.

⑥ Monitoring (switch status)



- The digital switch status of the machine can be checked by this menu.
- The activated switch will display in blue color.

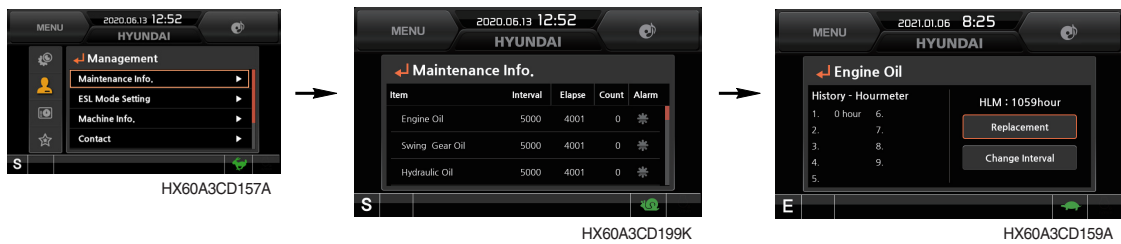
⑦ Monitoring (output status)



- The digital output status of the machine can be checked by this menu.
- The digital output status will display in blue color.

(3) Management

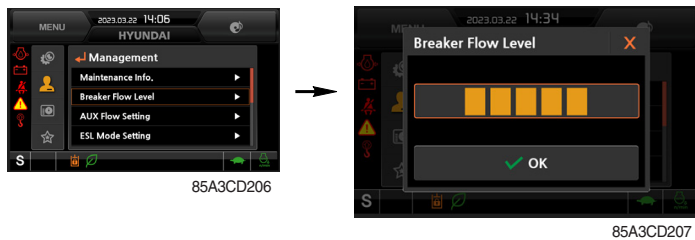
① Maintenance information



- Elapsed time : Display the elapsed time after the maintenance.
- Change interval : The change intervals can be changed in hour increments of 50.
- Change history : Display the change history for the maintenance.
- Replacement : The elapsed time will be reset to zero (0).
- Change or replace interval

※ Refer to the operator's page 6-16.

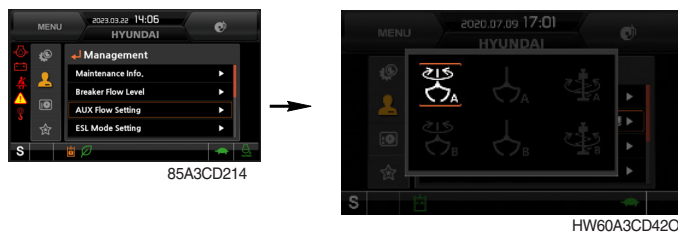
② Breaker flow level



- The breaker flow level can be modulated in 1~5 steps.

③ AUX flow setting

a. Option attach selection



- Three kinds of option attachment can be selected by this menu.

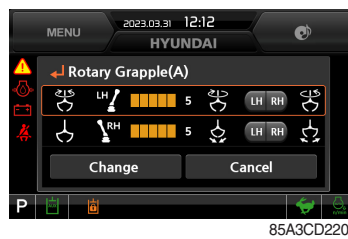
- Rotary grapple (4-way)
- Grapple (2-way)
- Auger (2-way)

※ There are two user modes (type A or B) in each option attachment.

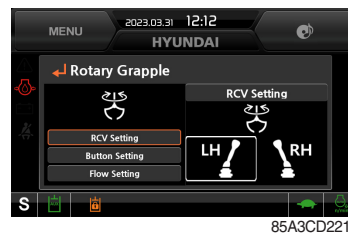
b. Proportional flow control setting

The preferable value of each option attachment can be set by this menu.

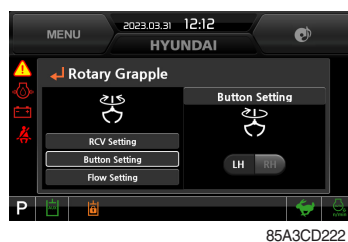
a) Rotary setting



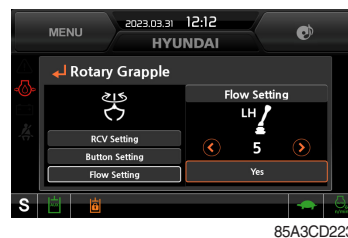
- Select rotary RCV, button and flow can be set by this menu



- RCV setting
 - Enable set LH or RH RCV for rotary operation.
 - Select LH for rotary → RH set for grapple automatically

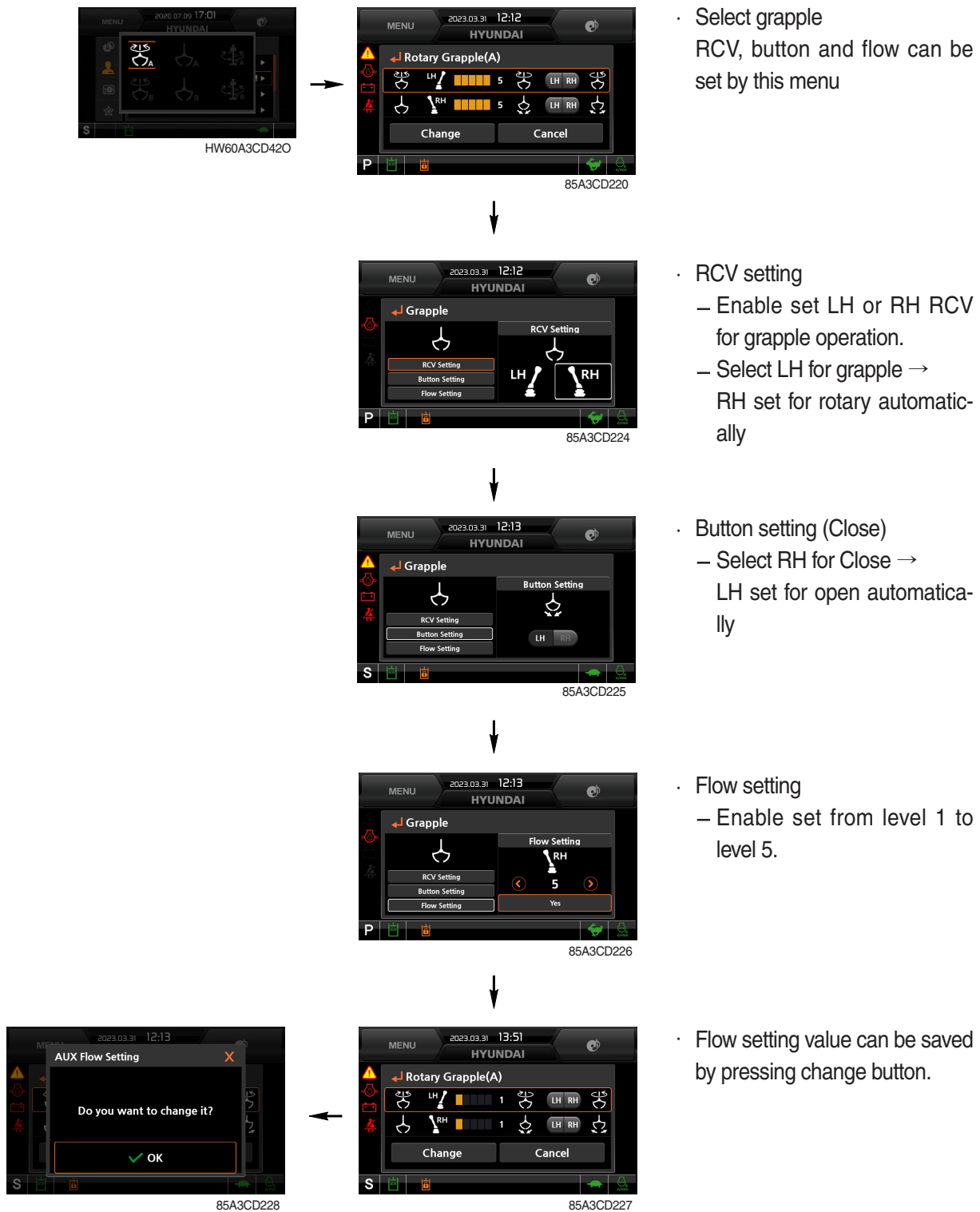


- Button setting (CW rotation)
 - Select LH for CW rotation → RH set for CCW rotation automatically



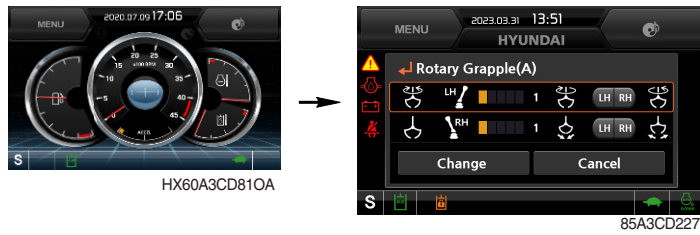
- Flow setting
 - Enable set from level 1 to level 5.

b) Grapple setting



- ※ Setting value saved once, it memorized in each icon and the last setting value is activated.
- ※ Saved setting can be used by pressing Icon button only.
- ※ There are two kinds (A and B) in each option attach setting and six kinds of option attach setting can be saved totally (2 of 4-way, 4 of 2-way).

c) Confirmation



- AUX flowing setting pilot lamp () is activated on the lower side of the main screen as below conditions.

※ The AUX switch is pressed to the AUX position and the AUX flow setting is selected Enabled.

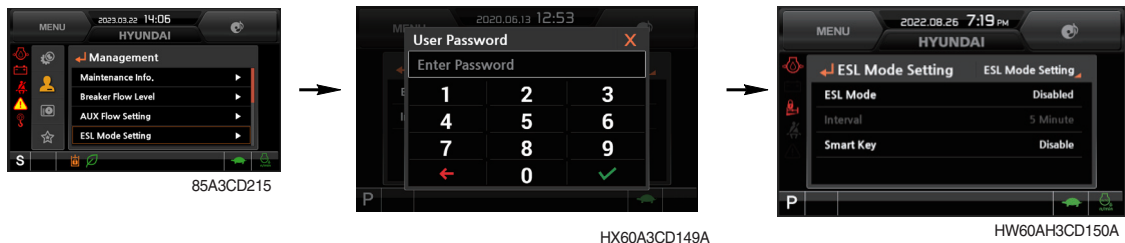
a) Rotary setting

- Rotary RCV : LH
- Rotary flow level : 3
- CW rotation : LH
- CCW rotation : RH

b) Grapple setting

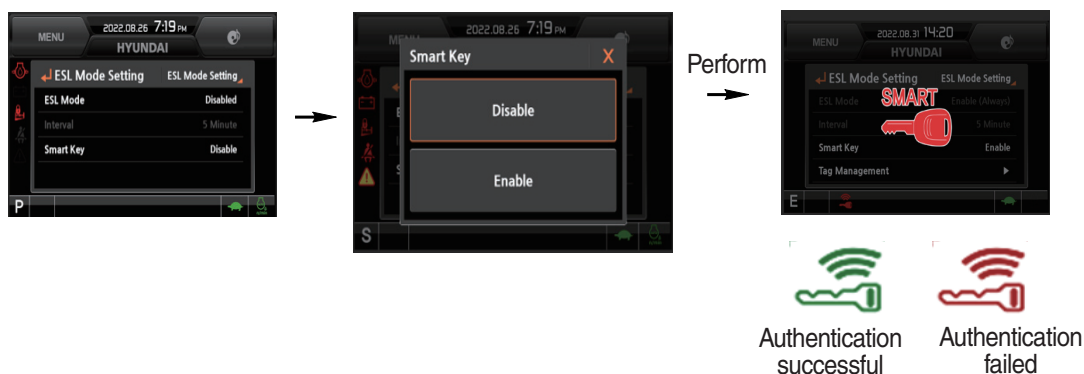
- Grapple RCV : RH
- Grapple flow level : 3
- Open : LH
- Close : RH

④ ESL mode setting



- ESL : Engine Starting Limit
- ESL mode is designed to be a theft deterrent or will prevent the unauthorized operation of the machine.
- When you Enable the ESL mode, the password will be required when the starting switch is turned to the on position.
- Disable : ESL function is disabled and password is not required to start engine.
- Enable (always) : The password is required whenever the operator starts engine.
- Interval : The password is required when the operator starts engine first. But the operator can restart the engine within the interval time without inputting the password.
- ※ The interval time can be set to a maximum 4 hours.
- ※ Default password : 00000
- Password length : 5~10 digits

Start Limit - Smart Key Setting (When smart key is installed)



- Smart Key Exclusive

When the Smart key option (optional) is installed, Smart key menu is shown, and performance or non-performance of Smart key authentication can be set through the Smart key menu.

When the Smart key is not in the cabin, the approval procedure is rejected, and password must be entered.

Start Limit - Tag Management

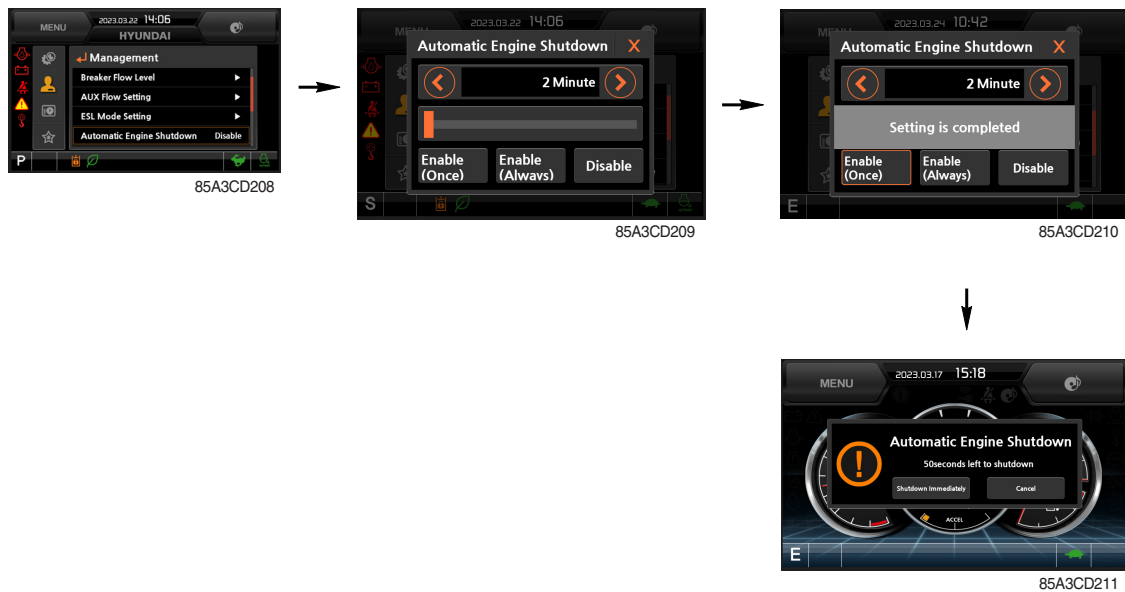


- The tag management menu is activated only when the Smart key menu is set through performance. Tag can be registered or deleted.
 - When registering the tag : Locate only the tag preferred for registration inside the cabin.
 - When deleting the tag : All registered tags are deleted.

※ Engine Starting Condition

Case	ESL Mode	Smart Key	Condition
1	Disable	Disable	- With registered tag : Engine can be started without password input. - Without registered tag : Engine can be started without password input.
2	Disable	Enable	If Smart Key is enabled, ESL Mode is automatically enabled. This Case 2 work the same as the Case 4.
3	Enable	Disable	- With registered tag : Engine can be started with password input. - Without registered tag : Engine can be started with password input.
4	Enable	Enable	- With registered tag : Engine can be started without password input. - Without registered tag : Engine can be started with password input.

⑤ Automatic engine shutdown



The automatic engine shutdown function can be set by this menu.

a. Once (one time)

- Automatic shutdown function set Once when key-on or engine operation condition.
 - Key-off when the shutdown button clicks after pop-up the automatic stop icon.
 - Shift automatic shutdown function to Disable when the cancel button clicks after pop-up the automatic stop icon.
- Keep Disable for the automatic shutdown function when key-off after key-on again or start engine.

b. Always (continuous use)

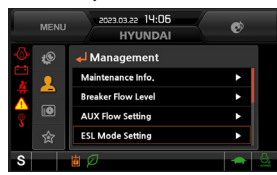
- Automatic shutdown function set Always when key-on or engine operation condition.
 - Key-off when the shutdown button clicks after pop-up the automatic stop icon.
 - Shift automatic shutdown function to Disable when when the cancel button clicks after pop-up the automatic stop icon.
- Keep Always for the automatic shutdown function when key-off after key-on again or start engine.

c. Disable

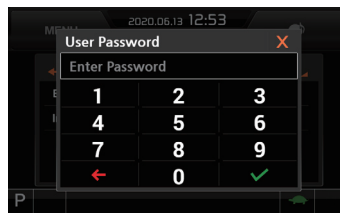
- Disable the engine automatic shutdown function.

⑥ Password change

– The password is 5~10 digits.

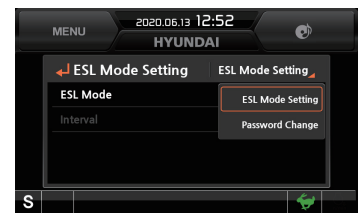


85A3CD215



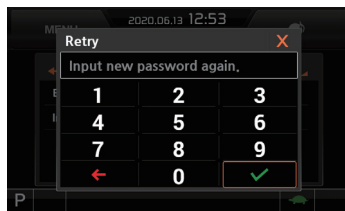
HX60A3CD149A

Enter the current password



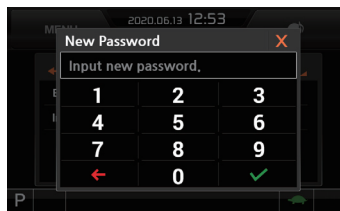
HX60A3CD153A

Select the password change



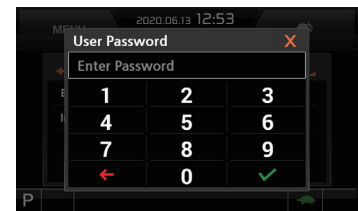
HX60A3CD156A

Saved the new password in the MCU



HX60A3CD155A

Enter the new password again



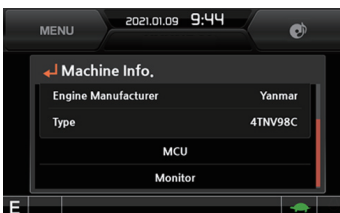
HX60A3CD149A

Enter the new password

⑦ Machine information



HX60A3CD160A



HX60A3CD161A



HX60A3CD162A

· The information of the cluster, machine MCU and engine and machine checked by this menu.

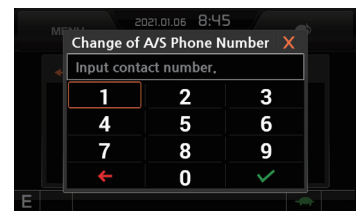
⑧ A/S phone number



HX60A3CD163A



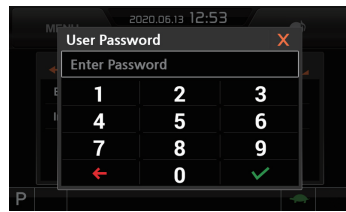
HX60A3CD164A



HX60A3CD165A

· The A/S phone number can be checked and changed.

⑨ Cluster update



Enter the user password

Select the cluster update

· The cluster and CAN device can be updated by this menu.

