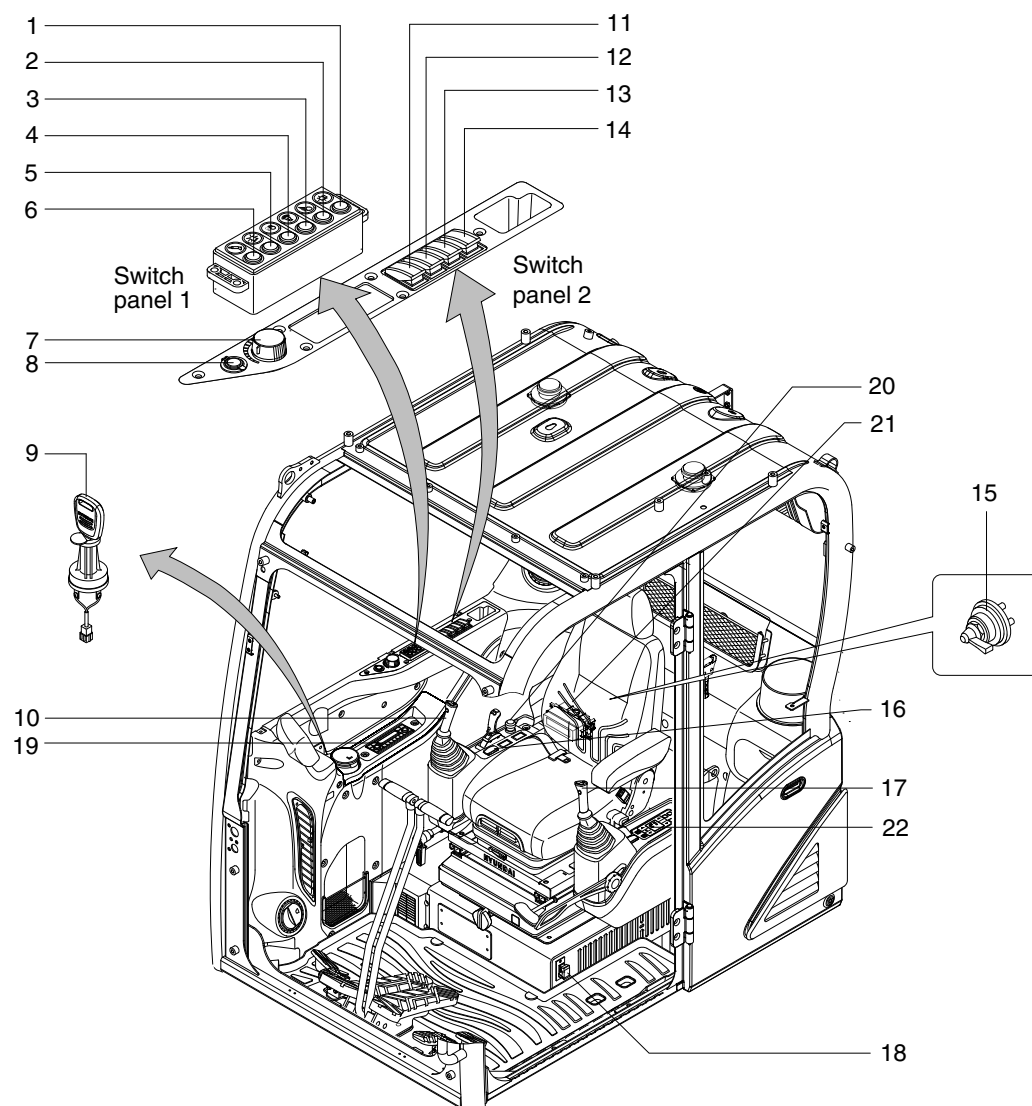


SECTION 4 ELECTRICAL SYSTEM

Group 1 Component Location	4-1
Group 2 Monitoring system	4-3
Group 3 Electrical Circuit	4-33
Group 4 Electrical Component Specification	4-51
Group 5 Connectors	4-59
Group 6 Fault codes	4-77

GROUP 1 COMPONENT LOCATION

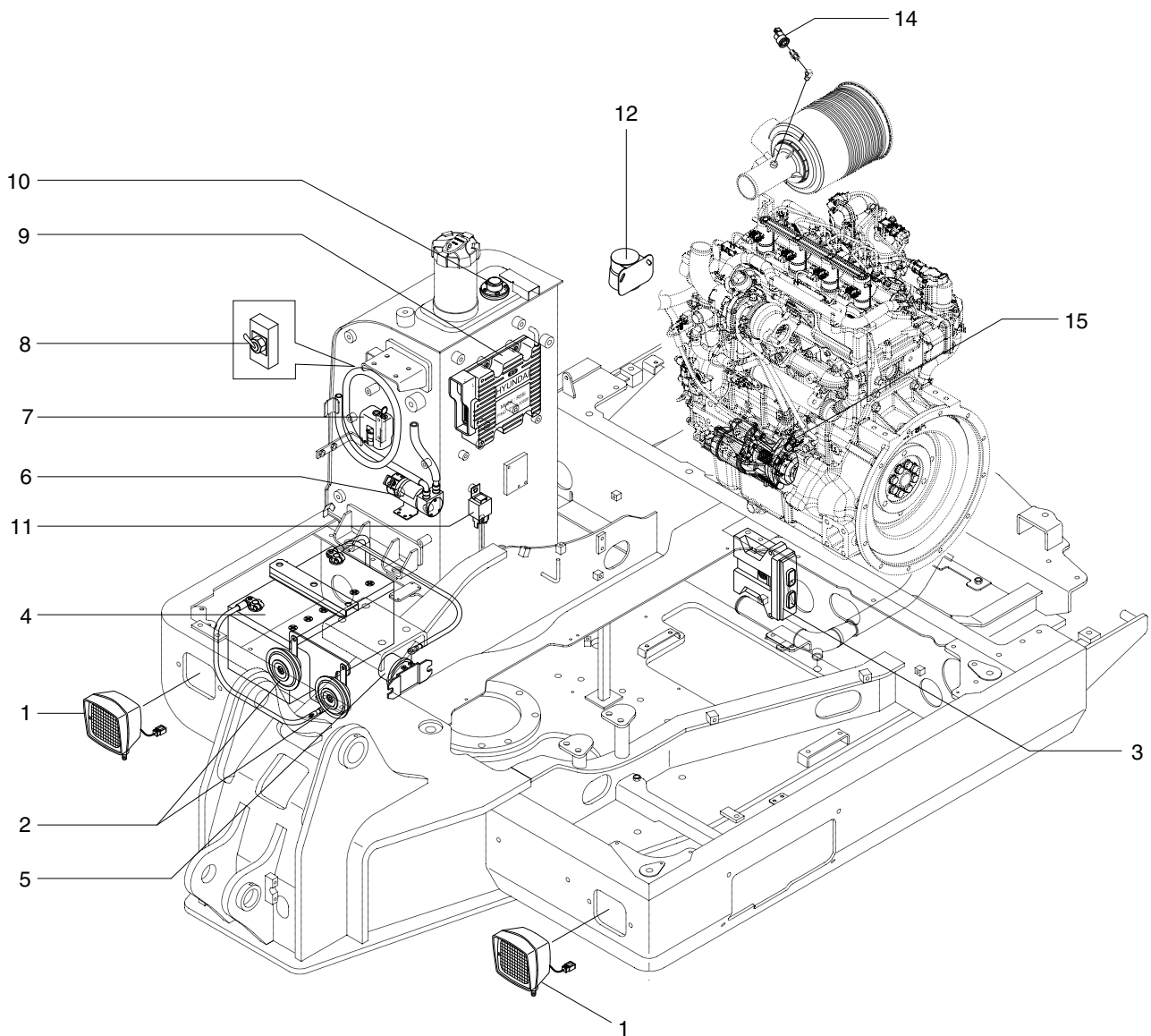
1. LOCATION 1



60A4EL01

- | | | |
|----------------------------------|--------------------------------|-------------------------------|
| 1 Head light switch | 9 Start switch | 17 Switches on LH RCV lever |
| 2 Work light switch | 10 Switches on RH RCV lever | 18 Emergency stop switch |
| 3 Travel alarm switch | 11 Pattern change switch (opt) | 19 Radio and USB player |
| 4 Cab light switch | 12 Wiper switch | 20 12V socket |
| 5 Beacon switch (opt) | 13 Washer switch | 21 Fuse box |
| 6 Breaker selection switch (opt) | 14 Overload switch (opt) | 22 Aircon & heater controller |
| 7 Accel dial | 15 Master switch | |
| 8 USB socket | 16 Quick coupler switch | |

2. LOCATION 2



60A4EL02

- | | | |
|------------------|-----------------------------|------------------------|
| 1 Work lamp | 6 Fuel filler pump | 11 Power relay |
| 2 Horn | 7 Washer tank assy | 12 Travel alarm buzzer |
| 3 PVG controller | 8 Filler pump toggle switch | 14 Air cleaner switch |
| 4 Battery | 9 MCU | 15 Alternator |
| 5 Battery relay | 10 Fuel sender | |

GROUP 2 MONITORING SYSTEM

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.

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.**



60A4CD10

- ※ **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

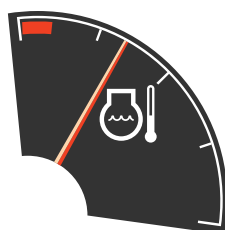
When you first turn starting switch ON, the operation screen will appear.



HX60A3CD101A

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

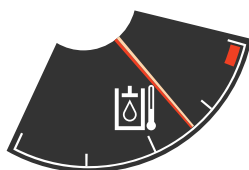
(2) Engine coolant temperature gauge



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.

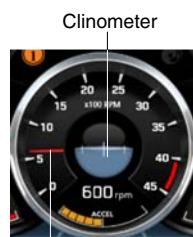
(4) Fuel level gauge



HX60A3CD55A

- ① This gauge indicates the amount of fuel in the fuel tank.
 - Black range : 9% or more
 - Red range : below 9%
- 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



60A3CD11

※ 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 4-14 for the switch.

(1) Engine coolant temperature warning lamp



290F3CD61

- ① The warning light is turned ON and buzzer is sounded when the engine coolant temperature is overheated.
- ② The engine speed is also decreased unless the coolant temperature is reduced again. Here, do not turn OFF the engine. When the engine is turned OFF, the coolant temperature is overheated even more to cause engine rattle due to the surge.

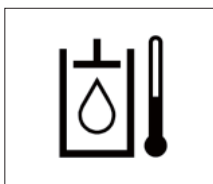
※ Check the temperature gauge of the engine coolant. The coolant is overheated when the gauge in the red range. Here, the coolant temperature warning lamp is turned ON, and the engine speed is decreased automatically.

The engine performs "low-speed idle" run until the gauge is returned to the black range. Even when the gauge returns to the black range, do not turn OFF the engine, and perform idle run additionally for 3~5 min. Ignoring this may cause surge from the heat to result in damage to the engine.

The reason for idle run of the engine is to disperse the overheated heat slowly to reduce the temperature.

After proper measures are finished check the coolant level again, and inspect whether the fan belt is loose, and whether there are any foreign substances around the radiator. When the coolant temperature returns to normal temperature, the engine speed is restored to normal speed again.

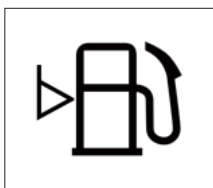
(2) Hydraulic oil temperature warning lamp



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 fuel level is below 9%.
- ② Fill the fuel immediately after 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. 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 warning lamp lights up when the engine oil pressure is low.
- ② If the lamp lights up, shut off the engine immediately. Check oil level.
- ※ **Serious damage can be caused to the engine when the engine is operated continuously while the warning lamp is turned ON.**

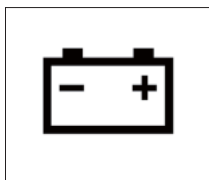
(6) Check engine warning lamp



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.**

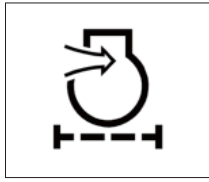
(7) Battery charging warning lamp



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.

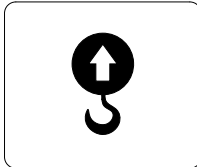
(8) Air cleaner warning lamp



290F3CD68

- ① This warning lamp lights up when the air cleaner is clogged.
- ② Check, clean or replace filter.

(9) Overload warning lamp (opt)



21093CD36

- 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) 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.**

(11) 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 fuel prefilter.

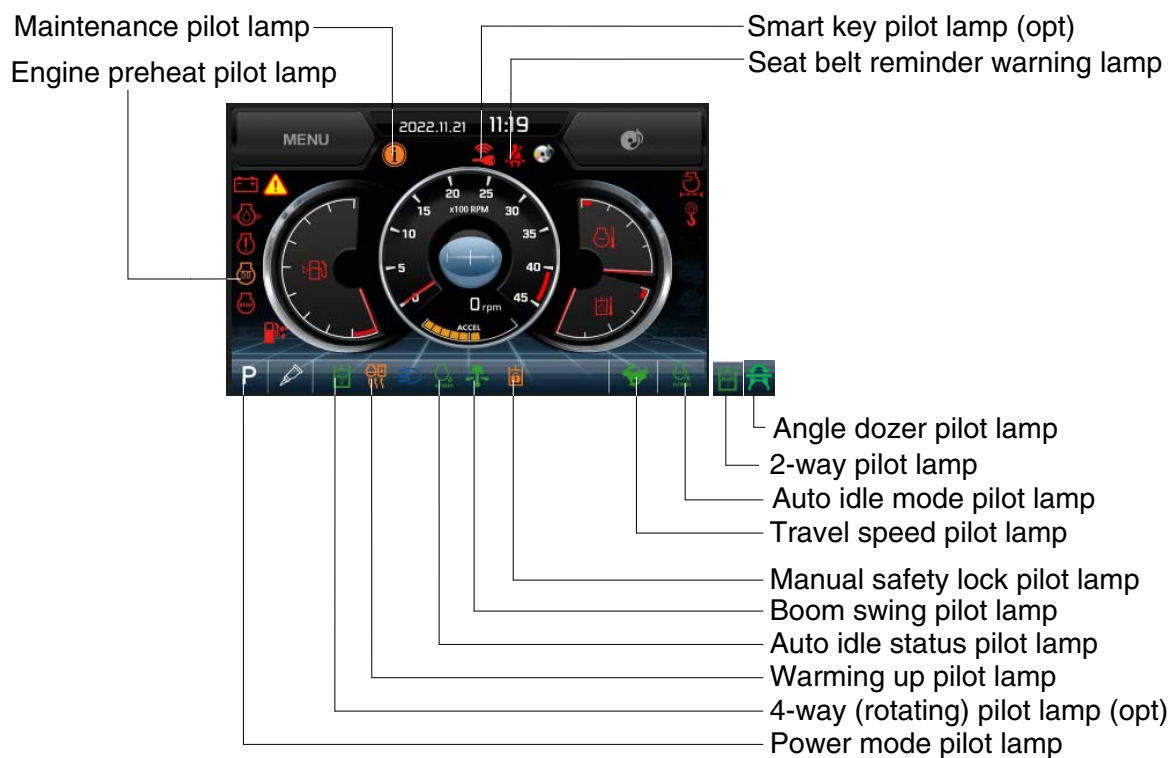
(12) Seat belt reminder warning lamp



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



60A3CD12

(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

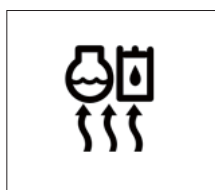
(2) Preheat pilot lamp



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.

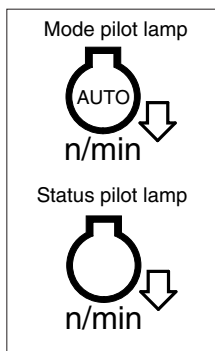
(3) Warming up pilot lamp



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.

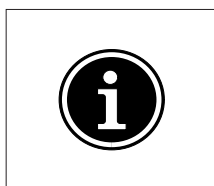
(4) Auto idle status/ mode pilot lamp



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

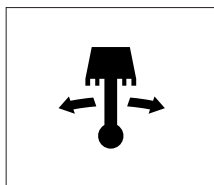


HX60A3CD116

- 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 4-15.

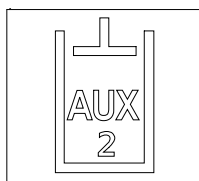
(6) Boom swing pilot lamp



HX603CD82

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

(7) 4-way (rotating) pilot lamp (opt)

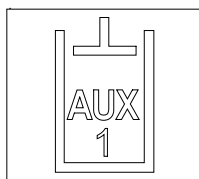


HW60A3CD48A

- ① This lamp lights up when the boom swing selection switch is set to the rotator (not used boom swing) and the 4-way operation switch on the LH control lever is pressed.

※ **Refer to the operator's manual page 3-36.**

(8) 2-way pilot lamp



HW65A3CD49

- ① This lamp lights up when the option flow control function is activated in the cluster.

※ **Refer to page 4-19.**

(9) Angle dozer pilot lamp (opt)



60A3CD15

- ① This lamp lights up when the selection switch on the LH RCV lever is selected to angle dozer operation position.

※ **Refer to the operator's manual page 3-36 for details.**

(10) Manual safety lock pilot lamp

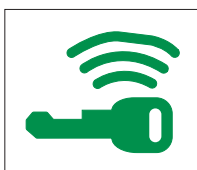


140WA3CD37

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

※ Refer to the operator's manual page 3-39 for the safety knob.

(11) Smart key pilot lamp (opt)



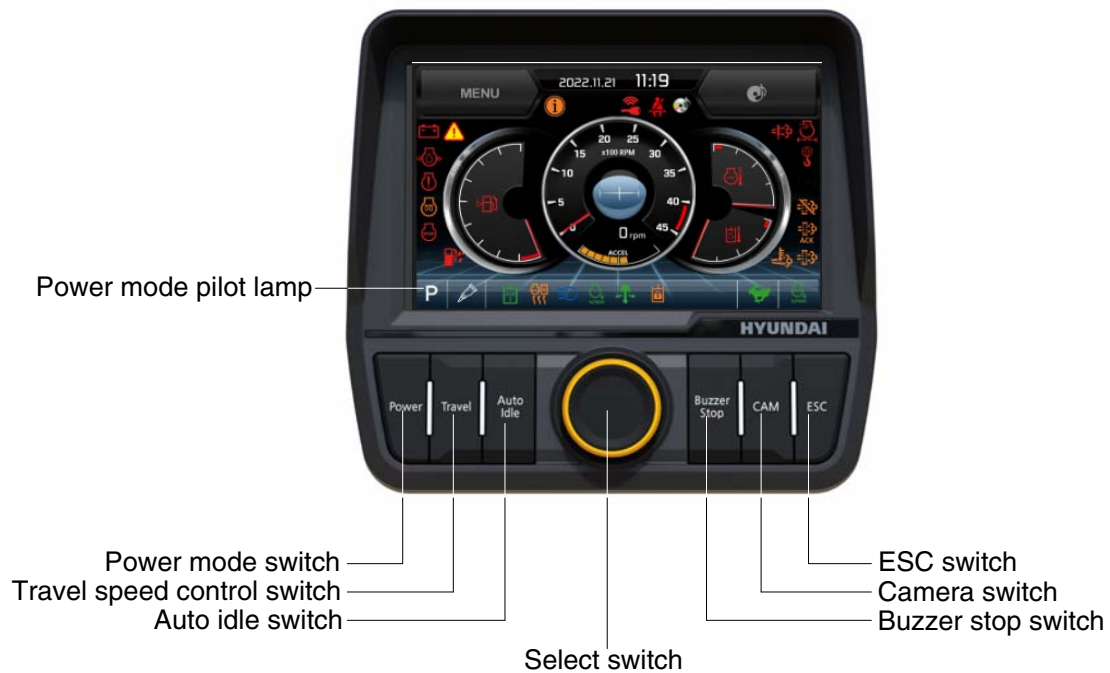
300A3CD36A

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 the authentication is successful.

※ Refer to the page 4-23.

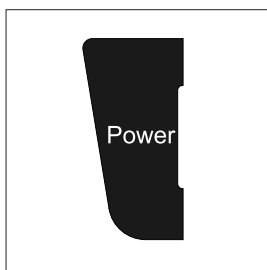
6) SWITCHES



60A3CD13

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

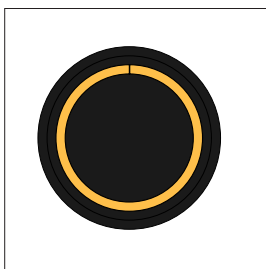
(1) Power mode switch



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.

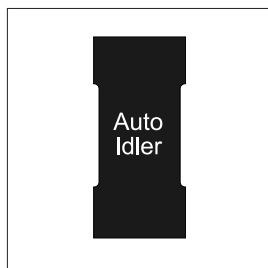
(2) Select switch



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 the page 4-11 for details.

