SECTION 4 ELECTRICAL SYSTEM

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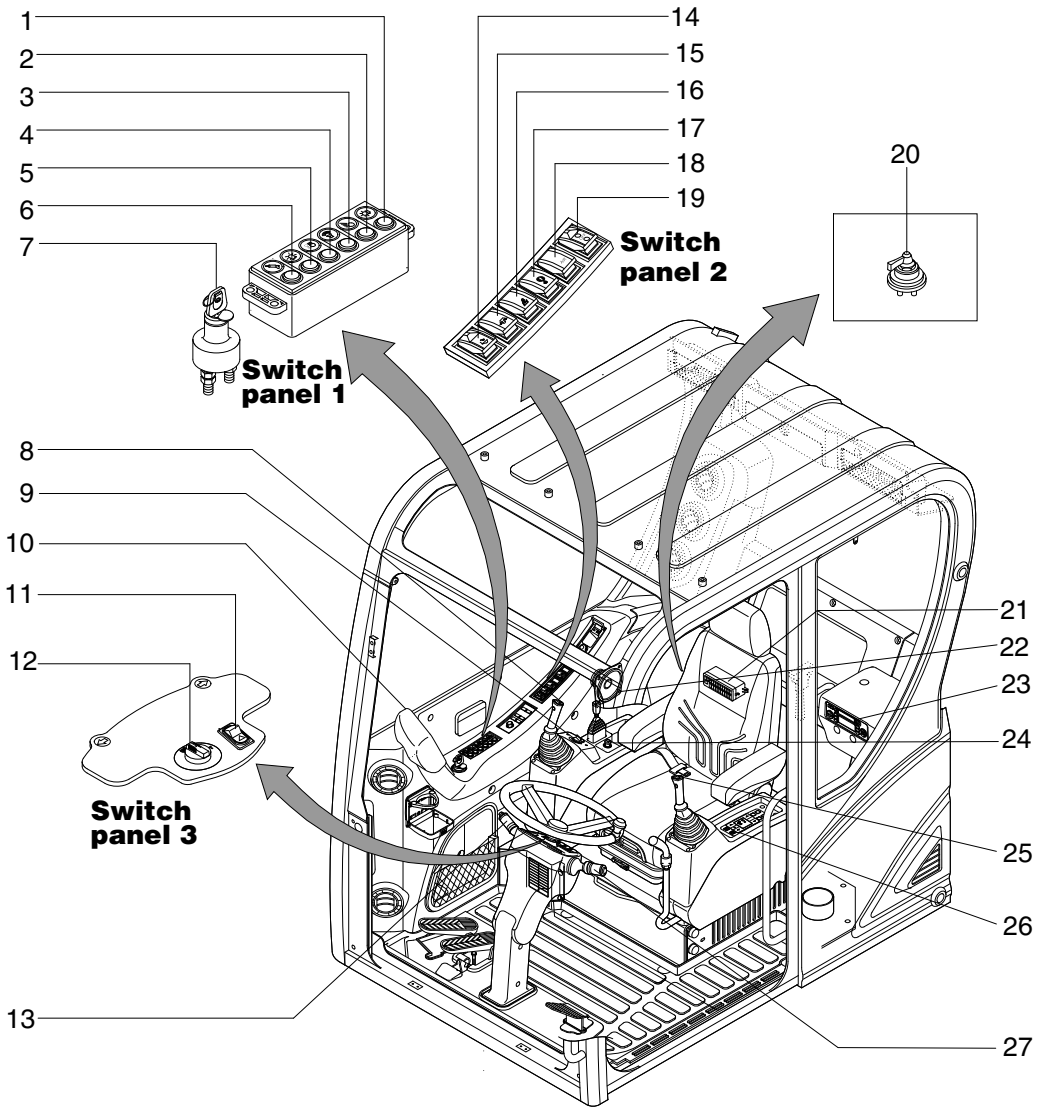
GROUP 1 COMPONENT LOCATION

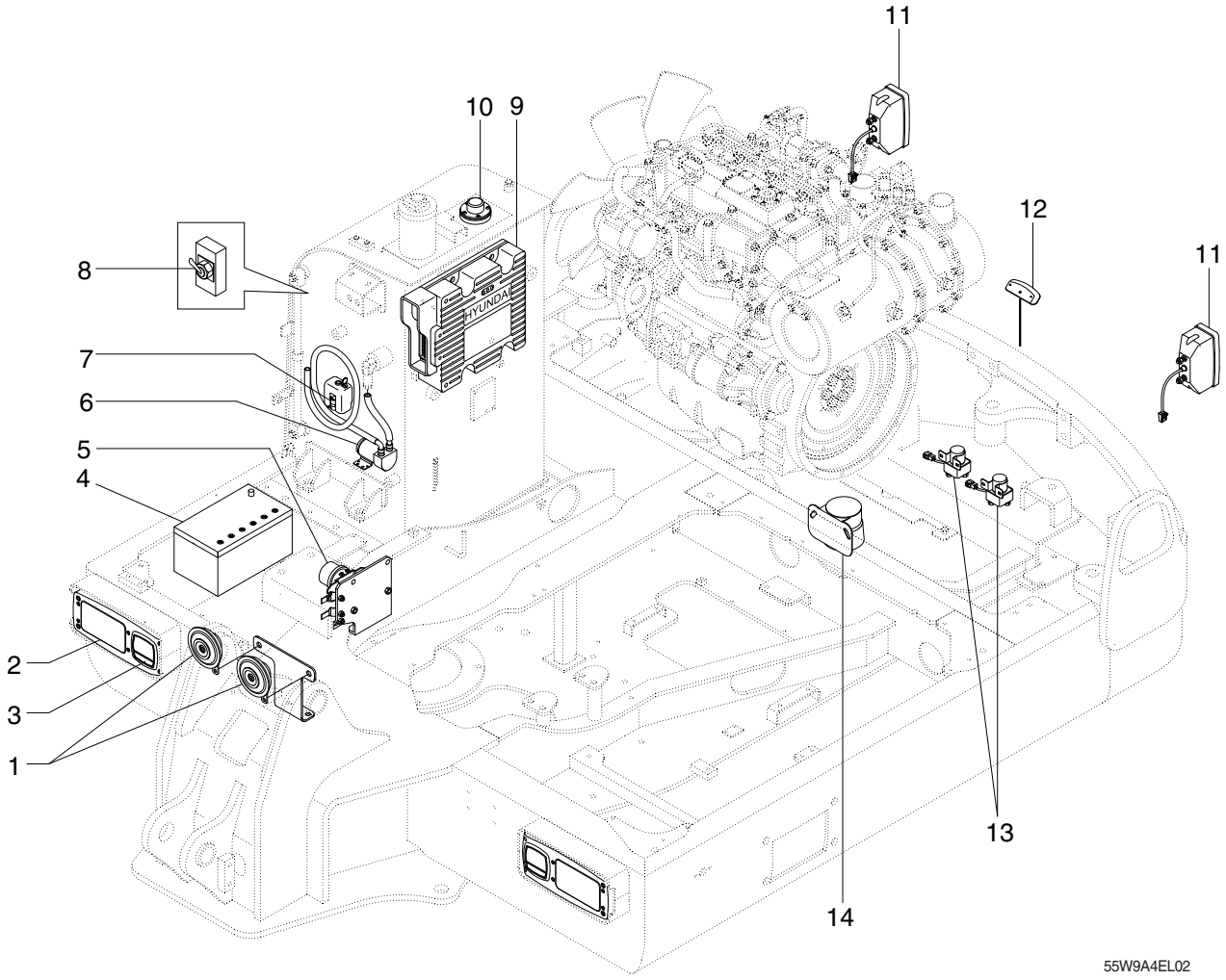
1. LOCATION 1



55W9A4EL01

1	Head light switch	10	Cluster	19	DPF switch
2	Work light switch	11	Hazard switch	20	Master switch
3	Travel alarm switch	12	Select switch	21	Fuse box
4	Cab light switch	13	Multifunction switch (RH)	22	Speaker
5	Beacon switch	14	Quick clamp switch (opt)	23	Radio & USB player
6	Breaker selection switch	15	Boom offset switch	24	Cigar light
7	Start switch	16	Auto ram lock switch	25	Horn switch
8	Breaker operation switch	17	Overload switch (opt)	26	Aircon and heater switch
9	Accel dial switch	18	Air compressor switch (opt)	27	Multifunction switch (LH)

2. LOCATION 2



1	Horn	6	Fuel filler pump	11	Combination lamp
2	Head lamp	7	Washer pump	12	Number plate lamp
3	Flasher position lamp	8	Filler pump toggle switch	13	Relays
4	Battery	9	Machine control unit (MCU)	14	Travel alarm buzzer
5	Battery relay	10	Fuel sender		

GROUP 2 MONITORING SYSTEM (machine serial No.:~#0578)

1. OUTLINE

Monitoring system consists of the monitor part and switch part.

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

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

2. CLUSTER

1) MONITOR PANEL

55W9A4EL20

3. CLUSTER FUNCTION

1) GAUGES AND DISPLAYS

(1) Operation screen

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

Default (A type)

559A3CD07A

Option (B type)

559A3CD07B

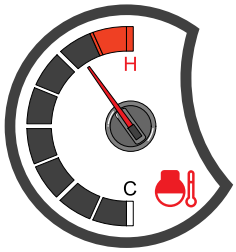
Option (C type)

559A3CD07C

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

※ Operation screen type can be set by the screen type menu of the display.
Refer to page 4-22 for details.

(2) Engine coolant temperature gauge



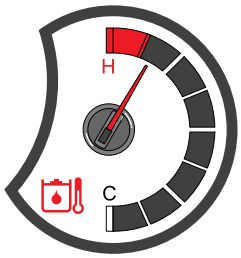
55I3CD07G

① This gauge indicates the temperature of coolant.
- Black range : 40-115˚C (104-239˚F)
- Red range : Above 115˚C (239˚F)

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

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

(3) Hydraulic oil temperature gauge



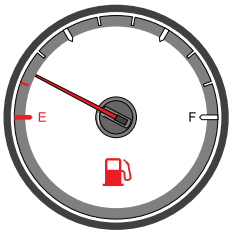
55I3CD07E

① This gauge indicates the temperature of hydraulic oil.
- Black range : 40-105˚C (104-221˚F)
- Red range : Above 105˚C (221˚F)

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

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

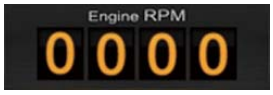
(4) Fuel level gauge



55I3CD07F

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

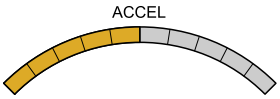
(5) Engine rpm display



559A3CD35

① This displays the engine speed.

(6) Accel dial display



55I3CD07C

① This displays acceleration dial level from 0 to 10 step.

3) COMMUNICATION ERROR AND LOW VOLTAGE WARNING POP-UP

(1) Communication error pop-up

559A3CD71

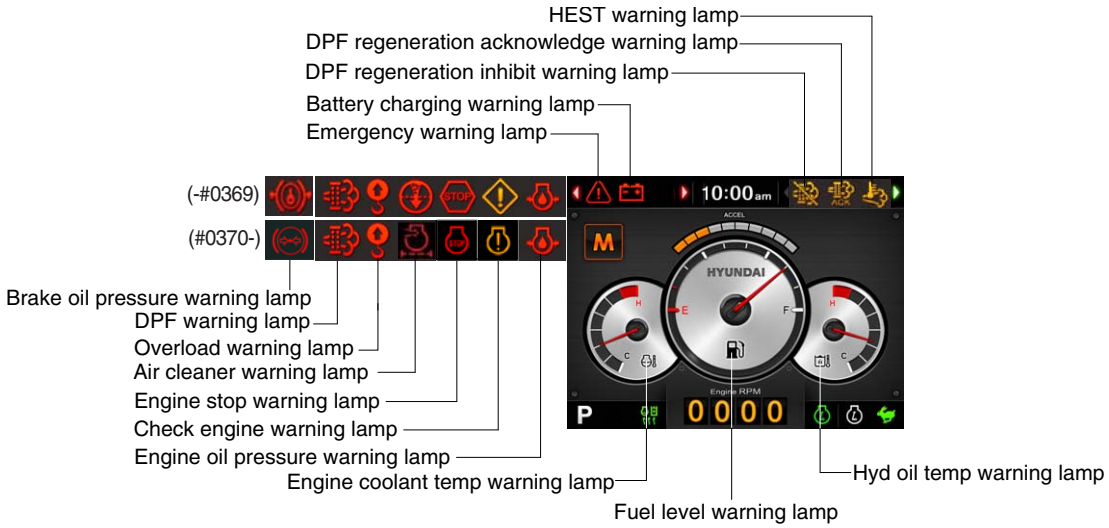
① Cluster displays this communication error pop-up when it has communication error with MCU.
② Communication error pop-up displays at operation screen only. Just buzzer alarm at the other screen.
③ If communication with MCU become normal state, it will disappear automatically.

(2) Low voltage warning pop-up

559A3CD72

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

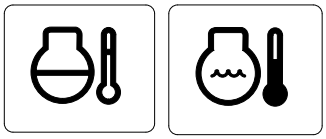


559A3CD08EA

※ **Each warning lamp on the left-top of the LCD pops up on the center of LCD and the buzzer sounds when the each warning is happened. The pop-up warning lamp moves to the original position and lights ON when the buzzer stop switch is pushed or the pop-up is touched. And the buzzer stops. Refer to page 4-14 for the switch.**

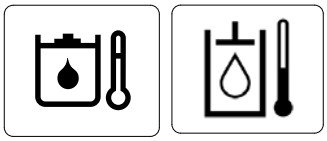
※ **When the warning lamps light ON more than 4, you can check all lamps with next page button (◀ , ▶) near the warning lamps.**

(1) Engine coolant temperature warning lamp



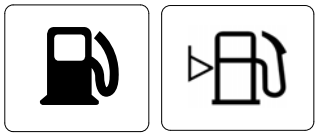
① The ⚠ lamp pops up on the center of LCD and the buzzer sounds when the engine coolant temperature is over 115˚C.
② The pop-up ⚠ lamp moves to the original position and lights ON when the buzzer stop switch is pushed or pop-up is touched. Also, the buzzer stops and lamp keeps ON.
③ Check the cooling system when the lamp keeps ON.

(2) Hydraulic oil temperature warning lamp



① The ⚠ 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



① This warning lamp lights ON and the buzzer sounds when the level of fuel is below 10%.
② Fill the fuel immediately when the lamp is ON.

(4) Emergency warning lamp

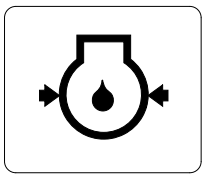
21093CD30

① This lamp pops up and the buzzer sounds when each of the below warnings are happened.
- Engine coolant overheating (over 115˚C)
- Hydraulic oil overheating (over 105˚C)
- MCU input voltage abnormal
- Accel dial circuit abnormal or open

※ **The pop-up warning lamp moves to the original position and lights ON when the buzzer stop switch is pushed or pop-up is touched. Also the buzzer stops.**
This is same as following warning lamps.