※ Do not turn power off while updating.

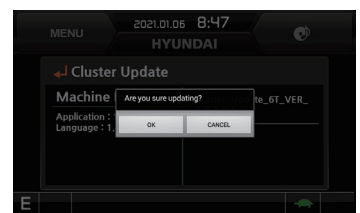
a. Application update



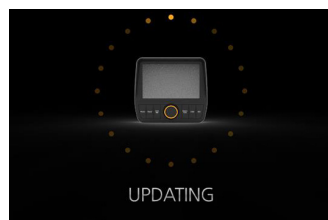
Select application item



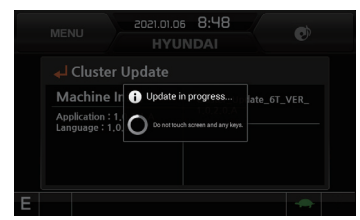
Select file to update



Select OK



Completed



In process

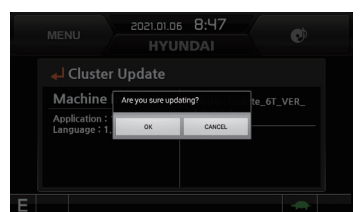
b. System update



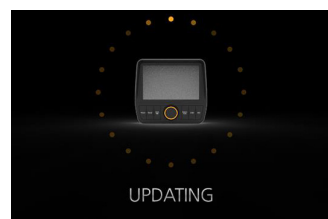
Select system item



Select file to update



Select OK

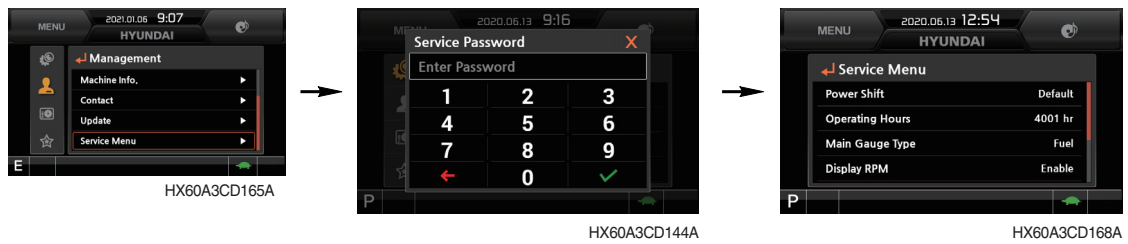


Completed



In process

⑩ Service menu



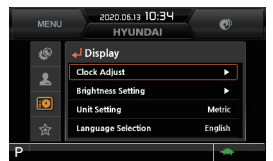
Enter the manager password

- Power shift : Power shift mode (default/option can be set by this menu.
- Operating hours : Operating hours in individual modes since the machine line out can be checked by this menu.
- Main gauge type : The engine rpm or fuel level gauge can be display on the main gauge of the main screen by this menu.
- Display RPM : Display the numeric value of engine rpm on the main gauge of the main screen can be set by this menu.
- AVCU setting : 2-Way or 4-Way dependent upon the machine options can be selected by this menu.
- Adding language : The language displayed on the cluster can be update by this menu when it is required to correct language.

※ This menu can be used only HCE service man. Do not attempt unauthorized adjustment.

(4) Display

① Clock adjust



HX60A3CD191A



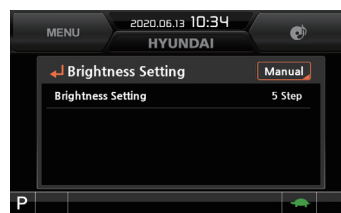
HX60A3CD192A

- The first row of boxes indicate Year/Month/Day.
- The second row shows the current time. (AM, PM/0:00~12:59)

② Brightness

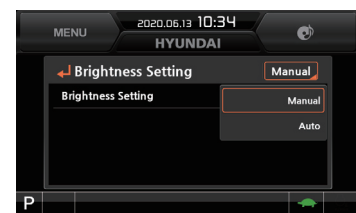


HX60A3CD193A

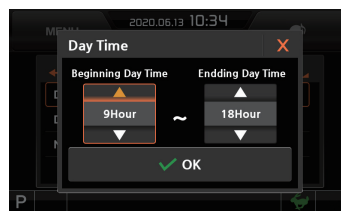


HX60A3CD194A

Manual (1st~10th step)



HX60A3CD195A



Auto (day/night)

HX60A3CD197A

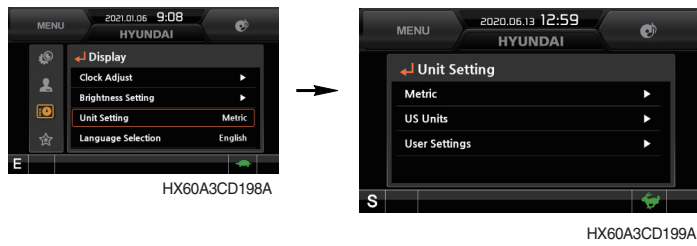


Auto (day time)

HX60A3CD196A

- If "Auto" is chosen, brightness for day and night can be set accordingly. Also, users can define which day time interval. (Set day starting time and ending time)

③ Unit set



- Metric units : Units change to metric units.
- US units : Units change to U.S. units
- User setting : Units change to user setting units

Item	Metric units	U.S. units	User setting
Temperature	°C	°F	°C, °F
Distance	km	mile	km, mile
Pressure	bar	Mpa	bar, Mpa, kgf/cm ² , psi
Flow	lpm	gpm	lpm, gpm
Volume	l	gal	l, gal

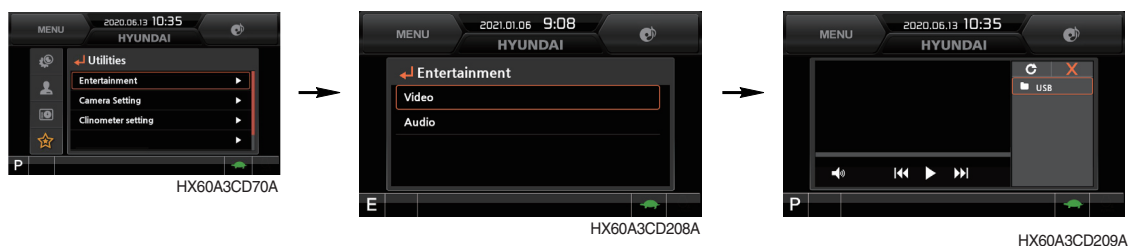
④ Language selection



- User can select preferable language (22 languages) and all displays are changed the selected language.

(5) Utilities

① Entertainment



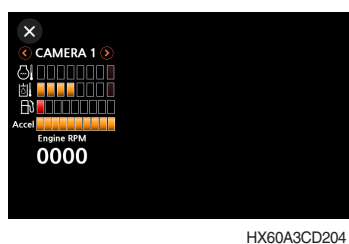
- Play MP4 or codec file of external hard disk through USB port.
- The USB port is located left side of the cluster.
- Over 1100 engine rpm, the screen turns into the operation screen with MP4 or codec file playing for the safety. The video is played again when the engine revolution is 1100 rpm or less.

▲ The video play is prohibited for the safety reason when the machine is operated.

② Camera setting



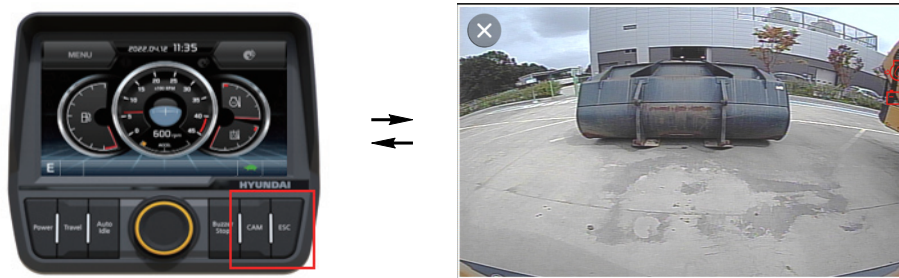
- Three cameras can be installed on the machine and display order can be set by this menu.
- ※ If the camera is not equipped, this menu is not useful.
- Turning the select switch in clockwise direction, the next ordered will be shown and in counter-clockwise direction, the previously ordered will be shown. Also, the camera channel can be changed by touching the screen.
- Display change to reduction size or display is not visible by pushing the select switch or touch the screen.
(display reduction size → hiding → display)



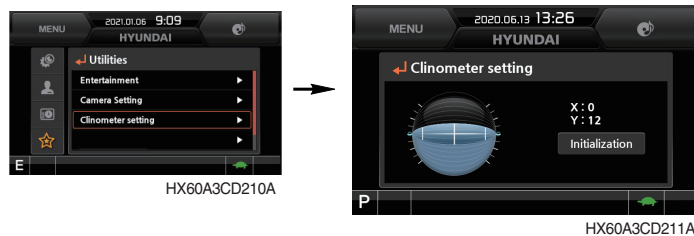
- The camera display is terminated by pressing the ESC switch or touch the X icon on the screen.

- **Camera control switch**

- Select the CAM switch to activate Rear / RH view camera from the beginning screen.
- While in that mode, select the ESC switch to return to the home screen.

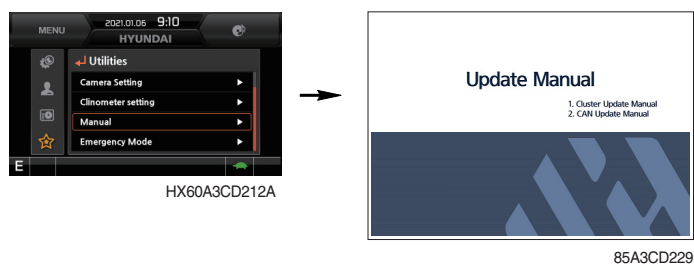


③ Clinometer setting



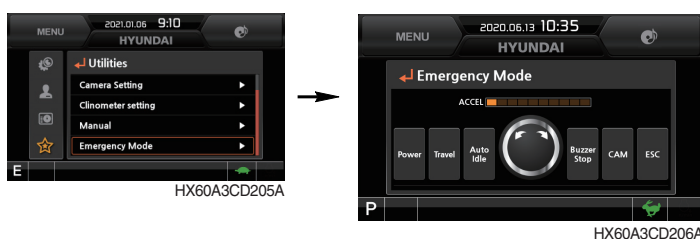
- When the machine is on the flatland, if you touch "initialization" on cluster, the values of X, Y will reset to "0".
- You can confirm tilt of machine in cluster's operating screen.

④ Manual



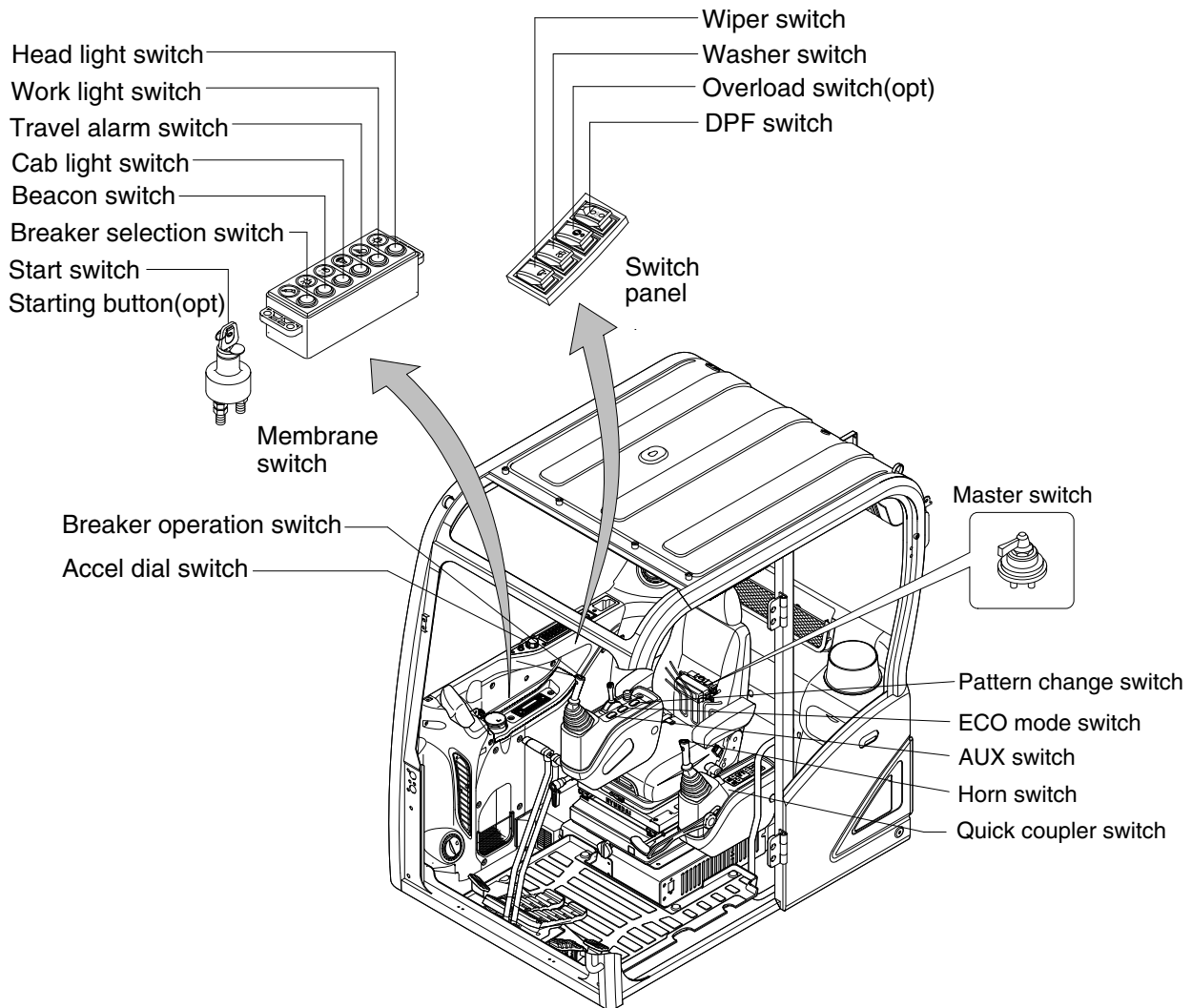
- Manual of the cluster can be read on the monitor.

⑤ Emergency mode



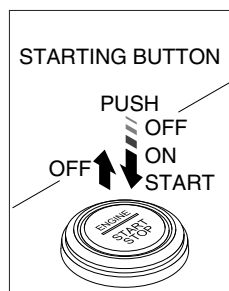
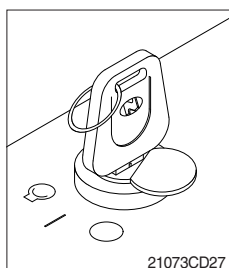
- When switches of the monitor and the accel dial fails, switches are displayed on LCD, and you are allowed to perform operation by touching the screen.
- Such operation is allowed only on this mode screen.

3. SWITCHES



85A3CD02B

1) STARTING SWITCH



Starting button with smart key tag (opt)

(1) There are three positions, OFF, ON and START.

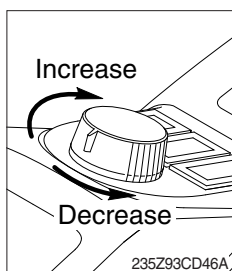
- (OFF) : None of electrical circuits activate.
- (ON) : All the systems of machine operate.
- (START) : Use when starting the engine.

Release key immediately after starting.

※ If you turn ON the starting switch in cold weather, the fuel warmer is automatically operated to heat the fuel by sensing the coolant temperature. Start the engine in 1~2 minutes after turning ON the starting switch. More time may take according to ambient temperature.

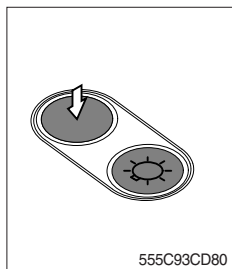
※ Key must be in the ON position with engine running maintain electrical and hydraulic function and prevent serious machine damage.

2) ACCEL DIAL



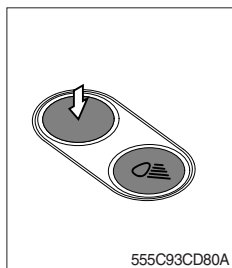
- (1) There are 10 dial setting.
- (2) Setting 1 is low idle and setting 10 is high idle.
 - By rotating the accel dial to right : Engine speed increased.
 - By rotating the accel dial to left : Engine speed decreased.

3) HEAD LIGHT SWITCH



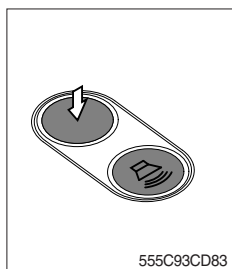
- (1) This switch is used to operate the illumination.
- (2) Press the switch once, the head light and illumination lamps come ON.
 - Air conditioner and heater controller
 - Radio and USB player
 - USB socket, DPF switch, accel dial and cigar lighter
- (3) Press the switch once more, the head light and illumination lamps turn off.

4) WORK LIGHT SWITCH



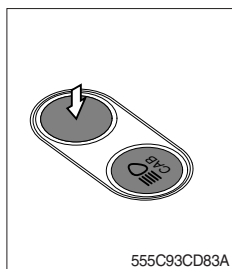
- (1) This switch is used to operate the work light.
 - Press the switch once, the work light comes ON and the pilot lamp ON.
 - Press the switch once more, the work light and pilot lamp turn off.

5) TRAVEL ALARM SWITCH



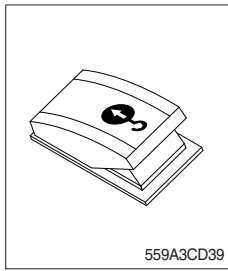
- (1) This switch is to activate travel alarm function surrounding when the machine travels.
 - ON : The travel alarm function is activated.
 - OFF : The travel alarm function is not activated.

6) CAB LIGHT SWITCH



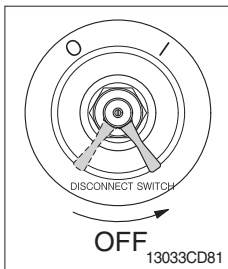
- (1) This switch turns on the cab light on the cab.

12) OVERLOAD SWITCH (option)



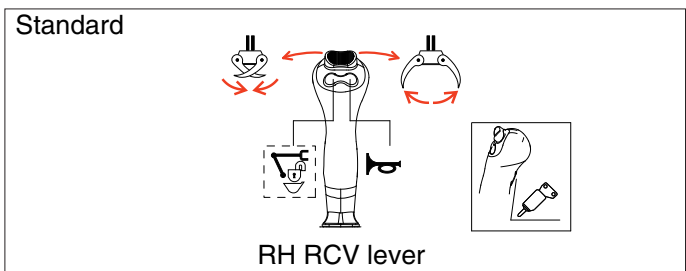
- (1) When this switch pressed ON position, buzzer makes sound and overload warning lamp comes ON in case that the machine is overload.
- (2) When it pressed OFF position, buzzer stops and warning lamp goes out.