(4) Buzzer stop switch

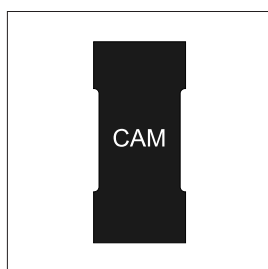


HX60A3CD121

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

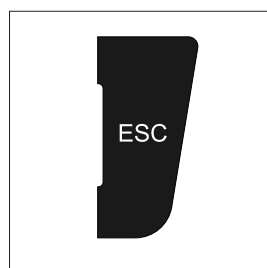


HX60A3CD122

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

※ Please refer to page 4-30 for the camera.

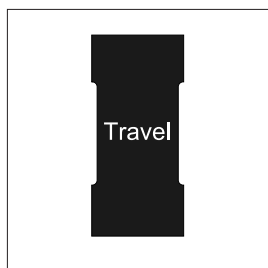
(6) Escape switch



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



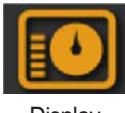
Sub menu screen



HW60AH3CD125A

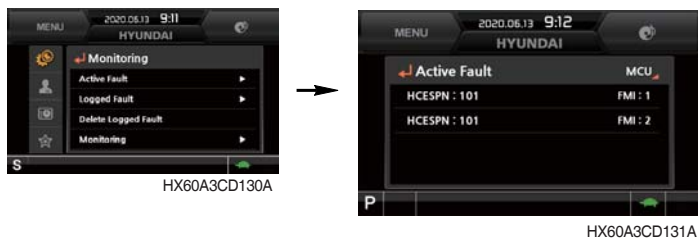
- ※ Please refer to the select switch, page 4-13 for selection and change of menus and input values.
- ※ In the operation screen, tap MENU or press the select switch to access the sub-menu screen.

(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 Option flow control ESL mode setting Change password Machine information A/S phone number Cluster update CAN update Service menu	Elapsed time, Change interval, Replacement etc. Opt attach set, Proportional flow control set, Confirmation ESL mode setting 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 Quick cooling 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 To maximize engine cooling performance

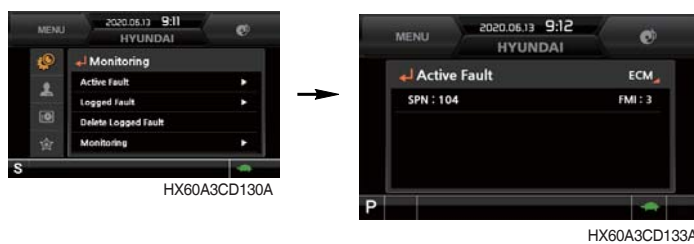
(2) Monitoring

① Active fault - Machine



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

② Active fault - Engine



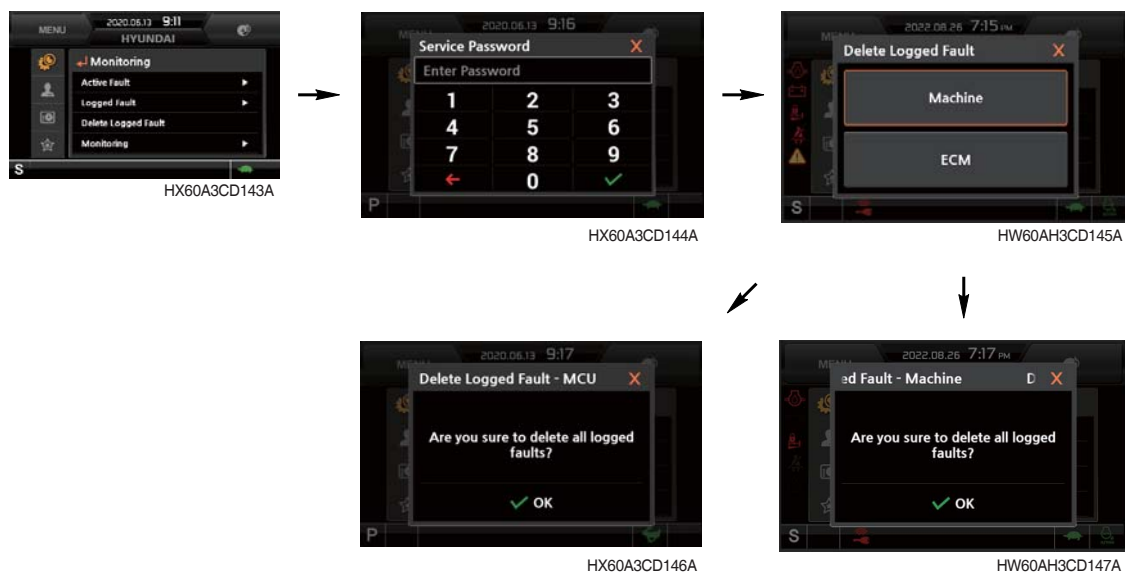
- The active faults of the engine ECU can be checked by this menu.

③ Logged fault - Machine/ Engine



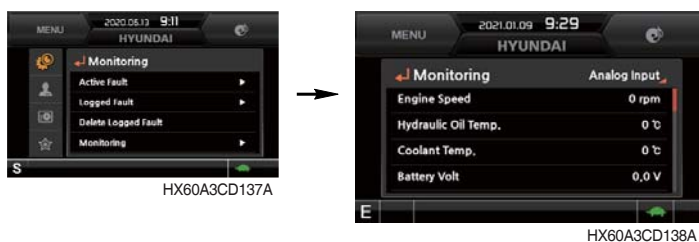
- The logged faults of the machine MCU or engine ECU can be checked by this menu.
- This menu can be used only HCE service man.

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 manual page 6-16.

② Option flow control

a. Option attach selection



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

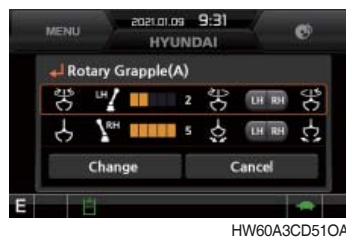
- Rotary grapple (4-way)
- Grapple (2-way)
- Auger (2-way)

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

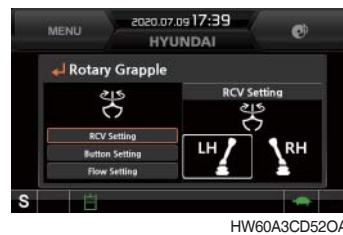
b. Proportional flow control setting

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



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

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.
 - Select LH for grapple → RH set for rotary automatically



- Button setting (Close)
 - Select RH for Close → LH set for open automatically



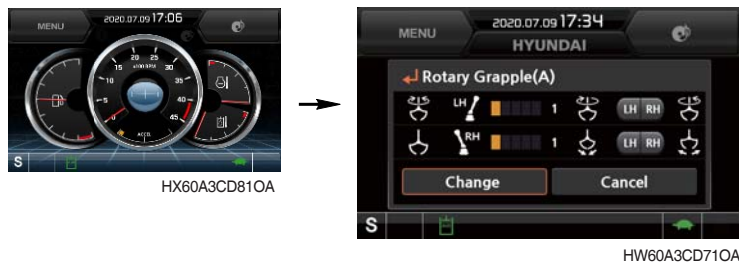
- Flow setting
 - Enable set from level 1 to level 5.



- Flow setting value can be saved by pressing 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



※ Symbol () is activated on the low side of main screen when option attach function is used.

※ Previous setting value can be checked by following procedure.

– Menu > Management > option attach

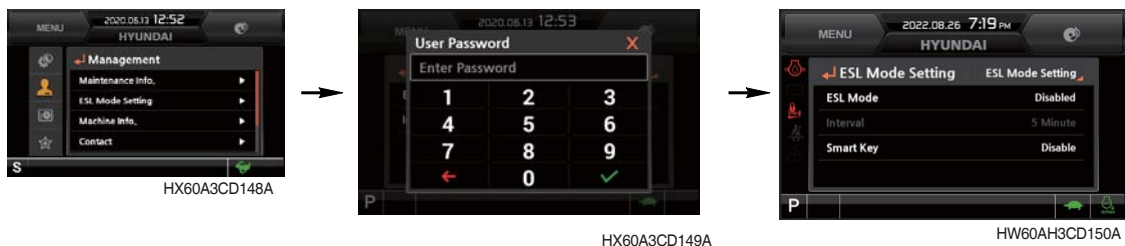
a) Rotary setting

- 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

③ 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.

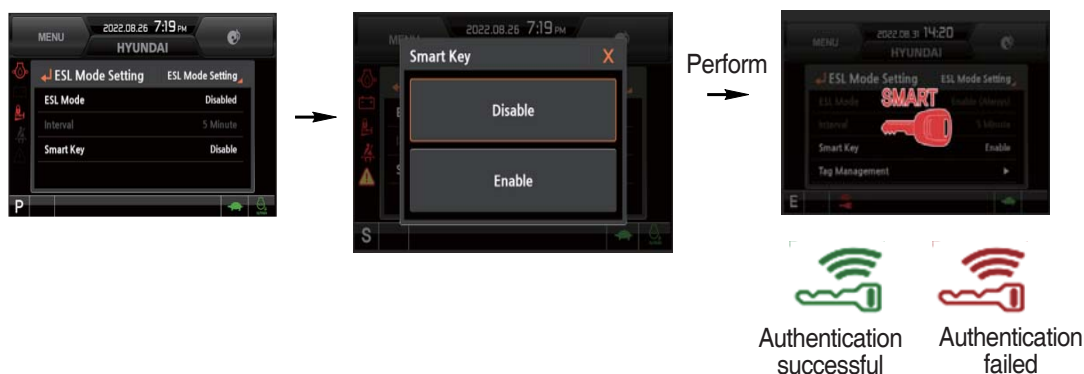
Interval : The password is required when the operator starts engine first. But the operator can restart the engine within the interval time without inputting the password.

※ 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)

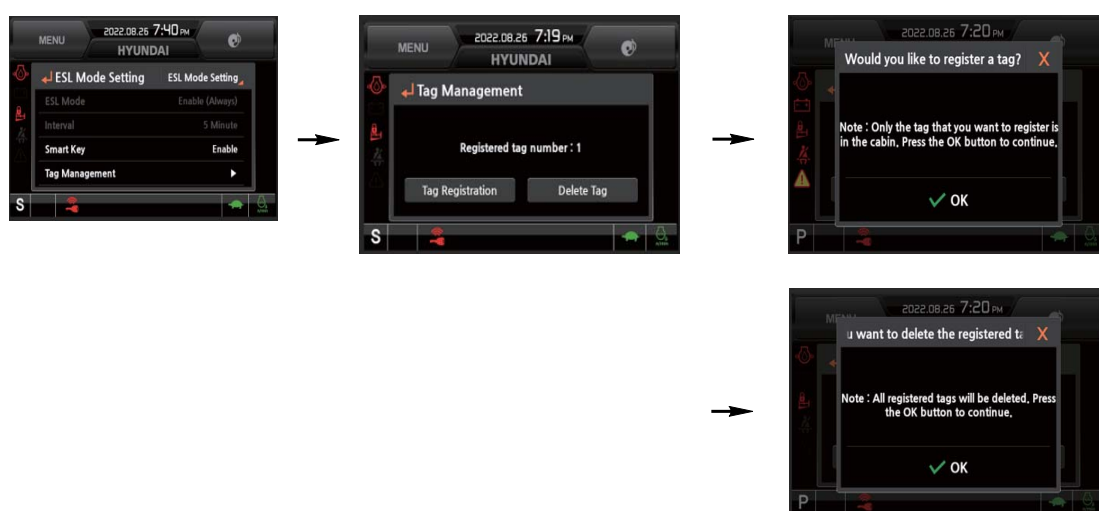


- Smart Key Exclusive

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

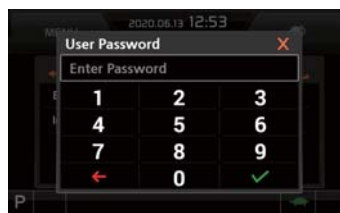
Case	ESL Mode	Smart Key	Condition
1	Disable	Disable	- With registered tag : Engine can be started without password input. - Without registered tag : Engine can be started without password input.
2	Disable	Enable	If Smart Key is enabled, ESL Mode is automatically enabled. This Case 2 work the same as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

④ Password change

– The password is 5~10 digits.

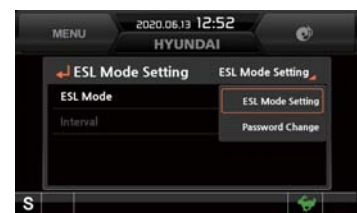


HX60A3CD151A



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

※ Before first use, please set user password and owner password in advance for machine security.

⑤ Machine information



HX60A3CD160A



HX60A3CD161A



HX60A3CD162A

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

⑥ A/S phone number



HX60A3CD163A



HX60A3CD164A



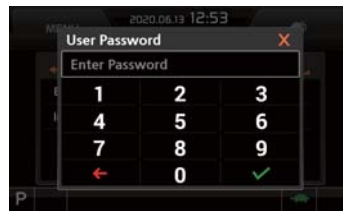
HX60A3CD165A

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

⑦ Cluster update



HX60A3CD169A



HX60A3CD149A

Enter the user password



HX60A3CD170A

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



HX60A3CD172A

Select application item



HX60A3CD173A

Select file to update



HX60A3CD174A

Select OK



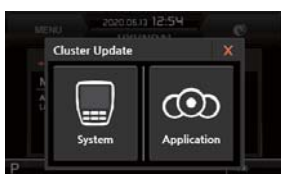
Completed



HX60A3CD175A

In process

b. System update



HX60A3CD177A

Select system item



HX60A3CD173A

Select file to update



HX60A3CD174A

Select OK



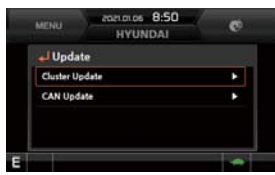
Completed



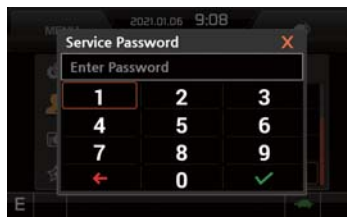
HX60A3CD175A

In process

⑧ CAN update



HX60A3CD169A



HX60A3CD149A

Enter the user password



HX60A3CD179A

Select the CAN update

· The application program can be downloaded and updated by this menu.

※ Do not turn power off while updating.

a. Download



HX60A3CD180A

Select update device



HX60A3CD181A

Select download

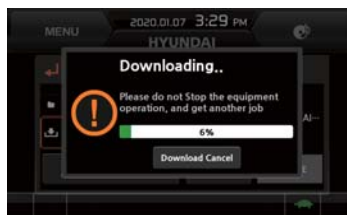


HX60A3CD182A

Select download after choose update file

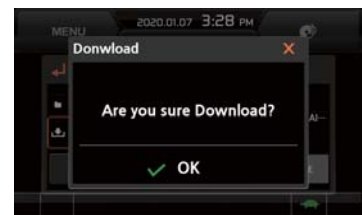


HX60A3CD185A



HX60A3CD184A

Stop download when select the cancel



HX60A3CD183A

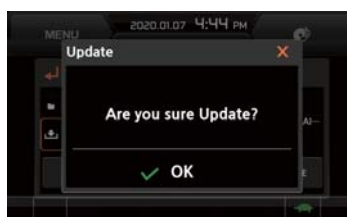
Confirm download

b. Update



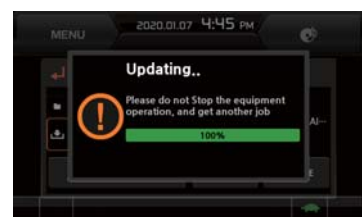
HX60A3CD186A

Select update after the download.



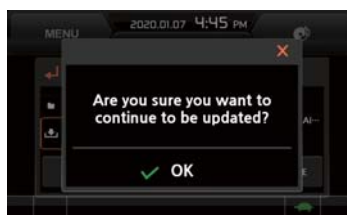
HX60A3CD187A

Confirm the update



HX60A3CD188A

In process update



HX60A3CD190A

Select the OK to update another application program



HX60A3CD175A

Completed update

⑨ 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 : Standard, 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

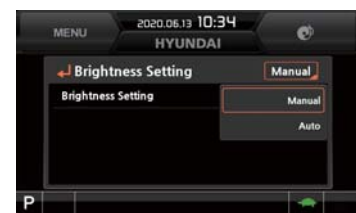


HX60A3CD193A

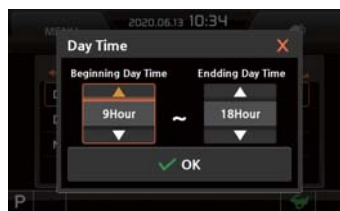


HX60A3CD194A

Manual (1st~10th step)



HX60A3CD195A



HX60A3CD197A

Auto (day/night)

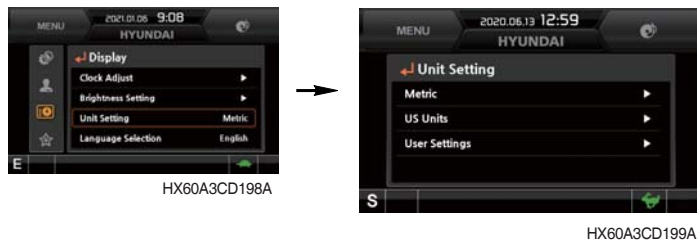


HX60A3CD196A

Auto (day time)

- 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

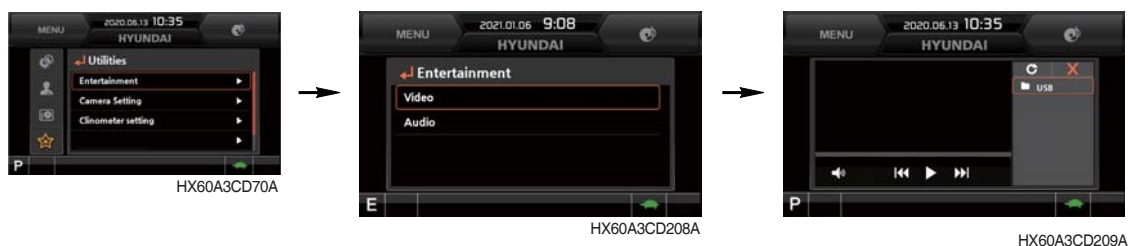
④ Language selection



- 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.

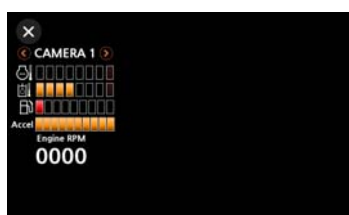
▲ The video play is prohibited for the safety reason when the machine is operated.

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)



HX60A3CD204

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

■ Rear / RH view camera UI setting (Option)

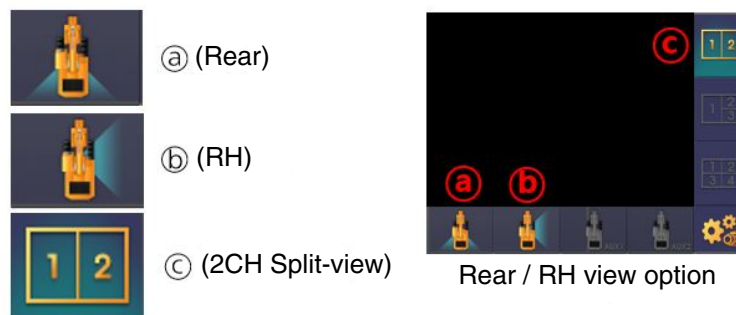
1) Camera control switch

- 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.



2) Cam image control (CIC) mode

- Touch ① (Rear), ② (RH) button on screen to set single-view camera mode.
- Touch ③ (2CH-split-view) button to set split-view camera mode.



3) Split-view Camera order setting

- Touch ④ (camera setting) button to set split-view camera order.



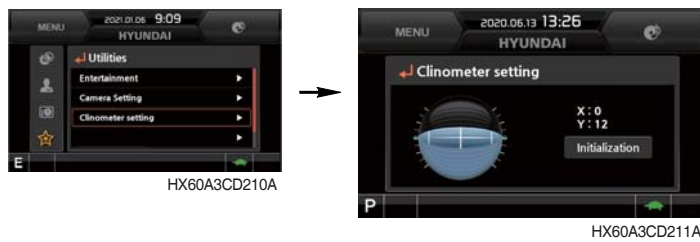
④(Camera Setting)



- You can change split-view camera order on display order menu.



③ Clinometer setting



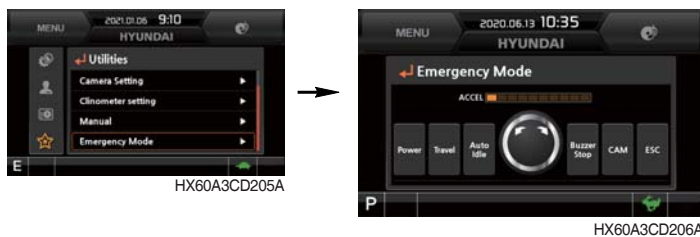
- When the machine is on the flatland, if you touch "initialization" on cluster, the values of X, Y will reset to "0".
- You can confirm tilt of machine in cluster's operating screen.