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

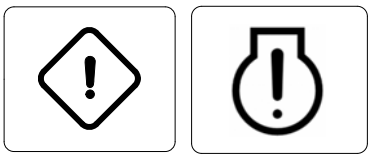
(5) Engine oil pressure warning lamp



21093CD32

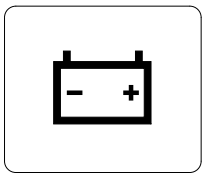
① This lamp lights ON when the engine oil pressure is low.
② If the lamp lights ON, shut OFF the engine immediately. Check oil level.

(6) Check engine warning lamp



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

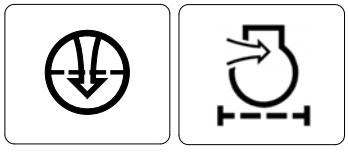
(7) Battery charging warning lamp



21093CD34

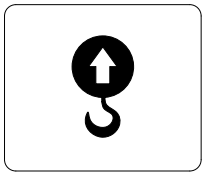
① This lamp lights ON when the battery charging voltage is low.
② Check the battery charging circuit when this lamp is ON.

(8) Air cleaner warning lamp



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

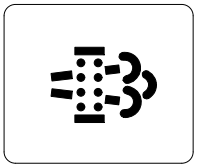
(9) Overload warning lamp (opt)



21093CD36

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

(10) DPF (diesel particulate filter) warning lamp



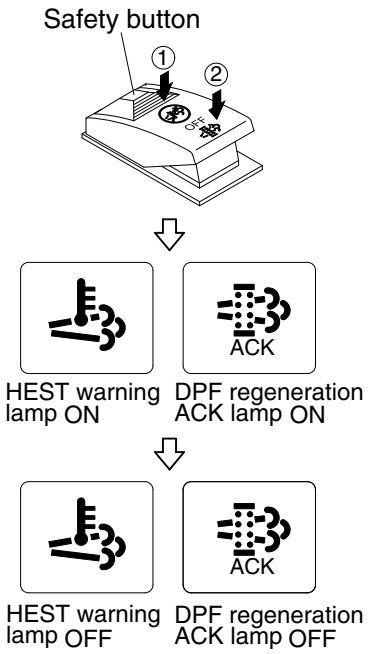
2609A3CD19

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

※ Consequences of delaying regeneration
- Poor performance caused by increasing exhaust gas pressure.
- Higher fuel consumption
- Shorter filter lifetime

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

※ Manual regeneration method of DPF



559A3CD143

※ Manual regeneration applies if the machine is in a fireproof area and there is no plan to turn off the maching during the regeneration.

① Stop and park the machine.

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

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

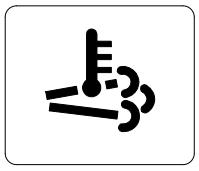
※ Refer to the page 4-62 for the switch operation.

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

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

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

(11) **HEST** (High exhaust system temperature) **warning lamp**



2609A3CD21

① This warning lamp indicates, when illuminated, that exhaust temperatures are high due to regeneration of the DPF.

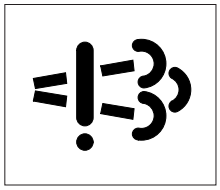
② The lamp will also illuminate during a manual regeneration.

③ When this lamp is illuminated, be sure the exhaust pipe outlet is not directed at any surface or material that can melt, burn, or explode.

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

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

(12) Emission system fail warning lamp



300A3CD15

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

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

a. The EGR valve malfunctions.

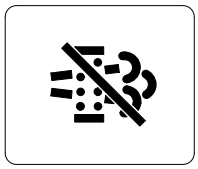
b. Electrical malfunction of the EGR control sensors. (disconnection, short)

c. Tampering with the EGR control sensors.

③ This warning lamp can be shown together with DPF warning lamp or engine fail lamp or engine stop warning lamp when diagsis DPF systems.

※ Please contact your Hyundai service center or local dealer.

(13) DPF regeneration inhibit warning lamp

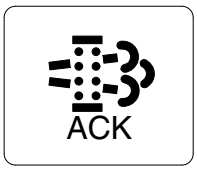


2609A3CD20

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

※ **Refer to the page 4-62 for the DPF switch.**

(14) DPF regeneration acknowledge warning lamp



559A3CD10

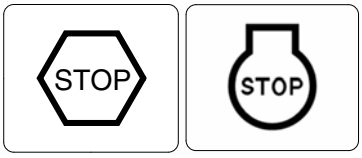
① This warning lamp lights ON stationary regeneration is in process.

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

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

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

(15) Stop engine warning lamp

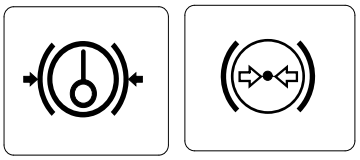


① If the lamp lights ON, stop the engine immediately and check the engine.

② Check the fault codes on the monitor.

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

(16) Brake oil pressure warning lamp

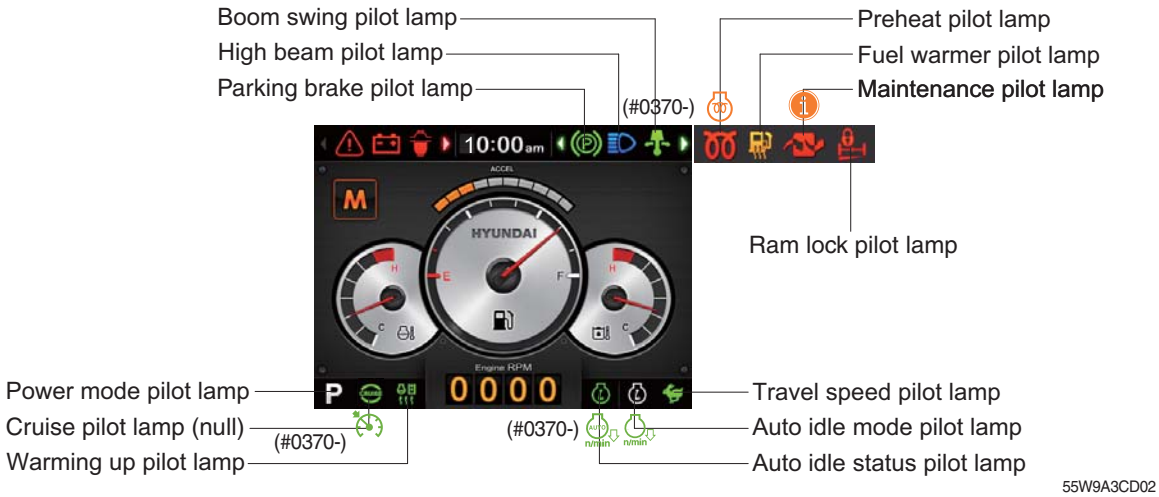


① The lamp lights ON when the oil pressure of service brake drops below the normal range.

② When the lamp is ON, stop the engine and check for its cause.

※ **Do not operate until any problems are corrected.**

5) PILOT LAMPS



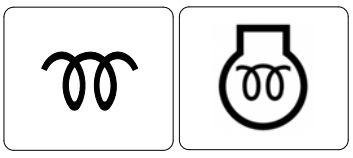
55W9A3CD02

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

(1) Mode pilot lamps

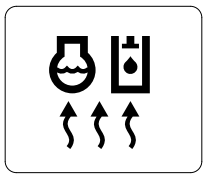
No	Mode	Pilot lamp	Selected mode
1	Power mode	P	Heavy duty power work mode
		S	Standard power mode
2	Travel mode		Low speed traveling
			High speed traveling
3	Auto idle mode		Auto idle status
			Auto idle mode

(2) Preheat pilot lamp



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

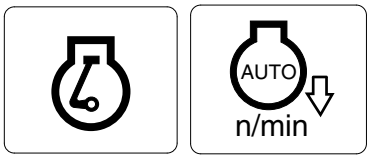
(3) Warming up pilot lamp



21093CD40

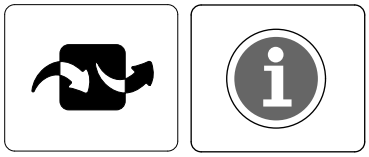
① This lamp is turned ON when the coolant temperature is below 30˚C(86˚F).
② The automatic warming up is cancelled when the engine coolant temperature is above 30˚C, or when 10 minutes have passed since starting the engine.

(4) Auto idle status/ mode pilot lamp



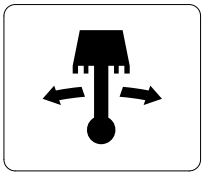
① The auto idle pilot lamp will be ON when the idle mode is selected.
② The auto idle status pilot lamp will be ON when all levers and pedals are at neutral position, and the auto idle mode is selected.

(5) Maintenance pilot lamp



① This lamp will be ON when the consuming parts are needed to change or replace. It means that the change or replacement interval of the consuming parts remains below 30 hours.
② Check the message in maintenance information of main menu. Also, this lamp lights ON for 3 minutes when the start switch is ON position.
※ **Refer to the page 4-20.**

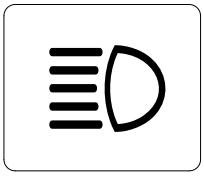
(6) Boom swing pilot lamp



559A3CD31

① This lamp is ON when the boom swing pedal is operated.

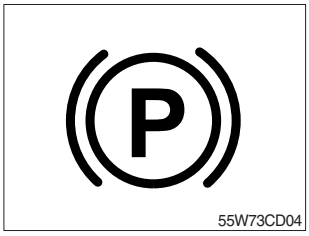
(7) High beam pilot lamp



55WI3CD50

① This lamp works when the illuminating direction is upward.
② This lamp comes ON when the dimmer switch is operated, e.g, when passing another vehicle.

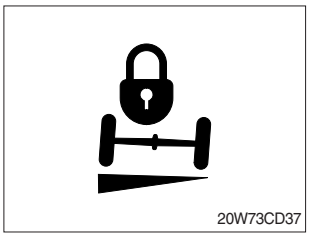
(8) Parking brake pilot lamp



55W73CD04

① When the parking brake is actuated, the lamp lights ON.
※ **Check the lamp is OFF before driving.**

(9) Ram lock pilot lamp



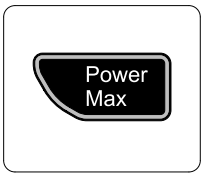
① This pilot lamp lights ON when ram lock switch is rear position.
② Also, the pilot lamp lights ON when the parking switch is ON or service brake is applied.

6) SWITCHES

559A3CD47

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

(1) Power mode switch

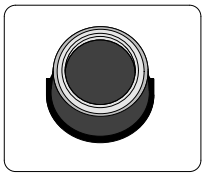


559A3CD25

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

② The pilot lamp changes S → P → S in order.

(2) Select switch



55I3CD50C

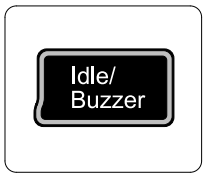
① This switch is used to select or change the menu and input value.

② Knob push
- Long (over 2 sec) : Return to the operation screen
- Medium (0.5~2 sec) : Return to the previous screen
- Short (below 0.5 sec) : Select menu

③ Knob rotation

This knob changes menu and input value.
- Right turning : Down direction / Increase input value
- Left turning : Up direction / Decreased input value

(3) Auto idle/ buzzer stop switch



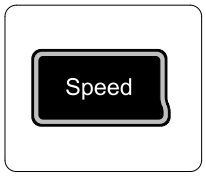
559A3CD50D

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

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

② The buzzer sounds when the machine has a problem.
In this case, push this switch and buzzer stops, but the warning lamp blinks until the problem is cleared.

(4) Travel speed control switch

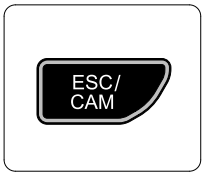


55I33CD50B

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

- : Low speed
- : High speed

(5) Escape/ Camera switch



559A3CD50E

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

② In the operation screen, pushing this switch will display the view of the camera on the machine (if equipped).
Please refer to page 4-24 for the camera.

③ If the camera is not installed, this switch is used only ESC function.

7) MAIN MENU

· Operation screen

559A3CD32A

559A3CD32B

559A3CD32C

Tap **M** or Press

Press ESC/CAM

Main menu screen

559A3CD32D

Sub menu screen

559A3CD32E

※ **Please refer to select switch, page 4-14 for selection and change of menu and input value.**

(1) Structure

No	Main menu	Sub menu	Description
1	 Monitoring 55I3CD51A	Active fault - Machine Active fault - Engine Logged fault - Machine Logged fault - Engine Monitoring (Analog) Monitoring (Digital) - Input Monitoring (Digital) - Output	MCU ECU MCU ECU Machine information Switch status Output status
2	 Management 55I3CD51B	ESL mode setting Change password Maintenance information Machine Information A/S phone number Service menu	ESL mode setting Password change Replacement, Change interval oils and filters Cluster, MCU, Engine, Machine A/S phone number, A/S phone number change Delete logged faults, Software download, Operating hour, power shift
3	 Display 55I3CD51C	Clock Screen type Brightness setting Unit setting Language Calibration	Clock A type, B type, C type Manual, Auto Temperature, Pressure 12 language Calibrating the touch screen
4	 Utilities 55I3CD51D	Camera setting Mode Video	Number of active, Display order, Camera No. Operation mode select Play music and video file

(2) Monitoring

① Active fault - Machine

559A3CD50 559A3CD50A

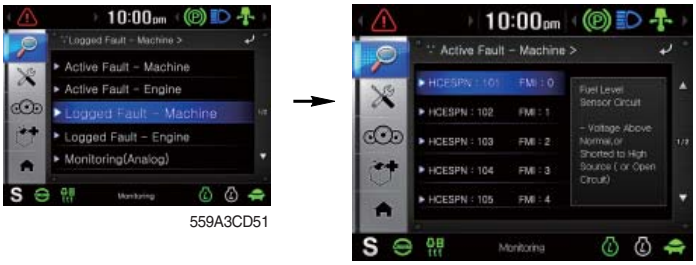
· The active faults of the MCU can be checked by this menu.

② Active fault - Engine

559A3CD50B 559A3CD50C

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

③ Logged fault - Machine/ Engine



559A3CD51 559A3CD50A

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

④ Monitoring (Analog)

559A3CD52 559A3CD52A

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

⑤ **Monitoring** (Digital) - **Input**

559A3CD53

559A3CD53A

· The switch status can be confirmed by this menu.
· The activated switchs are blue light ON.

⑥ **Monitoring** (Digital) - **Output**

559A3CD54

559A3CD54A

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

(3) Management

① ESL mode setting

559A3CD55

559A3CD55A

559A3CD55B

· **ESL mode setting**

- ESL : Engine Starting Limit
- ESL mode is desingned to be a theft deterrent or will prevent the unauthorized operation of the machine.
- If the ESL mode was selected Enable, the password will be required when the start switch is turned ON.
- **Disable** : Not used ESL function

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

  Enable (Interval): The password is required when the operator starts engine first. But the operator can restart the engine within the interval time without inputting the password. The interval time can be set maximum 2 days.