13) MASTER SWITCH

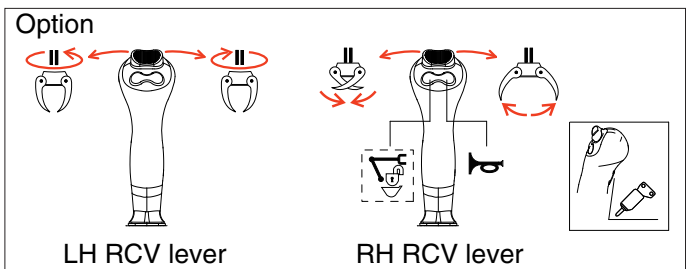


- (1) This switch is used to shut off the entire electrical system.
 - (2) I : The battery remains connected to the electrical system.
O : The battery is disconnected to the electrical system.
- ※ **Never turn the master switch to O (OFF) with the engine running. It could result in engine and electrical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

14) CONTROL LEVER SWITCH (LH, RH)



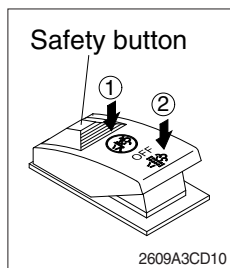
85A3CD32B



85A3CD33B

- (1) This switch use to operates the breaker operation by third step.
 - **First step : Select breaker selection switch on the membrane switch.**
 - **Second step : Select Aux switch to position 3.**
 - **Third step : Press breaker operation switch.**
 - (2) This switch operates the clamshell or shear.
- ※ **This switch applies to double action hydraulic attachment circuit.**

15) DPF (diesel particulate filter) SWITCH



(1) This switch is used to select the regeneration function of the DPF.

(2) Inhibit position (①)

- ① The inhibit position disallows any automatic or manual regeneration of the DPF.
- ② This may be used by operator to prevent regeneration when the machine is operating in a hazardous environment concerned about high temperature.
- ③ It is strongly recommended that this position is only activated when high temperatures may cause a hazardous condition.

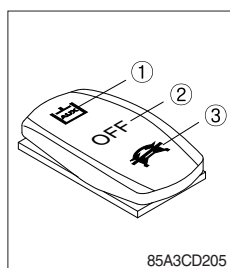
(3) OFF position

This position will initiate a automatic regeneration of the DPF.

(4) Manual regeneration position (②)

- ① This position will only initiate a manual regeneration of the DPF when the machine is in non-mission condition, engine must run at low idle speed and DPF soot levels are high enough to allow regeneration.
- ② HEST lamp will be illuminated during the entire regeneration.
- ※ Refer to the page 4-9 for details.
- ※ This switch can be move to the manual regeneration position (②) only when the safety button is pulled to backward.
- ※ Also, this switch return to the OFF position when released the manual regeneration position (②).

16) AUX SWITCH (option)

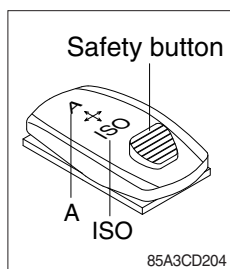


(1) This switch is used to select the auxiliary optional functions.

- ① : Angle dozer
- ② : Off
- ③ : Breaker operating or 2way or 4way

※ Refer to page 4-14 for the details.

17) PATTERN CHANGE SWITCH



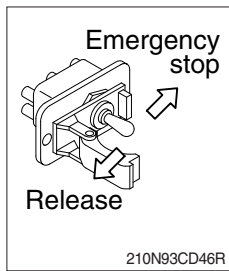
(1) The pattern change can be operated easily using this switch.

- Position ISO : ISO type pattern
- Position A : A type pattern

▲ Before starting the machine, check switch position.

※ Refer to page 4-22 for the details.

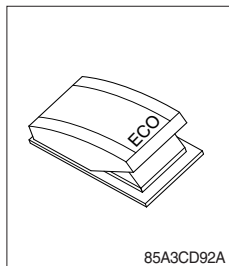
18) EMERGENCY ENGINE STOP SWITCH



(1) This switch is used to emergency stop the engine.

※ Be sure to keep the emergency switch on the release position when restart the engine.

19) ECO MODE SWITCH

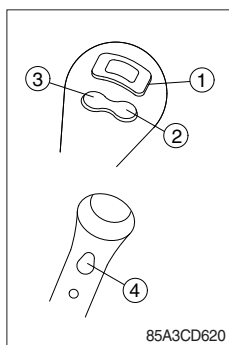


(1) This switch is used to improve the fuel economy of the equipment.

(2) The pump horsepower is reduced, when you press this switch.

20) LH RCV LEVER SWITCH

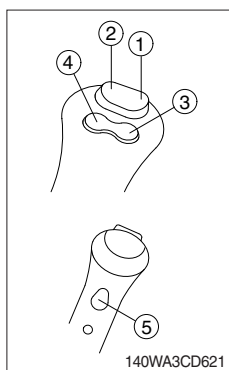
(1) Button type



The switches on the LH RCV lever is function as below.

- ① None
- ② None
- ③ None
- ④ None

(2) Proportional type (option)



The switches on the LH RCV lever is function as below.

① CW rotating switch

When this switch is pressed, the clockwise rotating will operate.

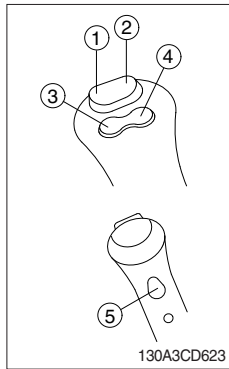
② CCW rotating switch

When this switch is pressed, the counterclockwise rotating will operate.

- ③ None.
- ④ None.
- ⑤ None.

21) RH RCV LEVER SWITCH

(1) Proportional type



The switches on the RH RCV lever is function as below.

① 2-way clamp switch

When this switch is pressed, the clamp will only operate when the crusher operation mode is selected.

② 2-way release switch

When this switch is pressed, the release or breaker will operate when the crusher operation mode or breaker operation mode is selected.

③ Quick coupler switch

This switch is used to engage or disengage the moving hook on quick coupler.

※ Refer to the operator's manual page 8-6.

④ Horn switch

When this switch is pressed, the horn will sound.

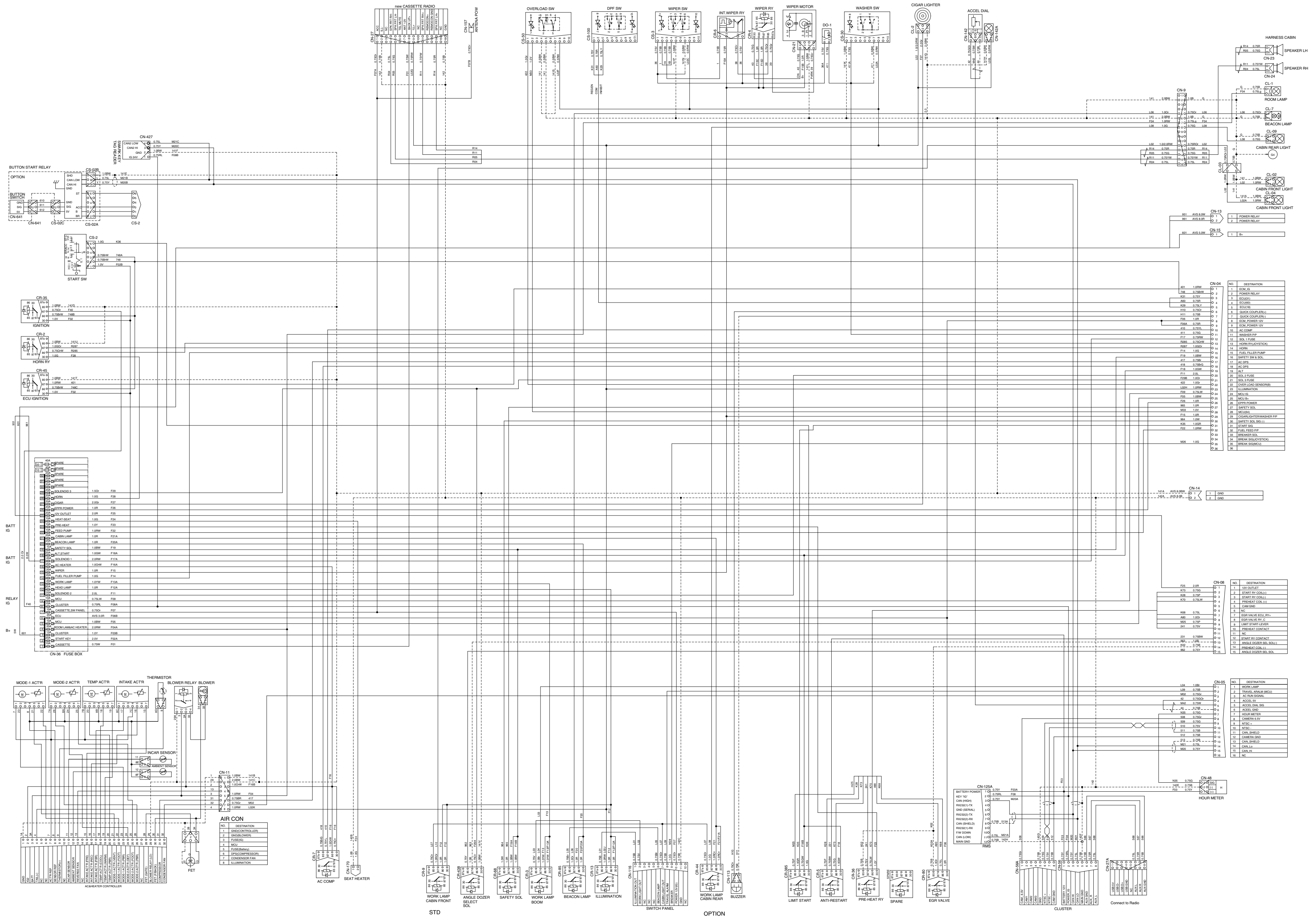
⑤ Breaker switch

When this switch is pressed, the breaker will only operate when the breaker operation mode is selected.

· ELECTRICAL CIRCUIT (1/2)
- MACHINE SERIAL NO. : -#0006

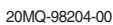


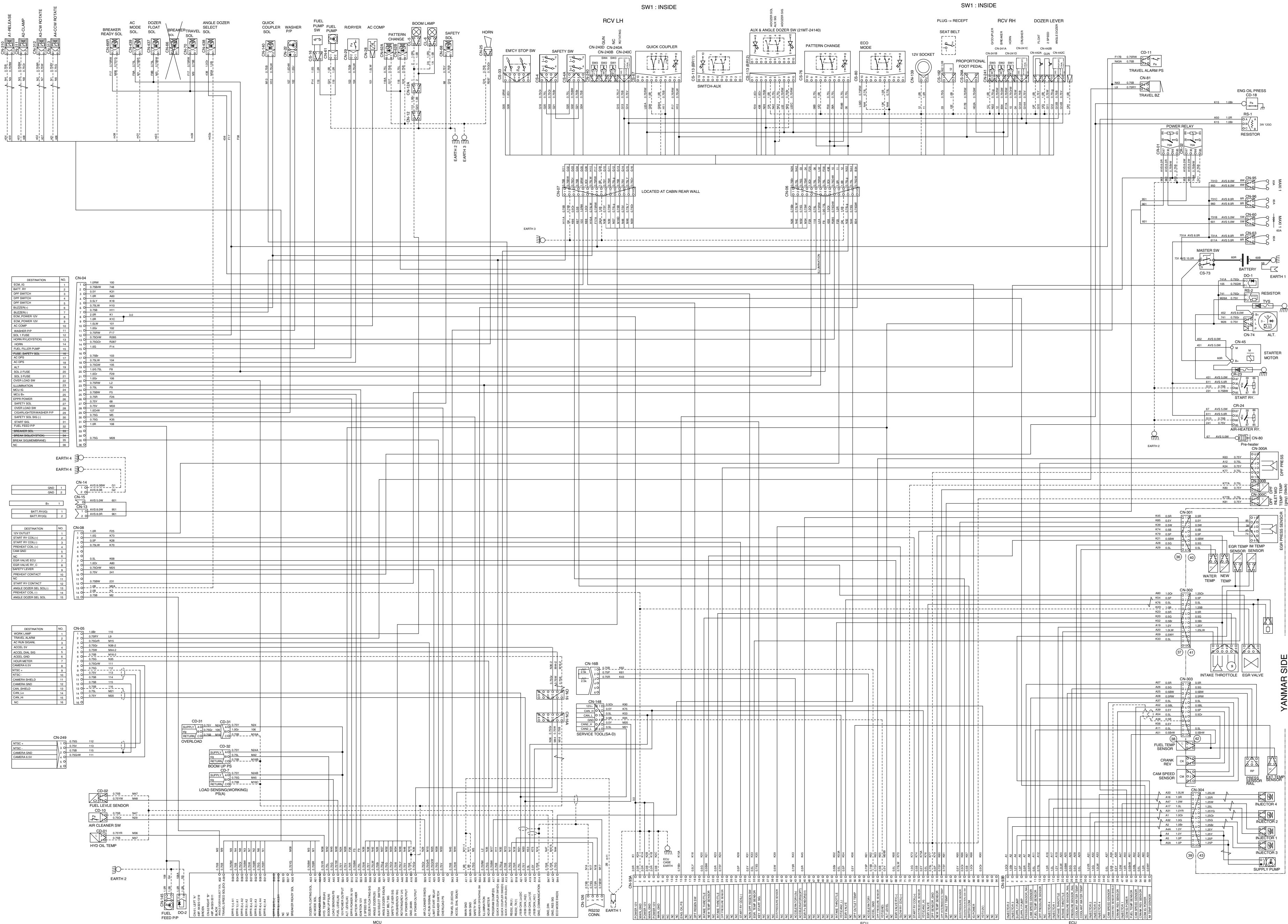
- MACHINE SERIAL NO. : #0007-



- MACHINE SERIAL NO. : -#0006







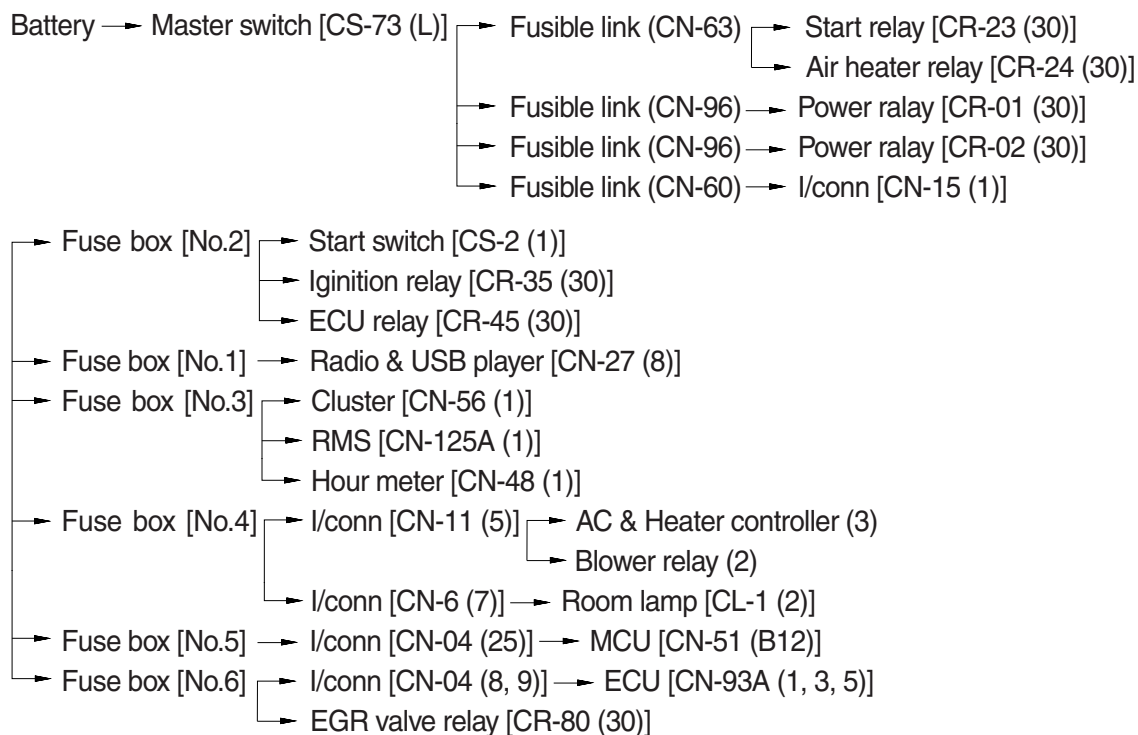
MEMORANDUM

1. POWER CIRCUIT

The negative terminal of battery is grounded to the machine chassis.

When the start switch is in the OFF position, the current flows from the positive battery terminal as shown below.

1) OPERATING FLOW



※ I/conn : Intermediate connector

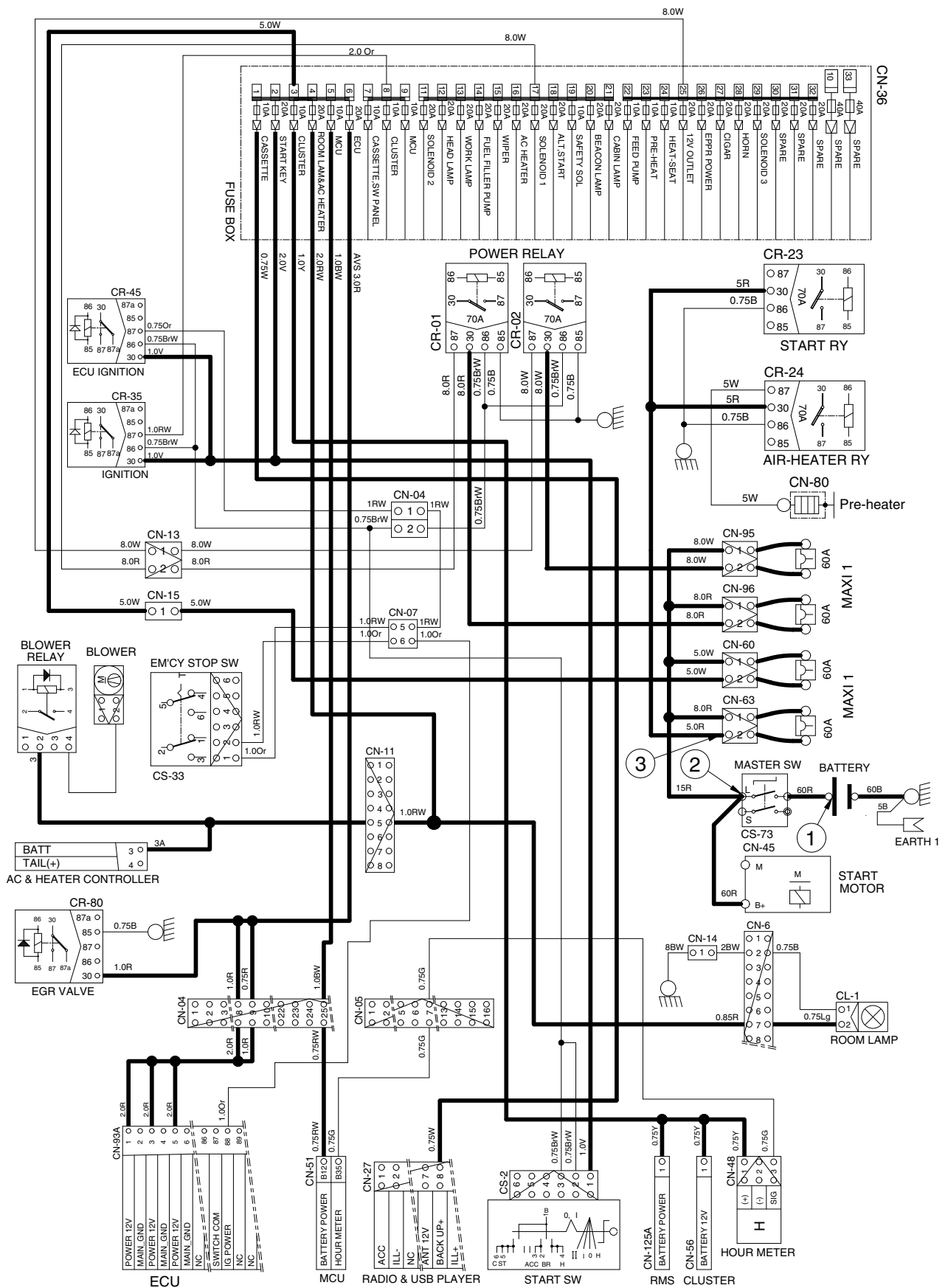
2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	OFF	① - GND (battery) ② - GND (master switch) ③ - GND (fusible link)	10~12.5V

※ GND : Ground

※ The circuit diagram may differ from the equipment, so please check before a repair.