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.

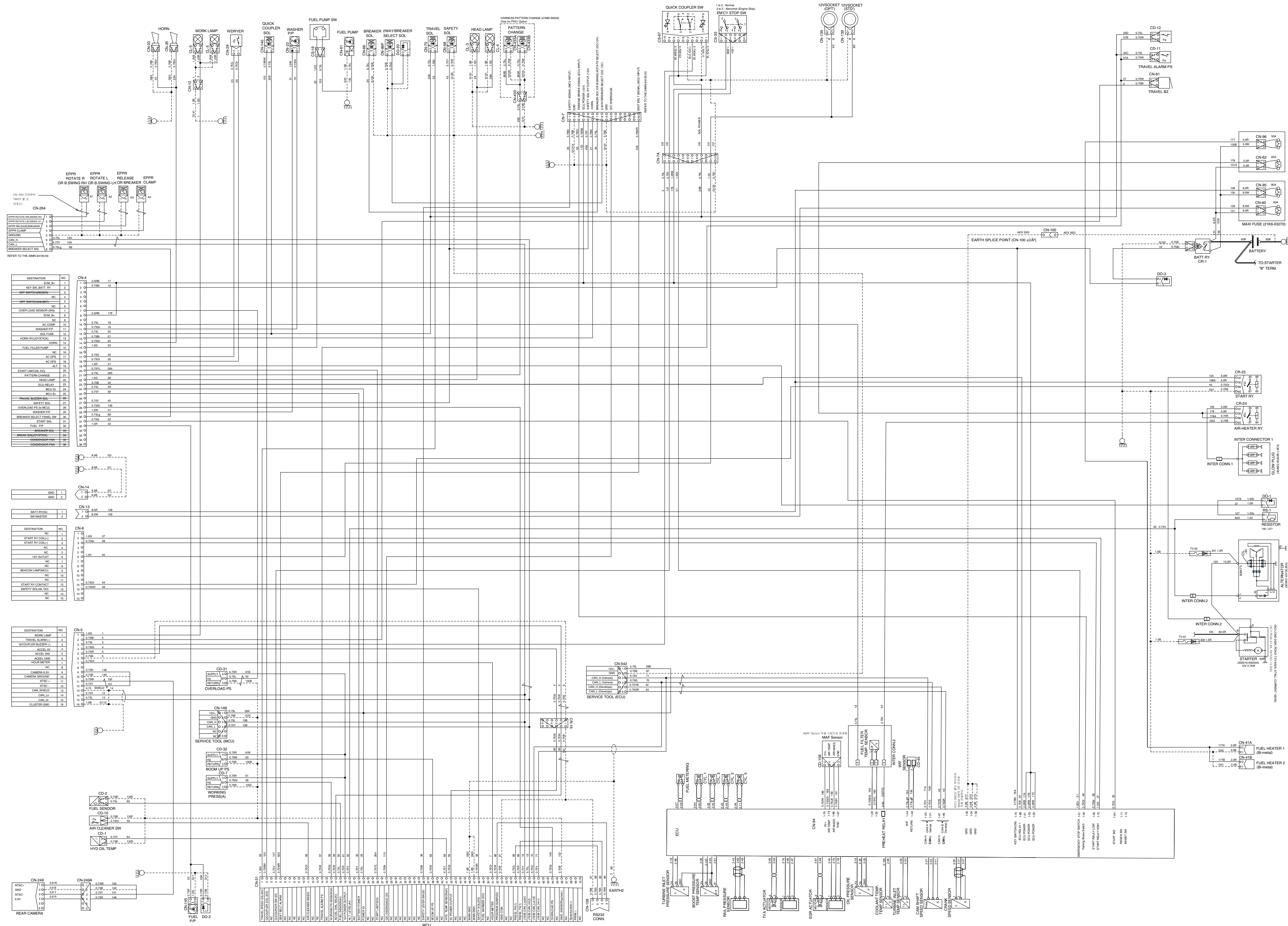
⑥ Quick Cooling Mode



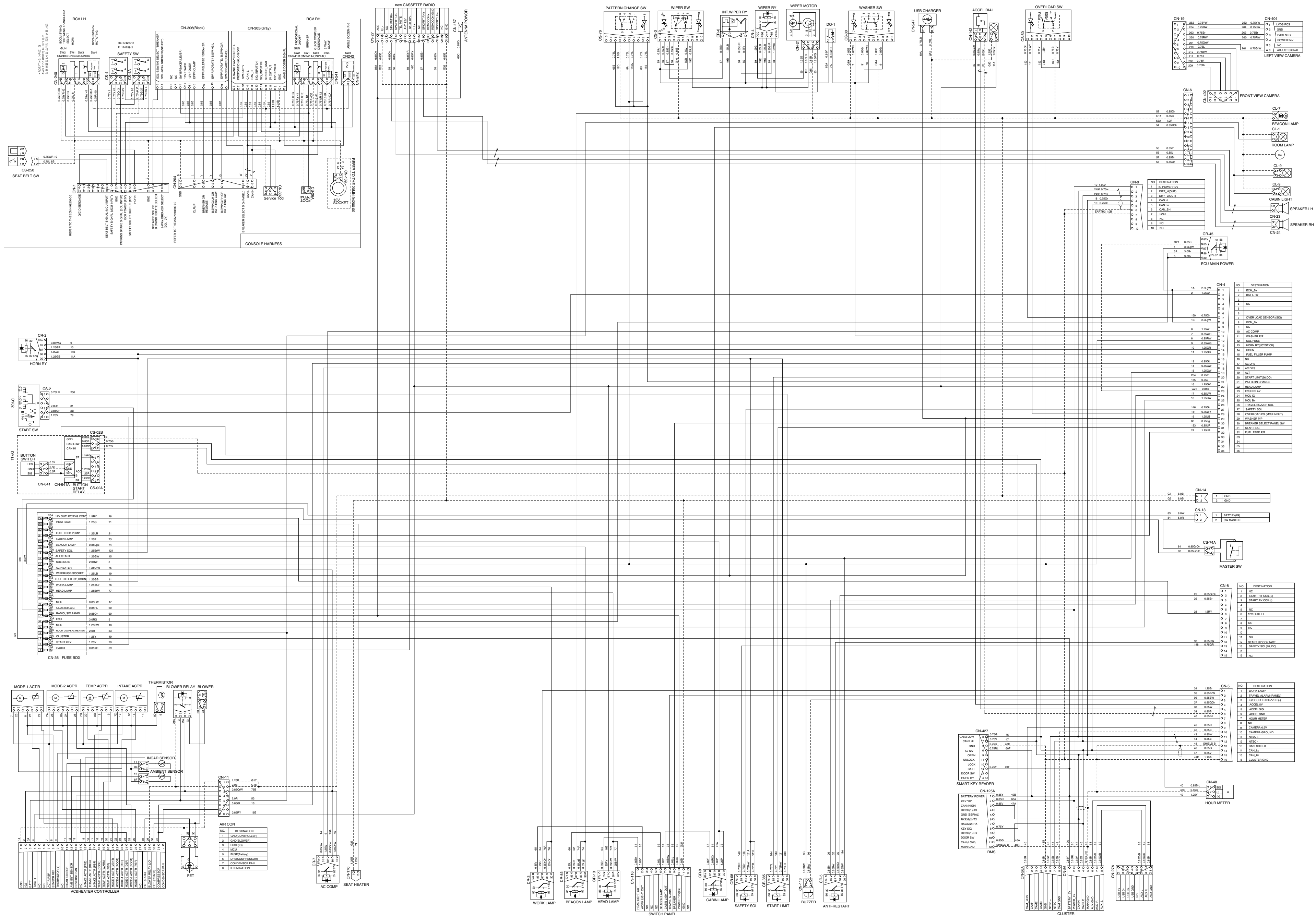
- While the machine is stopped and discontinued with operation, engine can be operated in maximum RPM for maximum rotation of the radiator fan. (Max. for 5 minutes)
 - Setting : When the machine is stopped, the safety knob is turned unlock position to set the quick cooling mode in the locked state
 - Release : Released when the operating time exceeds 5 minutes, when the safety knob is turned lock position and when the quick cooling mode release button is pressed

GROUP 3 ELECTRICAL CIRCUIT

· ELECTRICAL CIRCUIT (1/2)



ELECTRICAL CIRCUIT (2/2)



MEMORANDUM

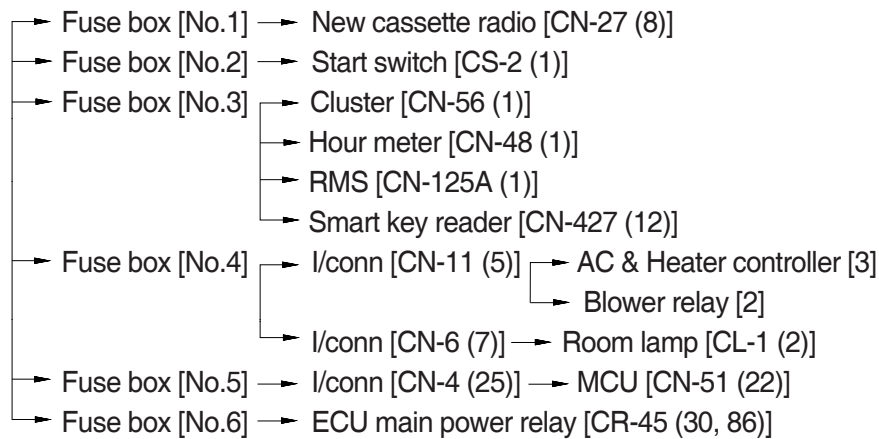
1. POWER CIRCUIT

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

Battery (B⁺) → Battery relay [CR-1] → Maxi fuse [CN-62] → Air heater relay [CR-24 (30)]
 Battery (B⁺) → Battery relay [CR-1] → Maxi fuse [CN-60] → I/conn [CN-13 (2)] → Master switch [CS-74A]



※ I/conn : Intermediate connector

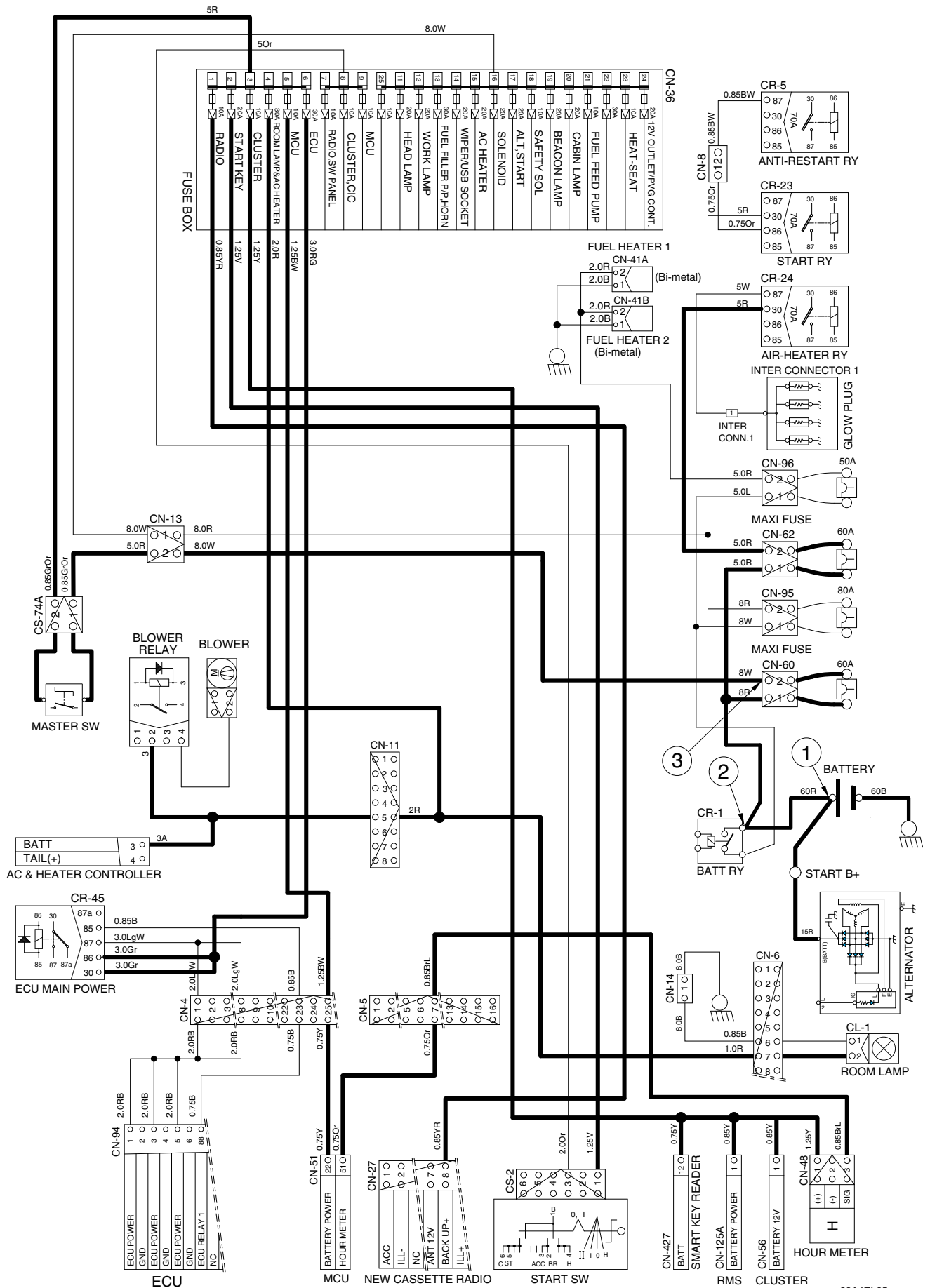
2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	OFF	① - GND (battery B ⁺) ② - GND (battery relay) 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



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

2. STARTING CIRCUIT

1) OPERATING FLOW

Battery (+) terminal → Battery relay [CR-1] → Maxi fuse [CN-60]
 → I/conn [CN-13 (2)] → Master switch [CS-74A] → Fuse box No.2 → Start key [CS-2 (1)]

※ Start switch : ON

→ Start switch ON [CS-2 (2)] → I/conn [CN-4 (2)] → ECU [CN-94 (1-75)]
 → Battery relay [CR-1]
 Battery relay [CR-1] : Battery relay operating (all power is supplied with the electric component)
 → Start switch ON [CS-2 (3)] → Fuse box (No. 7, 8, 9)] → I/conn [CN-4 (24)] →
 MCU [CN-51 (23)]

※ Start switch : START

Start switch START [CS-2 (6)] → Start limit relay [CR-385 (30) → (87)] → I/conn [CN-4 (31)]
 → ECU [CN-94A (1-84) → (1-72)]
 → I/conn [CN-8 (3) → Anti-restart relay [CR-5 (85) → (87)] → I/conn [CN-8 (12)]
 → Start relay [CR-23 (86) → (87)] → Starter operating

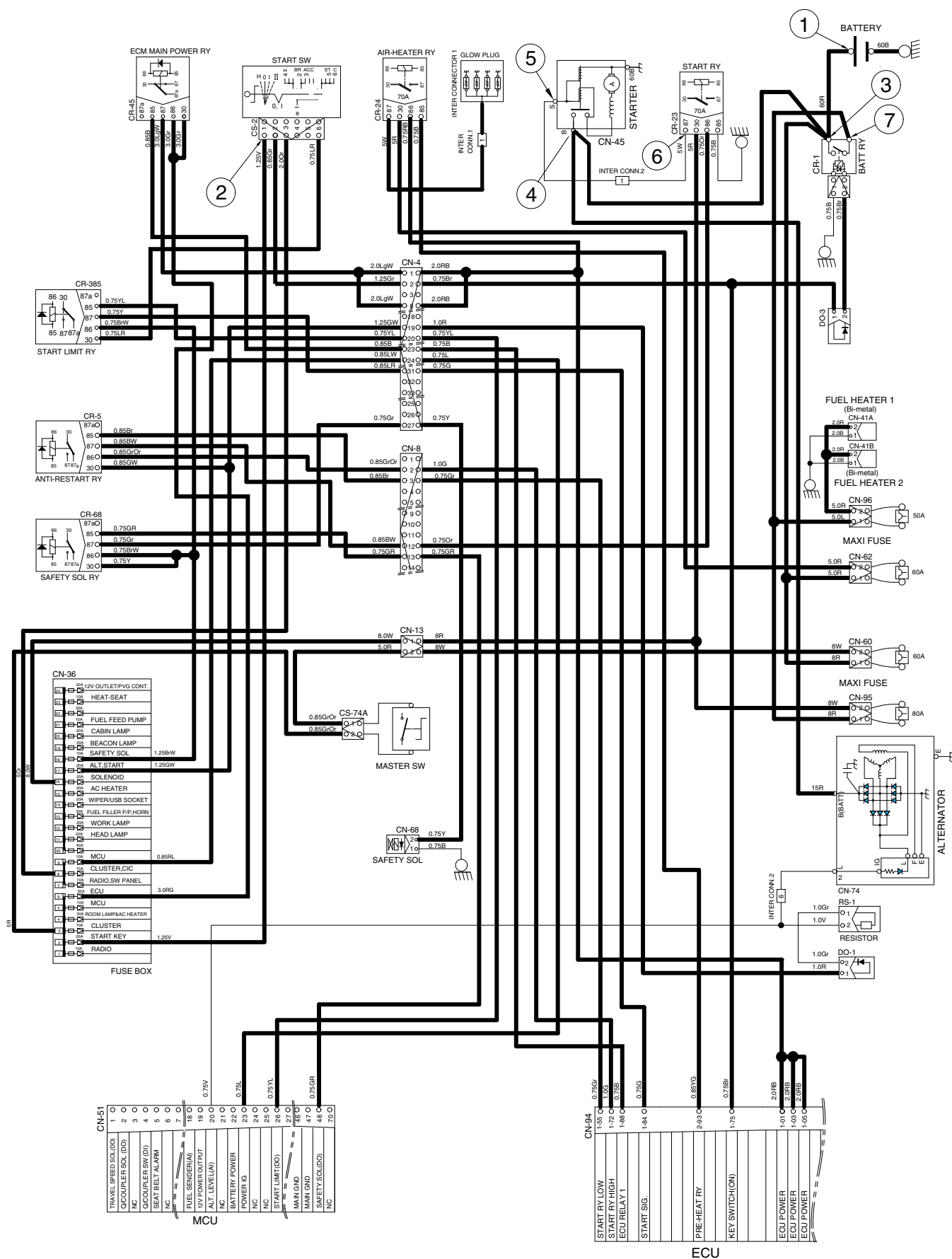
2) CHECK POINT

Engine	Start switch	Check point	Voltage
Operating	START	① – GND (battery B ⁺) ② – GND (start key) ③ – GND (battery relay M4) ④ – GND (starter B) ⑤ – GND (starter S) ⑥ – GND (start relay) ⑦ – GND (battery relay M8)	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 the alternator flows into the battery through the battery relay (CR-1).