  ※**Default password : 00000**

  ※**Password length : 5~10 digit**

② Change password

- The password is 5~10 digits.

559A3CD56

559A3CD56A

Enter the current password

559A3CD56B

Enter the new password

559A3CD56C

Enter the new password again

559A3CD56D

The new password is stored in the MCU.

③ Maintenance information

559A3CD57 559A3CD57A 559A3CD57B

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

No	Item	Interval
1	Engine oil	500
2	Final gear oil	1000
3	Swing gear oil	1000
4	Hydraulic oil	5000
5	Pilot line filter	1000
6	Hydraulic oil return filter	1000
7	Engine oil filter	500
8	Fuel filter	500
9	Pre-filter	500
10	Hydraulic tank breather	250
11	Air cleaner	500
12	Radiator coolant	2000
13	Swing gear pinion grease	1000

④ Machine Information

559A3CD58 559A3CD58A

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

⑤ A/S phone number

559A3CD59 559A3CD59A 559A3CD59B

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

⑥ Service menu

559A3CD60 Enter the password 559A3CD60A 559A3CD60B

· Delete logged fault : Logged faults of MCU or engine ECU can be deleted.
· S/W download : Update and display software about operating system, application, image and font.
· Operating hours : Operating hours since the machine line out can be checked.
· Power shift : Set power shift mode (standard/option)

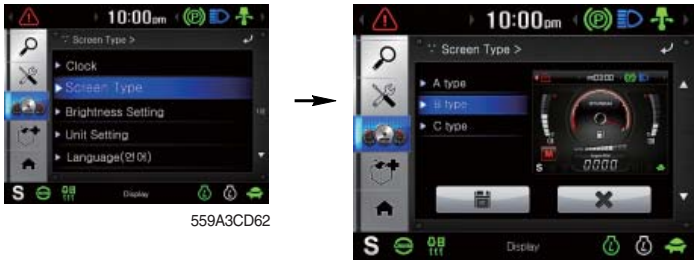
(4) Display

① Clock

559A3CD61 559A3CD61A

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

② Screen type



559A3CD62 559A3CD62A

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

③ Brightness setting calibration

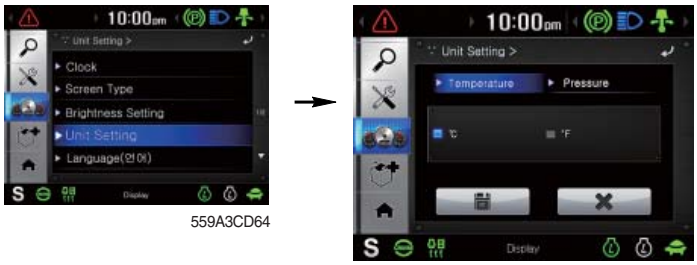
559A3CD63 559A3CD63A

Manual (1st~10th step)

Auto (day/night) 559A3CD63B Auto (time) 559A3CD63C

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

④ Unit setting



559A3CD64 559A3CD64A

· Temperature : ˚C ↔ ˚F

· Pressure : bar ↔ MPa ↔ kgf/cm² ↔psi

⑤ Language

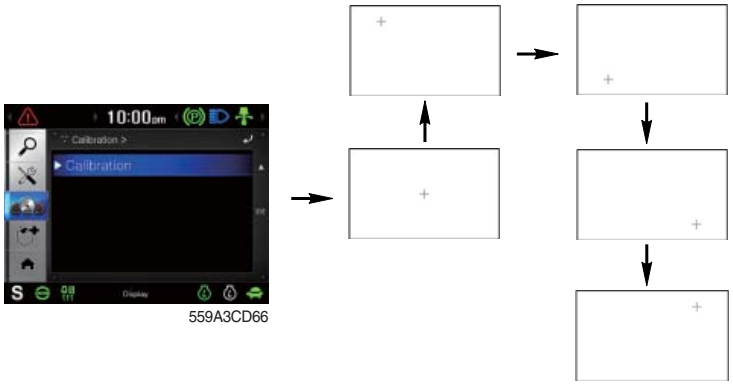
559A3CD65

559A3CD65A

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

⑥ Calibration

· When touch awareness goes wrong, this function use.
Fall in the next step if touches the middle point of cross with fingernail.
If touches total five points as follows, the setting is completed.



559A3CD66

2609A3CD149-153

(5) Utilities

① Camera setting

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

559A3CD67

559A3CD67A

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

559A3CD68

559A3CD68A

559A3CD68B

② Mode

559A3CD69

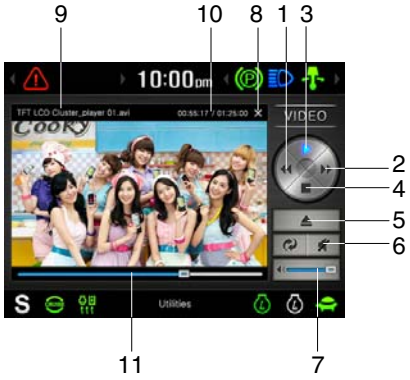
559A3CD69A

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

③ Video

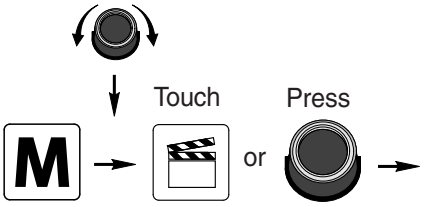
· Play MP4 or codec file of external hard disk through USB port.
· The USB port is located under the cluster.

559A3CD70



559A3CD70A

559A3CD70B



559A3CD70C

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

No.	Function	Control	No.	Function	Control
1	Previous track	Power mode switch or touch	7	Sound volume	Speed switch or touch
2	Next track	Speed switch or touch	8	Stop	ESC/CAM button or touch
3	Play	Touch	9	File name	-
4	Pause	Touch	10	Current time/ Total time	-
5	Contents display	Touch	11	Current playing time	-
6	Mute	Touch	-	-	-

MONITORING SYSTEM (machine serial No.: #0579~)

1) STRUCTURE

The cluster consists of LCD and switches as shown below. The LCD is to warn the operator in case of abnormal machine operation or conditions for the appropriate operation and inspection.
Also, The LCD is to set and display for modes, monitoring and utilities with the switches.
The switches or touch screen are to set the machine operation modes.

※ **The cluster installed on this machine does not entirely guarantee the condition of the machine. Daily inspection should be performed according to chapter 6, Maintenance.**

※ **When the cluster provides a warning immediately check the problem, and perform the required action.**

HX60A3CD100B

※ **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 4-29 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	6	Clinometer

(2) Engine coolant temperature gauge

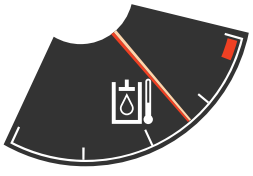
290F3CD53

① This gauge indicates the temperature of coolant.
- Black range : 40-115˚C (104-239˚F)
- Red range : Above 115˚C (239˚F)

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

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

(3) 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.

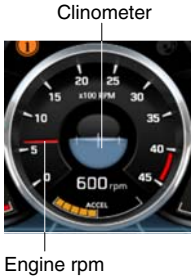
※ If the gauge indicates the red range or lamp lights ON in red even though the machine is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.

(4) Fuel level gauge

HX60A3CD55A

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

(5) Engine rpm display



HX60A3CD105K

① This displays the engine speed.

(6) Accel dial display

290F3CD59

① This displays acceleration dial level from 0 to 10 step.

3) COMMUNICATION ERROR AND LOW VOLTAGE WARNING POP-UP

(1) Communication error pop-up

HX60A3CD107A

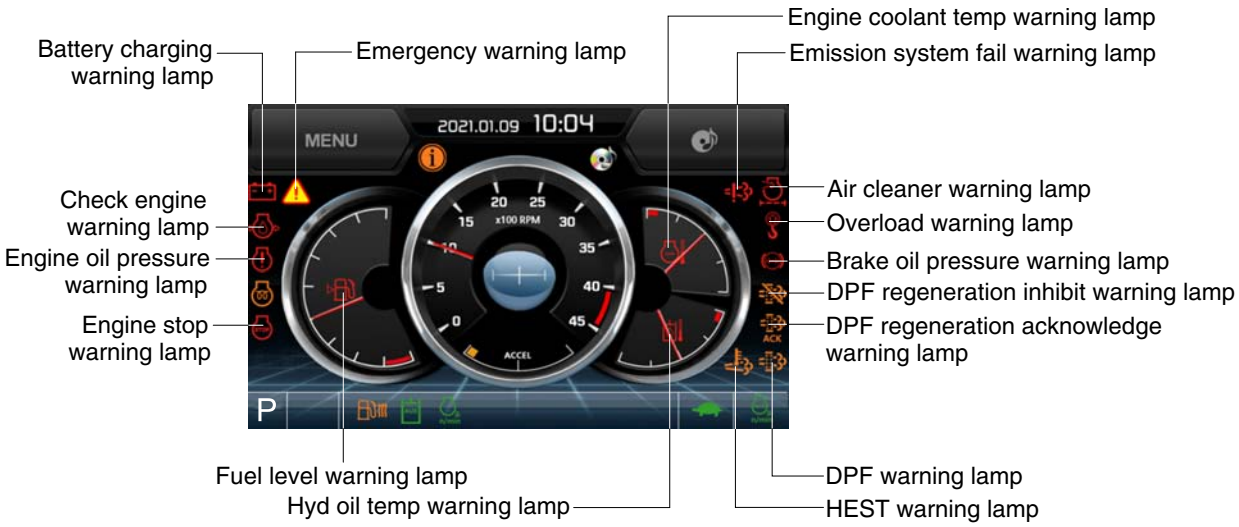
① Cluster displays this communication error pop-up when it has communication error with MCU.
② Communication error pop-up displays at operation screen only. Just buzzer alarm at the other screen.
③ If communication with MCU become normal state, it will disappear automatically.

(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

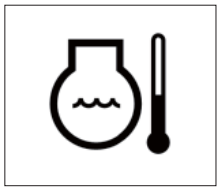


HX60A3CD109C

※ **Each warning lamp on the left-top of the LCD pops up on the center of LCD and the buzzer sounds when the each warning is happened. The pop-up warning lamp moves to the original position and lights ON when the buzzer stop switch is pushed or the pop-up is touched. And the buzzer stops. Refer to page 4-38 for the switch.**

※ **When the warning lamps light ON more than 4, you can check all lamps with next page button (◀, ▶) near the warning lamps.**

(1) Engine coolant temperature warning lamp



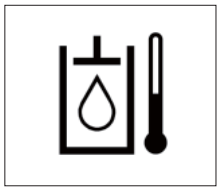
290F3CD61

① The lamp pops up on the center of LCD and the buzzer sounds when the engine coolant temperature is over 115˚C or more.

② The pop-up lamp moves to the original position and lights ON when the buzzer stop switch is pushed or pop-up is touched. Also, the buzzer stops and lamp keeps ON.

③ Check the cooling system when the lamp keeps ON.

(2) Hydraulic oil temperature warning lamp



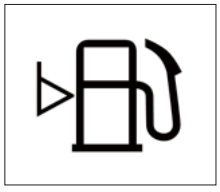
290F3CD62

① The lamp pops up on the center of LCD and the buzzer sounds when the hydraulic oil temperature is over 105˚C or more.

② The pop-up lamp moves to the original position and lights ON when the buzzer stop switch is pushed or pop-up is touched. Also, the buzzer stops and lamp keeps ON.

③ Check the hydraulic oil level and hydraulic oil cooling system.

(3) Fuel level warning lamp



290F3CD63

① This warning lamp lights ON and the buzzer sounds when the level of fuel is below 10%.

② Fill the fuel immediately when the lamp is ON.

(4) Emergency warning lamp

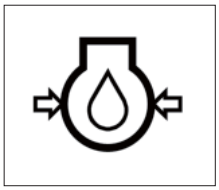
290F3CD64

① This lamp pops up and the buzzer sounds when each of the below warnings are happened.
- Engine coolant overheating (over 115˚C)
- Hydraulic oil overheating (over 105˚C)
- MCU input voltage abnormal
- Accel dial circuit abnormal or open

※ **The pop-up warning lamp moves to the original position and lights ON when the buzzer stop switch is pushed or pop-up is touched. Also the buzzer stops.**
This is same as following warning lamps.

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

(5) Engine oil pressure warning lamp



290F3CD65

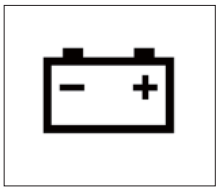
① This lamp lights ON when the engine oil pressure is low.
② If the lamp lights ON, shut off the engine immediately. Check oil level.

(6) Check engine warning lamp

290F3CD66

① This lamp lights ON when the communication between MCU and engine ECM on the engine is abnormal, or if the cluster received any fault code from engine ECM.
② Check the communication line between them.
If the communication line is OK, then check the fault codes on the cluster.
③ Also, this lamp pops up when the level of DPF soot is high.
※ Refer to the page 4-31 for the DPF warning lamp.

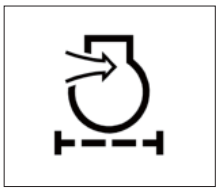
(7) Battery charging warning lamp



290F3CD67

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

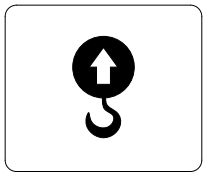
(8) Air cleaner warning lamp



290F3CD68

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

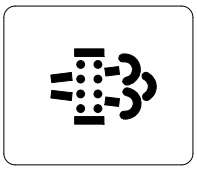
(9) Overload warning lamp (option)



21093CD36

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

(10) DPF (diesel particulate filter) warning lamp



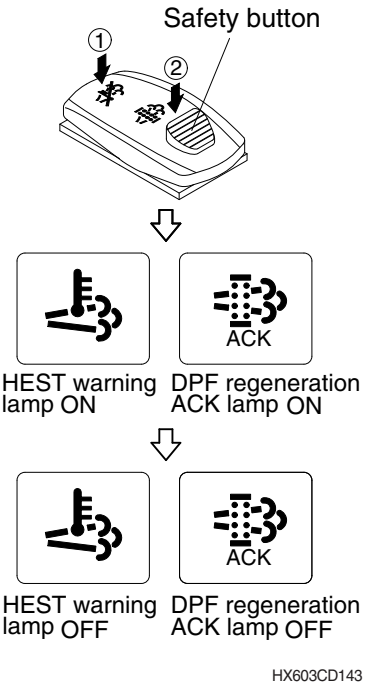
2609A3CD19

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

※ Consequences of delaying regeneration
- Poor performance caused by increasing exhaust gas pressure.
- Higher fuel consumption
- Shorter filter lifetime

Condition	Warning lamp			Remedy
	DPF	Check engine (pop up)	Stop engine (pop up)	
Normal	Off	Off	Off	· Automatic regeneration
Soot low	On	Off	Off	· Push DPF switch to OFF position if DPF switch is in inhibit position. (see 4-62 page) · Engine power may be reduced automatically (soot medium)
Soot midium	Blink	Off	Off	
Soot high	On	On	Off	· Engine power and speed will be reduced automatically · Initiate a manual regeneration
Stop	On	Off	On	· Stop the engine immediatary. · Please contact your Hyundai service center or local dealer.