POWER CIRCUIT



85A4EL04

※ The circuit diagram may differ from the equipment, so please check before a repair.

2. STARTING CIRCUIT

1) OPERATING FLOW

Battery (+) terminal → Master switch [CS-73 (L)] → Fusible link [CN-60]
 → I/conn [CN-15 (1)] → Fuse box No.2 → Start switch [CS-2 (1)]

(1) Start switch : ON

Start switch ON [CS-2 (2,3)] → Ignition [CR-35 (86) → (87)] → Fuse box [No.7,8,9]
 → I/conn [CN-04 (2)]
 → Power relay [CR-01 (86) → (87)] → CN-13 [(2)] → Fuse box [No.11~21]
 → Power relay [CR-02 (86) → (87)] → CN-13 [(1)] → Fuse box [No.22~32]

(2) Start switch : START

Start switch START [CS-2 (6)] → Limit start [CR-385 (30) → (87)] → I/conn [CN-04 (31)]
 → ECU [CN-93A (35) → (28, 73)] → I/conn [CN-08 (2, 3)] → Anti-restart relay [CR-5 (30) → (87)]
 → I/conn [CN-08 (12)] → Start relay [CR-23 (85) → (87)] → Start motor [CN-45 (M)]
 → Starter operating

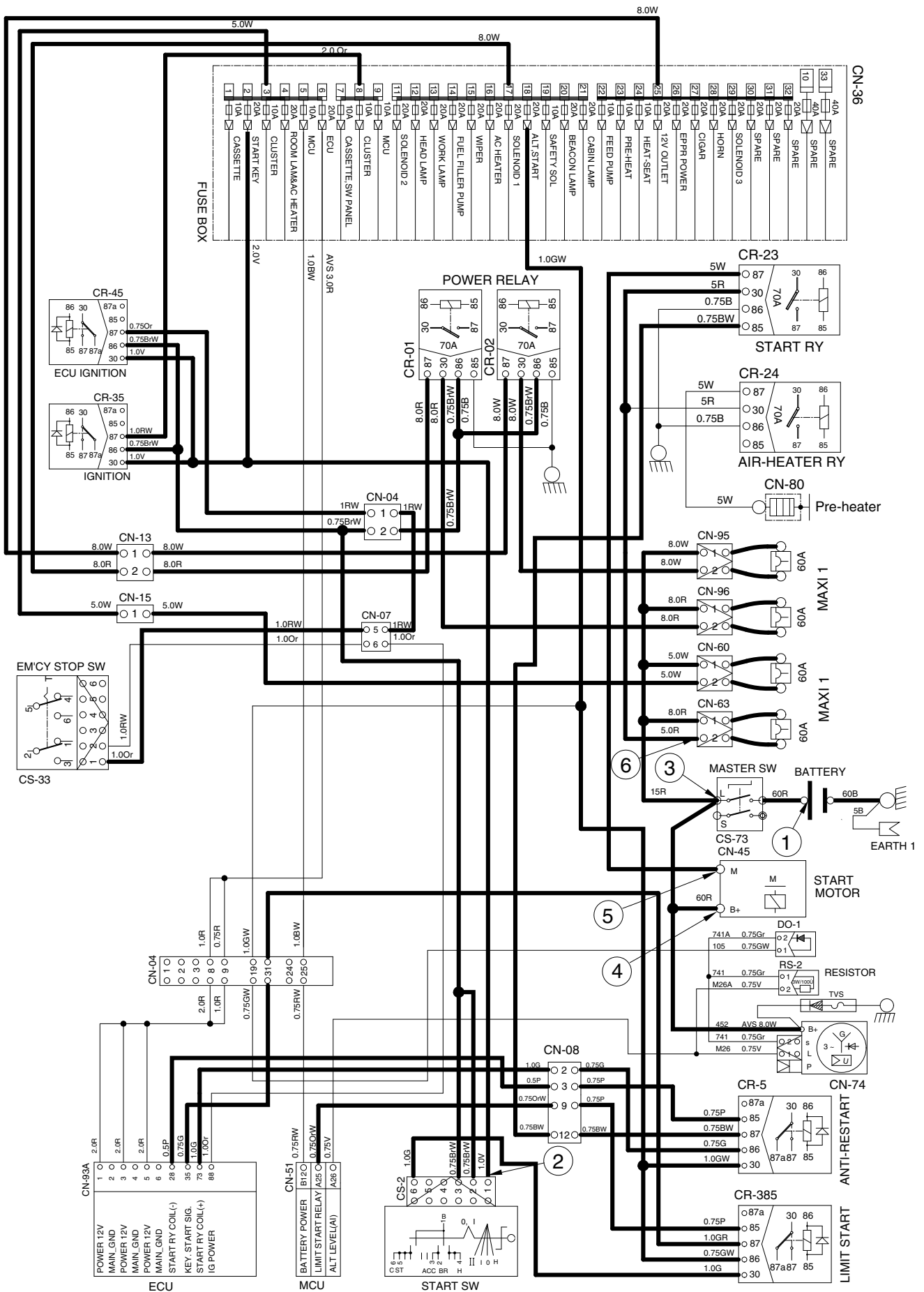
CHECK POINT

Engine	Start switch	Check point	Voltage
Operating	Start	① - GND (battery) ② - GND (start key) ③ - GND (master switch) ④ - GND (starter B ⁺) ⑤ - GND (starter M) ⑥ - GND (Fusible link)	10~12.5V

※ GND : Ground

※ The circuit diagram may differ from the equipment, so please check before a repair.

STARTING CIRCUIT



※ The circuit diagram may differ from the equipment, so please check before a repair.

3. CHARGING CIRCUIT

When the starter is activated and the engine is started, the operator releases the start switch to the ON position.

Charging current generated by operating alternator flows into the battery through the master switch (CS-73).

The current also flows from alternator to each electrical component and controller through the fuse box.

1) OPERATING FLOW

(1) Warning flow

Alternator [CN-74 (1)] → MCU [CN-51 (A26)] → Cluster warning lamp (via CAN interface)

(2) Charging flow

Alternator [CN-74 (B+)] → Master switch [CS-73 (L)] → Battery (+) terminal
→ Battery charging

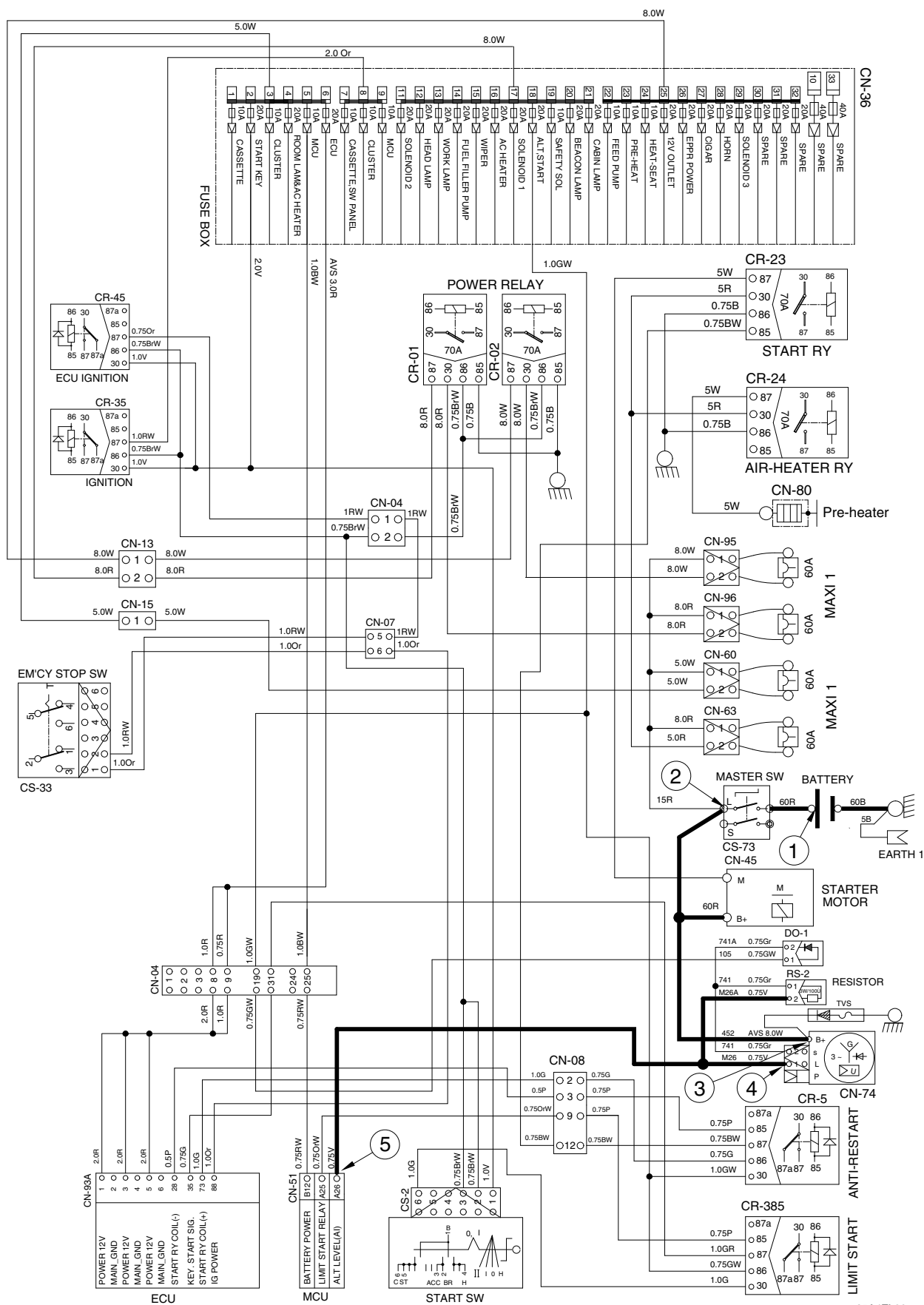
2) CHECK POINT

Engine	Start switch	Check point	Voltage
Operating	ON	① – GND (battery voltage) ② – GND (master switch) ③ – GND (alternator B ⁺ terminal) ④ – GND (alternator L terminal) ⑤ – GND (MCU)	10~12.5V

※ GND : Ground

※ The circuit diagram may differ from the equipment, so please check before a repair.

CHARGING CIRCUIT



85A4EL06

※ The circuit diagram may differ from the equipment, so please check before a repair.

4. ILLUMINATION AND WORK LAMP CIRCUIT

1) OPERATING FLOW

Fuse box (No.12) → Illumination [CR-13 (30,86)]
 Fuse box (No.12) → Front cab work lamp relay [CR-9 (30,86)]
 Fuse box (No.13) → Boom work lamp relay [CR-3 (30,86)]
 Fuse box (No.7) → Switch panel [CN-116 (10)]

(1) Illumination lamp switch ON

Illumination lamp switch ON [CN-116 (1)] → Illumination lamp relay [CR-13 (85) → (87)]
 → I/conn [CN-04 (23)] → I/conn [CN-06 (07)] → Quick coupler switch ill lamp ON [CS-67 (8)]
 → Aux & angle dozer sw ill lamp ON [CS-133 (8)]
 → ECO mode sw ill lamp ON [CS-80 (10)]
 → Radio & USB player illumination lamp ON [CN-27 (9)]
 → I/conn [CN-11 (8)] → AC/Heater controller illumination lamp ON
 → Overload switch illumination lamp ON [CS-50 (8)]
 → Wiper switch illumination lamp ON [CS-3 (8)]
 → Washer switch illumination lamp ON [CS-30 (8)]
 → Cigar lighter [CL-2 (1)]
 → Accel dial lamp [CN-142A (2)]

(2) Work lamp switch ON

Work light switch ON [CN-116 (2)] → Work lamp relay [CR-3 (85) → (87)] → I/conn [CN-05 (1)]
 I/conn [CN-12 (2)] → Boom work lamp ON [CL-5 (2), 6 (2)]

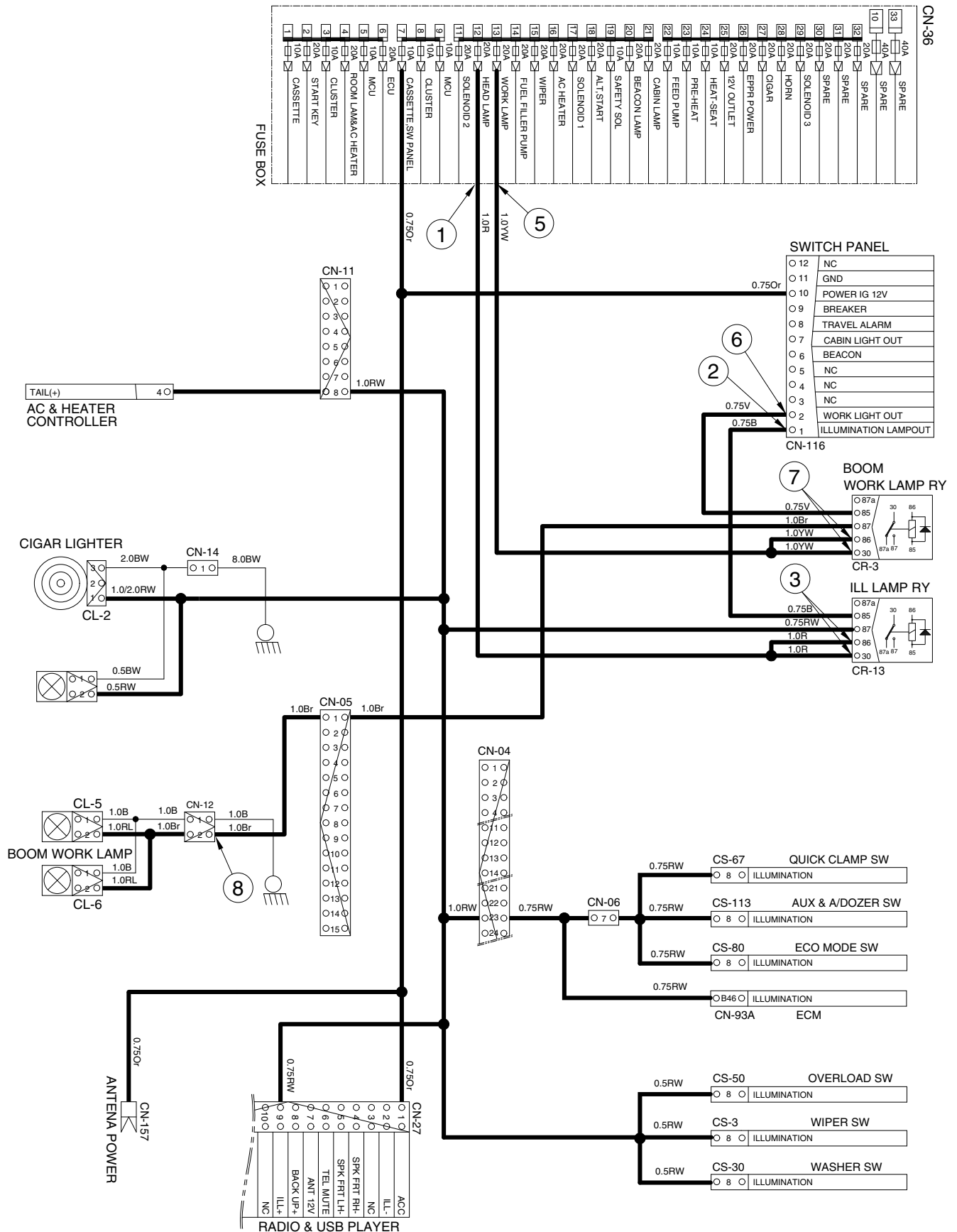
2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	ON	① - GND (fuse box) ② - GND (switch power input) ③ - GND (switch power output) ④ - GND (illumination lamp) ⑤ - GND (fuse box) ⑥ - GND (switch power input) ⑦ - GND (switch power output) ⑧ - GND (work light)	10~12.5V

※ GND : Ground

※ The circuit diagram may differ from the equipment, so please check before a repair.

ILLUMINATION AND WORK LAMP CIRCUIT



85A4EL07

※ The circuit diagram may differ from the equipment, so please check before a repair.