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

1) OPERATING FLOW

(1) Warning flow

Alternator [CN-74 (L)] → I/conn 2 [6] → MCU [CN-51 (20)] → Cluster warning lamp

(2) Charging flow

Alternator [CN-74 (B)] → Starter [CN-45 (B)] → Battery relay [CR-1]

→ Battery (+) terminal
→ Maxi fuse [CN-60] → I/conn [CN-13 (2)] → Master switch [CN-74A]
→ Fuse box [CN-36 No.1~6]
→ Maxi fuse [CN-95] → I/conn [CN-13 (1)] → Fuse box [CN-36 No.11~25]

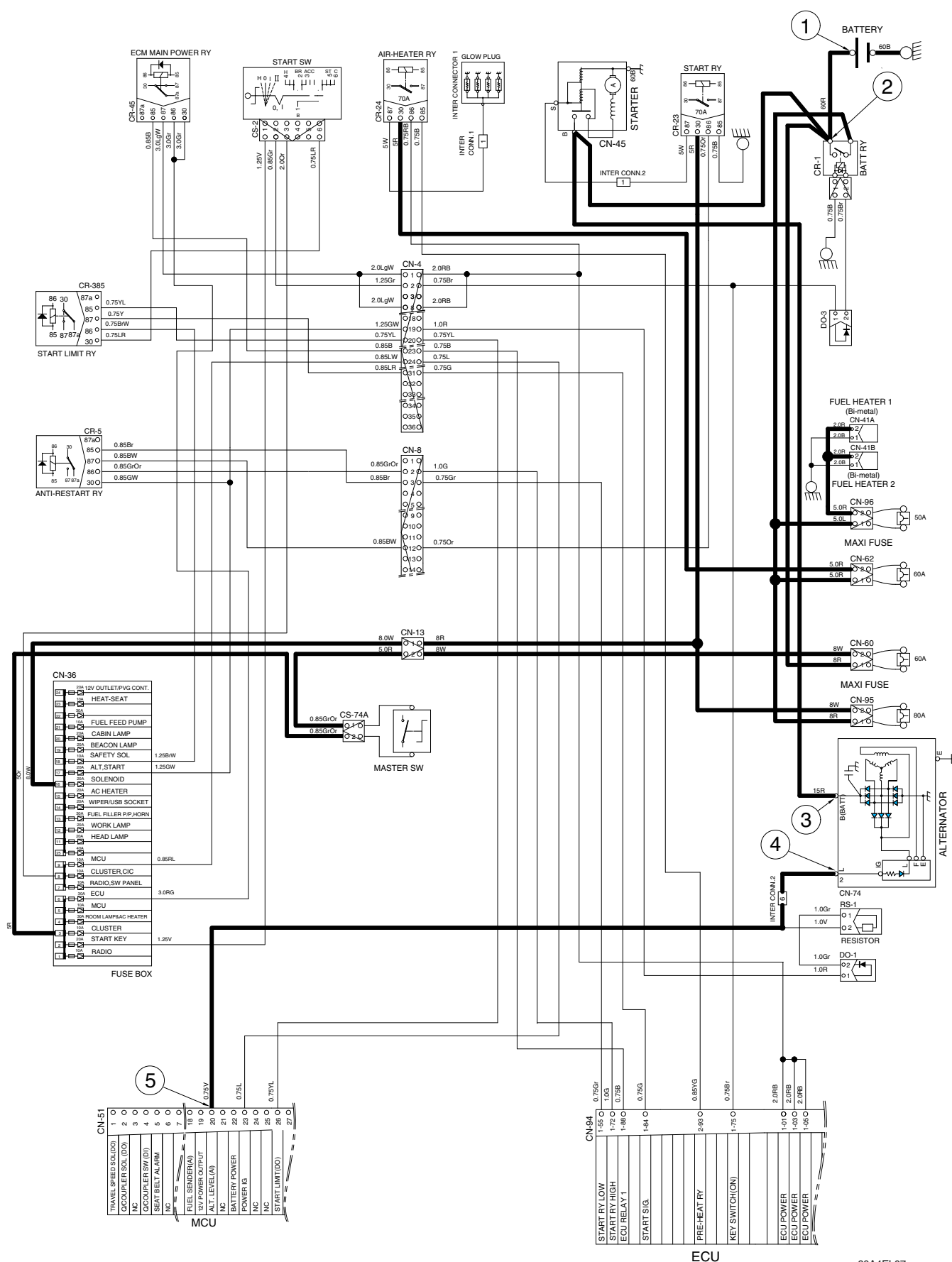
2) CHECK POINT

Engine	Start switch	Check point	Voltage
Operating	ON	① – GND (battery B ⁺) ② – GND (battery relay) 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



60A4EL07

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

4. HEAD AND WORK LAMP CIRCUIT

1) OPERATING FLOW

Fuse box (No.11) → Head lamp relay [CR-13 (30, 86)]

Fuse box (No.12) → Work lamp relay [CR-3 (30, 86)]

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

(1) Head lamp switch ON

Head lamp switch ON [CN-116 (1)] → Head lamp relay [CR-13 (85) → (87)]

→ I/conn [CN-4 (22)] → Head lamp ON [CL-3, 4 (2)]

→ New cassette radio illumination ON [CN-27 (9)]

→ Accel dial illumination ON [CN-142 (2)]

→ I/conn [CN-11 (8)] → AC/Heater controller illumination ON

(2) Work lamp switch ON

Work light switch ON [CN-116 (2)] → Work lamp [CR-3 (85) → (87)] → I/conn [CN-5 (1)]

I/conn [CN-12 (2)] → Work lamp ON [CL-5 (2)]

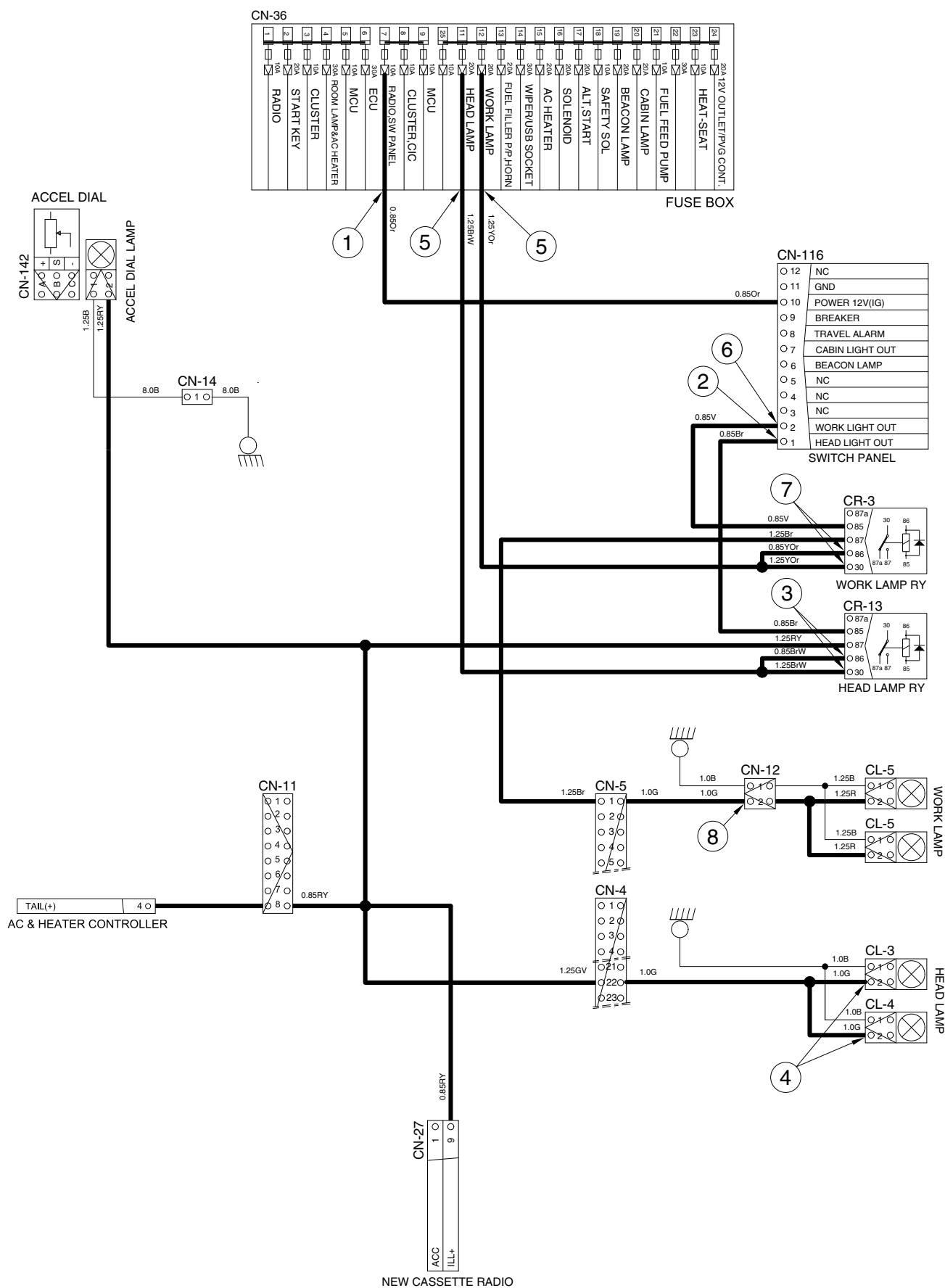
2) CHECK POINT

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

※ GND : Ground

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

HEAD AND WORK LAMP CIRCUIT



60A4EL08

※ 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.18) → Beacon lamp relay [CR-85 (30, 86)]

Fuse box (No.20) → Cab lamp relay [CR-9 (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-6 (5)] → Beacon lamp ON [CL-7 (2)]

(2) Cab lamp switch ON

Cab lamp switch ON [CN-116 (7)] → Cab lamp relay [CR-9 (85) → (87)] → I/conn [CN-6 (8)]

→ Cab lamp ON [CL-9 (2)]

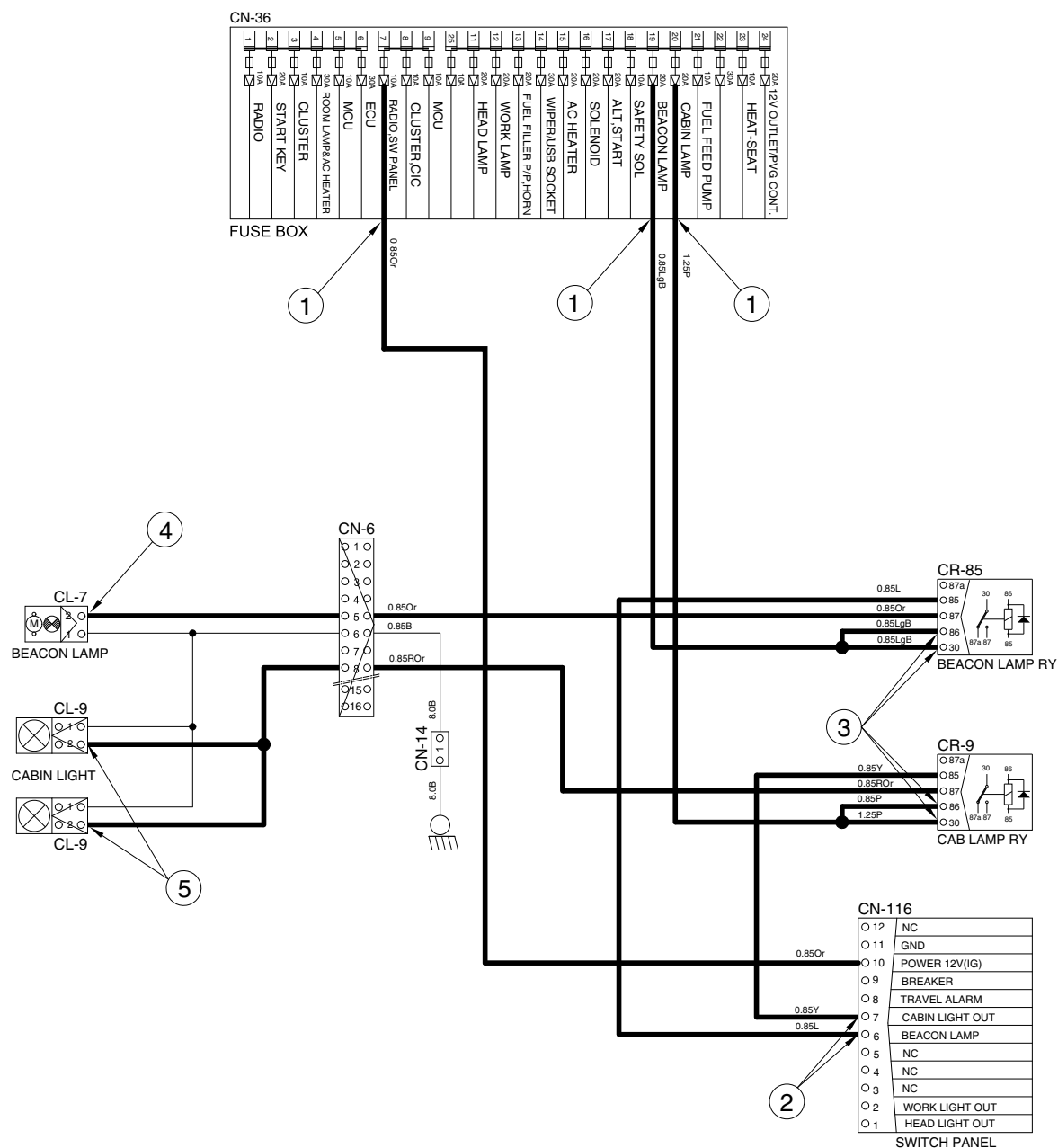
2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	ON	① - GND (fuse box) ② - GND (switch power output) ③ - GND (relay power input) ④ - GND (beacon lamp) ⑤ - GND (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



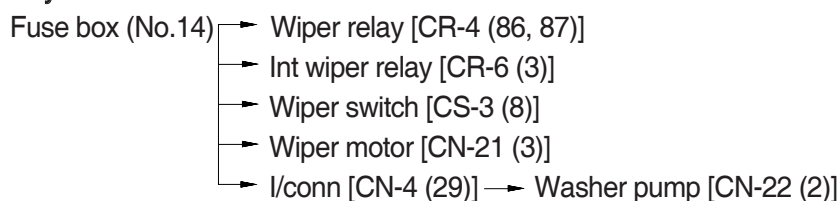
60A4EL09

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

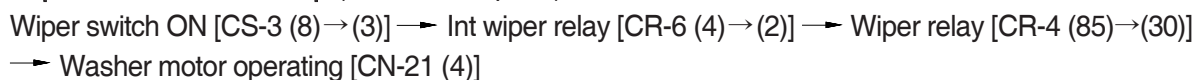
6. WIPER AND WASHER CIRCUIT

1) OPERATING FLOW

(1) Key switch ON



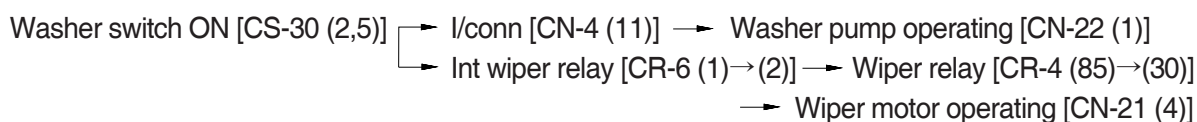
(2) Wipe switch ON : 1st step (intermittent speed)



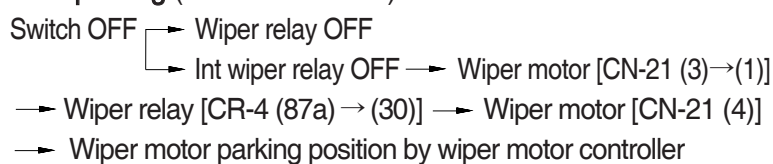
(3) Wiper switch ON : 2nd step (continual)