※ **Manual regeneration method of DPF**



HX603CD143

※ Manual regeneration applies if the machine is in a fireproof area and there is no plan to turn off the maching during the regeneration.

① Stop and park the machine.

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

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

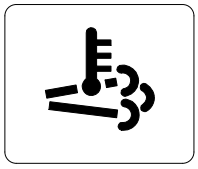
※ Refer to the page 4-62 for the switch operation.

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

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

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

(11) HEST (High exhaust system temperature) **warning lamp**



2609A3CD21

① This warning lamp indicates, when illuminated, that exhaust temperatures are high due to regeneration of the DPF.

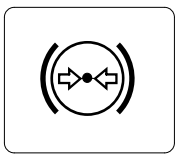
② The lamp will also illuminate during a manual regeneration.

③ When this lamp is illuminated, be sure the exhaust pipe outlet is not directed at any surface or material that can melt, burn, or explode.

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

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

(12) Brake oil pressure warning lamp

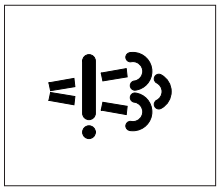


① The lamp lights ON when the oil pressure of service brake drops below the normal range.

② When the lamp is ON, stop the engine and check for its cause.

※ Do not operate until any problems are corrected.

(13) Emission system fail warning lamp



300A3CD15

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

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

a. The EGR valve malfunctions.

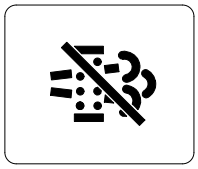
b. Electrical malfunction of the EGR control sensors. (disconnection, short)

c. Tampering with the EGR control sensors.

③ **This warning lamp can be shown together with DPF warning lamp or engine fail lamp or engine stop warning lamp when diagsis DPF systems.**

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

(14) DPF regeneration inhibit warning lamp

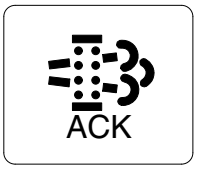


2609A3CD20

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

※ **Refer to the page 4-62 for the DPF switch.**

(15) DPF regeneration acknowledge warning lamp



559A3CD10

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

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

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

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

(16) Engine stop warning lamp

① If the lamp lights ON, stop the engine immediately and check the engine.

② Check the fault codes on the monitor.

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

5) PILOT LAMPS

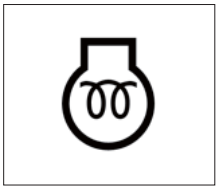
HW60A3CD112C

※ The left and the right movement buttons (◀ and ▶) are activated when nine indicator or more light, and touching the button shifts to the previous/next page. The buttons are not activated when eight indicators or less light.

(1) Mode pilot lamp

Sequence	Mode	Pilot lamp	Selected mode
1	Power mode	P	Heavy duty power work mode
		S	Standard power mode
2	Travel mode		Low speed traveling
			High speed traveling
3	Auto idle mode	AUTO n/min	Auto idle mode
		n/min	Auto idle status

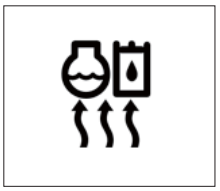
(2) Engine preheat pilot lamp



290F3CD79

① Turning the start switch ON automatically starts preheating.
② Start the engine after this indicator turns off.
See Page 4-4.

(3) Warming up pilot lamp

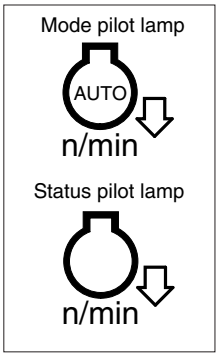


290F3CD80

① This lamp is turned ON when the coolant temperature is below 30˚C(86˚F).

② The automatic warming up is cancelled when the engine coolant temperature is above 30˚C, or when 10 minutes have passed since starting the engine.

(4) Auto idle status/ mode pilot lamp



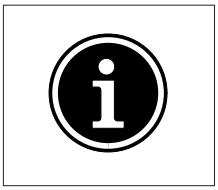
85A3CD106

① The auto idle mode pilot lamp will be ON when the idle mode is selected.

② The auto idle status pilot lamp will be ON when all levers and pedals are at neutral position, and the auto idle mode is selected.

③ One of the lever or pedal is operated, the status lamp will be OFF and the engine speed returns to the previous conditions.

(5) Maintenance pilot lamp



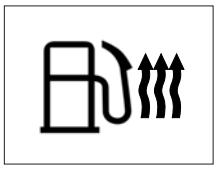
HX60A3CD116

① This lamp will be ON when the consuming parts are needed to change or replace. It means that the change or replacement interval of the consuming parts remains below 30 hours.

② Check the message in maintenance information of main menu. Also, this lamp lights ON for 3 minutes when the start switch is ON position.

※ **Refer to the page 4-43.**

(6) Fuel warmer pilot lamp

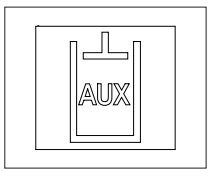


HX60A3CD111

① This lamp is turned ON when the coolant temperature is below 10˚C(50˚F) or the hydraulic oil temperature 20˚C(68˚F).

② The automatic fuel warming is cancelled when the engine coolant temperature is above 60˚C, and the hydraulic oil temperature is above 45˚C since the start switch was ON position.

(7) Optional flow control pilot lamp

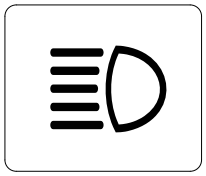


HW60A3CD48A

① The indicator lights when activating (performing) the optional flow control function.

※ **Refer to the Page 4-43.**

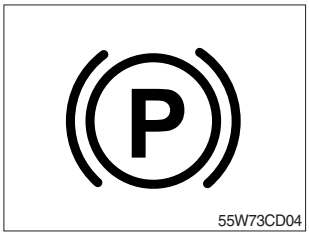
(8) High beam pilot lamp



55WI3CD50

① This lamp works when the illuminating direction is upward.
② This lamp comes ON when the dimmer switch is operated, e.g, when passing another vehicle.

(9) Parking brake pilot lamp



55W73CD04

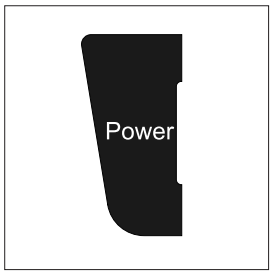
① When the parking brake is actuated, the lamp lights ON.
※ **Check the lamp is OFF before driving.**

6) SWITCHES

HX60A3CD117D

※ **Selecting the switch displays the indicator on LCD. See Page 4-34 for further information.**

(1) Power mode switch

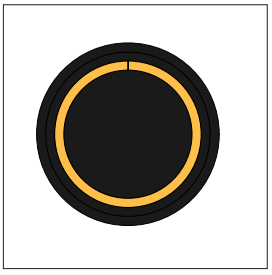


HX60A3CD118

① This switch selects the system power mode, and the selected power mode indicator is displayed on the indicator position.
- P : High-load work
- S : Standard load work

② The indicators shifts in the sequence of S → P → S.

(2) Select switch



HX60A3CD119

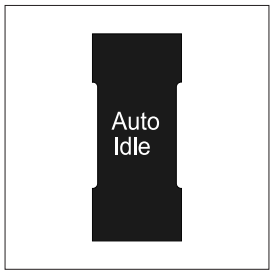
① The switch is used for selecting or changing the menus and input values.

② Knob pressing
- Pressing short (0.5 sec. or less) : Menu selecting

③ Knob turning

This knob is used for changing menus and input values :
- Right turning : Increasing downward direction and input value
- Left turning : Decreasing upward direction and input value

(3) Auto idle switch



HX60A3CD120

① This switch is used for operating or canceling the auto idle function.

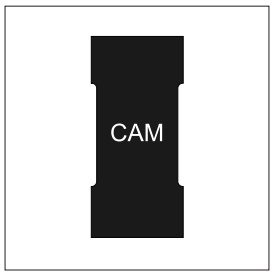
※ **See Page 4-34 for further information.**

(4) Buzzer stop switch

HX60A3CD121

① The buzzer sounds when the system fails.
In such a case, press the switch to stop the buzzer. The alarm indication is kept lit until trouble is resolved.

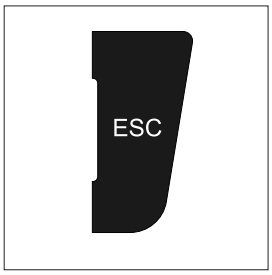
(5) Camera switch



HX60A3CD122

① Pressing this switch on the operation screen of the main menu displays the area illuminated by the camera mounted on the system (if the camera is mounted).
See Page 4-53 for information of the camera.

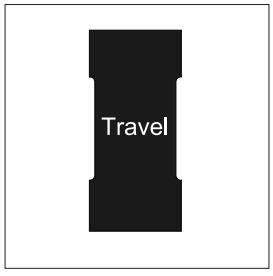
(6) Escape switch



HX60A3CD123

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

(7) Travel speed switch



HX60A3CD104

① This switch is used for changing driving speed.
: High speed
: Low speed

※ **Do not operated the driving speed switch during driving. System stability may adversely be affected.**

⚠ **Rapid change of system stability may cause injury or death of driver.**

7) MAIN MENU

Main menu screen

HX60A3CD124A

Tap MENU or Press

Press ESC

Sub menu screen

HX60A3CD125A

※ See “Selection Switch” on page 4-37 for further information on selection and change of the menus and input values.

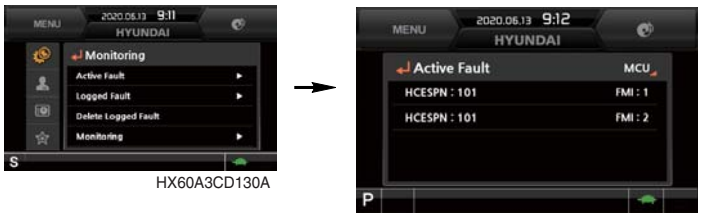
※ Touching the main menu switch, or pressing the selection switch prompts the sub-menu screen.

(1) Structure

No.	Main menu	Sub-menu	Description
1	 Monitoring	Active fault Logged fault Delete logged fault Monitoring	List of active fault of system/engine List of logged fault of system/engine Deleting specifics of logged fault (system/engine) Monitoring (conditions of system, switch, and output)
2	 Management	Maintenance info. Aux flow setting ELS mode setting Machine information Contact Cluster update Service menu	Checking and initialization of service Interval of oil and filters Optional attachment setting ELS mode setting/user password changing Information of cluster, MCU, engine system Display and change of contact information for after-sales services System and application updating Power shift, Operation hours, Main gauge type, Display RPM, DPF filter exchange, AVCU setting, Adding language
3	 Display	Clock adjust Brightness setting Unit setting Language selection	Current time setting Manual, auto Temperature, Distance, Pressure, Flow, Volumn 24 languages
4	 Utilities	Entertainment Camera setting Clinometer setting Emergency mode	Video/music file playing Setup of number of active cameras, display sequences, and camera numbers Initializing slope sensor Back-up switch for failed cluster switch

(2) Monitoring

① Active fault - system

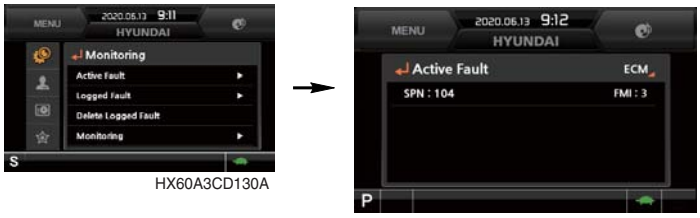


HX60A3CD130A

HX60A3CD131A

· You may use this menu to check active fault of MCU.

② Active fault - engine



HX60A3CD130A

HX60A3CD133A

· You may use this menu to check active fault of engine ECM.

③ Logged fault - system/engine

HX60A3CD134A

HX60A3CD135A

HX60A3CD136A

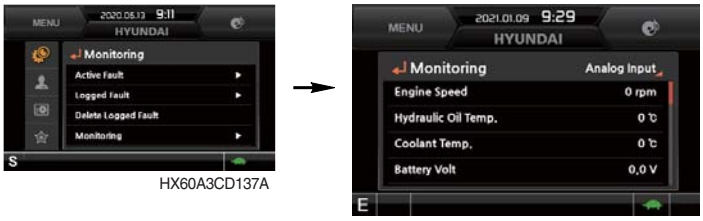
· You may use this menu to check fault logged on system MCU or engine ECM.
· The menu is accessible by maintenance engineer only.

④ Delete logged fault

HX60A3CD143A HX60A3CD144A HX60A3CD145A HX60A3CD146A HX60A3CD147A

· Delete logged fault: You are allowed to delete fault logged on system MCU or engine ECM. (Deletion can be deleted only while the engine is kept stopped.)

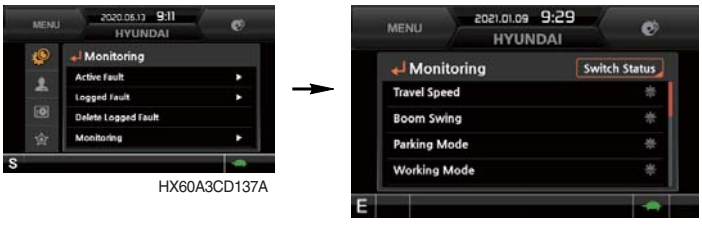
⑤ Monitoring (system conditions)



HX60A3CD137A HX60A3CD138A

· You may use this menu to check the system conditions such as engine rotation rate, oil temperature, voltage and pressure.

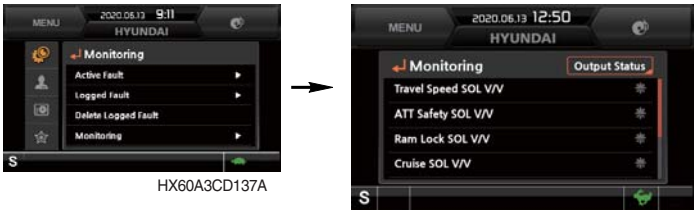
⑥ Monitoring (switch conditions)



HX60A3CD137A HX60A3CD140A

· You may use this menu to check digital switch information of the system.
· The operation switch lights blue.

⑦ Monitoring (output conditions)



HX60A3CD137A

HX60A3CD142A

- You may use this menu to check digital output information of the system.
- Output lights blue.

(3) Management

① Maintenance info.