5. BEACON LAMP AND CAB LAMP CIRCUIT

1) OPERATING FLOW

Fuse box (No.12) → Cab front work lamp relay [CR-9 (30, 86)]

Fuse box (No.20) → Beacon lamp relay [CR-85 (30, 86)]

Fuse box (No.21) → Cab rear work lamp relay [CR-44 (30, 86)]

Fuse box (No.7) → Switch panel [CN-116 (10)]

(1) Beacon lamp switch ON

Beacon lamp switch ON [CN-116 (6)] → Beacon lamp relay [CR-85 (85) → (87)] → I/conn [CN-5 (5)]
→ Beacon lamp ON [CL-7]

(2) Cab lamp switch ON

Cab lamp switch ON [CN-116 (7)] → Front lamp relay [CR-9 (85) → (87)] → I/conn [CN-9 (12)]
→ I/conn [CL-03 (2)] → Cab front lamp ON [CL-02 (2), CL-04 (2)]
→ Cab rear lamp relay [CR-44 (85) → (87)] → I/conn [CN-9 (8)]
→ Cab rear lamp ON [CL-09 (02)]

Cab lamp ON [CL-3 (2), 4 (2)]

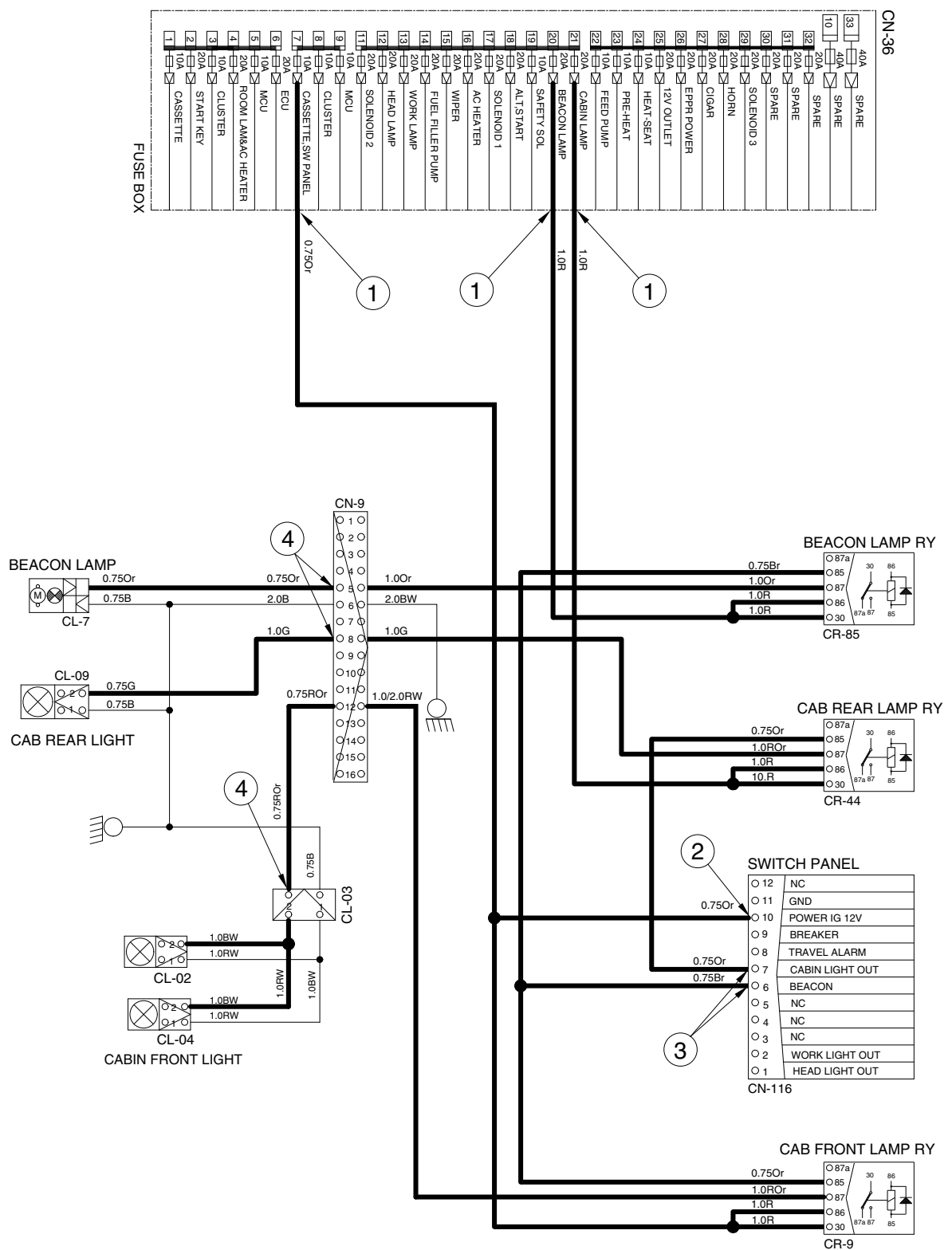
2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	ON	① - GND (fuse box) ② - GND (switch power input) ③ - GND (switch power output) ④ - GND (beacon & cab lamp)	10~12.5V

※ GND : Ground

※ The circuit diagram may differ from the equipment, so please check before a repair.

BEACON AND CAB LAMP CIRCUIT



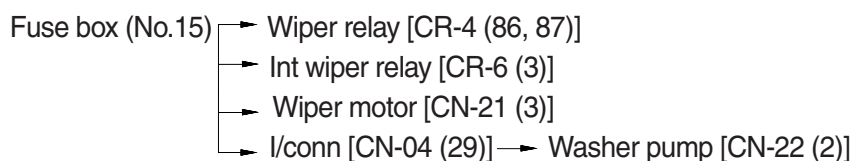
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※ The circuit diagram may differ from the equipment, so please check before a repair.

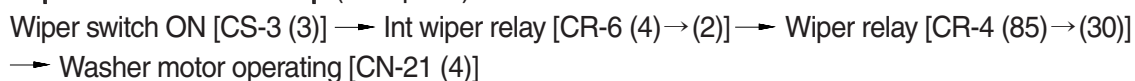
6. WIPER AND WASHER CIRCUIT

1) OPERATING FLOW

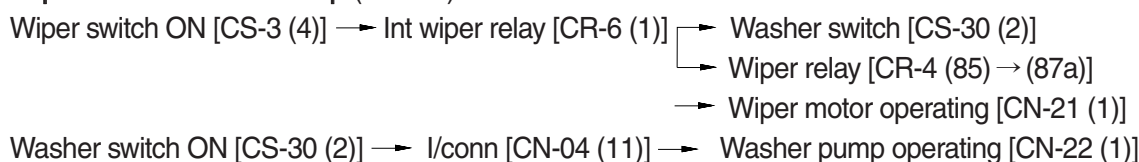
(1) Start switch ON



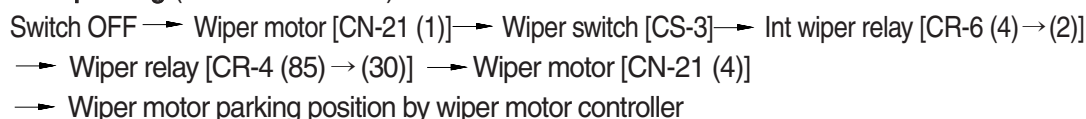
(2) Wipe switch ON : 1st step (low speed)



(3) Wiper switch ON : 2nd step (washer)



(4) Auto parking (when switch OFF)



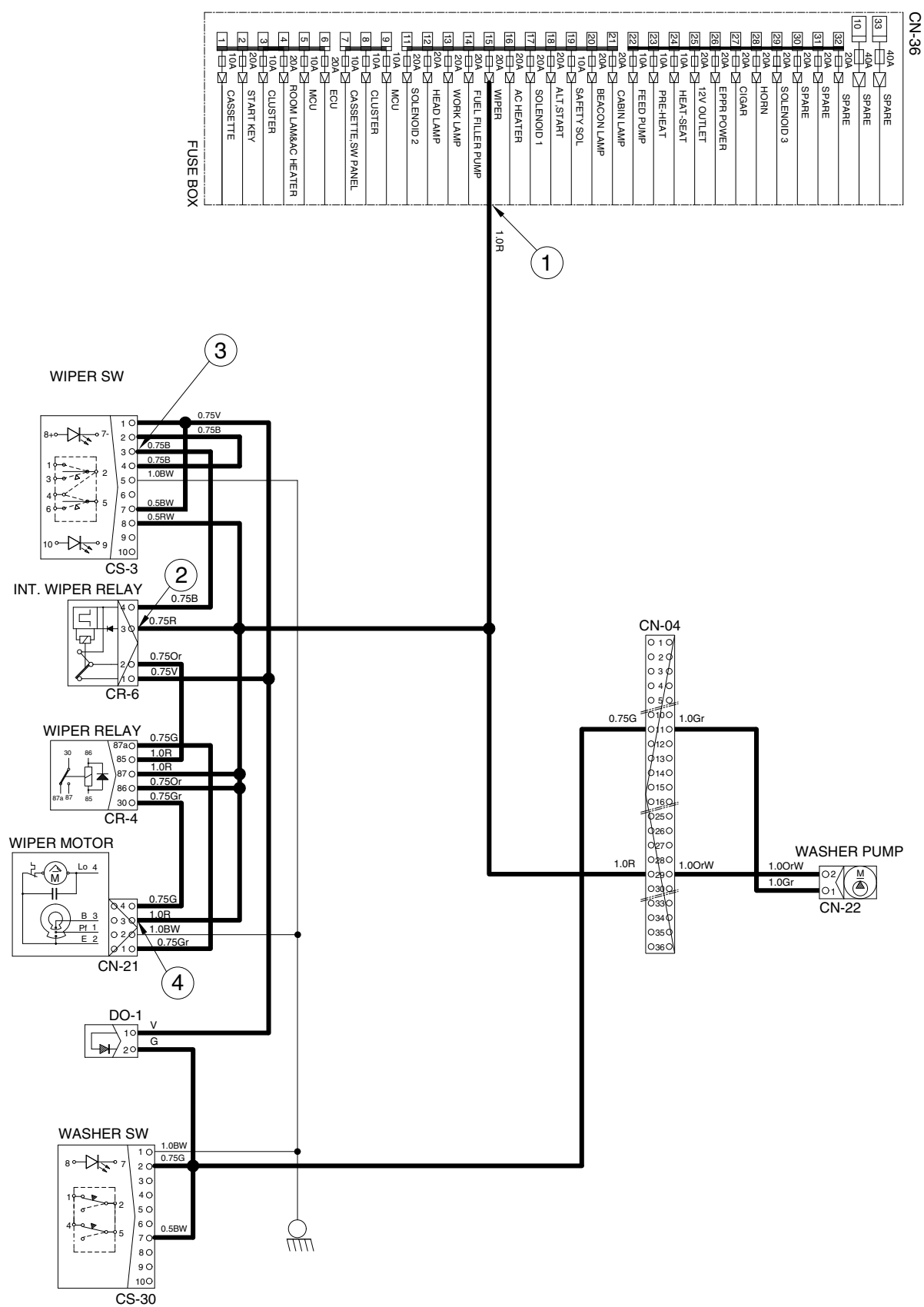
2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	ON	① - GND (fuse box) ② - GND (switch power input) ③ - GND (switch power output) ④ - GND (wiper motor)	10~12.5V

※ GND : Ground

※ The circuit diagram may differ from the equipment, so please check before a repair.

WIPER AND WASHER CIRCUIT



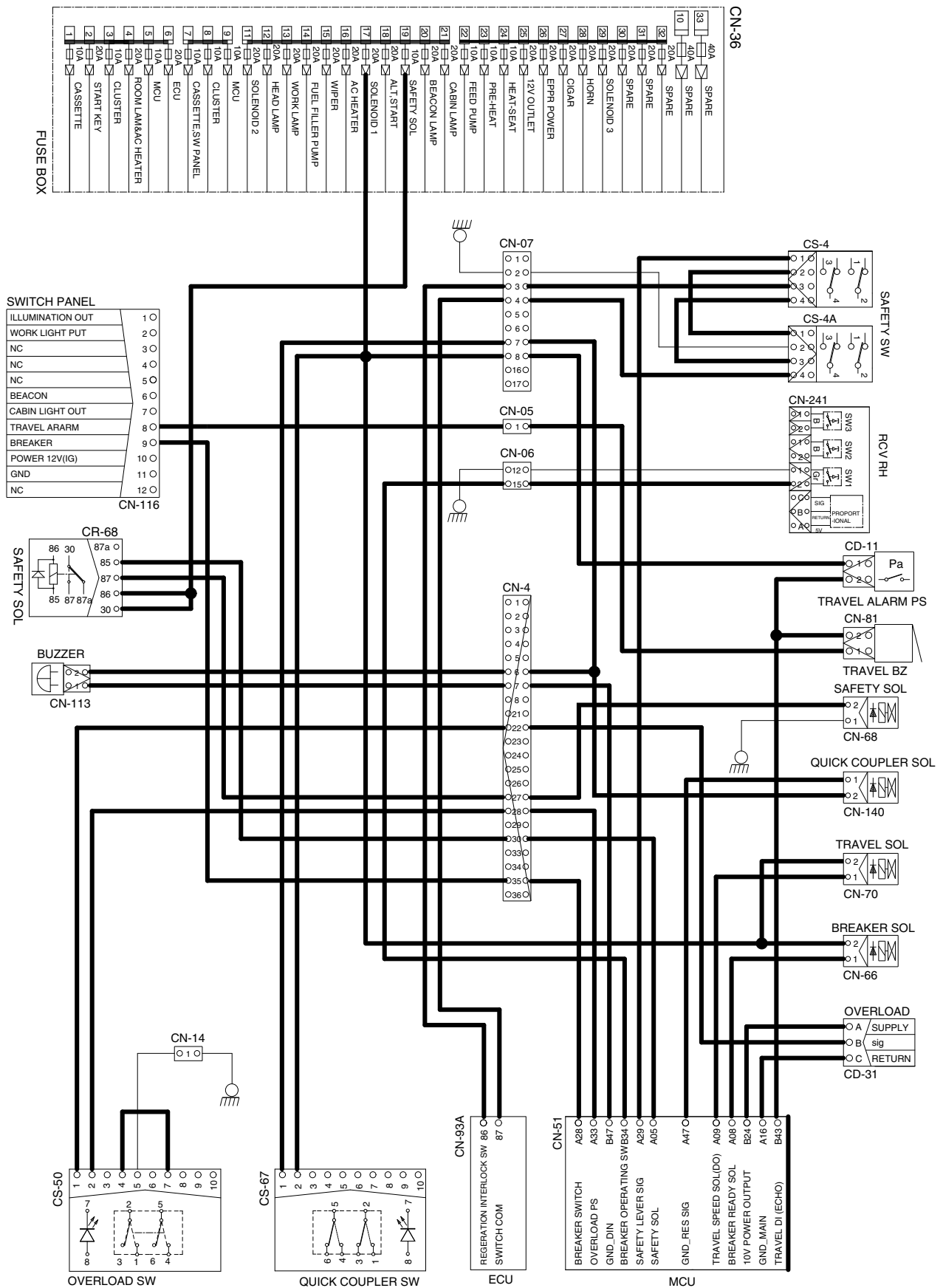
85A4EL09

※ The circuit diagram may differ from the equipment, so please check before a repair.

※ The circuit diagram may differ from the equipment, so please check before a repair.



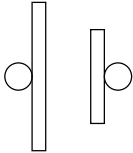
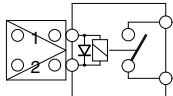
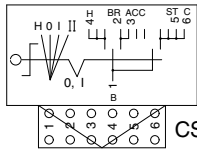
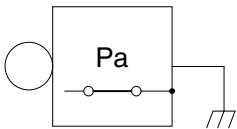
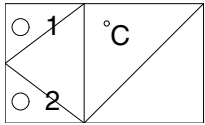
ELECTRIC CIRCUIT FOR HYDRAULIC

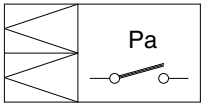
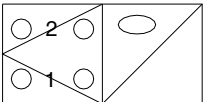
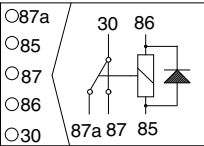
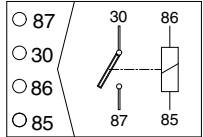
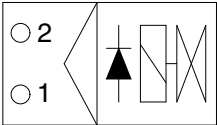
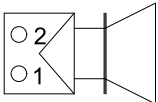


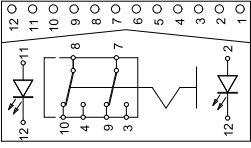
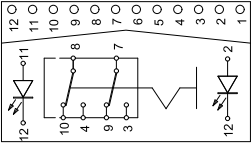
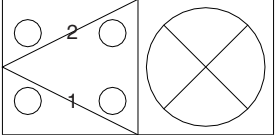
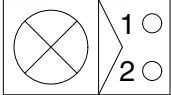
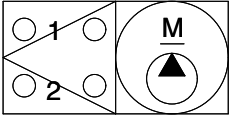
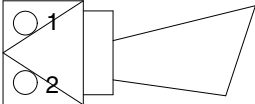
85A4EL11

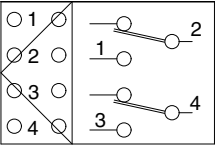
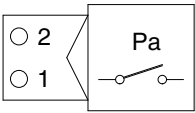
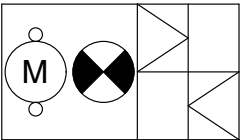
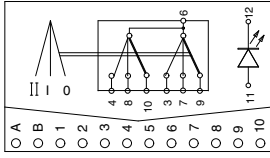
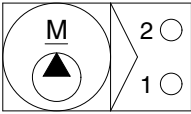
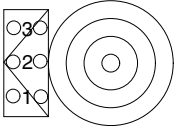
※ The circuit diagram may differ from the equipment, so please check before a repair.

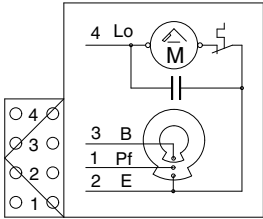
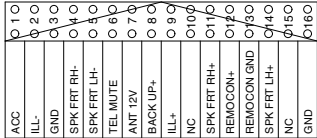
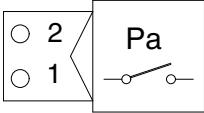
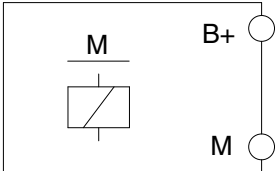
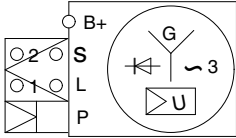
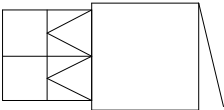
GROUP 4 ELECTRICAL COMPONENT SPECIFICATION

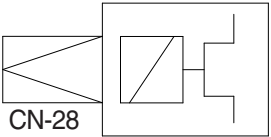
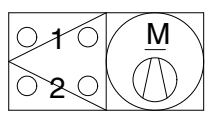
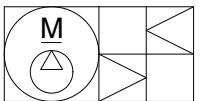
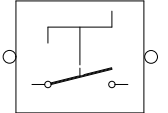
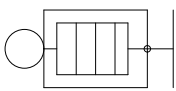
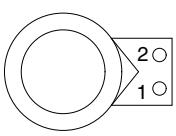
Part name	Symbol	Specification	Check
Battery		12V × 100Ah	※ Check specific gravity 1.280 over : over charged 1.280 ~ 1.250 : normal 1.250 below : recharging
Battery relay	 CR-1	Rated load : 12V 100A (continuity) 1000A (30 second)	※ Check coil resistance Normal : about 12Ω ※ Check contact Normal : ∞Ω
Start key	 CS-2	12V	※ Check contact OFF : ∞Ω(for each terminal) ON : 0Ω(for terminal 1-3 and 1-2) START : 0Ω(for terminal 1-5)
Pressure switch (for engine oil)	 CD-18	0.5 kgf/cm ² (N.C TYPE)	※ Check resistance Normal : 0Ω(CLOSE)
Hydraulic oil temperature sensor	 CD-1	0.5 kgf/cm ² (N.C TYPE)	※ Check resistance 50°C : 804Ω 80°C : 310Ω 100°C : 180Ω

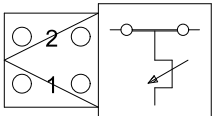
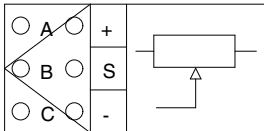
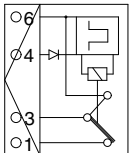
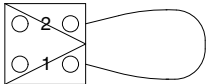
Part name	Symbol	Specification	Check
Air cleaner pressure switch	 CD-10	Pressure: 635mmH ₂ O (N.O TYPE)	※ Check contact Normal : ∞Ω
Fuel sender	 CD-2	-	※ Check resistance Full : 100Ω Low : 500Ω Empty warning : 700Ω
Relay	 CR-2 CR-3 CR-4 CR-5 CR-7 CR-9 CR-12 CR-13 CR-36 CR-45 CR-62 CR-71 CR-80 CR-85	12V 20A	※ Check resistance Normal : about 200Ω (for terminal 85-86) : 0Ω (for terminal 30-87a) : ∞Ω (for terminal 30-87)
Relay	 CR-23 CR-24	12V 70A	※ Rated coil current 1.2±0.3A
Solenoid valve	 CN-66 CN-68 CN-70 CN-121 CN-140	12V 1A	※ Check resistance Normal : 15~25Ω (for terminal 1-2)
Speaker	 CN-23(LH) CN-24(RH)	4Ω 20W	※ Check resistance Normal : 4Ω