(4) Washer switch ON



(5) 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

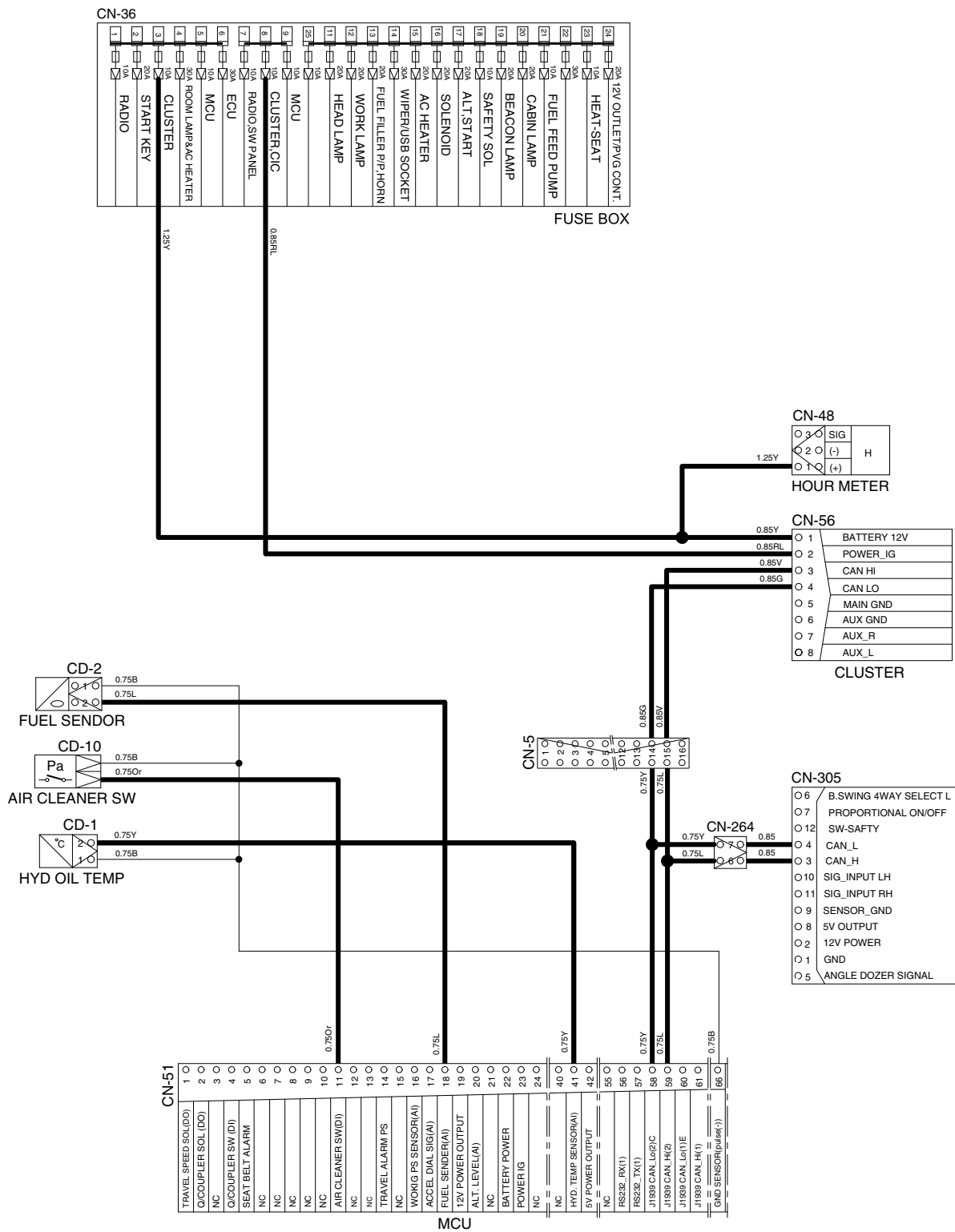
※ GND : Ground

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

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



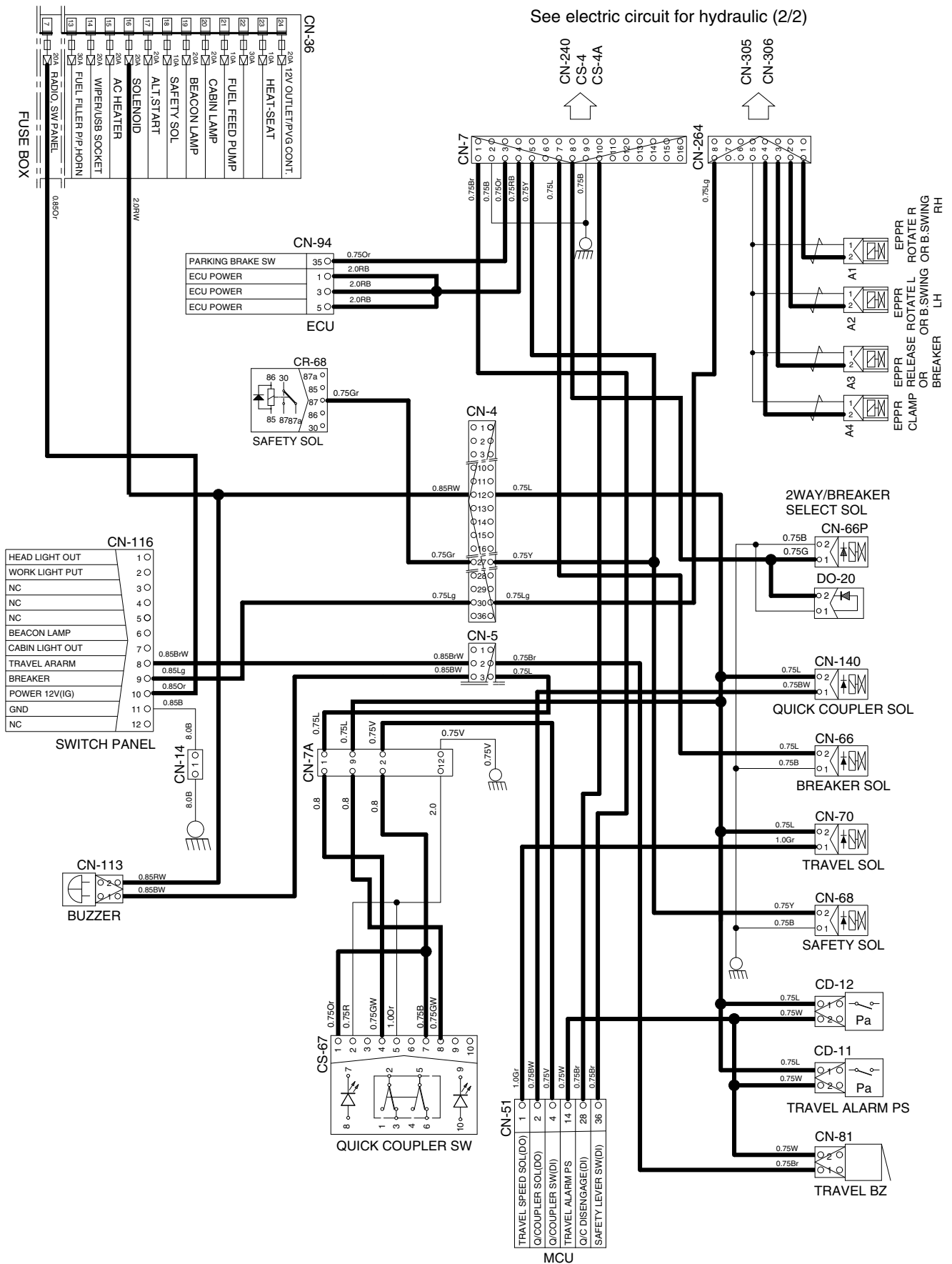
MONITORING CIRCUIT



60A4EL11

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

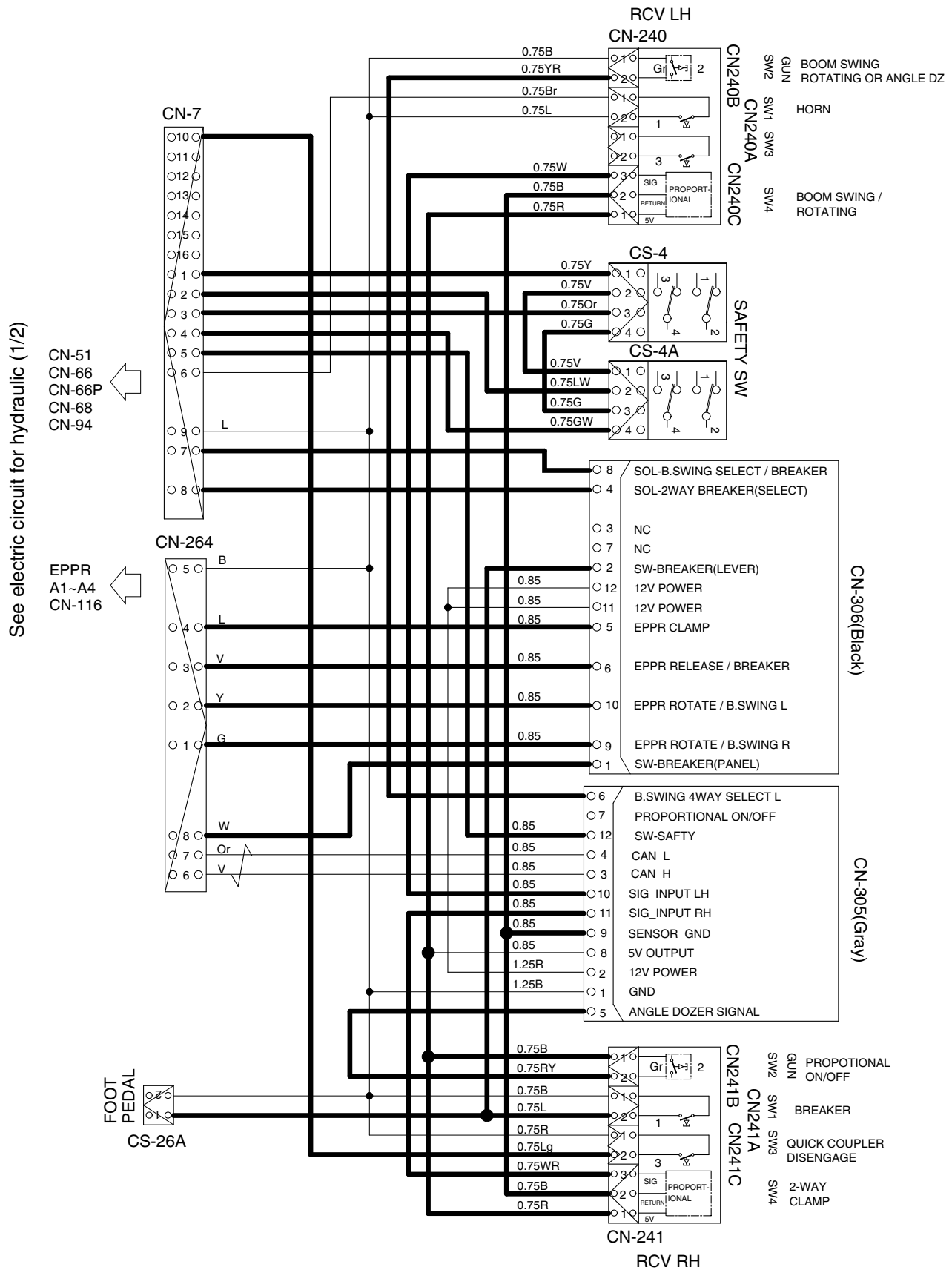
ELECTRIC CIRCUIT FOR HYDRAULIC (1/2)



60A4EL12

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

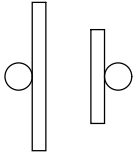
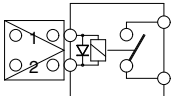
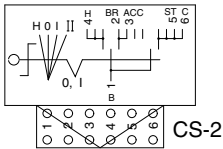
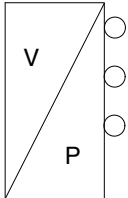
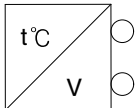
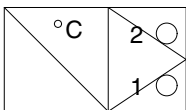
ELECTRIC CIRCUIT FOR HYDRAULIC (2/2)

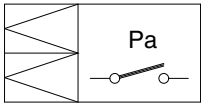
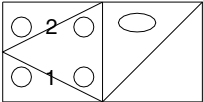
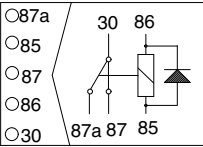
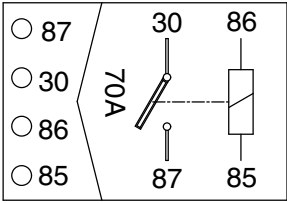
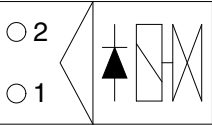
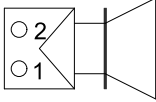


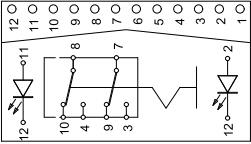
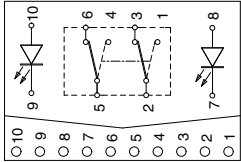
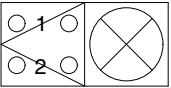
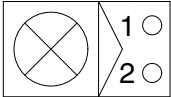
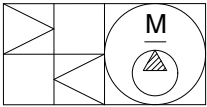
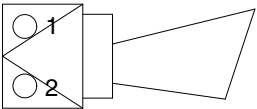
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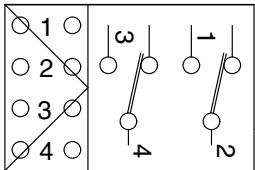
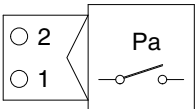
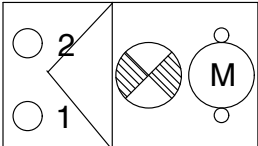
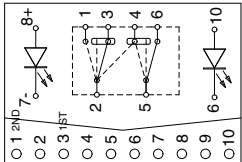
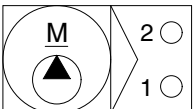
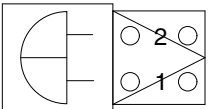
※ The circuit diagram may differ from the equipment, so please check before a repair.

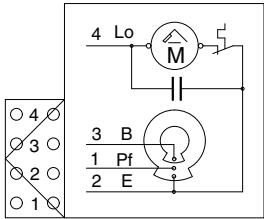
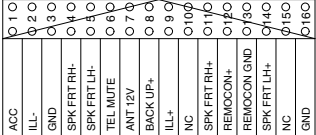
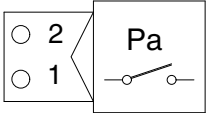
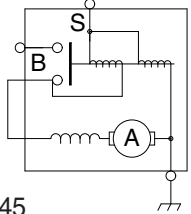
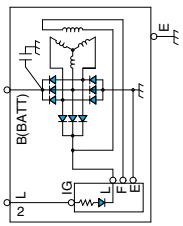
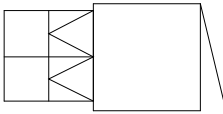
GROUP 4 ELECTRICAL COMPONENT SPECIFICATION

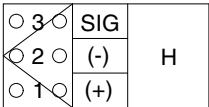
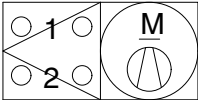
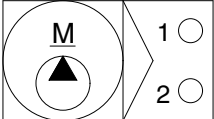
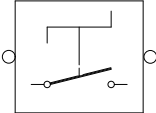
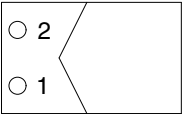
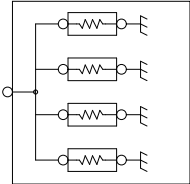
Part name	Symbol	Specification	Check
Battery		12V × 100Ah	※ Check specific gravity 1.280 over : over charged 1.280 ~ 1.250 : normal 1.250 below : recharging
Battery relay	 CR-1	Rated load : 12V 100A (continuity) 1000A (30 second)	※ Check coil resistance Normal : about 12Ω ※ Check contact Normal : ∞Ω
Start switch	 CS-2	12V	※ Check contact OFF : ∞Ω (for each terminal) ON : 0Ω (for terminal 1-3 and 1-2) START : 0Ω (for terminal 1-6)
Pressure switch (for engine oil)		-	※ Check resistance Normal : 0Ω (CLOSE)
Coolant temperature sensor		-	※ Check resistance 50°C : 804Ω 80°C : 310Ω 100°C : 180Ω
Hydraulic temperature sensor		-	※ Check resistance 50°C : 804Ω 80°C : 310Ω 100°C : 180Ω

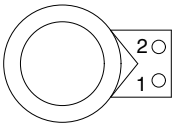
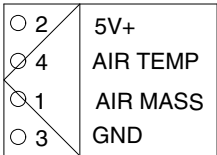
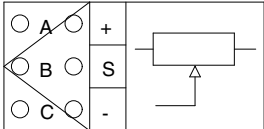
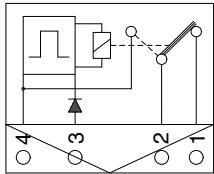
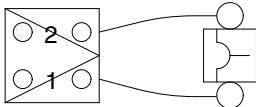
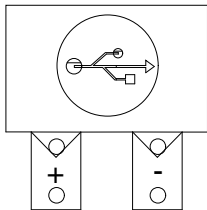
Part name	Symbol	Specification	Check
Air cleaner pressure switch	 CD-10	Pressure: 635mmH ₂ O (N.O TYPE)	※ Check contact Normal : $\infty \Omega$
Fuel sender	 CD-2	-	※ Check resistance Full : 100Ω Low : 500Ω Empty warning : 700Ω
Relay	 CR-2 CR-3 CR-4 CR-5 CR-7 CR-9 CR-13 CR-45 CR-68 CR-85 CR-385	12V 20A	※ Check resistance Normal : about 200Ω (for terminal 85-86) : 0Ω (for terminal 30-87a) : $\infty \Omega$ (for terminal 30-87)
Relay (Start, Air heater)	 CR-23 CR-24	12V 70A	※ Rated coil current $1.2 \pm 0.3A$
Solenoid valve	 CN-66 CN-66P CN-68 CN-70 CN-140 CN-433A CN-433B	12V 1A	※ Check resistance Normal : $15 \sim 25 \Omega$ (for terminal 1-2)
Speaker	 CN-23(LH) CN-24(RH)	4Ω 20W	※ Check resistance Normal : 4Ω

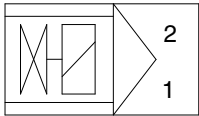
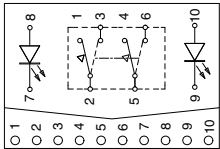
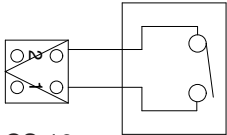
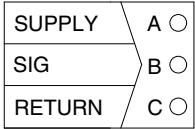
Part name	Symbol	Specification	Check
Overload switch	 CS-50	12V 16A	※ Check contact Normal OFF - $\infty \Omega$ (for terminal 1-5,2-6) - 0Ω (for terminal 5-7,6-8)
Quick clamp switch	 CS-67	12V 16A	※ Check contact Normal OFF - $\infty \Omega$ (for terminal 1-5,2-6) - 0Ω (for terminal 5-7,6-8)
Lamp	 CL-3 CL-4 CL-5 CL-9	12V (LED)	※ Check disconnection Normal : 1.2Ω
Room lamp	 CL-1	12V 10W	※ Check disconnection Normal : a few Ω
Fuel filler pump	 CN-61	12V 35 ℓ /min	※ Check operation Supply power (for terminal 1) : 12V
Horn	 CN-20 CN-25	12V	100±5dB

Part name	Symbol	Specification	Check
Safety switch	 CS-4 CS-4A	—	—
Pressure switch	 CD-11 CD-12	10bar (N.C type)	※ Check contact Normal : 0.1Ω
Beacon lamp	 CL-7	12V (LED)	※ 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)
Buzzer	 CN-113	12V	—

Part name	Symbol	Specification	Check
Wiper motor	 CN-21	12V 3A	—
New cassette radio	 CN-27	24V 2A	※ Check voltage 20 ~ 25V (for terminal 1-3, 3-8)
Receiver dryer	 CN-29	12V (N.O type)	※ Check contact Normal : $\infty \Omega$ (for terminal 1-2)
Starter	 CN-45	12V 2.5kW	※ Check contact Normal : 0.1Ω
Alternator	 CN-74	12V 90A	※ Check contact Normal : 0Ω (for terminal B-L)
Travel buzzer	 CN-81	12V	—

Part name	Symbol	Specification	Check
Hour meter	 CN-48	12V	-
Air con blower		12V 8.5A	-
Fuel feed pump	 CN-145	12V	-
Master switch	 CS-74A	12V 1000A	-
Fuel heater	 CN-41A CN-41B	12V 38W	-
Glow plug		-	-

Part name	Symbol	Specification	Check
12V socket	 CN-139	12V 120W	-
MAF sensor	 CD-158	5V	-
Accel dial	 CN-142	-	※ Check resistance Normal : about 5k Ω (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	-
Maxi fuse	 CN-60 CN-62 CN-95 CN-96	12V, 50A (CN-96) 12V, 60A (CN-60, 62) 12V, 80A (CN-95)	-
USB charger	 CN-247	-	-

Part name	Symbol	Specification	Check
EPPR valve	 A1, A2, A3, A4	-	-
Washer switch	 CS-30	12V 16A	※ Check resistance Normal OFF -∞ Ω (for terminal 2-3, 5-6)
Fuel pump switch	 CS-16	-	-
Pressure sensor	 CD-7 CD-31 CD-32	8~30A	※ Check contact Normal -0.1 Ω

GROUP 5 CONNECTORS

1. CONNECTOR DESTINATION

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-4	AMP	36	Cabin room harness - Main harness	1743059-2	1743062-3
CN-5	AMP	16	Cabin room harness - Main harness	368047-1	368050-1
CN-6	AMP	16	Cabin harness - Cabin room lamp harness	368047-1	368050
CN-7	AMP	16	Main harness-Console harness	368047-1	368050-1
CN-7A	AMP	12	Main harness-Console harness	174661-2	368537-1
CN-8	-	15	Cabin room harness-Main harness	2-85262-1	368301-1
CN-9	AMP	10	AAVM harness	174655-2	174657-2
CN-11	DEUTSCH	8	Air-con harness	DT06-8S-EP06	-
CN-12	AMP	2	Main harness - Boom lamp harness	S816-002002	S816-102002
CN-13	KET	2	Earth	MG620557-5	MG620558-5
CN-14	-	2	Earth	S813-030201	-
CN-16	AMP	6	Power connector	-	174264-2
CN-16A	AMP	6	Power connector	174262-2	-
CN-19	AMP	10	AAVM-RH camera harness-Cabin harness	174655-2	174657-2
CN-20	DEUTSCH	2	Horn	DT06-2S-EP06	-
CN-21	AMP	4	Wiper harness	180900-0	-
CN-22	KET	2	Washer tank	MG640605	-
CN-23	KET	2	Speaker LH	MG610070	-
CN-24	KET	2	Speaker RH	MG610070	-
CN-25	DEUTSCH	2	Horn	DT06-2S-EP06	-
CN-27	KUM	16	Cassette & radio	PK145-16017	-
CN-27A	-	8	Cassette & radio	-	S816-108002
CN-29	KET	2	Receiver dryer	MG640795	-
CN-36	-	-	Fuse box	21MN-55100	-
CN-41A	DELPHI	2	Fuel heater 1	15300027	-
CN-41B	DELPHI	2	Fuel heater 2	15300027	-
CN-45	TERM	-	Starter	-	-
CN-48	TERM	1	Hour meter	2-520193-2	-
CN-51	AMP	70	MCU	1-968879-1	-
CN-56	AMP	8	Cluster	-	S816-106002
CN-56A	AMP	8	Cluster	174982	-
CN-60	AMP	2	Maxi fuse	21K6-03270	03.01060
CN-61	DEUTSCH	2	Fuel filler pump	DT06-2S-EP06	DT04-2P-E005
CN-62	-	2	Maxi fuse	21K6-03270	03.01060

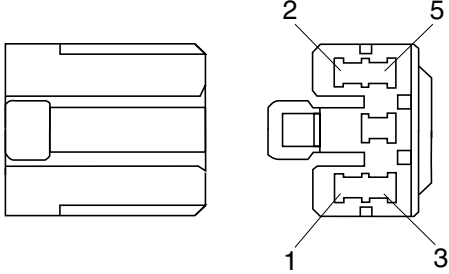
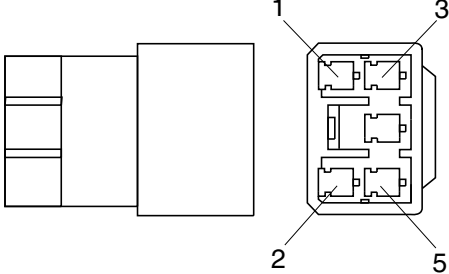
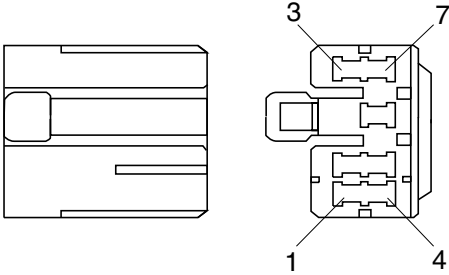
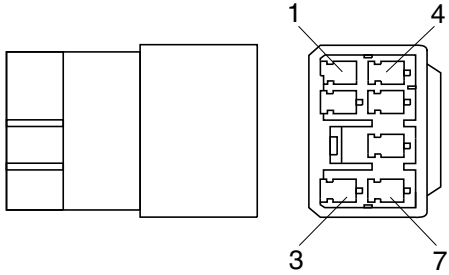
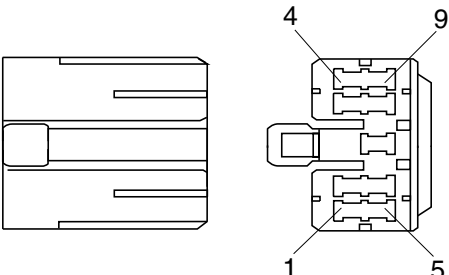
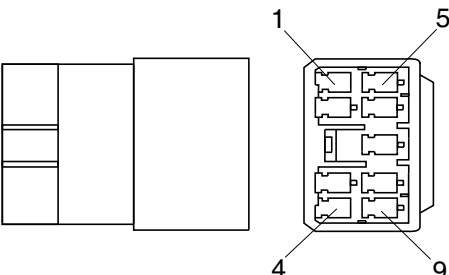
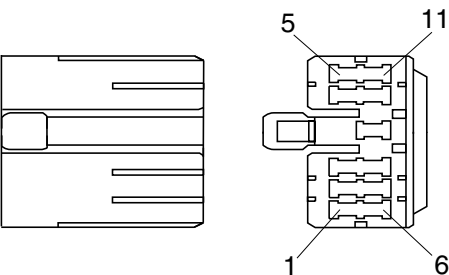
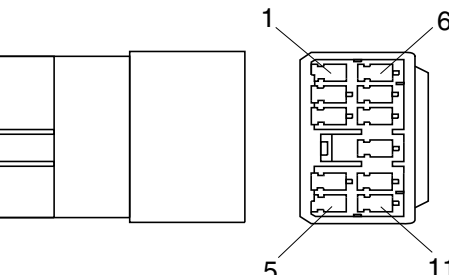
Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-66	DEUTSCH	2	Breaker solenoid	DT06-2S-EP06	-
CN-66P	DEUTSCH	2	2way / breaker select sol	DT06-2S-EP06	DT04-2P-E005
CN-68	DEUTSCH	2	Safety solenoid	DT06-2S-EP06	-
CN-70	DEUTSCH	2	Travel HI-LO solenoid	DT06-2S-EP06	-
CN-74	DONGA	1	Alternator	S820-408000	-
CN-81	DEUTSCH	2	Travel buzzer	DT06-2S-EP06	DT04-2P-E005
CN-94	BOSCH	91	ECU	1 928 405 452	-
CN-95	-	2	Maxi fuse	21K6-03270	03.01080
CN-96	-	2	Maxi fuse	21K6-03270	03.01050
CN-100	KET	1	ECU ground	MG640944-5	-
CN-113	AMP	2	Buzzer	S810-002202	-
CN-116	AMP	12	Switch panel	368542-1	-
CN-125A	DEUTSCH	12	RMS	DT06-126-P021	DT04-12PA-P021
CN-126	DEUTSCH	4	RS232	DT06-4S-EP06	DT04-4P-E004
CN-139	AMP	2	12V socket (opt)	172434-2	-
CN-139	AMP	2	12V socket (std)	174198-1	-
CN-140	DEUTSCH	2	Quick coupler	DT06-2S-EP06	DT04-2P-E005
CN-142	DEUTSCH	3	Accel dial	DT06-3S-EP06	-
CN-142	AMP	2	Accel dial lamp	174352-2	-
CN-145	DEUTSCH	2	Fuel feed pump	DT06-2S-EP06	-
CN-148	DEUTSCH	6	Service tool	DT06-6S-EP06	DT04-6P-E005
CN-157	-	1	Antena power	S822-014000	-
CN-170	-	2	Seat heat switch	12052641	-
CN-240	DEUTSCH	3	Boom swing/rotating switch	DT06-3S-EP06	-
CN-240A	DEUTSCH	2	Horn switch	-	DT04-2P-E005
CN-240B	DEUTSCH	3	Boom swing/rotating sel switch	DT06-2S-EP06	-
CN-240C	-	1	N.A	-	S822-114000
CN-241	DEUTSCH	3	2 way clamp switch	DT06-3S-EP06	-
CN-241A	DEUTSCH	2	Breaker switch	-	DT04-2P-E005
CN-241B	DEUTSCH	2	Proportional ON/OFF switch	DT06-2S-EP06	-
CN-241C	-	1	Q/C disengage switch	-	S822-114000
CN-242	DEUTSCH	3	Angle dozer switch	DT06-3S-EP06	DT04-3P-E005
CN-247	AMP	1	USB socket	171809	-
CN-249	DEUTSCH	6	Rear camera	DT06-3S-EP06	-
CN-249A	DEUTSCH	6	Rear camera	DT06-6S-EP06	DT04-6P-E005
CN-264	DEUTSCH	8	PVG EPPR	DT06-8S	DT04-8P
CN-264	DEUTSCH	8	Console harness-Main harness	DT06-8S	DT04-8P
CN-305	DEUTSCH	12	AVCU	DTM06-06-12SA	-
CN-306	DEUTSCH	12	AVCU	DTM06-06-12SB	-