HX60A3CD158A

HX60A3CD157A

HX60A3CD159A

- Elapsed: Time elapsed since inspection and maintenance is displayed.
- Change interval: You are allowed of changing exchange cycle in 50 hours.
- History-Hourmeter: History of inspection, maintenance and exchange is displayed.
- Replacement: Elapsed time is reset to zero.
- **Change or replace interval**

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

② Aux flow setting

a. Optional attachment setup

HW60A3CD33OA

HW60A3CD41OA

HW60A3CD42O

- Setup up to three optional attachments.

ⓐ Rotary grapple (4-way)

ⓑ Grapple (2-way)

ⓒ Auger (2-way)

※ Each option attachment operating in one of two user modes (Type A and B)

b. Proportional flow control setting

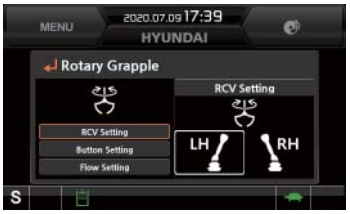
You may use this menu to set the values of individual option attachments.

a) Rotary setup

HW60A3CD42O

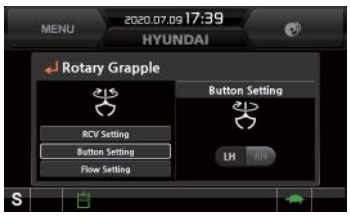
HW60A3CD51OA

· Rotary selecting
RCV, button, and flow setup.



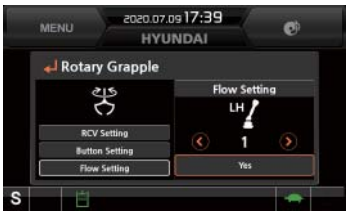
HW60A3CD52OA

· RCV setup
- It is possible to set operating RCV for rotary operation to LH or RH .
- Selecting rotary RCV to LH automatically sets grapple RCV to RH.



HW60A3CD53OA

· Button setup (rotating clockwise)
- Selecting clockwise rotating direction to LH automatically sets counterclockwise rotating direction to RH.



HW60A3CD54OA

· Flow setup
- You may set flow between Level 1 and 5.

b) Grapple setting

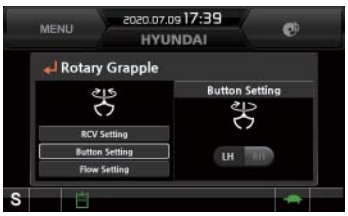
HW60A3CD42O

HW60A3CD61OA

· Grapple selection
RCV, button and flow setup

HW60A3CD62OA

· RCV setup
- It is possible to set RCV for grapple operation to LH or RH.
- Selecting grapple RCV to RH automatically sets rotary RCV to LH.



HW60A3CD63OA

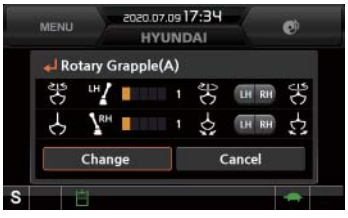
· Button setup (Close)
- Setting Close to RH automatically sets Open to LH.

HW60A3CD72OA

HW60A3CD64OA

· Flow setup
- Setting between Level 1 and 5.

HW60A3CD42O

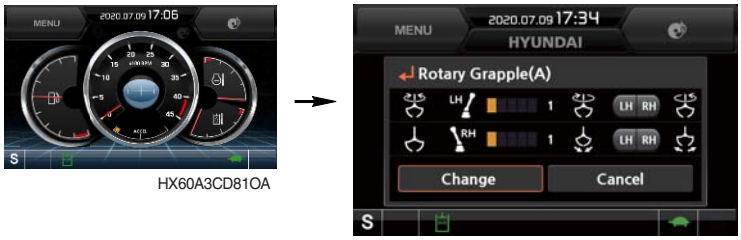


HW60A3CD71OA

· Never forget to select Change button **once** flow setting is complete.

※ Saved setting is stored in each icon, and value finally stored becomes active.
※ You may use any stored values by pressing Icon button.
※ It is possible to perform two user's settings per attachment (A and B), and to store up to six values. (Two for 4-way, four for 2-way)

c) Checking settings



HX60A3CD81OA

HW60A3CD71OA

※ Operating optional attachment function activates the symbol on the bottom of the main screen.

※ You are allowed of checking settings as follows in the course of Menu - Administrator Functions - Optional Attachment.

(a) Rotary setup
- Rotary RCV setup : LH
- Rotary flow level : 3
- CW direction control : LH
- CCW direction control : RH

(b) Grapple setup
- Grapple RCV setup : RH
- Grapple flow level : 3
- Open control : LH
- Close contro l: RH

③ ESL mode setting

HX60A3CD148A

HX60A3CD149A

HX60A3CD150A

- The ESL mode setting is designed to prevent theft and unauthorized operation of the system.
- When selecting the ESL mode setting to continuous operation, password should be entered when turning the Start button ON.
- Disabled : The ESL mode setting function does not operate.
  Continuous operation : Password should be entered whenever operator starts the engine.
  Enable(interval): Password should be entered when operator starts the engine first. It is not required to enter the password until restart within specified time.
  You may set the specified time up to two days.

※ Default password : 00000

※ Length of password : 5-10 digits

④ Changing password

- The length of the password is between 5 and 10 digits.

HX60A3CD151A

HX60A3CD149A

Entering current password

HX60A3CD153A

Selecting Change Password

HX60A3CD156A

Storing new password in MCU

HX60A3CD155A

Entering new password again

HX60A3CD149A

Entering new password

⑤ Machine information

HX60A3CD160A

HX60A3CD161A

HX60A3CD162A

· On this screen, you may check information of the instrument panel, the system controller (MCU), the engine and the system.

⑥ Contact

HX60A3CD163A

HX60A3CD164A

HX60A3CD165A

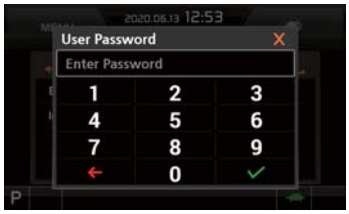
· You may check or change the contact information for after-sales services.

⑦ Cluster update

HX60A3CD169A

HX60A3CD170A

Selecting Cluster Update



HX60A3CD149A

Entering user's password

· It is possible to update the cluster and CAN.

※ **Do not turn power off while updating.**

a. Application update

HX60A3CD172A

Selecting application items

HX60A3CD173A

Selecting files to update

HX60A3CD174A

Selecting OK

HX60A3CD175A

In progress

HX60A3CD176

Completed

b. System update

HX60A3CD177A

Selecting system items

HX60A3CD173A

Selecting files to update

HX60A3CD174A

Selecting OK

HX60A3CD175A

In progress

HX60A3CD176

Completed

⑧ Service menu

HX60A3CD165A HX60A3CD144A HX60A3CD168A

Entering service password

- Power shift : Set the power shift mode (default/option).
- Operating hours : You may check operating hours of the system in individual modes after acceptance of the system.
- Main gauge type : It is possible to display engine rotation rate or fuel level on the main gage of the main screen.
- Display RPM : It is possible to set display of numeric value of engine rotation rate on the main gauge of the main screen.
- DPF filter exchange : You may initialize parameters relevant to DPF of engine ECU after cleaning the DPF filter.
- AVCU setting : You may select Standard, 2-Way or 4-Way dependent upon the system options.
- Adding language : It is possible to update language displayed on the cluster when it is required to correct language.

※ The service menu is accessible by maintenance engineer only. Do not attempt unauthorized adjustment.

(4) Display

① Clock adjust

HX60A3CD191A

HX60A3CD192A

- "****-**-**" on the first line indicates year/month/day.
- The second line indicates current time (00:00 - 12:59 am/pm)

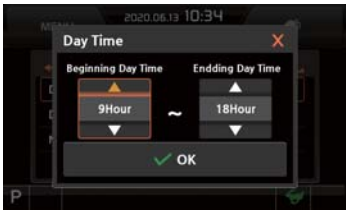
② Brightness setting

HX60A3CD193A

Manual (Level 1 to 10) HX60A3CD194A

HX60A3CD195A

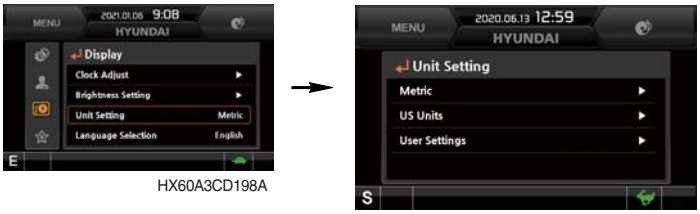
Auto (daytime) HX60A3CD196A



Auto (day/night) HX60A3CD197A

- Selecting “Auto” allows setting brightness different in day and night. It is also allowed to set hours in daytime. (Setting beginning day time and ending day time)

③ Unit setting



HX60A3CD198A

HX60A3CD199A

- Metric: Units are changed to metric units.
- U.S. units: Units are changed to U.S. units.
- User setting : Units are changed to user setting.

Item	Metric system	U.S. unit	User's setup
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

HX60A3CD200A

HX60A3CD201A

· You may select your language (from 24 languages), and all the information is displayed in the selected language.

(5) Utilities

① Entertainment

HX60A3CD70A HX60A3CD208A HX60A3CD209A

- You may play MP4 or CODEC files of detachable hard disk through USB port.
- USB port is on the left of the instrument panel.
- When engine rotation rate exceeds 1100 rpm or higher, the screen is switched to the operation screen even while MP4 or CODEC file is played for safety. When engine rotation rate drops to 1100 rpm or lower, animation clip is played again.

⚠ Do not play animation clip while operating the system to prevent risks of accident.

② Camera setting

HX60A3CD202A HX60A3CD203A

- You may install three cameras on the system, and set display sequence on this menu.
- If no camera is installed, this menu is disabled.

- When rotating Select switch clockwise, the screen of the next camera is displayed. When rotating the switch counterclockwise, the screen of the previous camera is displayed. You may also change the camera channel by touching the screen.
- You may display or hide the mini instrument panel by pressing Select switch or touching the screen.
  (Mini instrument panel displayed → hidden → displayed)

HX60A3CD204

- Pressing ESC switch or touching X icon on the screen terminates the camera mode.

③ Clinometer setting

HX60A3CD210A

HX60A3CD211A

· Pressing “Default” when the system is kept on flat surface resets X and Y values to zero.
· You may check gradient of the system on the operating screen of the instrument panel.

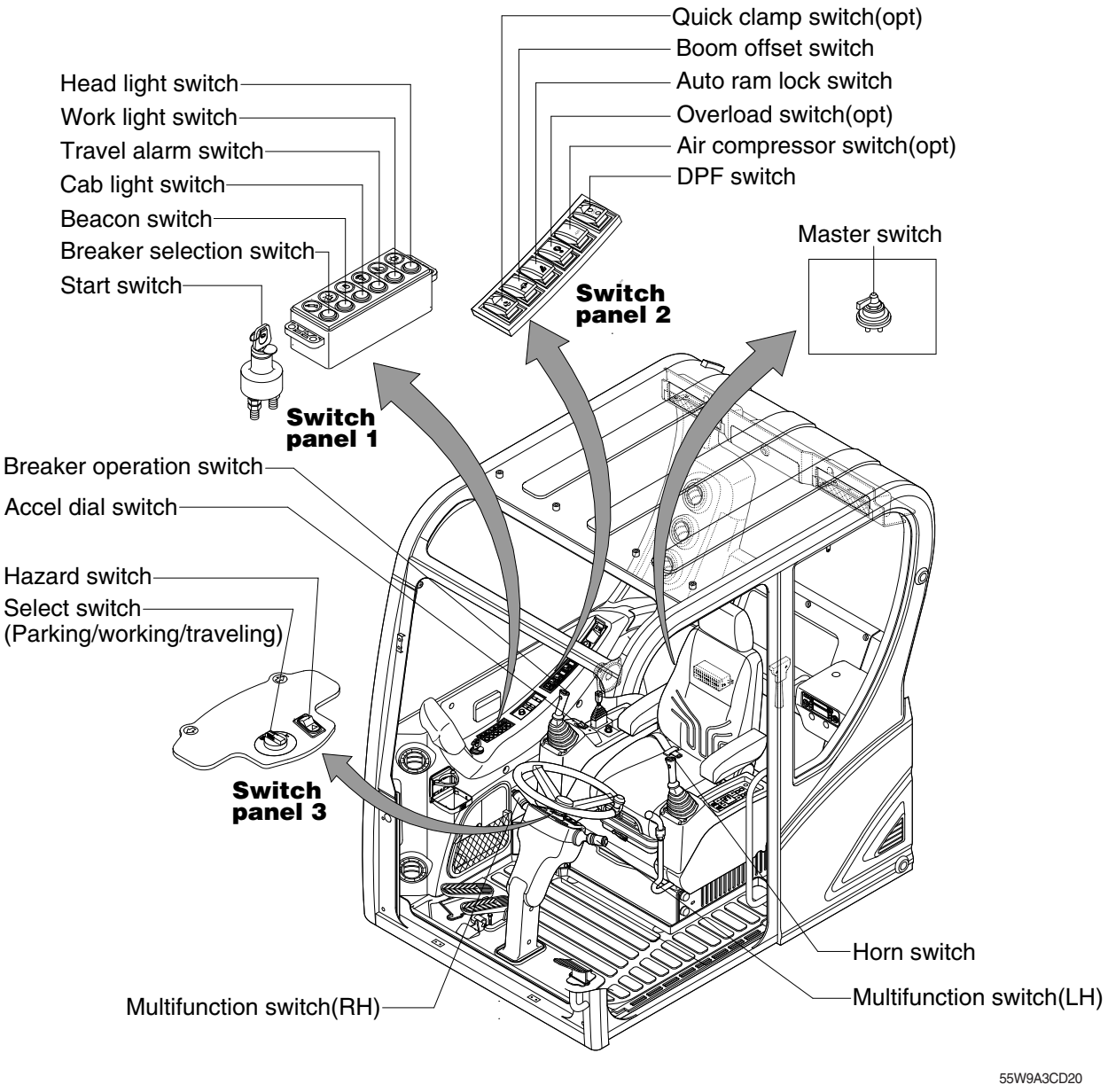
④ Emergency mode

HX60A3CD205A

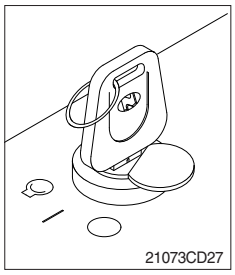
HX60A3CD206A

· When the switch or the acceleration dial of the monitor fails, the switch is displayed on LCD, and you are allowed to perform operation by touching the screen.
· Such operation is allowed only on this mode screen.

4. SWITCHES



1) STARTING SWITCH

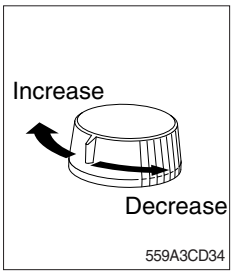


(1) There are three positions, OFF, ON and START.