Part name	Symbol	Specification	Check
Boom swing switch	 CS-47	12V 16A	※ Check contact Normal OFF - $\infty\Omega$ (for terminal 1-5,2-6) - 0Ω (for terminal 5-7,6-8)
Quick coupler switch	 CS-67	12V 16A	※ Check contact Normal OFF - $\infty\Omega$ (for terminal 1-5,2-6) - 0Ω (for terminal 5-7,6-8)
Work, cab lamp	 CL-5 CL-6 CL-9 CL-10	12V 65W (H3 TYPE)	※ Check disconnection Normal : 1.2Ω
Room lamp	 CL-1	12V 10W	※ Check disconnection Normal : a few Ω
Fuel filler pump	 CN-145	12V 20A 35 l/min	※ Check operation Supply power (for terminal 1) : 12V
Horn	 CN-25	12V	100±5dB

Part name	Symbol	Specification	Check
Safety switch	 CS-4	Micro	※ Check contact Normal : 0Ω(for terminal A-B) : ∞Ω(for terminal A-C) Operating : ∞Ω(for terminal A-B) : 0Ω(for terminal A-C)
Pressure switch	 CD-11 CD-12	10bar (N.C type)	※ Check contact Normal : 0.1Ω
Beacon lamp	 CL-7	12V (Strobe type)	※ Check disconnection Normal : a fewΩ
Wiper switch	 CS-3	12V 16A	※ Check contact Normal : ∞Ω
Washer pump	 CN-22	12V 3.8A	※ Check contact Normal : 3Ω(for terminal 1-2)
Cigar lighter	 CL-2	12V 10A 1.4W	※ Check coil resistance Normal : about 1MΩ ※ Check contact Normal : ∞Ω Operating time : 5~15sec

Part name	Symbol	Specification	Check
Wiper motor	 CN-21	12V 3A	※ Check contact Normal : 6Ω(for terminal 2-6)
Radio & USB player	 CN-27	24V 2A	※ Check voltage 20 ~ 25V (for terminal 1-3, 3-8)
Receiver dryer	 CN-29	12V	※ Check contact Normal : 0Ω
Starter	 CN-45	12V × 3kW	※ Check contact Normal : 0.1Ω
Alternator	 CN-74	12V 100A	※ Check contact Normal : 0Ω(for terminal B ⁺ -1) Normal : 24 ~ 27.5V
Travel buzzer	 CN-81	12V 0.5A	※ Check contact Normal : 5.2Ω

Part name	Symbol	Specification	Check
Compressor	 CN-28	12V 79W	-
Blower fan motor	 CN-83	12V 9.5A	※ Check resistance 2.5Ω(for terminal 1-2)
Fuel feed pump	 CN-61	12V	-
Master switch		12V 1000A	-
Preheater	 CN-80	12V 42A 500W	-
12V socket	 CN-139	12V 120W	-

Part name	Symbol	Specification	Check
Duct sensor		1°C OFF 4°C ON	※ Check resistance Normal : 0Ω (for terminal 1-2) the atmosphere temp : over 4°C
Accel dial	 CN-142	-	※ Check resistance Normal : about 5kΩ (for terminal A-C) ※ Check voltage Normal : about 5V (for terminal A-C) : 2~4.5V (for terminal C-B)
Int wiper relay	 CR-6	12V 12A	-
Fusible link	 CN-60 CN-95	12V, 30A (CN-65) 12V, 60A (CN-95)	-

GROUP 5 CONNECTORS

1. CONNECTOR DESTINATION

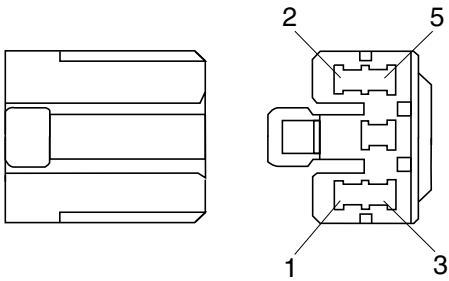
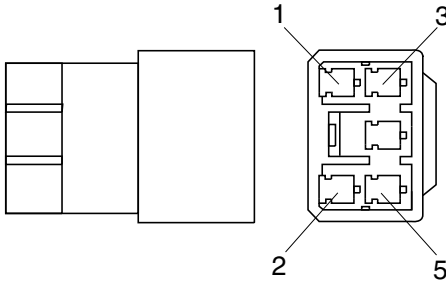
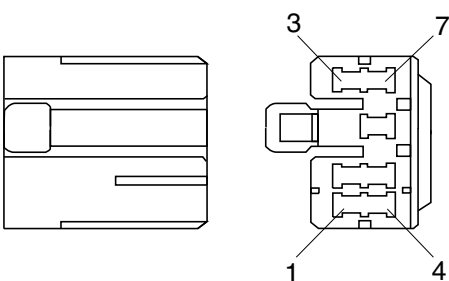
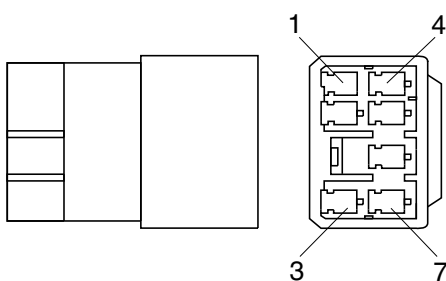
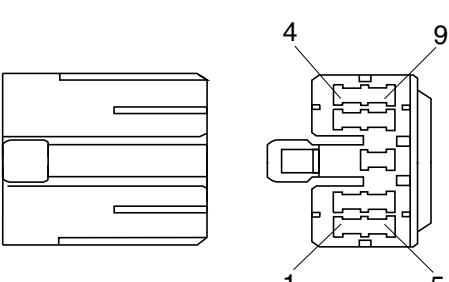
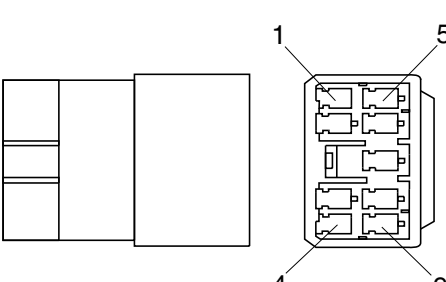
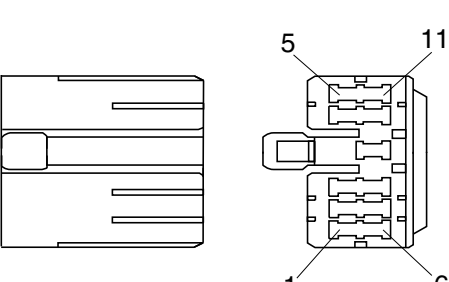
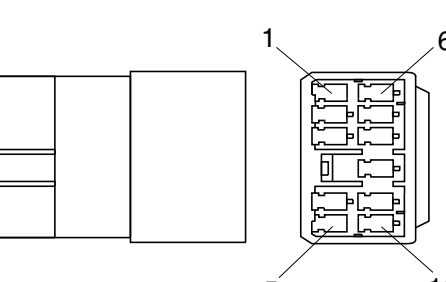
Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-4	AMP	15	Cab room harness - Main harness	-	1743062-2
CN-5	AMP	16	Cab room harness - Main harness	-	368050-1
CN-6	-	15	Cab harness - Cab room lamp harness	2-85262-1	368301-1
CN-7	AMP	16	Main harness - Console harness	368047-1	368050-1
CN-8	AMP	15	Main harness - Cab harness	-	308301-1
CN-11	-	8	Air-con	DT06-8S-EP06	-
CN-12	DEUTSCH	2	Boom lamp	DT06-2S-EP06	-
CN-13	KET	2	Power connector	MG610557-5	-
CN-14	KET	2	Earth connector	MG620558-5	-
CN-15	KET	1	Power connector	MG640944-5	-
CN-16	AMP	6	Emergency throttle	-	174264-2
CN-16B	AMP	6	Emergency throttle	S816-006002	-
CN-22	KET	2	Washer tank	MG640605	-
CN-25	DEUTSCH	2	Horn	DT06-2S-EP06	-
CN-27	-	16	Cassette radio	PK145-16017	-
CN-28	AMP	1	Air conditioner compressor	S810-001202	-
CN-29	KET	2	Receiver dryer	MG640795	-
CN-36	-	-	Fuse box	21MN-55100	-
CN-51	MOLEX	48	MCU	64320-3319	-
CN-52	MOLEX	48	MCU	64320-3311	-
CN-56	AMP	8	Cluster	-	S816-108202
CN-56A	-	8	Cluster	174982	-
CN-61	DEUTSCH	2	Fuel filler pump	DT06-2S-EP06	-
CN-62	MTA	-	Master switch	03-210000	-
CN-62A	DEUTSCH	2	Pattern change solenoid - Cab harness	DT06-2S-EP06	DT04-2P- E005
CN-62B	DEUTSCH	2	Pattern change solenoid - Cab harness	DT06-2S-EP06	DT04-2P- E005
CN-63	MTA	-	Master switch	03-210000	-
CN-66R	DEUTSCH	2	Breaker ready solenoid	DT06-2S-EP06	-
CN-68	DEUTSCH	2	A1 safety solenoid	DT06-2S-EP06	-
CN-70	DEUTSCH	2	A2 Travel solenoid	DT06-2S-EP06	-
CN-74	KET	2	Alternator	MG640188-5	-
CN-80	YAZAKI	1	Pre heater	7323-3010	-
CN-81	DEUTSCH	2	Buzzer	DT06-2S-EP06	-
CN-93A	AMP	94	ECU case	3-1355136-3	-
CN-93B	AMP	60	ECU case	1897635-2	-
CN-95	MTA	-	Fuse holder	03-210000	-

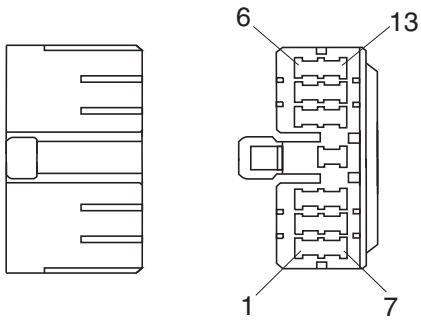
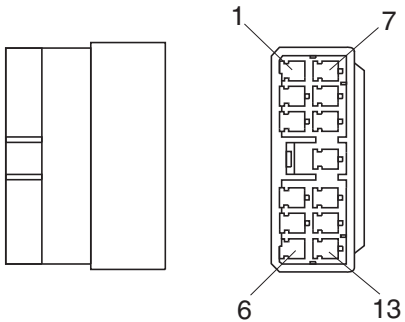
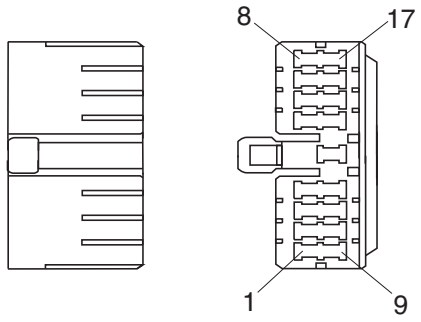
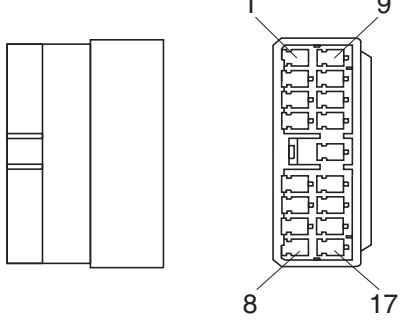
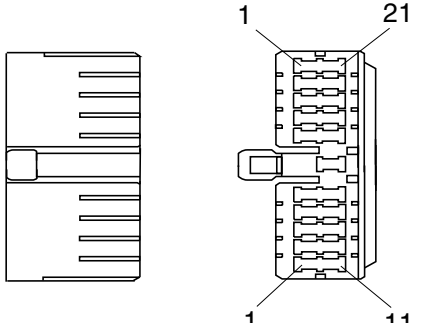
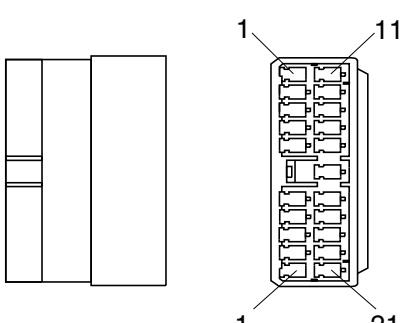
Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-96	MTA	-	Fuse holder	03-210000	-
CN-113	-	2	Buzzer	S810-002202	-
CN-116	-	12	Switch panel	368542-1	-
CN-125A	-	12	RMS	DT06-126-P021	-
CN-126	DEUTSCH	4	RS-232 connector	DT06-4S-EP06	-
CN-139	-	2	Dozer socket	S810-002202	-
CN-140	DEUTSCH	2	Quick coupler solenoid	DT06-2S-ER06	DT04 -2P-E005
CN-142	-	6	Accel dial	DT06-8S-EP06	-
CN-145	YAZAKI	2	Fuel feed pump	7123-6423-30	-
CN-148	DEUTSCH	6	Service tool	DT06-6S-E008	-
CN-170	-	2	Seat heat switch	12052641	-
CN-240C	-	3	LH joystick	DT06-3S	-
CN-241A	-	2	Breaker switch	-	DT04-2P
CN-241B	-	3	Clamp release switch	DT06-3S	-
CN-241C	-	2	Quick coupler switch	-	DT06-2S
CN-249	DEUTSCH	6	Rear camera	DT06-6S	DT04-6P
CN-300A	AMP	6	DPF pressure	1438153-5	-
CN-300B	FCI	2	DPF mid temperature	54200206	-
CN-300C	FCI	2	DPF inlet temperature	54200208	-
CN-301	AMP	8	EGR sensor	776532-1	-
CN-302	AMP	12	EGR sensor	776533-1	-
CN-303	AMP	12	EGR valve	776533-2	-
CN-304	AMP	12	Cab rail	776533-3	-
CN-310	DEUTSCH	2	Release or breaker	DT06-2S-EP06	-
CN-311	DEUTSCH	2	Clamp	DT06-2S-EP06	-
CN-312	DEUTSCH	2	Rotating	DT06-2S-EP06	-
CN-313	DEUTSCH	2	Rotating	DT06-2S-EP06	-
CN-427	MOLEX	4	Smart reader	39012040	-
CN-437	DEUTSCH	2	Float solenoid	DT06-2S-EP06	-
CN-438	DEUTSCH	2	Angle dozer sele ct solenoid	DT06-2S-EP06	DT04-2P-E005
CN-439	DEUTSCH	2	AC mode solenoid	DT06-2S-EP06	-
CN-442A	-	3	Angle dozer switch	-	DT04-3P
CN-442B	-	2	Dozer float switch	DT06-2S	-
CN-442C	-	2	2 speed switch	DT04-2P	-
LAMP					
CL-1	-	2	Room lamp	MG610392	-
CL-2	-	-	Ci		
CL-3	-	2	Cab lamp	DT06-2S-EP06	-
CL-5	-	2	LH work lamp	DT06-2S-EP06	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CL-6	-	2	RH work lamp	DT06-2S-EP06	-
CL-7	-	2	Beacon lamp	DT06-2S-EP06	-
CL-9	-	2	Rear cab lamp	DT06-2S-EP06	-
.RELAY					
CR-1	KET	4	Power relay	MG612017-5	-
CR-2	KET	4	Power relay	MG612017-5	-
CR-23	KET	4	Power relay	MG612017-5	-
CR-24	KET	4	Power relay	MG612017-5	-
.SENDER					
CD-1	AMP	2	Hydraulic temp sender	85202-1	-
CD-2	DEUTSCH	2	Fuel sender	DT06-2S-EP06	-
CD-7	DEUTSCH	3	Load sensing pressure	DT06-3S-EP006	-
CD-10	AMP	2	Air cleaner switch	85202-1	-
CD-11	KET	2	Travel alarm pressure	MG640795	-
CD-18	YAZAKI	1	Engine oil pressure	7123-5014	-
CD-31	DEUTSCH	3	Overload pressure	DT06-3S-EP006	-
CD-32	DEUTSCH	3	Boom up pressure	DT06-3S-EP006	-
DO-1	AMP	2	Starter	S816-002002	-
.SWITCH					
CS-2	-	6	Start key	S814-006000	-
CS-3	CARLING	10	Wiper motor	VC2-01	-
CS-4	-	4	Safety switch	174257-2	-
CS-4A	-	4	Safety switch	174259-2	-
CS-16	AMP	2	Fuel filler pump switch	174352-2	174354-2
CS-26A	-	2	Foot pedal seat belt	S816-002002	S816-102002
CS30	CARLING	10	Wiper masher	VC2-01	-
CS-33	-	6	Emergency stop switch	A816-006002	-
CS-50	-	10	Overload switch	VC2-01	-
CS-67	CARLING	10	Quick coupler	VC2-01	-
CS-76	CARLING	10	Pattern change	VC2-01	-
CS-80	CARLING	10	ECO mode	VC2-01	-
CS-100	CARLING	10	DPF switch	VC2-01	-
CS-113	CARLING	2	AUX	174352-2	174354-2
CS-162	-	2	Foot pedal seat belt	DT06-2S	DT04-2P

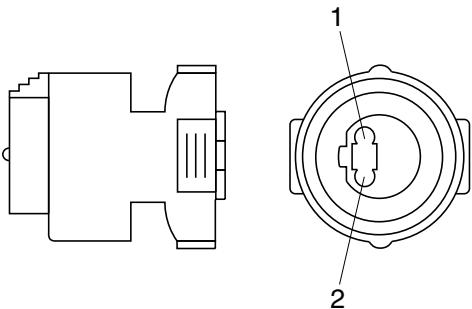
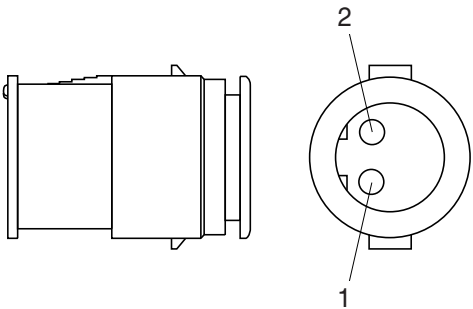
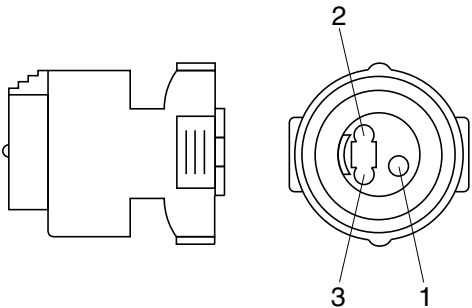
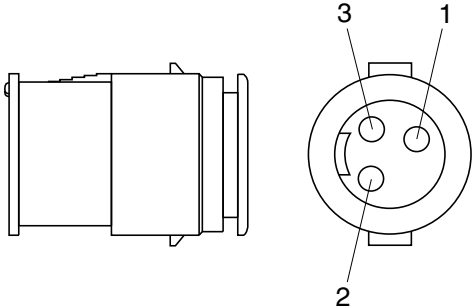
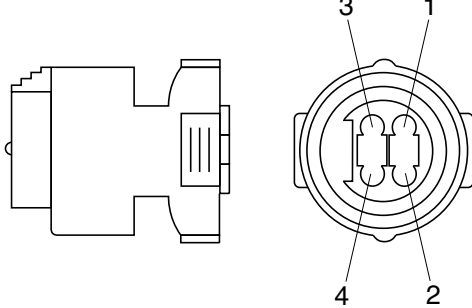
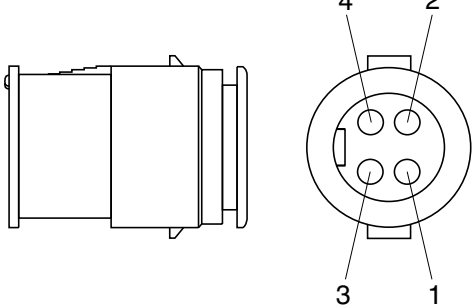
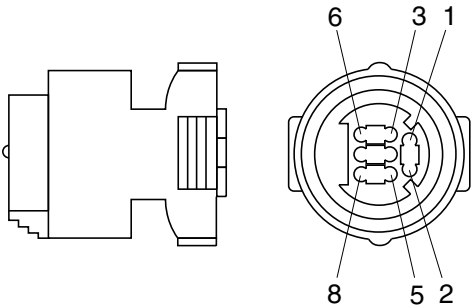
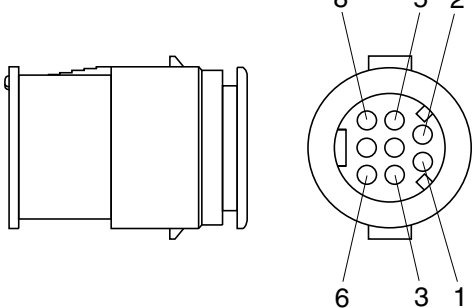
2. CONNECTION TABLE FOR CONNECTORS