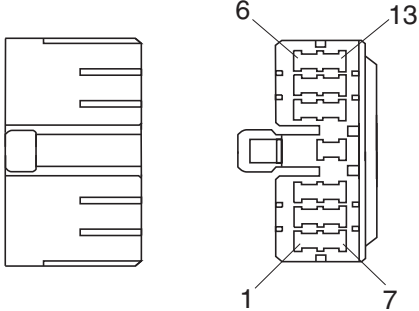
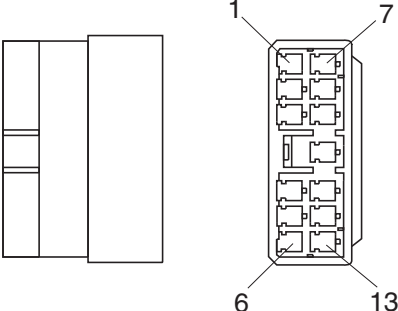
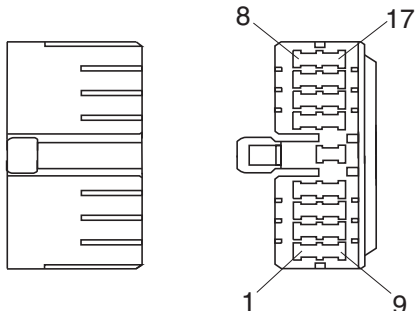
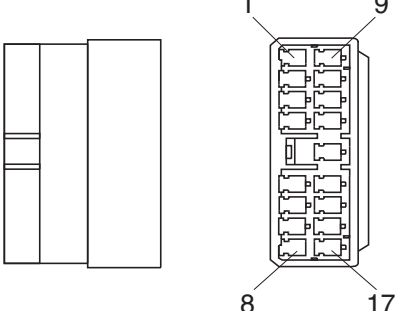
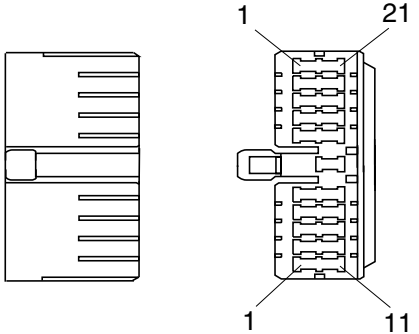
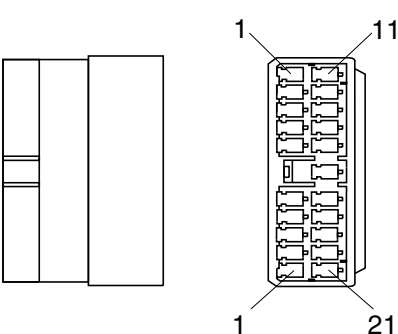
Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-307	DEUTSCH	3	Service tool	DT06-3S-EP06	DT04-3P-E005
CN-402	DEUTSCH	6	Front view camera	DT06-6S-EP06	DT04-6P-E005
CN-404	DEUTSCH	6	LH view camera	DT06-6S-EP06	DT04-6P-E005
CN-427	-	12	Smart key reader	5557-12R	5559-12P
CN-433	DEUTSCH	2	Pattern change harness	DT06-2S-EP06	DT04-2P-E005
CN-433A	DEUTSCH	2	Pattern change solenoid	DT06-2S-EP06	-
CN-433B	DEUTSCH	2	Pattern change solenoid	DT06-2S-EP06	-
CN-542	DEUTSCH	6	Service tool (ECU)	DT06-6S-EP06	DT04-6P-E005
CN-641	KET	3	Button key (opt)	MG641035	-
CN-641A	KET	3	BKCU (opt)	MG651032	-
CN-A1	DEUTSCH	2	EPPR- Rotate or boom swing RH	DT06-2S-EP06	-
CN-A2	DEUTSCH	2	EPPR- Rotate or boom swing LH	DT06-2S-EP06	-
CN-A3	DEUTSCH	2	EPPR- Release or breaker	DT06-2S-EP06	-
CN-A4	DEUTSCH	2	EPPR- Clamp	DT06-2S-EP06	-
CN-INTER 1	KET	1	Inter connection 1	-	MG643800
CN-INTER 2	KET	6	Inter connection 2	-	MG610513
· LAMP					
CL-1	KET	2	Room lamp	MG610392	-
CL-3	DEUTSCH	2	Head lamp	DT06-2S-EP06	DT04-2P-E005
CL-4	DEUTSCH	2	Head lamp	DT06-2S-EP06	DT04-2P-E005
CL-5	DEUTSCH	2	Work lamp	DT06-2S-EP06	DT04-2P-E005
CL-7	DEUTSCH	2	Beacon lamp	DT06-2S-EP06	DT04-2P-E005
CL-9	DEUTSCH	2	Cabin lamp	DT06-2S-EP06	DT04-2P-E005
CL-10	DEUTSCH	2	Cabin lamp	DT06-2S-EP06	DT04-2P-E005
· RELAY					
CR-1	AMP	2/-	Battery relay	S816-002002	S816-102002
CR-1	DONGA	-	Battery relay contact (IG)	S820-408000	-
CR-2	-	5	Horn relay	SJA003526-001	-
CR-3	-	5	Work lamp relay	SJA003526-001	-
CR-4	-	5	Wiper relay	SJA003526-001	-
CR-5	-	5	Anti-restart relay	SJA003526-001	-
CR-6	KET	4	Int wiper relay	MG652999	-
CR-7	-	5	AC comp relay	SJA003526-001	-
CR-9	-	5	Cabin lamp relay	SJA003526-001	-
CR-13	-	5	Head lamp relay	SJA003526-001	-
CR-23	KET	4	Start relay	MG612017-5	-
CR-24	KET	4	Air heater relay	MG612017-5	-
CR-45	-	5	ECU power relay	SJA003526-001	-
CR-68	-	5	Safety solenoid relay	SJA003526-001	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CR-85	-	5	Beacon lamp relay	SJA003526-001	-
CR-385	-	5	Start limit relay	SJA003526-001	-
· SENDER					
CD-1	AMP	2	Hydraulic temp sender	85202-1	-
CD-2	AMP	2	Fuel sender	-	S816-102002
CD-7	DEUTSCH	3	Auto idle pressure switch	DT06-3S-EP06	-
CD-10	AMP	2	Air cleaner switch	85202-1	-
CD-11	KET	2	Travel pressure switch	MG640795	-
CD-12	KET	2	Travel pressure switch	MG640795	-
CD-31	DEUTSCH	3	Overload pressure switch	DT06-3S-EP06	DT04-3P-E005
CD-32	DEUTSCH	3	Boom up pressure switch	DT06-3S-EP06	-
CD-45	DEUTSCH	2	WIF sensor	DT06-2S-EP06	-
CD-158	AMP	4	MAF sensor	1-178645-1	-
DO-1	AMP	2	Diode	174352-2	21EA-50570
DO-2	AMP	2	Diode	174352-2	21EA-50550
DO-3	AMP	2	Diode	174352-2	21EA-50550
DO-20	AMP	2	Diode	S816-002002	21EA-50550
· SWITCH					
CS-2	KET	6	Start key switch	S814-006000	-
CS-2B	DEUTSCH	3	BKCU	DT06-3S-EP06	DT04-3P-E005
CS-3	CARLING	10	Wiper switch	VC2-01	-
CS-4	AMP	4	Safety switch	174257-2	-
CS-4A	AMP	4	Safety switch	-	174259-2
CS-16	AMP	2	Fuel filler pump switch	174352-2	174354-2
CS-26A	AMP	2	Foot pedal	174352-2	174359-2
CS-30	CARLING	10	Wiper/washer switch	VC2-01	-
CS-33	AMP	6	Emergency switch	174262-2	-
CS-50	CARLING	10	Overload switch	VC2-01	-
CS-67	CARLING	10	Quick coupler switch	VC2-01	-
CS-74A	YAZAKI	2	Master switch	S813-030201	S813-130201
CS-76	CARLING	10	Pattern change switch	VC2-01	-
CS-250	DEUTSCH	2	Seat belt alarm	DT06-2S-EP06	DT04-2P-E005

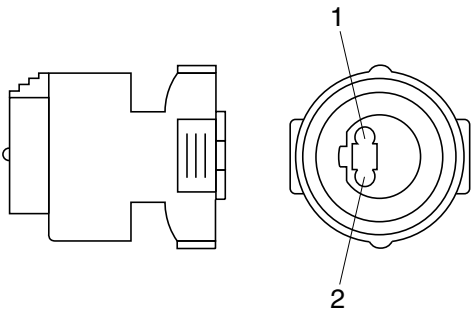
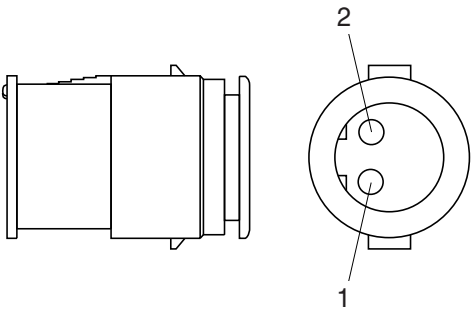
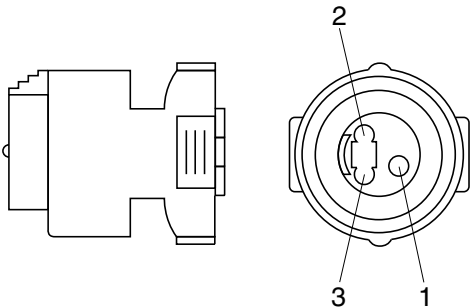
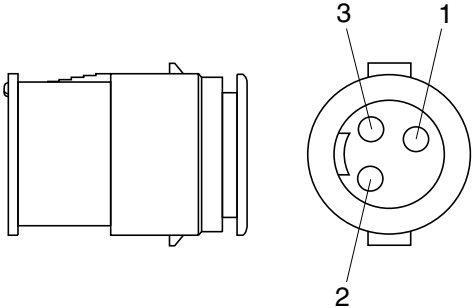
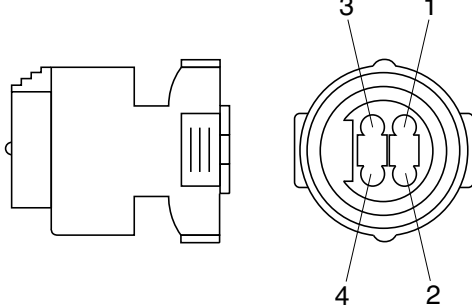
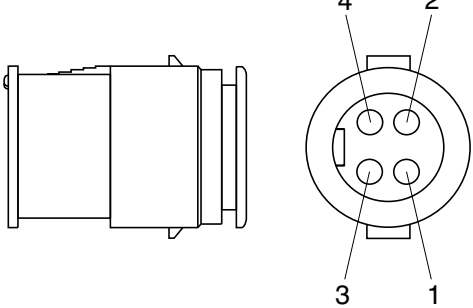
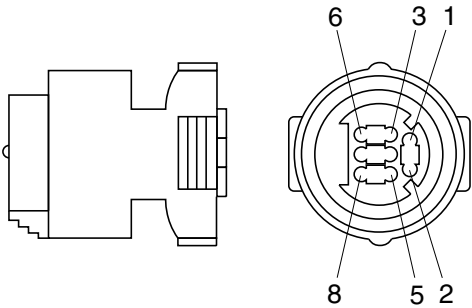
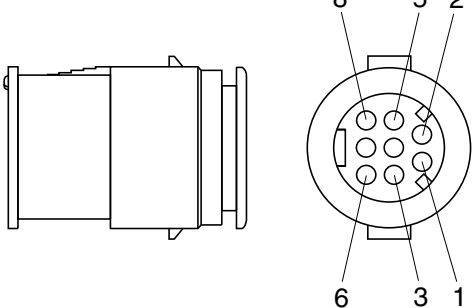
2. CONNECTION TABLE FOR CONNECTORS

1) PA TYPE CONNECTOR

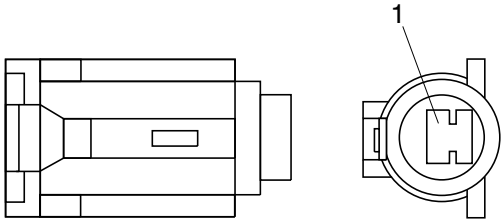
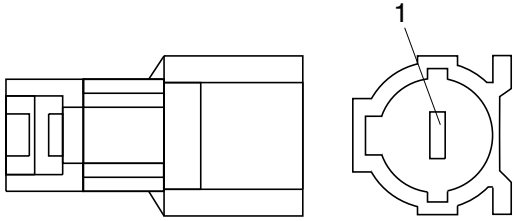
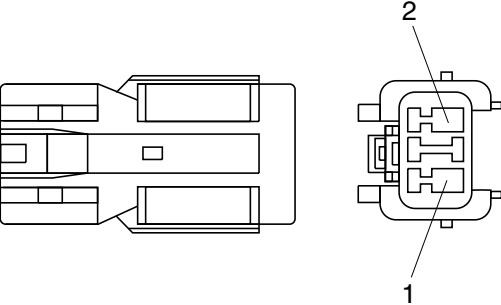
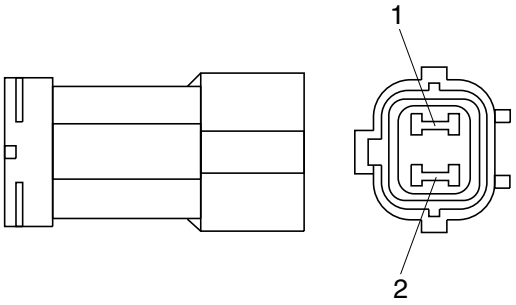
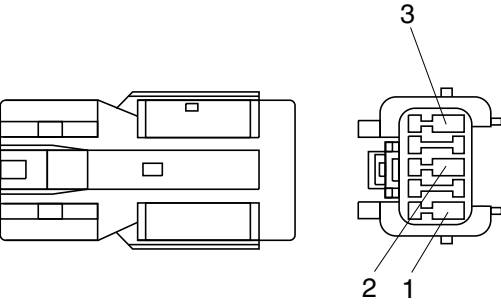
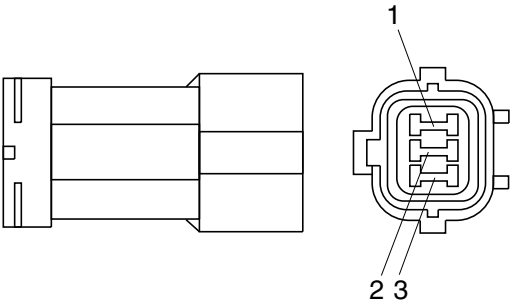
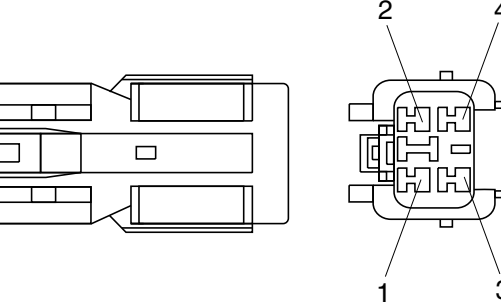
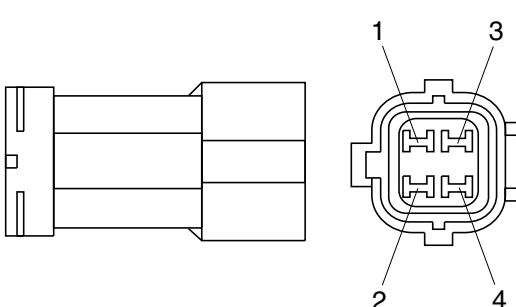
No. of pin	Receptacle connector (female)	Plug connector (male)
5	 S811-005002	 S811-105002
7	 S811-007002	 S811-107002
9	 S811-009002	 S811-109002
11	 S811-011002	 S811-111002

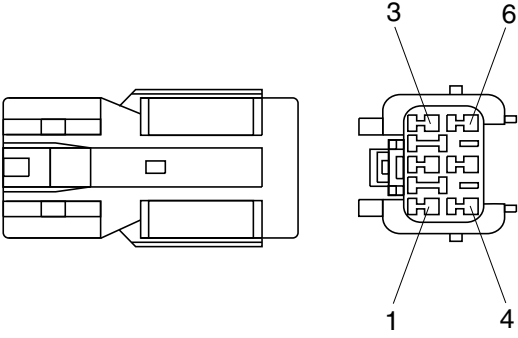
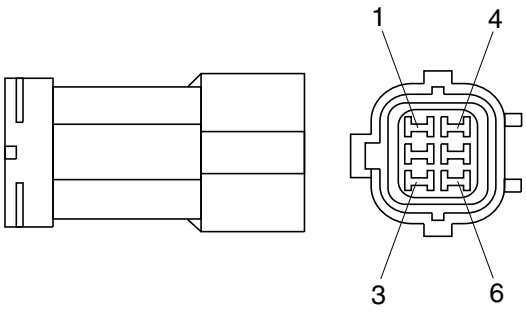
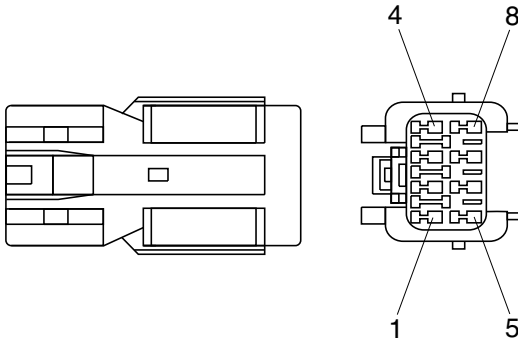
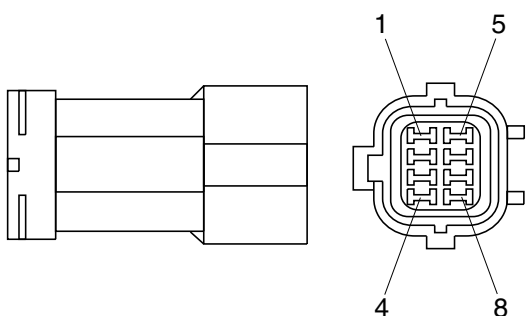
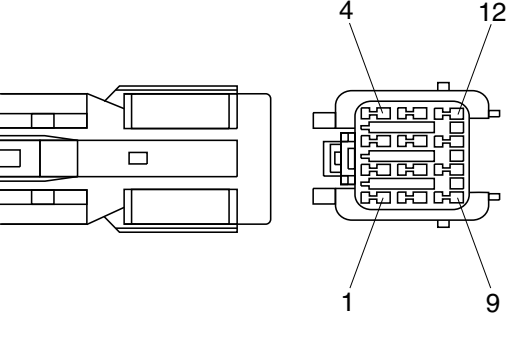
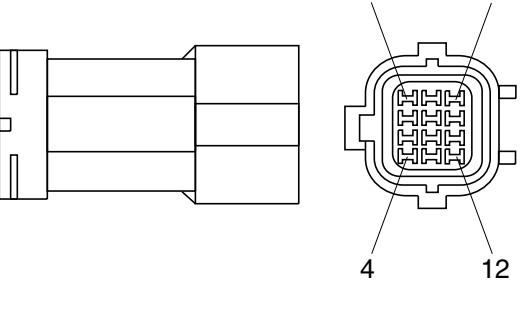
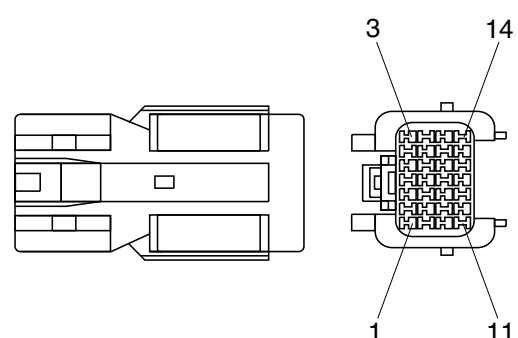
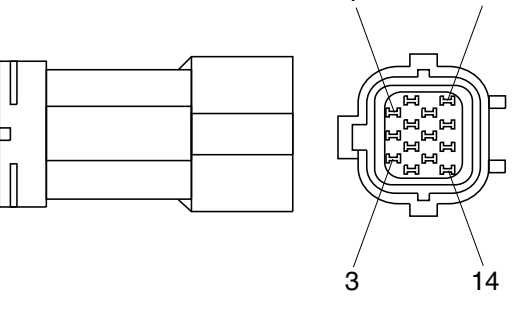
No. of pin	Receptacle connector (female)	Plug connector (male)
13	 S811-013002	 S811-113002
17	 S811-017002	 S811-117002
21	 S811-021002	 S811-121002