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

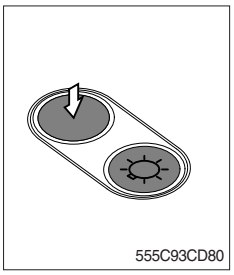
※ **Key must be in the ON position with engine running to maintain electrical and hydraulic function and prevent serious machine damage.**

2) ACCEL DIAL



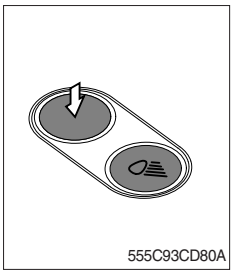
(1) There are 10 dial setting.
(2) Setting 1 is low idle and setting 10 is high idle.
- By rotating the accel dial to right : Engine speed increased.
- By rotating the accel dial to left : Engine speed decreased.

3) HEAD LIGHT SWITCH



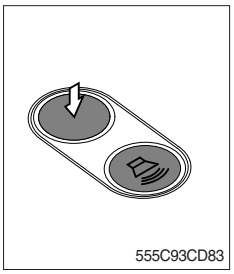
(1) This switch is used to operate the head light.
- Press the switch once, the head light comes ON and the pilot lamp ON.
- Press the switch once more, the head light and pilot lamp turn off.

4) WORK LIGHT



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

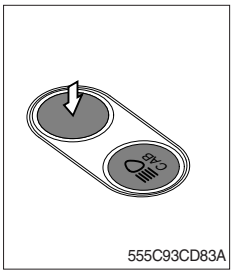
5) TRAVEL ALARM SWITCH



(1) This switch is used to alarm surroundings when the machine travels to forward and backward.

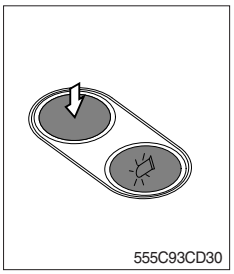
(2) On pressing this switch, the alarm operates only when the machine is traveling.

6) CAB LIGHT SWITCH



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

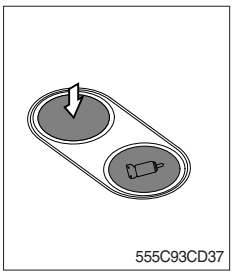
7) BEACON SWITCH (option)



(1) This switch turns ON the rotary light on the cab.

(2) The below indicator lamp is turned ON when operating this switch.

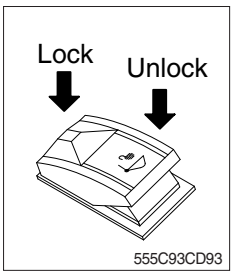
8) BREAKER SELECTION SWITCH (option)



(1) This switch is used to operate breaker.

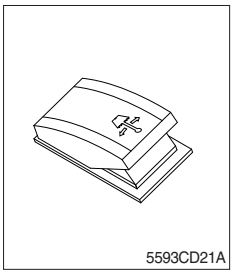
※ **The breaker operates only when this switch is pressed.**

9) QUICK CLAMP SWITCH (option)



(1) This switch is used to engage or disengage the moving hook on quick clamp.

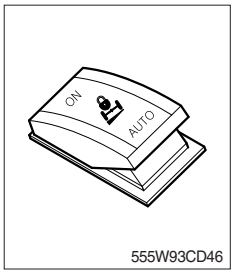
10) BOOM OFFSET SWITCH



(1) This switch is used to swing the boom to the right or left direction.

(2) The indicator lamp turned ON when selected this switch.

11) AUTO RAM LOCK SWITCH



(1) This switch activate front axle oscillation cylinder to locking position for increase of stability.

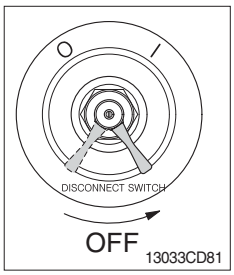
· ON : Set front axle to locking position for excavation work or travels even ground. Also, the ram lock pilot lamp comes ON at the travel pilot lamp.

· AUTO : Set front axle to locking or unlocking as table.

※ **Refer to page 4-32 for select switch.**

Select switch (parking/working/ traveling)	Ram lock	Conditions
Parking (P)	Locking	· Always
Traveling (T)	Unlocking	· Always
Working (W)	Locking	· FNR lever in neutral position · Service brake pedal is depressed.
	Unlocking	· FNR lever in forward/reverse position and service brake pedal is not depressed. · 2 way pedal is equipped and service brake pedal is not depressed.

12) MASTER SWITCH

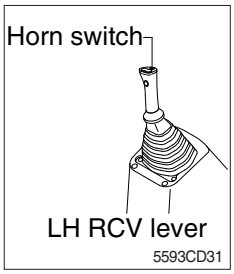


(1) This switch is used to shut off the entire electrical system.

(2) I : The battery remains connected to the electrical system.
O : The battery is disconnected to the electrical system.

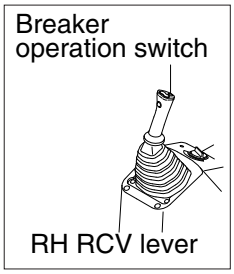
※ **Never turn the master switch to O (OFF) with the engine running. It could result in engine and electrical system damage.**

13) HORN SWITCH



(1) This switch is at the top of left side control lever.
On pressing, the horn sounds.

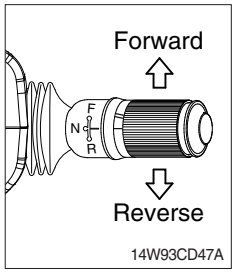
14) BREAKER OPERATION SWITCH



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

15) RH MULTI FUNCTION SWITCH

(1) FNR lever



① This lever changes travel direction of machine.

- **F** : Machine moves forward
- **N** : Neutral position
- **R** : Machine moves backward

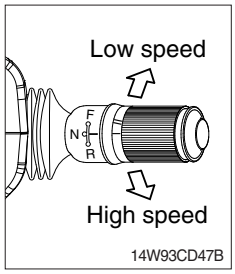
⚠ **Travel direction will be reversed if lower structure is positioned with dozer in front.**

② The warning buzzer sounds when the lever is in the reverse position.

⚠ **If this lever is not in the neutral position, engine does not started.**

⚠ **Be sure to stop the machine when changing the direction forward or backward while traveling.**

(2) Travel speed switch

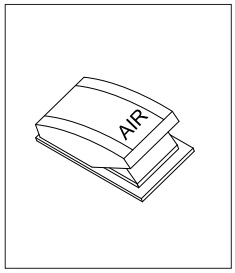


① This switch is for selecting travelling speed between high and low.

- Low speed (−) : 11.3 km/hr (7.0 mph), turtle mark
- High speed (=) : 30 km/hr (19.0 mph), rabbit mark

⚠ **In case of changing the travel speed, be sure to stop the machine completely.**

16) AIR COMPRESSOR SWITCH (option)

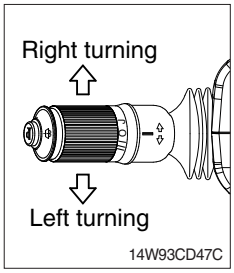


(1) This switch is used to activate the air compressor.

(2) The indicator lamp turned ON when selected this switch.

17) LH MULTI FUNCTION SWITCH

(1) Direction indication lamp switch

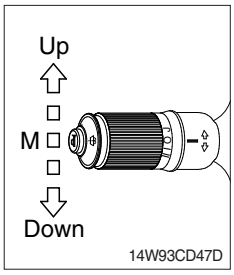


① This switch is used to warn or signal the turning direction of the machine to other machines or equipment.

② Push the lever to forward for turning right (⇧), pull the lever to backward for turning left (⇩).

③ The turning pilot lamp comes ON at the travel pilot lamp on the steering column.

(2) Dimmer switch



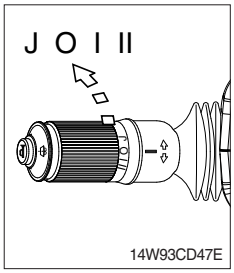
① This switch is used to turn the head lights direction.

② Switch positions.

- Up ( ) : To flash for passing
- Middle ( ) : Head lights low beam ON
- Down ( ) : Head lights high beam ON

③ If you release the switch when it's in up position, the switch will return to middle.

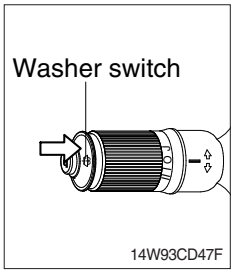
(3) WIPER SWITCH



① When the switch is in J position, the wiper moves intermittently.

② When placed in I or II position, the wiper moves continuously.

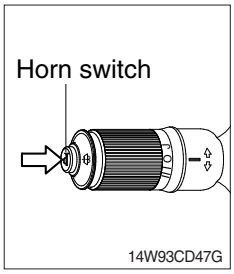
(4) WASHER SWITCH



① If you push the grip of the lever, washer liquid will be sprayed and the wiper will be activated 2-3 times.

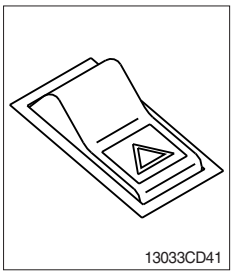
※ Check the quantity of washer liquid in the tank. If the level of the washer liquid is LOW, add the washer liquid (in cold, winter days) or water. The capacity of tank is 1.5 liter.

(5) HORN SWITCH



① This switch is at the end of left side multifunction switch. On pressing, the horn sounds.

18) HAZARD SWITCH

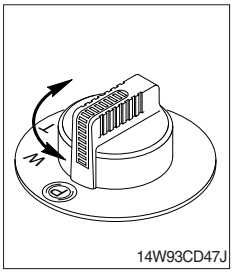


(1) Use for parking, or roading machine.

(2) LH and RH turn signal lamps come ON at the same time by this switch.

※ **If the switch is left ON for a long time, the battery may be discharged.**

19) SELECT SWITCH (parking / working / traveling)

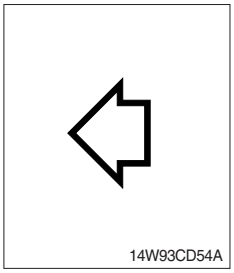


(1) This switch is used to select the operation mode as below.

- Parking (Ⓟ) : The parking brake is applied.
- Working (W) : The machine needs to be working.
- Traveling (T) : The machine needs to be traveling.

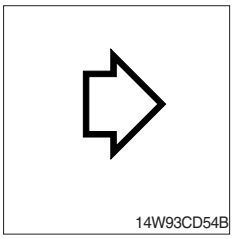
20) TURNING PILOT LAMP

(1) Left turning pilot lamp



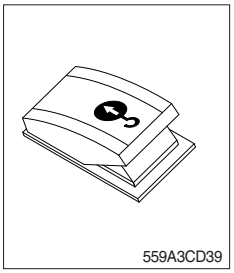
(1) This lamp flashes with sound when the LH multifunction switch is move to backward position.

(2) Right turning pilot lamp



① This lamp flashes with sound when the LH multifunction switch is
② move to forward position.

21) OVERLOAD SWITCH (option)



(1) When this switch pressed ON position, buzzer makes sound and overload warning lamp comes ON in case that the machine is overload.

(2) When it pressed OFF position, buzzer stops and warning lamp goes out.

22) DPF (diesel particulate filter) SWITCH

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

(2) Inhibit position (①)

① The inhibit position disallows any automatic or manual regeneration of the DPF.

② This may be used by operator to prevent regeneration when the machine is operating in a hazardous environment concerned about high temperature.

③ It is strongly recommended that this position is only activated when high temperatures may cause a hazardous condition.

(3) OFF position

This position will initate a automatic regeneration of the DPF.

(4) Manual regeneration position (②)

① This position will only initate a manual regeneration of the DPF when the machine is in non-mission condition, engine must run at low idle speed and DPF soot levels are high enough to allow regeneration.

② HEST lamp will be illuminated during the entire regeneration.

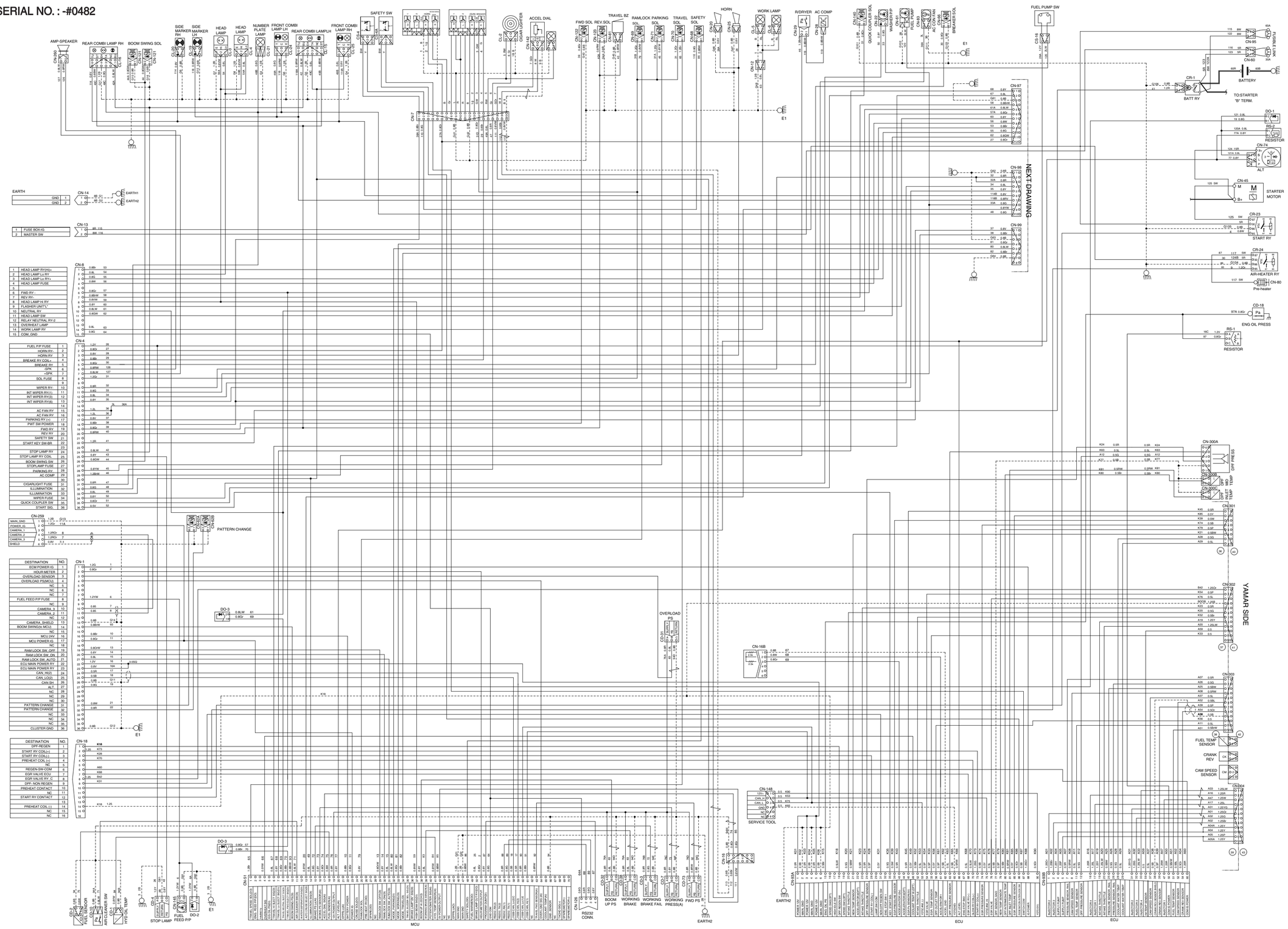
※ **Refer to the page 4-9 for details.**