1) PA TYPE CONNECTOR

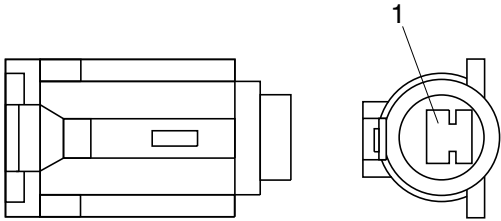
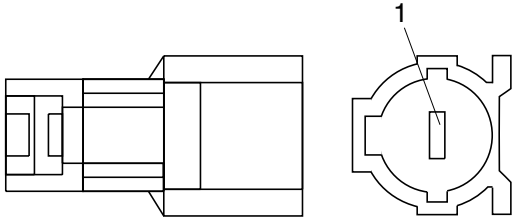
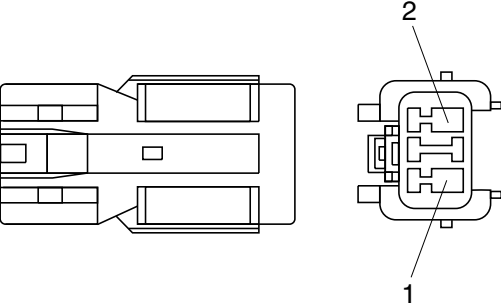
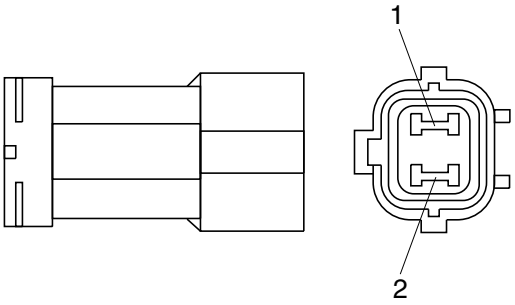
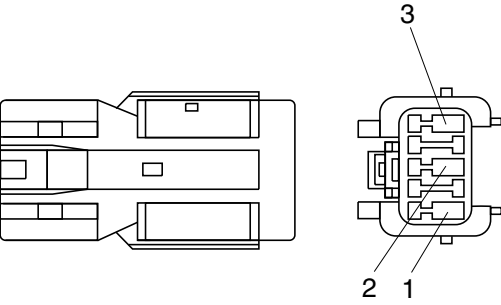
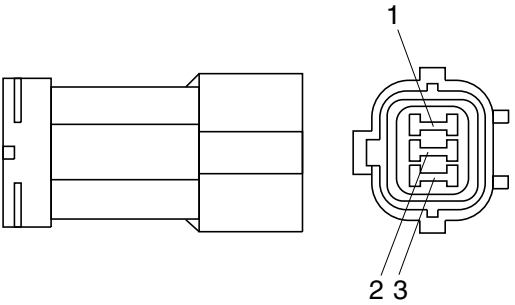
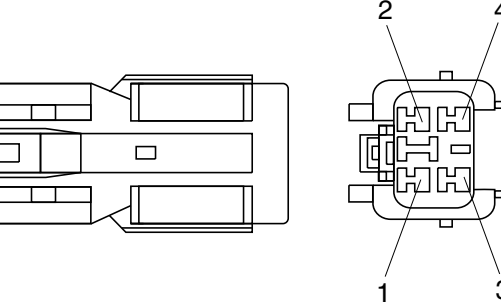
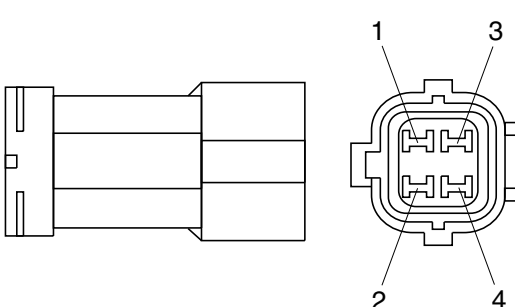
No. of pin	Receptacle connector (female)	Plug connector (male)
5	 S811-005002	 S811-105002
7	 S811-007002	 S811-107002
9	 S811-009002	 S811-109002
11	 S811-011002	 S811-111002

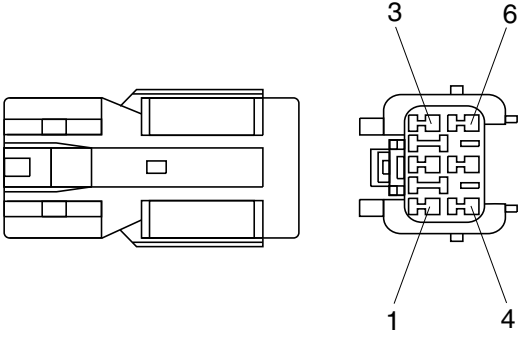
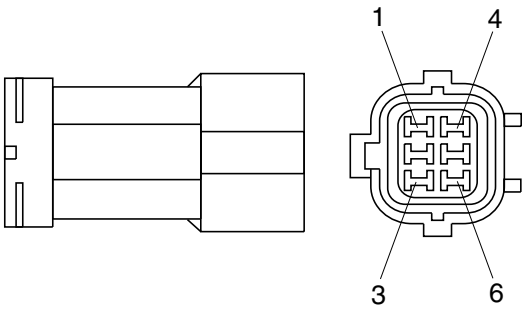
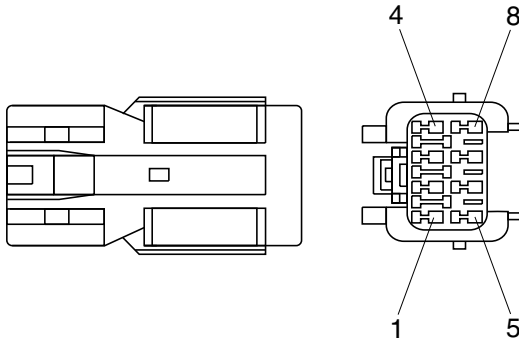
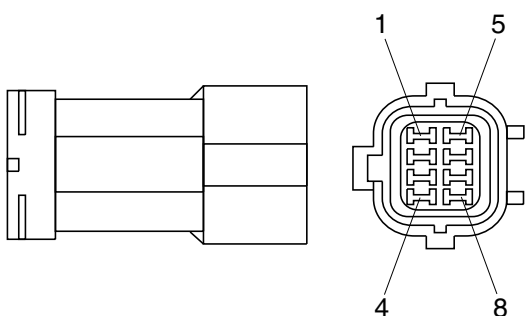
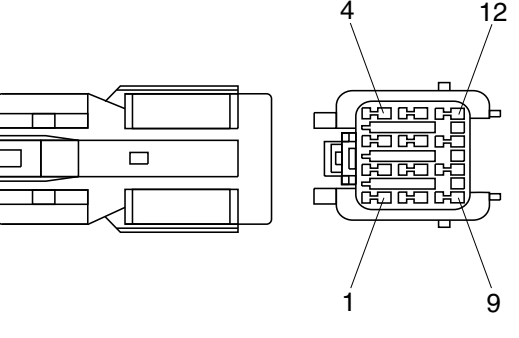
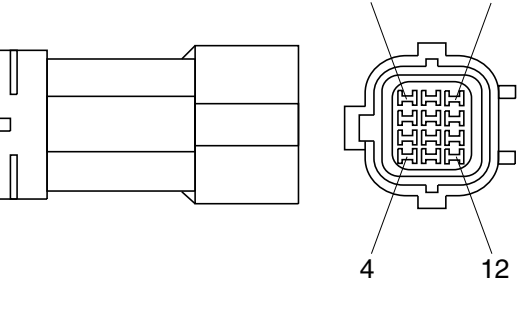
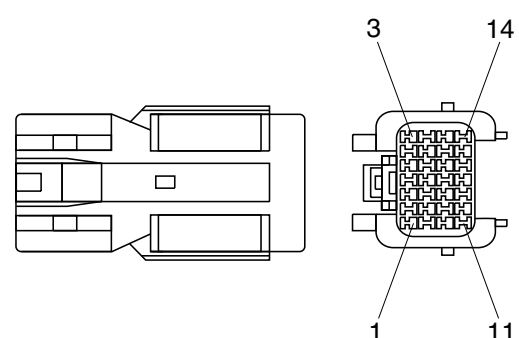
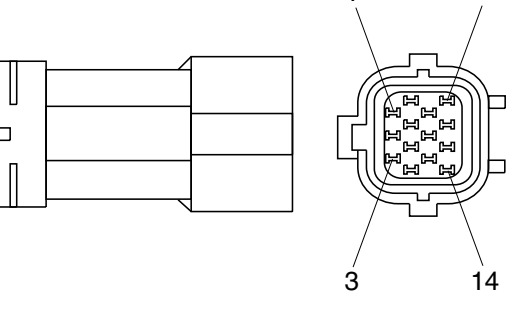
No. of pin	Receptacle connector (female)	Plug connector (male)
13	 S811-013002	 S811-113002
17	 S811-017002	 S811-117002
21	 S811-021002	 S811-121002

2) J TYPE CONNECTOR

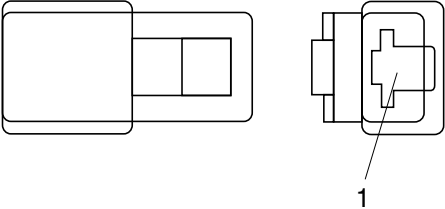
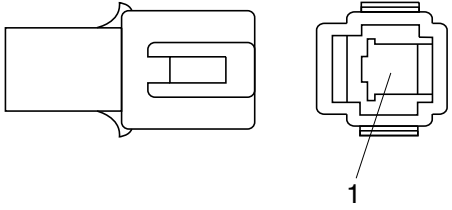
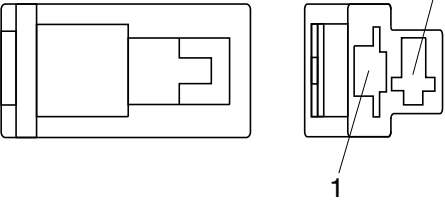
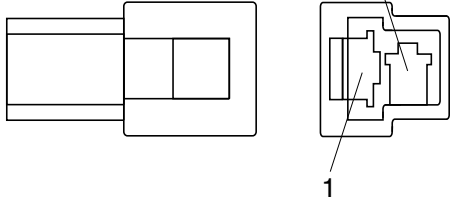
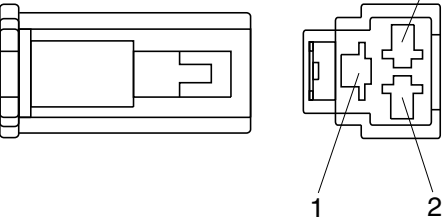
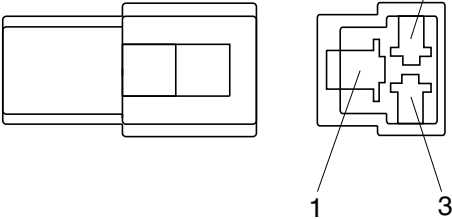
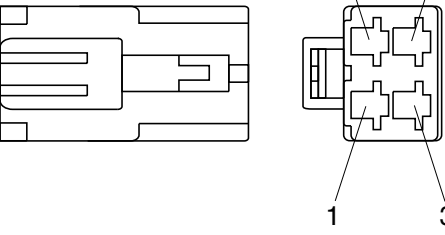
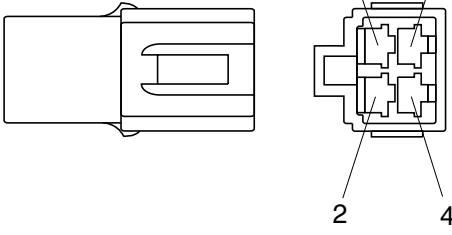
No. of pin	Receptacle connector (female)	Plug connector (male)
2	 S816-002001	 S816-102001
3	 S816-003001	 S816-103001
4	 S816-004001	 S816-104001
8	 S816-008001	 S816-108001

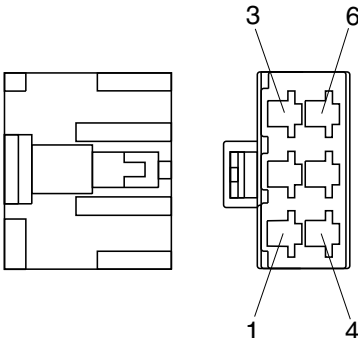
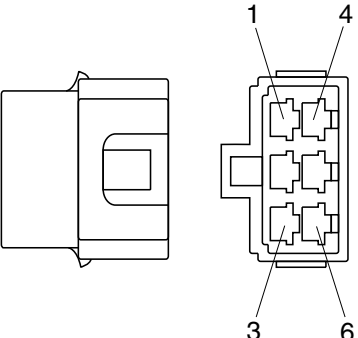
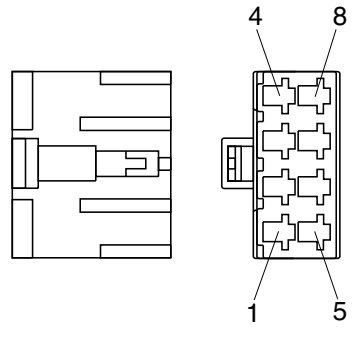
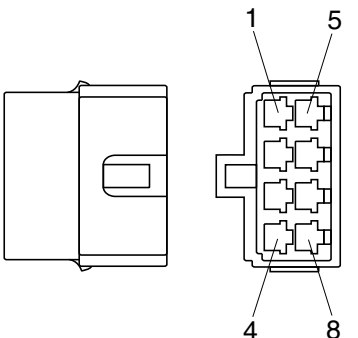
3) SWP TYPE CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
1	 S814-001000	 S814-101000
2	 S814-002000	 S814-102000
3	 S814-003000	 S814-103000
4	 S814-004000	 S814-104000

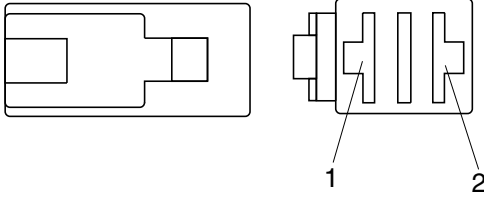
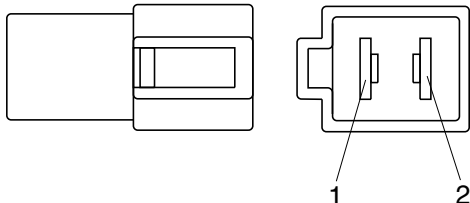
No. of pin	Receptacle connector (female)	Plug connector (male)
6	 S814-006000	 S814-106000
8	 S814-008000	 S814-108000
12	 S814-012000	 S814-112000
14	 S814-014000	 S814-114000

4) CN TYPE CONNECTOR

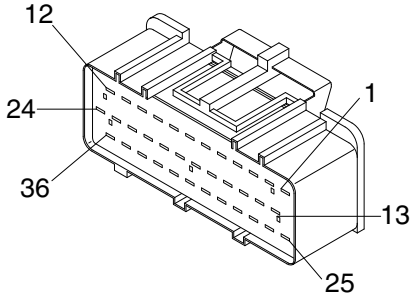
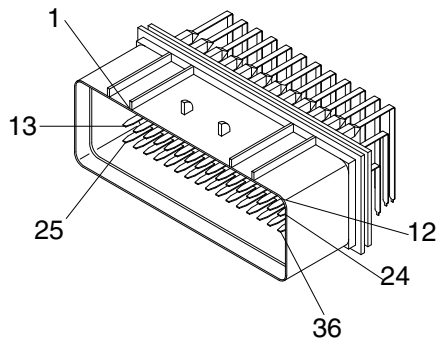
No. of pin	Receptacle connector (female)	Plug connector (male)
1	 S810-001202	 S810-101202
2	 S810-002202	 S810-102202
3	 S810-003202	 S810-103202
4	 S810-004202	 S810-104202

No. of pin	Receptacle connector (female)	Plug connector (male)
6	 S810-006202	 S810-106202
8	 S810-008202	 S810-108202

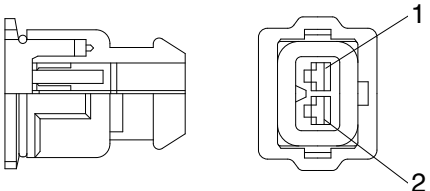
5) 375 FASTEN TYPE CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
2	 S810-002402	 S810-102402

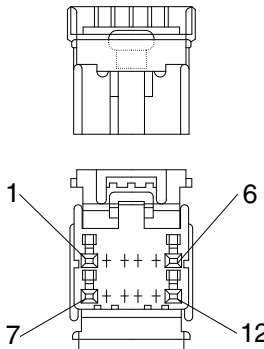
6) AMP ECONOSEAL CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
36	 344111-1	 344108-1

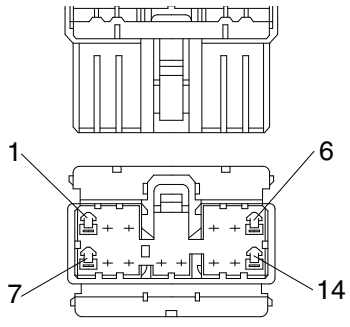
7) AMP TIMER CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
2	 85202-1	

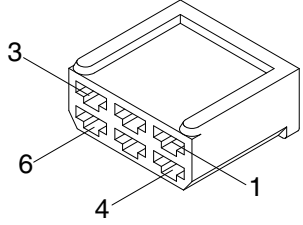
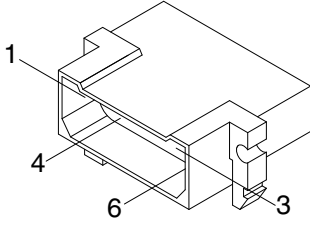
8) AMP 040 MULTILOCK CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
12	 174045-2	

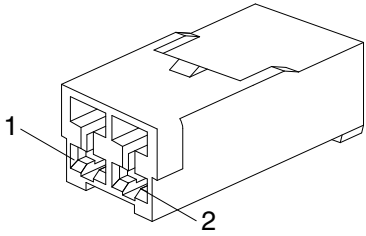
9) AMP 070 MULTILOCK CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
14	 173852	