2) J TYPE CONNECTOR

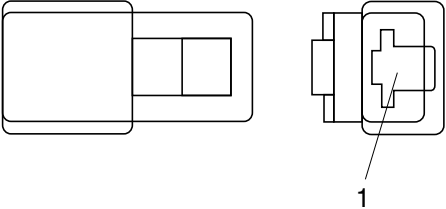
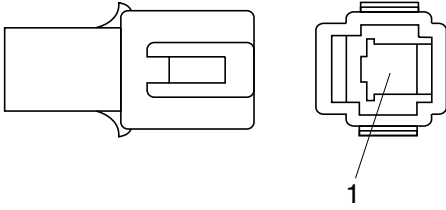
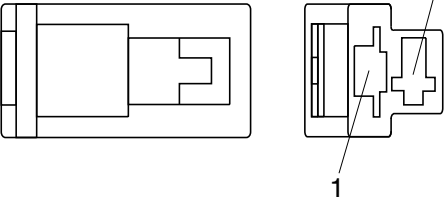
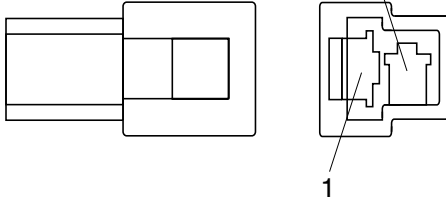
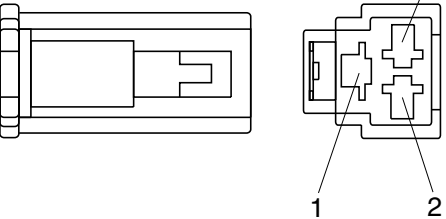
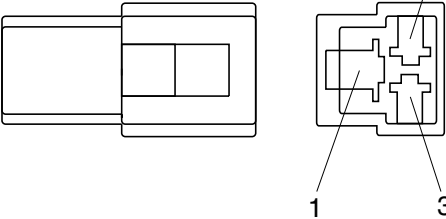
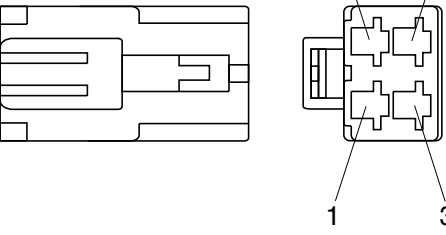
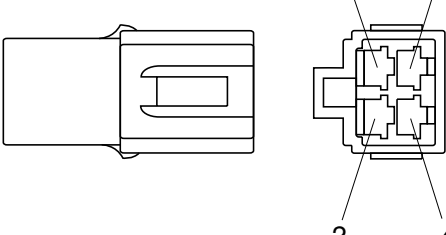
No. of pin	Receptacle connector (female)	Plug connector (male)
2	 S816-002001	 S816-102001
3	 S816-003001	 S816-103001
4	 S816-004001	 S816-104001
8	 S816-008001	 S816-108001

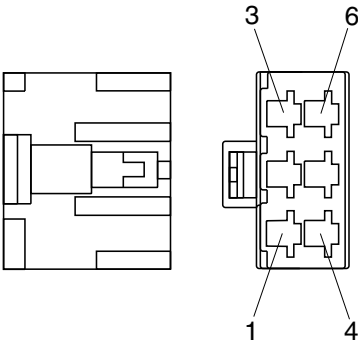
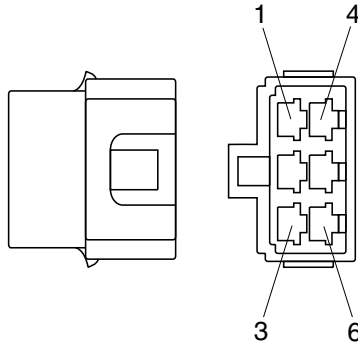
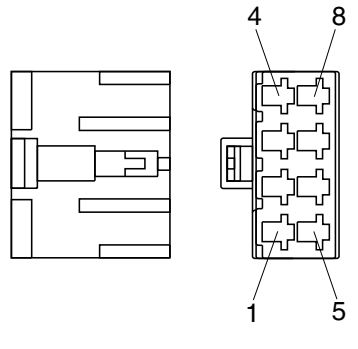
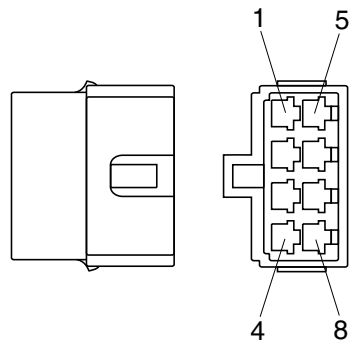
3) SWP TYPE CONNECTOR

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

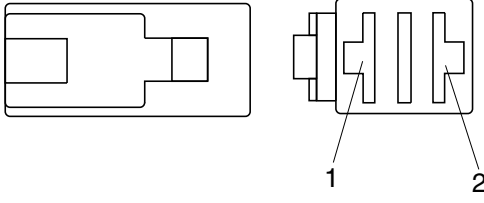
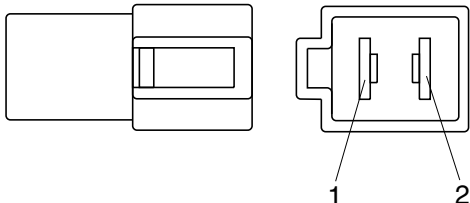
No. of pin	Receptacle connector (female)	Plug connector (male)
6	 S814-006000	 S814-106000
8	 S814-008000	 S814-108000
12	 S814-012000	 S814-112000
14	 S814-014000	 S814-114000

4) CN TYPE CONNECTOR

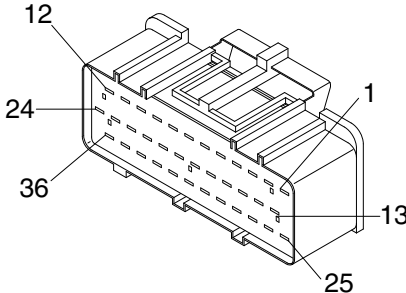
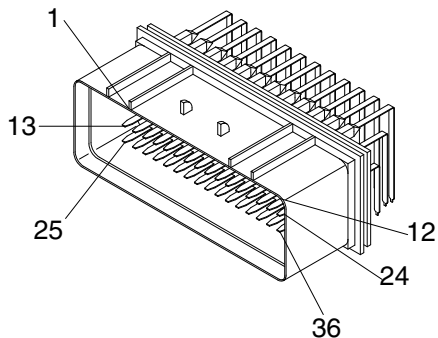
No. of pin	Receptacle connector (female)	Plug connector (male)
1	 S810-001202	 S810-101202
2	 S810-002202	 S810-102202
3	 S810-003202	 S810-103202
4	 S810-004202	 S810-104202

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

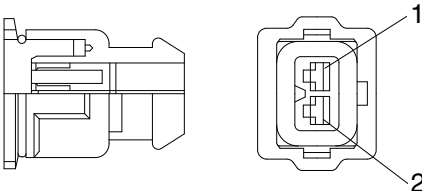
5) 375 FASTEN TYPE CONNECTOR

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

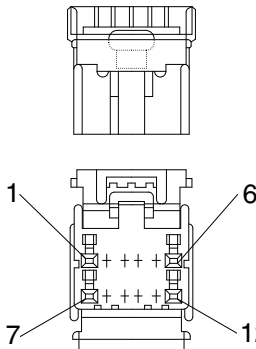
6) AMP ECONOSEAL CONNECTOR

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

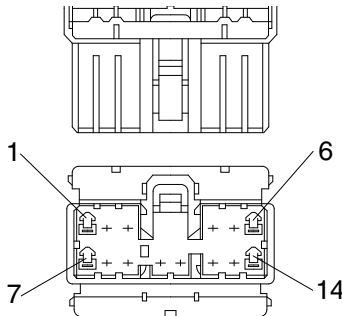
7) AMP TIMER CONNECTOR

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

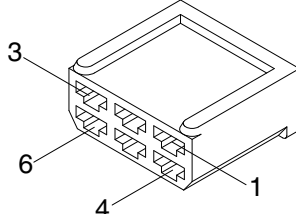
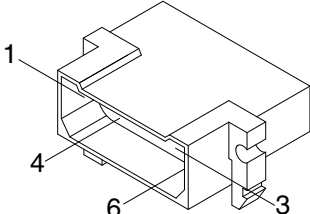
8) AMP 040 MULTILOCK CONNECTOR

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

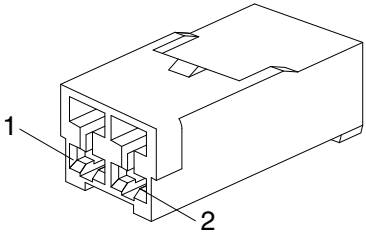
9) AMP 070 MULTILOCK CONNECTOR

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

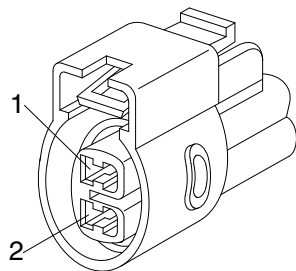
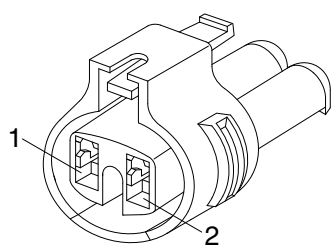
10) AMP FASTIN - FASTON CONNECTOR

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

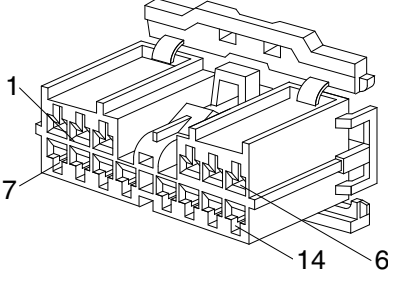
11) KET 090 CONNECTOR

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

12) KET 090 WP CONNECTORS

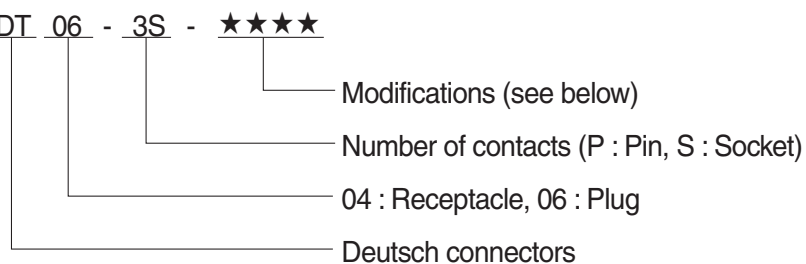
No. of pin	Receptacle connector (female)	Plug connector (male)
2	 MG640605	
2	 MG640795	

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

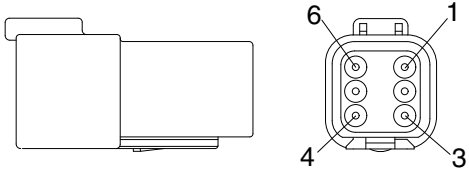
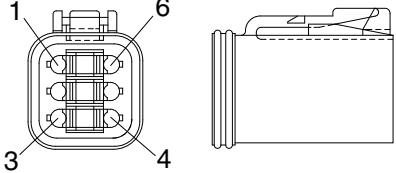
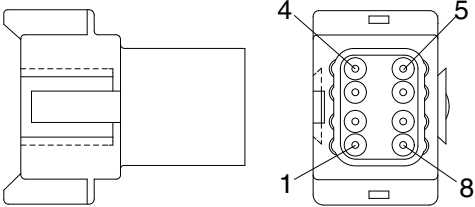
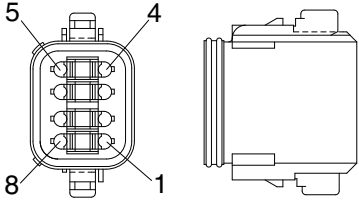
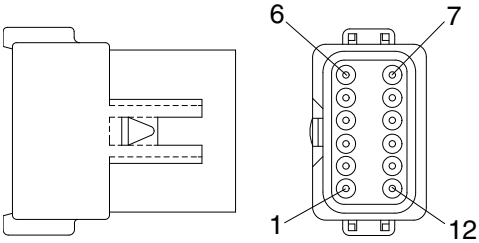
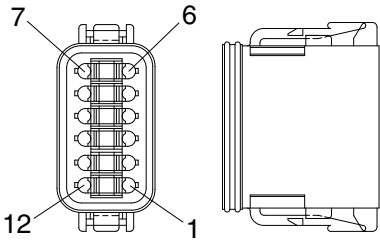
E005 : Combination - E004 & E003

EP04 : End cap

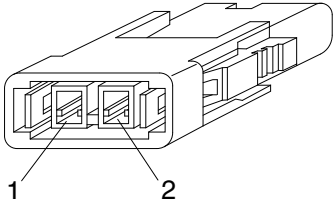
EP06 : Combination P012 & EP04

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

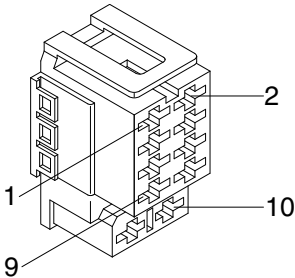
No. of pin	Receptacle connector (female)	Plug connector (male)
2	DT06-2S	DT06-2P
3	DT06-3S	DT06-3P
4	DT06-4S	DT06-4P

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

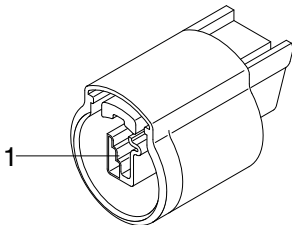
15) MOLEX 2CKTS CONNECTOR

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

Fault code		Description
HCESPN	FMI	
840	2	Cluster communication data error
841	2	ECM communication data error
ISDP	2	Water in fuel warning
Lo bat	2	Low battery warning

2. ENGINE FAULT CODE

Fault code		Description
SPN	FMI	
0	19	Timeout Error of CAN-Receive-Frame TSC1VE (Engine speed & Torque demand)
27	0	EGR Position Open jammed fault
27	1	EGR Position Closed jammed fault
27	3	EGR Position Sensor High Fault
27	4	EGR Position Sensor Low Fault
27	20	EGR Close Position Learning Range Over Fault
27	22	EGR Close Position Learning Drift Fault for long time
27	23	EGR Close Position Learning Drift Fault for short time
29	3	Accel pedal position track2 sensor High fault
29	4	Accel pedal position track2 sensor Low fault
29	15	Hand pedal position track2 sensor High fault
29	17	Hand pedal position track2 sensor Low fault
51	0	Throttle valve Position Open jammed fault
51	1	Throttle valve Position Closed jammed fault
51	3	Throttle valve Position Sensor High Fault
51	4	Throttle valve Position Sensor Low Fault
51	22	Throttle valve Close Position Learning Drift Fault for long time
51	23	Throttle valve Close Position Learning Drift Fault for short time
51	30	Throttle valve Close Position Learning Range Over Fault
91	3	Accel pedal position track1 sensor High fault
91	4	Accel pedal position track1 sensor Low fault
91	11	Accel pedal position sensor plausibility fault (Not synchronism between track1 and track2)
91	12	Hand pedal position sensor plausibility fault (Not synchronism between track1 and track2)
91	15	Hand pedal position track1 sensor High fault
91	17	Hand pedal position track1 sensor Low fault
91	19	Timeout Error of CAN-Receive-Frame EEC2 (Pedal)
97	3	Water In Fuel Sensor signal range high fault
97	4	Water In Fuel Sensor signal range low fault
97	14	Water in fuel detected – Warning step
97	23	Water in fuel detected – Torque de-rate step (After 20min)
98	3	Oil combination (Level and temperature) signal output short circuit to battery error
98	4	Oil combination (Level and temperature) signal output short circuit to ground error
98	5	Oil combination (Level and temperature) sensor itself open or short circuit error
98	18	Engine oil level is too low (Low step3)
98	22	Oil combination (Level and temperature) sensor timeout fault
98	23	Oil combination (Level and temperature) sensor itself Voltage out of range error
98	24	Engine oil level is low (Low step2)

Fault code		Description
SPN	FMI	
100	1	Engine Oil Pressure Too Low Fault
100	3	Engine Oil Pressure Sensor High Fault
100	4	Engine Oil Pressure Sensor Low Fault
102	3	Intake Manifold Pressure Sensor High Fault
102	4	Intake Manifold Pressure Sensor Low Fault
105	3	Intake manifold temperature sensor High fault
105	4	Intake manifold temperature sensor Low fault
105	16	Intake manifold temperature High fault
108	3	Atmospheric Pressure Sensor High Fault
108	4	Atmospheric Pressure Sensor Low Fault
110	0	Coolant high temperature Fault
110	3	Coolant Temperature Sensor High Fault
110	4	Coolant Temperature Sensor Low Fault
110	10	Coolant Temperature Plausibility Fault
132	1	Intake manifold pressure low plausibility fault (Compressor out pressure too low)
132	3	Signal range check high error for Air mass flow sensor
132	4	Signal range check low error for Air mass flow sensor
132	5	Battery voltage error of Air mass flow sensor
132	19	Signal error of Air mass flow sensor
132	21	Sensitivity drift error low for Air mass flow sensor
157	10	Fuel Leakage is detected based on fuel quantity balance
157	11	Maximum positive deviation of rail pressure exceeded
157	26	Rail pressure too low fault
157	27	Maximum rail pressure exceeded
157	28	Pressure relief valve(PRV) failure
171	0	Environment Temperature Too High
171	3	Environment Temperature Sensor Signal High
171	4	Environment Temperature Sensor Signal Low
172	0	Inlet air temperature High fault
172	3	Inlet air temperature sensor High fault
172	4	Inlet air temperature sensor Low fault
173	1	DOC Exothermal Efficiency Fault
174	0	Fuel temperature high fault
174	3	Fuel Temperature Sensor High Fault
174	4	Fuel Temperature Sensor Low Fault
175	11	Oil combination (Level and temperature) sensor itself Oil temperature out of range error
177	15	Transmission oil temperature high fault (CAN)
177	16	Transmission oil temperature high fault (H/W Switch)
190	0	Engine over speed detection fault