※ **This switch can be move to the manual regeneration position (②) only when the safety button is pulled to backward.**

※ **Also, this switch return to the OFF position when released the manual regeneration position (②).**

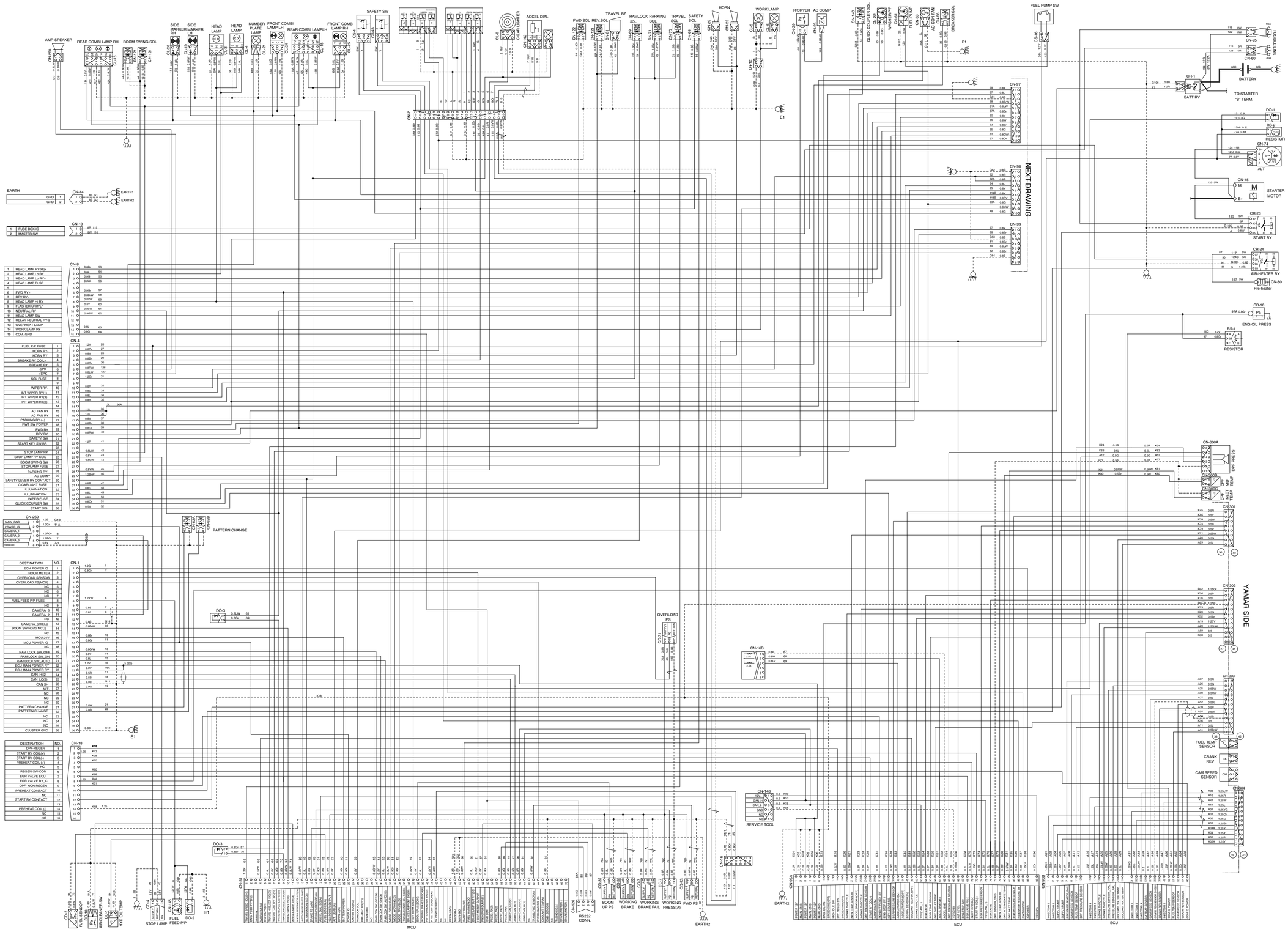
· ELECTRICAL CIRCUIT (1/3)

- MACHINE SERIAL NO. : -#0482



20M9-95122-00

- MACHINE SERIAL NO. : #0483-#0642



1	HEAD LAMP RY(HI)+
2	HEAD LAMP Lo RY
3	HEAD LAMP Lo RY+
4	HEAD LAMP FUSE
5	
6	FWD RY -
7	REV RY -
8	HEAD LAMP HI RY
9	FLASHER UNIT(+)
10	NEUTRAL RY
11	HEAD LAMP SW
12	RELAY NEUTRAL RY-2
13	OVERHEAT LAMP
14	WORK LAMP RY
15	COM_GND

FUEL P/P FUSE	1
HORN RY-	2
HORN RY	3
BREAKE RY COIL+	4
BREAKE RY	5
-SPK	6
+SPK	7
SOL FUSE	8
	9
WIPER RY-	10
INT WIPER RY(+)	11
INT WIPER RY(3)	12
INT WIPER RY(6)	13
	14
AC FAN RY	15
AC FAN RY	16
PARKING RY (+)	17
PWT SW POWER	18
FWD RY	19
REV RY	20
SAFETY SW	21
START KEY SW-BR	22
	23
STOP LAMP RY	24
STOP LAMP RY COIL	25
BOOM SWING SW	26
STOPLAMP FUSE	27
PARKING RY	28
AC COMP	29
SAFETY LEVER RY CONT ACT	30
CIGARLIGHT FUSE	31
ILLUMINATION	32
ILLUMINATION	33
WIPER FUSE	34
QUICK COUPLER SW	35
START SIG.	36

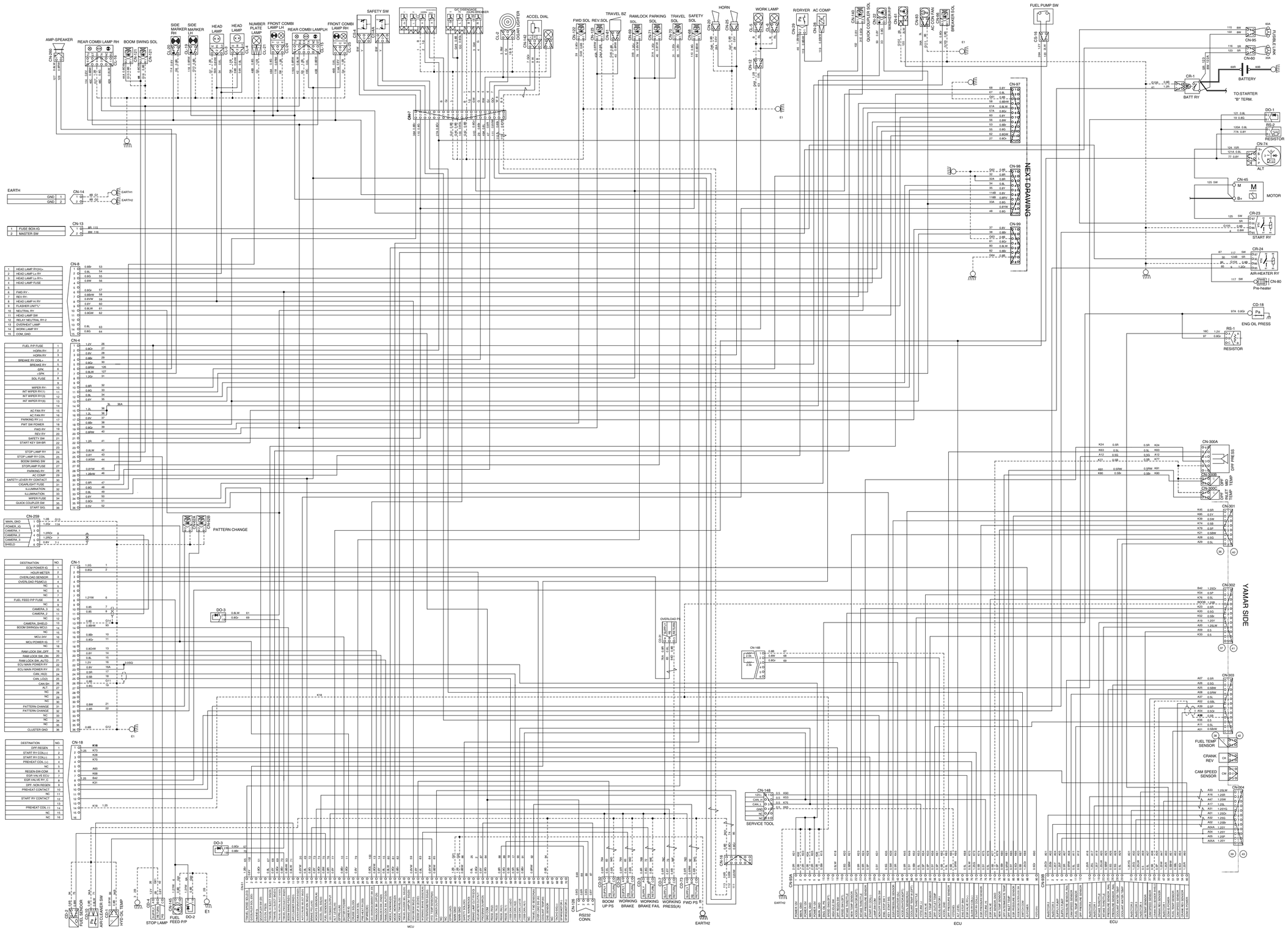
MAIN_GND	1
POWER_IG	2
CAMERA_1	3
CAMERA_2	4
CAMERA_3	5
SHIELD	6

DESTINATION	NO.
ECM POWER IG	1
HOUR METER	2
OVERLOAD SENSOR	3
OVERLOAD PS/MCU	4
NC	5
NC	6
NC	7
FUEL FEED P/P FUSE	8
NC	9
CAMERA_3	10
CAMERA_2	11
NC	12
CAMERA_SHIELD	13
BOOM SWING(to MCU)	14
NC	15
MCU 24V	16
MCU POWER IG	17
NC	18
RAM LOCK SW_OFF	19
RAM LOCK SW_ON	20
RAM LOCK SW_AUTO	21
ECU MAIN POWER RY	22
ECU MAIN POWER RY	23
CAN_HI(2)	24
CAN_LO(2)	25
CAN SH	26
ALT	27
NC	28
NC	29
NC	30
PATTERN CHANGE	31
PATTERN CHANGE	32
NC	33
NC	34
NC	35
CLUSTER GND	36

DESTINATION	NO.
DPF REGEN	1
START RY COIL(-)	2
START RY COIL(+)	3
PREHEAT COIL (+)	4
NC	5
REGEN SW-COM	6
EGR VALVE ECU	7
EGR VALVE RY_C	8
DPF- NON REGEN	9
PREHEAT CONTACT	10
NC	11
START RY CONTACT	12
	13
PREHEAT COIL (-)	14
NC	15
NC	16