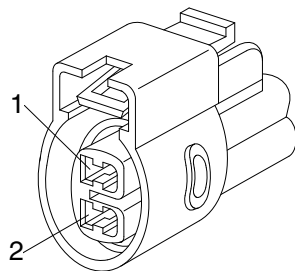
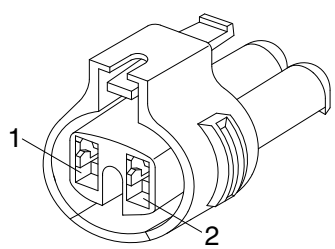
10) AMP FASTIN - FASTON CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
6	 925276-0	 480003-9

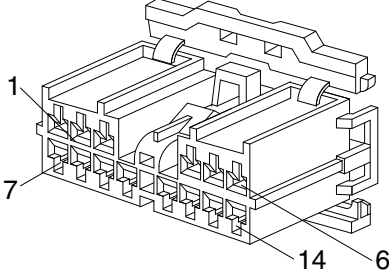
11) KET 090 CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
6	 MG610070	

12) KET 090 WP CONNECTORS

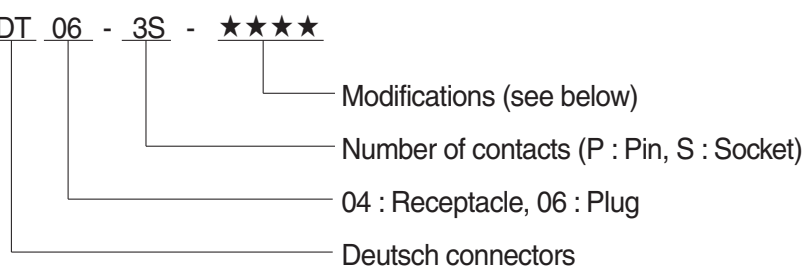
No. of pin	Receptacle connector (female)	Plug connector (male)
2	 MG640605	
2	 MG640795	

13) KET SDL CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
14	 MG610406	

14) DEUTSCH DT CONNECTORS

DT 06 - 3S - ★★☆☆



※ Modification

E003 : Standard end cap - gray

E004 : Color of connector to be black

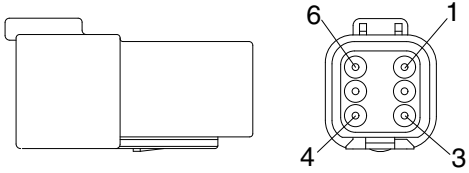
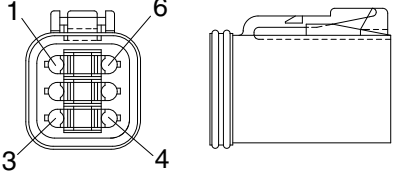
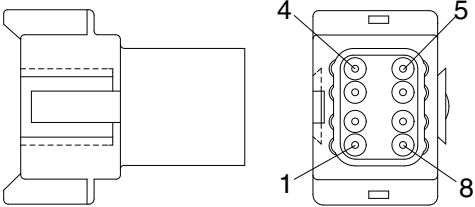
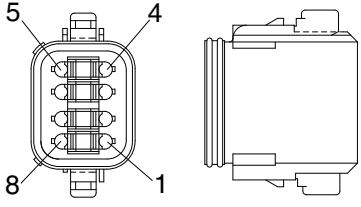
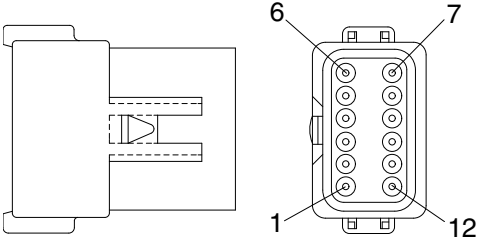
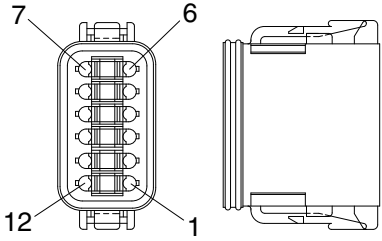
E005 : Combination - E004 & E003

EP04 : End cap

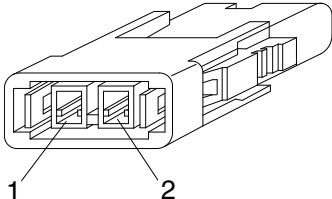
EP06 : Combination P012 & EP04

P012 : Front seal enhancement - connectors color to black for 2, 3, 4 & 6pin

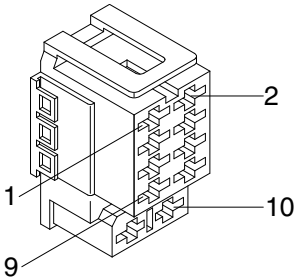
No. of pin	Receptacle connector (female)	Plug connector (male)
2	DT06-2S	DT06-2P
3	DT06-3S	DT06-3P
4	DT06-4S	DT06-4P

No. of pin	Receptacle connector (female)	Plug connector (male)
6	 DT06-6S	 DT06-6P
8	 DT06-8S	 DT06-8P
12	 DT06-12S	 DT06-12P

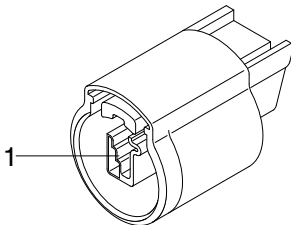
15) MOLEX 2CKTS CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
2	 35215-0200	

16) ITT SWF CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
10	 SWF593757	

17) MWP NMWP CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
1	 NMWP01F-B	

GROUP 6 FAULT CODES

1. MACHINE FAULT CODE

Fault code		Description
HCESPN	FMI	
101	3	Hydraulic oil temperature sensor circuit - voltage above normal or shorted to high source (or open circuit)
	4	Hydraulic oil temperature sensor circuit - voltage below normal or shorted to low source
105	0	Working pressure sensor data above normal range (or open circuit)
	1	Working pressure sensor data below normal range
	2	Working pressure sensor data error
	4	Working pressure sensor circuit - voltage below normal, or shorted to low source
108	0	Travel oil pressure sensor data above normal range (or open circuit)
	1	Travel oil pressure sensor data below normal range
	2	Travel oil pressure sensor data error
	4	Travel oil pressure sensor circuit - voltage below normal or shorted to low source
122	0	Overload pressure sensor data above normal range (or open circuit)
	1	Overload pressure sensor data below normal range
	2	Overload pressure sensor data error
	3	Overload pressure sensor circuit - voltage below normal or shorted to low source
301	3	Fuel level sensor circuit - voltage above normal or shorted to high source (or open circuit)
	4	Fuel level sensor circuit - voltage below normal or shorted to low source
503	0	Brake pressure sensor data above normal range (or open circuit)
	1	Brake pressure sensor data below normal range
	2	Brake pressure sensor data error
	4	Brake pressure sensor data - voltage below normal or shorted to low source
505	0	Working brake pressure sensor data above normal range (or open circuit)
	1	Working brake pressure sensor data below normal range
	2	Working brake pressure sensor data error
	4	Working brake pressure sensor circuit - voltage below normal, or shorted to low source
530	0	Travel fwd pilot pressure sensor data above normal range (or open circuit)
	1	Travel fwd pilot pressure sensor data below normal range
	2	Travel fwd pilot pressure sensor data error
	4	Travel fwd pilot pressure sensor circuit - voltage below normal, or shorted to low source
	14	Travel fwd pilot pressure sensor circuit - special instructions
	16	Travel fwd pilot pressure sensor circuit - voltage valid but above normal operational range
701	4	Hour meter circuit - voltage below normal, or shorted to low source
705	0	MCU input voltage high
	1	MCU input voltage low
707	1	Alternator node I voltage low (or open circuit)
714	3	Acc. dial circuit - voltage above normal, or shorted to high source (or open circuit)
	4	Acc. dial circuit - voltage below normal, or shorted to low source
840	2	Cluster communication data error
841	2	ECM communication data error

2. ENGINE FAULT CODE

Fault code		Description	
YANMAR SPN	FMI	Area	Status
522400	2	Crankshaft speed sensor	Crankshaft signal error
	5		No signal from crankshaft
522401	2	Camshaft speed sensor	Camshaft signal error
	5		No signal from camshaft
	7		Angle offset error
523249	5	Crankshaft speed sensor, Camshaft speed sensor	Crankshaft/camshaft, speed sensor non-input (simultaneous)
91	3	Accelerator sensor 1	Accelerator sensor 1 error (voltage high)
	4		Accelerator sensor 1 error (voltage low)
28	3	Accelerator sensor 2	Accelerator sensor 2 error (voltage high)
	4		Accelerator sensor 2 error (voltage low)
522624	7	Accelerator sensor 1 + 2	Dual accelerator sensor error (closed position)
522623	7		Dual accelerator sensor error (open position)
29	3	Accelerator sensor 3	Accelerator sensor 3 error (voltage high)
	4		Accelerator sensor 3 error (voltage low)
	8	Pulse sensor	Pulse accelerator sensor error (pulse communication)
28	0	Accelerator sensor 3	Accelerator sensor 3 error (foot pedal in open position)
	1		Accelerator sensor 3 error (foot pedal in closed position)
51	3	Intake throttle position sensor	Intake throttle position sensor error (voltage high)
	4		Intake throttle position sensor error (voltage low)
102	3	EGR low pressure side pressure sensor	ERG low pressure side pressure sensor error (excessive sensor output)
	4		ERG low pressure side pressure sensor error (insufficient sensor output)
	13		ERG low pressure side pressure sensor error (abnormal learning value)
	10		ERG low pressure side pressure sensor error (detected value error)
1209	3	EGR pressure sensor (high-pressure side)	ERG high pressure side pressure sensor error (excessive sensor output)
	4		ERG high pressure side pressure sensor error (insufficient sensor output)
	13		ERG high pressure side pressure sensor error (abnormal learning value)
	10		ERG high pressure side pressure sensor error (detected value error)
110	3	Engine coolant temperature sensor	Engine coolant temperature sensor error (excessive sensor output)
	4		Engine coolant temperature sensor error (insufficient sensor output)
	10		Engine coolant temperature sensor error (detected value error)
	0		Engine coolant temperature high (overheat)
172	3	Ambient air temperature sensor	Ambient air temperature sensor error (voltage high)
	4		Ambient air temperature sensor error (voltage low)

Fault code		Description	
YANMAR SPN	FMI	Area	Status
174	3	Fuel temperature sensor	Fuel temperature sensor error (voltage high)
	4		Fuel temperature sensor error (voltage low)
	0		Fuel temperature high
157	3	Rail pressure sensor	Rail pressure sensor error (voltage high)
	4		Rail pressure sensor error (voltage low)
3251	3	DPF differential pressure sensor	DPF differential pressure sensor error (excessive sensor output)
	4		DPF differential pressure sensor abnormal rise in differential pressure
	0		DPF differential pressure sensor error abnormal rise in differential pressure
	13		DPF differential pressure sensor error (abnormal learning value)
4795	31	DPF substrate/DPF differential pressure sensor	DPF substrate/DPF differential pressure sensor error (DPF substrate removal/DPF differential pressure sensor detected value error)
3609	3	DPF high pressure side pressure sensor	DPF high pressure side pressure sensor error (excessive sensor output)
	4		DPF high pressure side pressure sensor error (insufficient sensor output)
	10		DPF high pressure side pressure sensor error (detected value error)
3242	3	DPF intermediated temperature sensor	DPF inlet temperature sensor error (excessive sensor output)
	4		DPF inlet temperature sensor error (insufficient sensor output)
	10		DPF inlet temperature sensor error (detected value error)
	0		DPF inlet temperature sensor abnormal temperature (abnormally high)
3250	3	DPF intermediate temperature sensor	DPF intermediate temperature sensor error (excessive sensor output)
	4		DPF intermediate temperature sensor error (insufficient sensor output)
	10		DPF intermediate temperature sensor error (detected value error)
	1		DPF intermediate temperature sensor abnormal temperature (abnormally low)
108	3	Atmospheric pressure sensor	Atmospheric pressure sensor error (excessive sensor output)
	4		Atmospheric pressure sensor error (insufficient sensor output)
	10		Atmospheric pressure sensor error (characteristic error)
173	3	Exhaust manifold temperature sensor	Exhaust manifold temperature sensor error (excessive sensor output)
	4		Exhaust manifold temperature sensor error (insufficient sensor output)
	10		Exhaust manifold temperature sensor error (detected value error)
1485	7	Main relay	Main relay contact sticking
	2		Main relay early opening

Fault code		Description	
YANMAR SPN	FMI	Area	Status
522243	5	Starting aid relay	Starting aid relay disconnection
	6		Starting aid relay relay GND short circuit
654	5	Injector (No.1 cylinder)	Disconnection (injector-specific)
	6		Coil short circuit
	3		Short circuit
653	5	Injector (No.2 cylinder)	Disconnection (injector-specific)
	6		Coil short circuit
	3		Short circuit
652	5	Injector (No.3 cylinder)	Disconnection (injector-specific)
	11		Coil short circuit
	3		Short circuit
651	5	Injector (No.4 cylinder)	Disconnection (injector-specific)
	6		Coil short circuit
	3		Short circuit
4257	12	All injectors	Injector drive IC error
2797	6		Injector drive circuit (Bank1) short circuit (4TN: common circuit for No.1, No4 and all 3TN cylinders)
2798	6		Injector drive circuit (Bank2) short circuit (4TN: circuit for No.2 and 3 cylinders)
523462	13	Injector (correction value)	Inujector (No.1 cylinder) correction value error
523463	13		Inujector (No.2 cylinder) correction value error
523464	13		Inujector (No.3 cylinder) correction value error
522465	13		Inujector (No.4 cylinder) correction value error
522571	3	SCV (MPROP)	SCV (MPROP) L side VB short circuit
	6		SCV (MPROP) L side GND short circuit
633	3		SCV (MPROP) H side VB short circuit
	6		SCV (MPROP) H side GND short circuit
	5		SCV (MPROP) disconnection
522572	6		SCV (MPROP) drive current (high level)
	11		SCV (MPROP) pump overload error
157	0	Rail pressure error	Rail pressure too high
	18		Rail pressure deviation error (low rail pressure)
	15		Rail pressure deviation error (high rail pressure)
	16	PLV (common rail pressure limit valve)	PLV open valve
523469	0		Rail pressure fault (The times of PLV valve opening error)
523470	0		Rail pressure fault (The time of PLV valve opening error)
523489	0		Rail pressure fault (The actual rail pressure is too high during PRV limp home)
523498	9		Rail pressure fault (controlled rail pressure error after PLV valve opening)
523491	0	Rail pressure control	Rail pressure fault (injector B/F temperature error during PLV4 limp home)
523460	7		Rail pressure fault (operation time error during RPS limp home)

Fault code		Description	
YANMAR SPN	FMI	Area	Status
190	16	Overspeed	Overspeed
2950	5	Intake throttle drive circuit	No-load of throttle valve drive H bridge circuit
	3		Power short circuit of throttle valve drive H bridge output 1
	4		GND short circuit of throttle valve drive H bridge output 1
	6		Overload on the drive H bridge circuit of throttle valve
2951	3		VB power short circuit of throttle valve drive H bridge output 2
	4		GND short circuit of throttle valve drive H bridge output 1
2950	7		Throttle valve sticking (sticking open)
2951	7		Throttle valves sticking (sticking closed)
522596	9	CAN 2	TSC1 (SA1) reception timeout
522597	9		TSC1 (SA2) reception timeout
522599	9		Y_ECR1 reception timeout
522600	9		Y_EC reception timeout
522601	9		Y_RSS reception timeout
237	31		VI_ reception timeout
	13		VI_ reception data error
522609	9		Y_ETCP1 reception timeout
522618	9		EBC1 reception timeout
522619	9		Y_DPFIF reception timeout
522730	12		Immobilizer error (CAN communication)
1202	2		Immobilizer error (system)
522610	9	CAN 1	CAN 1 (for EGR): reception timeout from the EGR valve
522611	9		CAN 1 (for exhaust throttle): reception timeout
2791	0	EGR valve	EGR overvoltage error
	1		EGR low voltage error
	7		EGR feedback error
	9		EGR ECM data error
	12		Disconnection in EGR motor coils
522579	12		Short circuit in EGR motor coils
522580	12		EGR position sensor error
522581	7		EGR valve sticking error
522183	7		EGR initialization error
522184	1		EGR high temperature thermistor error
522617	1		EGR low temperature thermistor error
522746	12		EGR target value out of range
522747	12	Exhaust throttle	Exhaust throttle (voltage fault)
522748	12		Exhaust throttle (motor fault)
522749	12		Exhaust throttle (sensor system fault)
	12		Exhaust throttle (MPU fault)
522750	12		Exhaust throttle (PCB fault)
522751	19		Exhaust throttle (CAN fault)

Fault code		Description	
YANMAR SPN	FMI	Area	Status
630	12	EEPROM	EEPROM memory deletion error
522576	12		EEPROM memory reading error
522578	12		EEPROM memory writing error
522585	12	ECU internal fault	CY 146 SPI communication fault
522588	12		Excessive voltage of supply 1
522589	12		Insufficient voltage of supply 1
522590	12		Sensor supply voltage error 1
522591	12		Sensor supply voltage error 2
522592	12		Sensor supply voltage error 3
522744	4		Actuator drive circuit 1 short to ground
522994	4		Actuator drive circuit 2 short to ground
523471	6		Actuator drive circuit 3 short to ground
523473	12		AD converter fault 1
523474	12		AD converter fault 2
523475	12		External monitoring IC and CPU fault 1
523476	12		External monitoring IC and CPU fault 2
523477	12		ROM fault
523478	12		Shutoff path fault 1
523479	12		Shutoff path fault 2
523480	12		Shutoff path fault 3
523481	12		Shutoff path fault 4
523482	12		Shutoff path fault 5
523483	12		Shutoff path fault 6
523484	12		Shutoff path fault 7
523485	12		Shutoff path fault 8
523486	12		Shutoff path fault 9
523487	12		Shutoff path fault 10
523488	0		Recognition error of engine speed
3059	5	Breather heater (optional parts for 4TNV86CT and 4TNV98CT)	Breather heater disconnection
	4		Breather heater short circuit (GND)
	3		Breather heater short circuit (VB)
522323	0	Air cleaner switch	Air cleaner clogged alarm
522329	0	Water separator switch	Water separator alarm
167	5	Charge switch	Charge switch disconnection
	1		Charge alarm
100	4	Oil pressure switch	Oil pressure switch disconnection
	1		Low oil pressure alarm
522573	0	DPF	Excessive PM accumulation (method C)
522574	0		Excessive PM accumulation (method P)
522575	7		Regeneration failure (stationary regeneration failure)
522577	11		Regeneration failure (stationary regeneration not performed)
3250	0	DPF intermediate temperature sensor	DPF intermediate temperature sensor abnormal rise in temperature (post-injection malfunction)

Fault code		Description	
YANMAR SPN	FMI	Area	Status
3720	16	DPF OP interface	Ash cleaning request 1
	0		Ash cleaning request 2
3719	16		Stationary regeneration standby
	0		Backup mode
3695	14		Reset regeneration is inhibited
3719	9		Regeneration failure (recovery regeneration failure)
	7		Recovery regeneration is inhibited