Fault code		Description
SPN	FMI	
444	0	Battery Voltage High fault (Warning)
444	1	Battery Voltage Low fault (Warning)
444	2	Powerstage diagnosis could be disabled due to low Battery voltage
444	3	Battery Voltage Signal Range Max fault
444	4	Battery Voltage Signal Range Min fault
444	12	Powerstage diagnosis disabled due to high Battery voltage
626	12	Starter switch stuck fault (Cranking request is too long.)
636	2	Crank Signal disturbed fault
636	8	Cranks No signal error
637	2	Cam Signal disturbed fault
637	8	Cam Signal Lost fault
637	30	Cam Signal Drift Fault
639	2	CAN communication error
639	19	CAN bus off error
651	2	Injector Code(IQA) Program Missing Fault (Cylinder#1)
651	4	Injector Short circuit Fault (Cylinder #1)
651	5	Injector Open circuit Fault (Cylinder #1)
651	22	Injector High Low side Short circuit Fault (Cylinder #1)
652	2	Injector Code(IQA) Program Missing Fault (Cylinder#2)
652	4	Injector Short circuit Fault (Cylinder #2)
652	5	Injector Open circuit Fault (Cylinder #2)
652	22	Injector High Low side Short circuit Fault (Cylinder #2)
653	2	Injector Code(IQA) Program Missing Fault (Cylinder#3)
653	4	Injector Short circuit Fault (Cylinder #3)
653	5	Injector Open circuit Fault (Cylinder #3)
653	22	Injector High Low side Short circuit Fault (Cylinder #3)
654	2	Injector Code(IQA) Program Missing Fault (Cylinder#4)
654	4	Injector Short circuit Fault (Cylinder #4)
654	5	Injector Open circuit Fault (Cylinder #4)
654	22	Injector High Low side Short circuit Fault (Cylinder #4)
676	3	Glow plug Relay driver Short circuit to Battery Fault
676	4	Glow plug Relay driver Short circuit to Ground Fault
676	5	Glow plug Relay driver Open circuit Fault
970	12	Engine shut off request through CAN (EBC1)
970	22	Engine shut off request through hardwire
975	3	PWM FAN Output short to battery circuit fault
975	4	PWM FAN Output short to ground circuit fault
975	5	PWM FAN Output open circuit fault
987	3	CE(Check engine) Lamp Short to Battery

Fault code		Description
SPN	FMI	
987	4	CE(Check engine) Lamp Short to Ground
987	5	CE(Check engine) Lamp Open circuit
1076	3	Fuel Metering unit plausibility error in overrun mode
1076	4	Fuel Metering unit plausibility error in idle mode
1076	16	Maximum negative rail pressure deviation with metering unit on lower limit is exceeded
1076	20	Rail pressure too low for injection
1081	3	Glow plug Lamp Short to Battery
1081	4	Glow plug Lamp Short to Ground
1081	5	Glow plug Lamp Open circuit
1207	0	ECU temperature High fault
1207	3	ECU temperature sensor High fault (Short circuit to battery)
1207	4	ECU temperature sensor Low fault (Short circuit to ground)
1382	0	Fuel filter pressure high fault
1382	1	Fuel filter pressure low fault
1382	3	Fuel filter pressure sensor signal high fault
1382	4	Fuel filter pressure sensor signal low fault
1382	7	Fuel Filter Pressure low detection 1 - Warning
1382	13	Fuel Filter Pressure low detection 2 - Torque reduction
1485	7	ECU Main relay Stuck fault
1485	11	ECU Main relay Early opening fault
1568	3	Multi-torque switch signal too high fault
1568	4	Multi-torque switch signal too low fault
1612	3	Injector bank 1st Short circuit fault
1612	12	Injector bank 2nd Short circuit fault
1639	3	Fan speed too high fault
1639	4	Fan speed too low fault
1639	11	Fan speed signal long period fault path
1761	19	DEF Tank Level Signal error
1867	1	ECU over temperature for SCR Monitoring
1867	3	"ABE active" report due to overvoltage detection
1867	4	"ABE active" report due to undervoltage detection
1867	11	"WDA/ABE active" report due to unknown reason
1867	19	"WDA active" report due to errors in query-response communication
1867	22	ECU Software Reset 0 fault
2789	0	Turbine inlet temperature High fault
2789	3	Turbine inlet temperature sensor High fault
2789	4	Turbine inlet temperature sensor Low fault
2789	11	Turbine inlet temperature Plausibility Fault
2791	3	EGR H-Bridge Driver Short circuit to battery

Fault code		Description
SPN	FMI	
2791	4	EGR H-Bridge Driver Short circuit to ground
2791	5	EGR H-Bridge Driver Open Circuit Fault
3031	14	DEF Tank temperature overheated
3031	16	DEF Tank Temperature sensor High plausibility fault
3031	18	DEF Tank Temperature sensor Low plausibility fault
3216	4	NOx sensor signal low fault (Upstream NOx sensor)
3216	18	NOx sensor 1 (Upstream) concentration Low plausibility fault
3219	7	NOx sensor heating error (Upstream NOx sensor)
3224	5	NOx sensor Open circuit fault (Upstream NOx sensor)
3224	6	NOx sensor Short circuit fault (Upstream NOx sensor)
3226	4	NOx sensor signal low fault (Downstream NOx sensor)
3229	7	NOx sensor heating error (Downstream NOx sensor)
3234	5	NOx sensor Open circuit fault (Downstream NOx sensor)
3234	6	NOx sensor Short circuit fault (Downstream NOx sensor)
3236	0	EGR rate slow response positive error
3236	16	Maximum EGR rate governor deviation
3242	0	DPF(SCRf) inlet temperature High fault
3242	3	DPF(SCRf) inlet temperature sensor High fault
3242	4	DPF(SCRf) inlet temperature sensor Low fault
3242	11	DPF(SCRf) inlet temperature Plausibility Fault
3242	20	DPF(SCRf) inlet temperature Drift fault
3251	3	DPF differential pressure sensor High fault
3251	4	DPF differential pressure sensor Low fault
3251	13	DPF differential pressure drift fault
3251	18	DPF differential pressure too low fault
3360	14	DEF pressure line heater error (Perform afterrun)
3361	3	DEF dosing valve actuator Short circuit to battery Fault
3361	4	DEF dosing valve actuator Short circuit to ground Fault
3361	5	DEF dosing valve actuator Open Circuit Fault
3361	13	DEF dosing valve actuator Over temperature Fault
3361	14	Urea dosing valve plausibility fault
3361	22	DEF dosing valve actuator HS(High side) Short circuit to battery Fault
3361	23	DEF dosing valve actuator HS(High side) Short circuit to ground Fault
3361	27	DEF Dosing valve is blocked
3363	3	DEF Tank heating coolant valve output Short circuit to battery Fault
3363	4	DEF Tank heating coolant valve output Short circuit to ground Fault
3363	5	DEF Tank heating coolant valve output Open circuit Fault
3363	7	DEF Tank heating coolant valve output Over temperature Fault
3509	3	ECU Sensor supply1 Over voltage fault

Fault code		Description
SPN	FMI	
3509	4	ECU Sensor supply1 Under voltage fault
3509	5	ECU Sensor supply1 voltage fault
3509	6	ECU Sensor supply1 Short circuit to ground
3509	11	ECU Sensor supply Overvoltage monitoring error
3510	3	ECU Sensor supply2 Over voltage fault
3510	4	ECU Sensor supply2 Under voltage fault
3510	5	ECU Sensor supply2 voltage fault
3510	6	ECU Sensor supply2 Short circuit to ground
3510	11	ECU Sensor supply Undervoltage monitoring error
3511	3	ECU Sensor supply3 Over voltage fault
3511	4	ECU Sensor supply3 Under voltage fault
3511	5	ECU Sensor supply3 voltage fault
3511	6	ECU Sensor supply3 Short circuit to ground
3516	0	DEF Quality Too High fault
3516	1	DEF Quality Too Low fault
3517	18	DEF Tank level is empty
3520	3	DEF Quality Sensor Open circuit
3520	4	DEF Quality Sensor Short circuit
3532	3	DEF Level Sensor Open circuit
3532	4	DEF Level Sensor Short circuit
3695	3	DPF regeneration inhibit switch Stuck (Short to Battery) fault (Hardwire)
3696	3	DPF regeneration enable switch Stuck (Short to Battery) fault (Hardwire)
3696	11	DPF regeneration inhibit & enable switch plausibility fault (Hardwire)
3697	3	DPF lamp 1 (DPF regeneration switch enable lamp) Short to Battery
3697	4	DPF lamp 1 (DPF regeneration switch enable lamp) Short to Ground
3697	5	DPF lamp 1 (DPF regeneration switch enable lamp) Open circuit
3715	14	DPF regeneration failure (DPF regeneration is not performed well during machine operation mode)
3720	16	DPF Ash loading High fault (Ash cleaning is needed)
4082	3	Fuel metering unit Short circuit to Battery fault
4082	4	Fuel metering unit Short circuit to Ground fault
4082	5	Fuel metering unit Open circuit fault
4082	7	Fuel metering unit Over temperature fault
4335	0	DEF Overpressure error at METERINGCONTROL (DEF pump pressure is too high)
4335	1	DEF Underpressure error at METERINGCONTROL (DEF pump pressure is too low)
4335	2	DEF pressure build up error at PRESSUREBUILDUP (DEF pump pressure is too low)
4335	7	DEF Leakage detection at METERINGCONTROL
4335	12	DEF Overpressure error regardless of the state (DEF pump pressure is too high)

Fault code		Description
SPN	FMI	
4335	15	DEF Pressure reduction error at PRESSUREREDUCTION (Detected an insufficient pressure drop)
4335	16	DEF underpressure error at AFTERRUN_PRESSURECOMPENSATION
4344	2	DEF backflow Line plausibility error at DETECTIONMODE (Does not detect a pressure drop)
4354	5	DEF Pressure line heater circuit Open circuit Fault
4354	6	DEF Pressure line heater circuit Open circuit or Short circuit to ground Fault
4355	5	DEF Backflow line heater circuit Open circuit Fault
4355	6	DEF Backflow line heater circuit Open circuit or Short circuit to ground Fault
4356	5	DEF Suction line heater circuit Open circuit Fault
4356	6	DEF Suction line heater circuit Open circuit or Short circuit to ground Fault
4364	14	SCR Efficiency Too low fault
4365	3	DEF Temperature Sensor Open circuit
4365	4	DEF Temperature Sensor Short circuit
4365	14	DEF Tank temperature plausibility fault (Insufficient temperature increment)
4374	3	DEF Supply Pump Motor Signal output Short circuit to battery Fault
4374	4	DEF Supply Pump Motor Signal output Short circuit to ground Fault
4374	5	DEF Supply Pump Motor Signal output Open circuit Fault
4374	7	DEF Supply Pump Motor Signal output Over temperature Fault
4374	8	DEF Supply Pump Motor Speed Deviation Fault
4374	9	DEF Supply Pump Motor Speed Deviation Permanent Fault
4374	12	DEF Supply Pump Motor No activation Fault
4781	15	DPF Soot mass too high status (> 120%)
4781	16	DPF Soot mass high status (> 110%)
5067	3	PTO (Idle up) Lamp Short to Battery
5067	4	PTO (Idle up) Lamp Short to Ground
5067	5	PTO (Idle up) Lamp Open circuit
5099	3	Oil Pressure Warning Lamp Short to Battery
5099	4	Short circuit to ground error of oil pressure lamp
5099	5	Oil Pressure Warning Lamp Open circuit
5313	3	Rail pressure sensor High fault
5313	4	Rail pressure sensor Low fault
5419	3	Throttle valve H-Bridge Driver Short circuit to battery
5419	4	Throttle valve H-Bridge Driver Short circuit to ground
5419	5	Throttle valve H-Bridge Driver Open Circuit Fault
5435	10	DEF pressure stabilization error at DETECTIONMODE (DEF pump pressure is not stable)
5435	12	DEF pressure check error at DETECTIONMODE (Detected an insufficient pressure drop)
5436	3	DEF Reverting valve output Short circuit to battery Fault
5436	4	DEF Reverting valve output Short circuit to ground Fault

Fault code		Description
SPN	FMI	
5436	5	DEF Reverting valve output Open circuit Fault
5436	7	DEF Reverting valve output Over temperature Fault
5436	11	DEF Reverting valve Pressure drop plausibility fault
5436	14	DEF Reverting valve is blocked (Detected an insufficient pressure drop)
5491	3	DEF Pressure line heater relay output Short circuit to battery Fault
5491	4	DEF Pressure line heater relay output Short circuit to ground Fault
5491	5	DEF Pressure line heater relay output Open circuit Fault
5491	7	DEF Pressure line heater relay output Over temperature Fault
5491	12	DEF Pressure line heater feedback plausibility Fault
5571	22	Common rail pressure relief valve reached maximum allowed opening count
5571	23	Common rail pressure relief valve Forced to open status (Pressure increase)
5571	24	Common rail pressure relief valve Forced to open status (Pressure shock)
5571	25	Common rail pressure relief valve is open
5571	27	Averaged rail pressure is outside the expected tolerance range
5571	28	Common rail pressure relief valve reached maximum allowed open time
5629	14	DPF differential pressure too high fault
5629	15	DPF differential pressure high fault (Warning)
5706	5	DEF Supply module heater circuit Open circuit Fault
5706	6	DEF Supply module heater circuit Open circuit or Short circuit to ground Fault
5706	12	DEF Supply module heater temperature plausibility fault (Insufficient temperature increment)
5706	14	DEF Supply module heater temperature plausibility fault at cold start (Insufficient temperature increment)
5706	22	DEF Supply module heater plausibility fault (Insufficient temperature increment)
5746	3	DEF Main heater relay output Short circuit to battery Fault
5746	4	DEF Main heater relay output Short circuit to ground Fault
5746	5	DEF Main heater relay output Open circuit Fault
5746	6	DEF heater line circuit Short circuit to battery Fault
5746	7	DEF Main heater relay output Over temperature Fault
5965	3	SCR system Main relay short circuit to battery
5965	4	SCR system Main relay short circuit to ground
5965	5	SCR system Main relay open circuit
6323	3	Electric fuel feed pump Output short to battery circuit fault
6323	4	Electric fuel feed pump Output short to ground circuit fault
6323	5	Electric fuel feed pump Output open circuit fault
6323	13	Electric fuel feed pump performance fault
6385	19	Timeout Error of CAN-Receive-Frame EOI (Engine Starter Motor Relay Control)
6875	3	DEF Supply Pump pressure sensor High fault
6875	4	DEF Supply Pump pressure sensor Low fault

Fault code		Description
SPN	FMI	
6875	16	DEF Supply Pump pressure sensor High plausibility fault
6875	18	DEF Supply Pump pressure sensor Low plausibility fault
6915	3	DPF lamp 2 (DPF Regeneration Active Lamp) Short to Battery
6915	4	DPF lamp 2 (DPF Regeneration Active Lamp) Short to Ground
6915	5	DPF lamp 2 (DPF Regeneration Active Lamp) Open circuit
6916	3	DPF lamp 3 (DPF regeneration switch inhibit lamp) Short to Battery
6916	4	DPF lamp 3 (DPF regeneration switch inhibit lamp) Short to Ground
6916	5	DPF lamp 3 (DPF regeneration switch inhibit lamp) Open circuit
7069	3	DEF Backflow line heater relay output Short circuit to battery Fault
7069	4	DEF Backflow line heater relay output Short circuit to ground Fault
7069	5	DEF Backflow line heater relay output Open circuit Fault
7069	7	DEF Backflow line heater relay output Over temperature Fault
7069	12	DEF Backflow line heater feedback plausibility Fault
7107	12	DEF Supply module temperature plausibility fault (Insufficient temperature increment)
7107	14	DEF Supply module temperature plausibility fault at cold start (Insufficient temperature increment)
7416	3	DEF Supply module heater relay output Short circuit to battery Fault
7416	4	DEF Supply module heater relay output Short circuit to ground Fault
7416	5	DEF Supply module heater relay output Open circuit Fault
7416	7	DEF Supply module heater relay output Over temperature Fault
7416	12	DEF Supply module heater feedback plausibility Fault
7538	12	DEF Supply module temperature duty cycle in failure range
7538	13	Diagnostic Fault Check for Urea supply module duty cycle in the invalid range
7538	22	DEF Supply module heater temperature duty cycle in failure range
7538	23	DEF Supply module heater temperature duty cycle in invalid range
7538	24	DEF Supply module temperature measurement non-availability fault
7538	25	DEF Supply module time period outside specified range
7538	26	DEF Supply module PWM signal fault
7540	3	DEF Suction line heater relay output Short circuit to battery Fault
7540	4	DEF Suction line heater relay output Short circuit to ground Fault
7540	5	DEF Suction line heater relay output Open circuit Fault
7540	7	DEF Suction line heater relay output Over temperature Fault
7540	12	DEF Suction line heater feedback plausibility Fault
7748	3	Starter relay power stage output short circuit to battery
7748	4	Starter relay HS power stage output short circuit to ground
7748	5	Starter relay power stage output open circuit
8614	12	Injection cut off demand (ICO) for shut off coordinator
55296	12	ECU EEPROM Read Error
55552	12	ECU EEPROM Write Error

Fault code		Description
SPN	FMI	
57344	19	Timeout Error of CAN-Receive-Frame CM1 (Status of regeneration initiate and inhibit switches)
61441	19	Timeout Error of CAN-Receive-Frame EBC1 (Engine shut off request)
61454	19	Timeout Error of CAN-Receive-Frame AT1IG1 (NOx Upstream Concentration)
61455	19	Timeout Error of CAN-Receive-Frame AT1O1 (NOx Downstream Concentration)
64923	19	Timeout Error of CAN-Receive-Frame A1DEFI (DEF Tank)
65110	19	Timeout Error of CAN-Receive-Frame AT1T1I (Urea Level, Temperature over CAN)
65164	19	Timeout Error of CAN-Receive-Frame AAI (Hydraulic Oil Temperature)
65241	19	Timeout Error of CAN-Receive-Frame AUXIO1 (status of vehicle cut off [Safety bar])
65265	19	Timeout Error of CAN-Receive-Frame RxCCVS (PTO / Idle up)
65272	19	Timeout Error of CAN-Receive-Frame TRF1 (Transmission oil temperature)
65320	19	Timeout Error of CAN-Receive-Frame FanCtl (FAN Control)
65400	19	Timeout Error of CAN-Receive-Frame RxSMVCU (Pedal & Engine speed demand from VCU)
65400	22	Message Check Sum Error of CAN Receive Frame SMVCU (Pedal & Engine speed demand from VCU)
65400	23	Message Counter Error of CAN Receive Frame SMVCU (Pedal & Engine speed demand from VCU)
65401	19	Timeout Error of CAN-Receive-Frame DPM1 (Air Conditioning Switch Status / Oil life reset)
65402	19	Timeout Error of CAN-Receive-Frame DPM9 (Multiple torque Map select switch)
104332	9	NOx sensor Mounting Error (Upstream NOx sensor)
104385	9	NOx sensor Mounting Error (Downstream NOx sensor)
520601	12	CY327(Power control chipset) SPI Communication Error
520618	12	ECU ADC(Analog to Digital Convertor) NTP(Null Load Test Pulse) Monitoring fault
520641	12	ECU ROM Memory multiple error
520642	12	ECU MM(Monitoring Module) Synchronization Loss fault during Shut-off path test
520643	12	MoF(Monitoring of Function) Over Run error
520696	12	ECU ADC(Analog to Digital Convertor) Test error
520697	12	ECU ADC(Analog to Digital Convertor) Voltage ratio error
520698	12	ECU query response-communication error
520699	12	ECU SPI-communication error
520700	12	ECU Shut-off path test error
520701	12	ECU Wrong set response time error during shut off path test
520702	12	ECU Too many SPI errors during shut off path test
520703	12	ECU WDA working error during Shut-off path test
520704	12	ECU OS Timeout error during Shut-off path test
520705	12	ECU Positive test failure error during Shut-off path test
520706	12	ECU Shut-off path test timeout fault
520707	3	ECU Overvoltage error during Shut-off path test
520707	4	ECU Undervoltage error during Shut-off path test

Fault code		Description
SPN	FMI	
520723	12	NCD Inducement Fault Level1 (Group1 - EGR Block)
520724	12	NCD Inducement Fault Level2 (Group1 - EGR Block)
520725	12	NCD Inducement Fault Level3 Final inducement (Group1 - EGR Block)
520726	12	NCD Inducement Fault Warning (Group1 - EGR Block)
520727	12	NCD Inducement Fault Level1 (Group2 – Dosing Interrupt)
520728	12	NCD Inducement Fault Level2 (Group2 – Dosing Interrupt)
520729	12	NCD Inducement Fault Level3 Final inducement (Group2 – Dosing Interrupt)
520730	12	NCD Inducement Fault Warning (Group2 – Dosing Interrupt)
520736	12	NCD inducement Fault Level1 (Group4 – DEF Quality)
520737	12	NCD inducement Fault Level2 (Group4 – DEF Quality)
520738	12	NCD inducement Fault Level3 Final inducement (Group4 – DEF Quality)
520739	12	NCD inducement Fault Warning (Group4 – DEF Quality)
520740	12	NCD inducement Fault Level1 (Group5 – Tampering)
520741	12	NCD inducement Fault Level2 (Group5 – Tampering)
520742	12	NCD inducement Fault Level3 Final inducement (Group5 – Tampering)
520743	12	NCD inducement Fault Warning (Group5 – Tampering)
520790	12	NCD inducement Repeat offense Level1
520791	12	NCD inducement Repeat offense Level2
520792	12	NCD inducement Repeat offense Level3 Final inducement
520797	12	MoF(Monitoring of Function) Engine speed error