20M9-95123-00

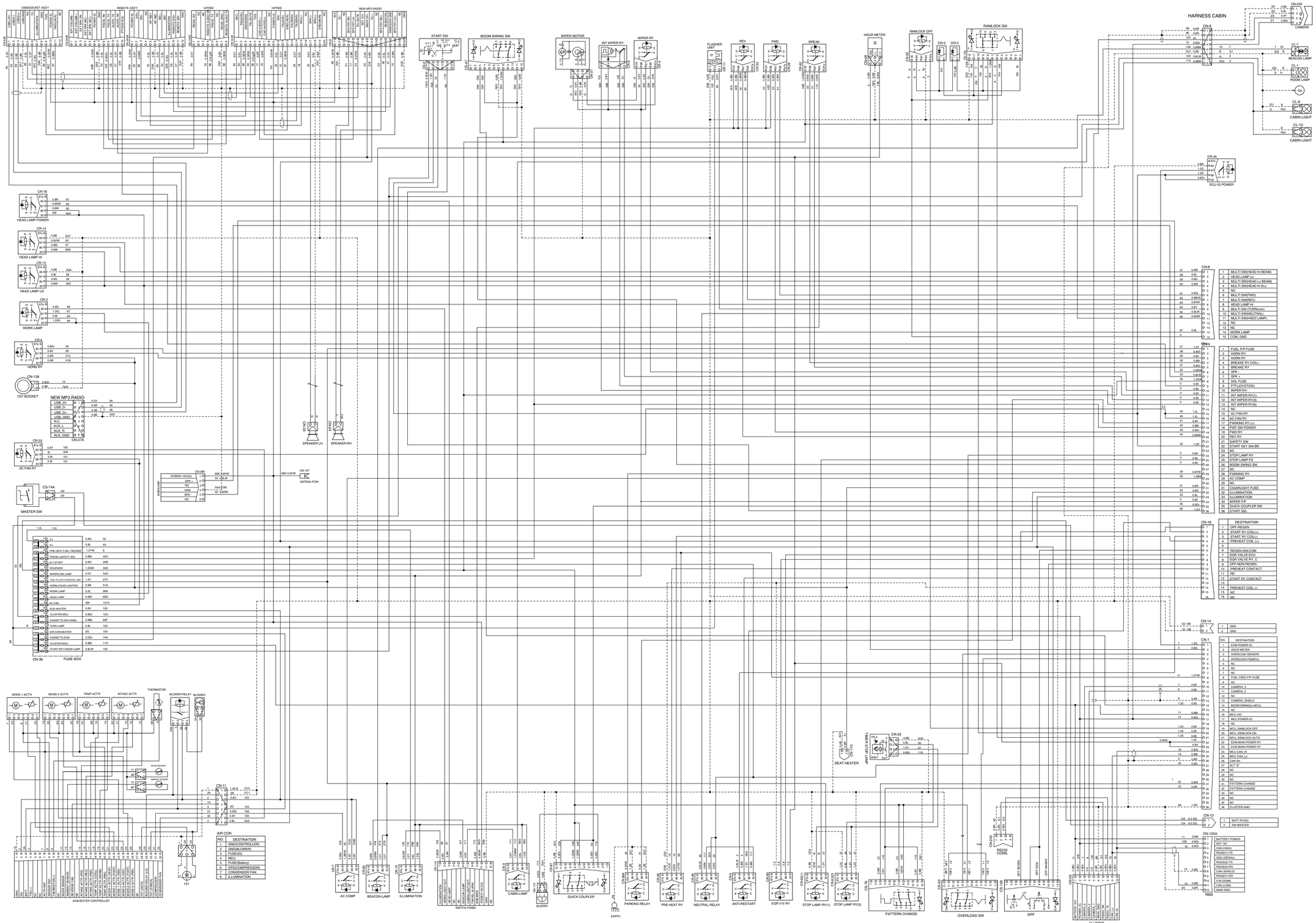
- MACHINE SERIAL NO. : #0643-



20M9-95123-00

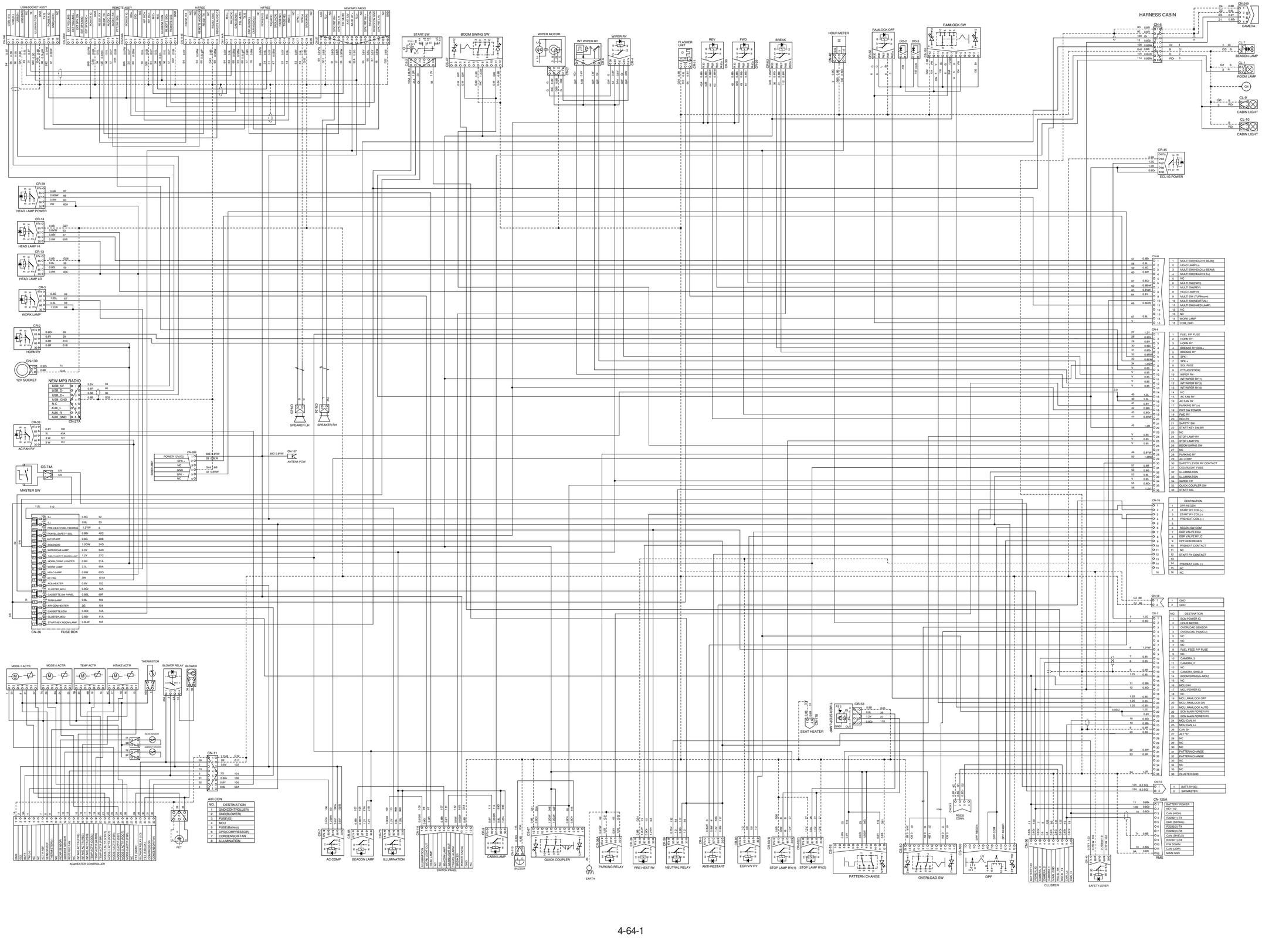
· ELECTRICAL CIRCUIT (2/3)

- MACHINE SERIAL NO. : -#0482



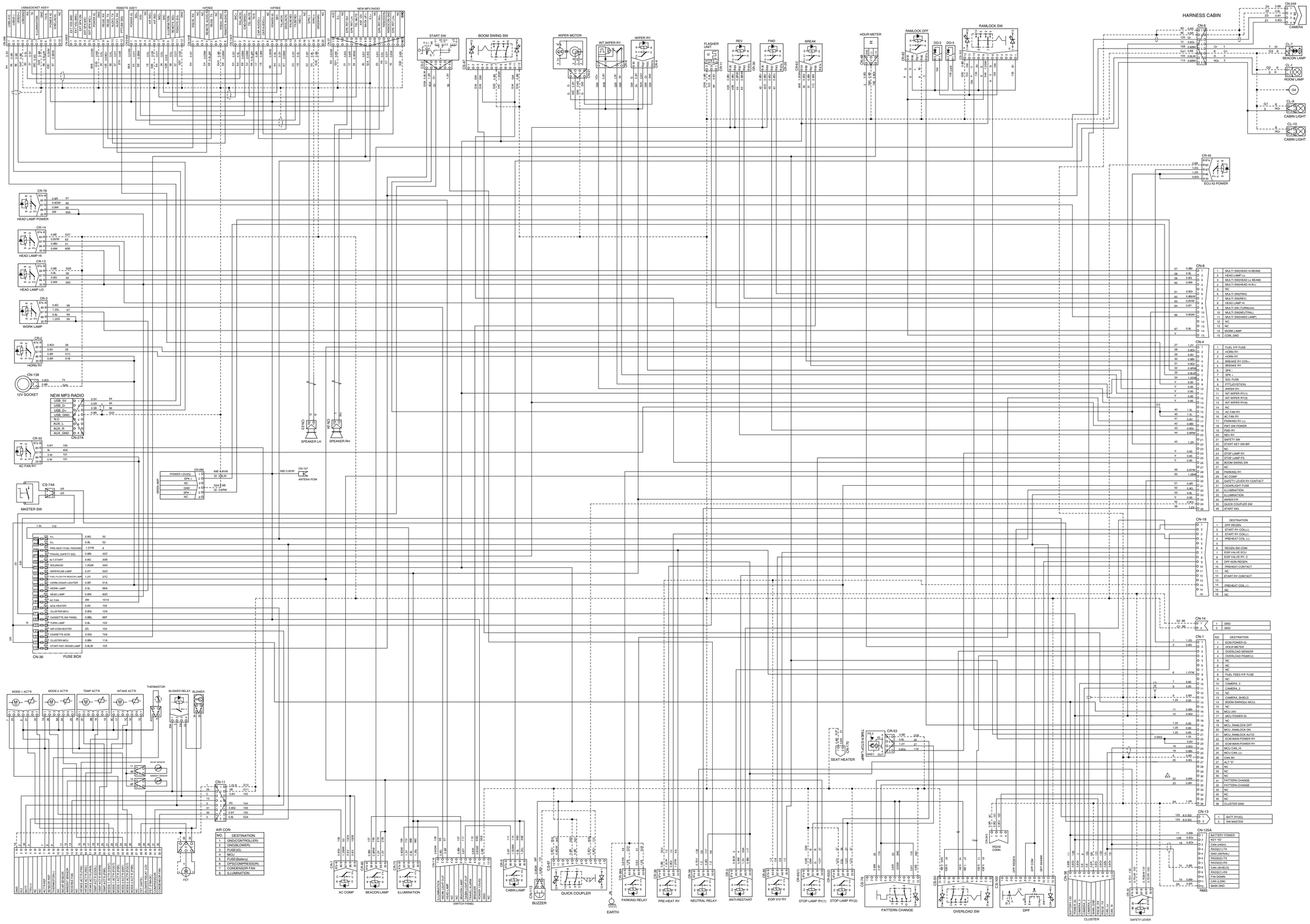
20M9-95111-00

- MACHINE SERIAL NO. : #0483-#0642



20M9-95112-00

- MACHINE SERIAL NO. : #0643-



NO.	DESTINATION
1	GND(CONTROLLER)
2	GND(BLOWER)
3	FUSE(IG)
4	MCU
5	FUSE(Battery)
6	DPS(COMPRESSOR)
7	CONDENSOR FAN
8	ILLUMINATION

1	MULTI SW(HEAD HI BEAM)
2	HEAD LAMP LH
3	MULTI SW(HEAD LH BEAM)
4	MULTI SW(HEAD HI B+)
5	NC
6	MULTI SW(WD)
7	MULTI SW(REV)
8	HEAD LAMP HI
9	MULTI SW (TURN)com)
10	MULTI SW(NEUTRAL)
11	MULTI SW(HEAD LAMP)
12	NC
13	NC
14	WORK LAMP
15	COM_GND

1	FUEL P/P FUSE
2	HORN RY-
3	HORN RY
4	BREAKE RY COIL+
5	BREAKE RY
6	SPK-
7	SPK +
8	SOL FUSE
9	PTT(JOYSTICK)
10	WIPER RY-
11	INT WIPER RY(1)
12	INT WIPER RY(3)
13	INT.WIPER RY(B)
14	NC
15	AC FAN RY
16	AC FAN RY
17	PARKING RY (+)
18	PWT SW POWER
19	FWD RY
20	REV RY
21	SAFETY SW
22	START KEY SW-BR
23	NC
24	STOP LAMP RY
25	STOP LAMP FB
26	BOOM SWING SW
27	NC
28	PARKING RY
29	AC COMP
30	SAFETY LEVER-RY CONTACT
31	CIGARLIGHT FUSE
32	ILLUMINATION
33	ILLUMINATION
34	WIPER P/P
35	QUICK COUPLER SW
36	START SIG.

	DESTINATION
1	OFF-REGEN
2	START RY COIL(+)
3	START RY COIL(-)
4	PREHEAT COIL (+)
5	
6	REGEN-SW-COM
7	EGR VALVE ECU
8	EGR VALVE RY_C
9	OFF-NON REGEN
10	PREHEAT CONTACT
11	NC
12	START RY CONTACT
13	
14	PREHEAT COIL (-)
15	NC
16	NC

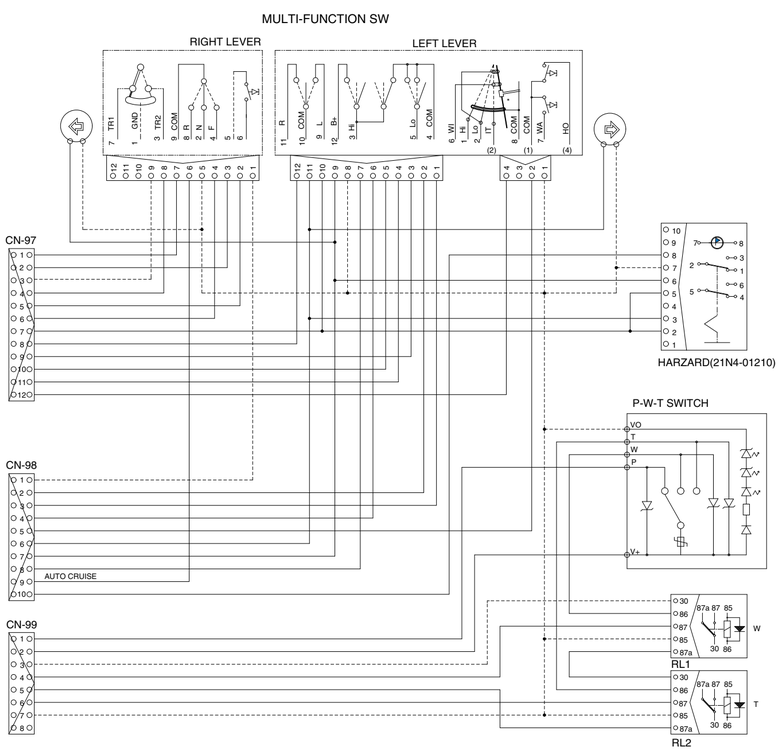
1	GND
2	GND

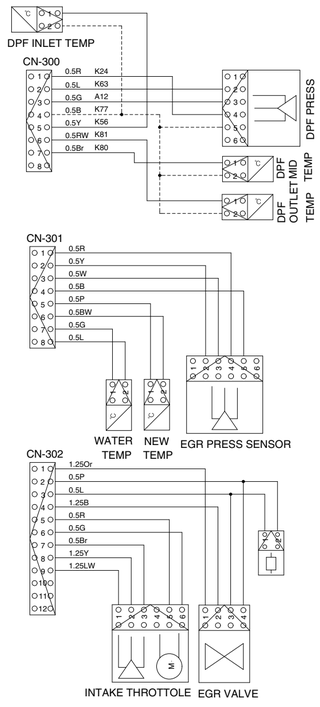
NO.	DESTINATION
1	ECM POWER-IG
2	HOUR METER
3	OVERLOAD SENSOR
4	OVERLOAD PS(MCU)
5	NC
6	NC
7	NC
8	FUEL FEED P/P FUSE
9	NC
10	CAMERA_3
11	CAMERA_2
12	NC
13	CAMERA_SHIELD
14	BOOM SWING(to MCU)
15	NC
16	MCU 24V
17	MCU POWER IG
18	NC
19	MCU_RAMLOCK OFF
20	MCU_RAMLOCK ON
21	MCU_RAMLOCK AUTO
22	ECM MAIN POWER RY
23	ECM MAIN POWER RY
24	MCU CAN_HI
25	MCU CAN_Lo
26	CAN SH
27	ALT "S"
28	NC
29	NC
30	NC
31	PATTERN CHANGE
32	PATTERN CHANGE
33	NC
34	NC
35	NC
36	CLUSTER GND

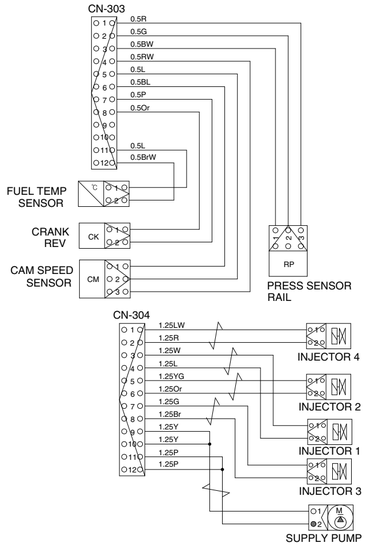
1	BATT.RY(G)
2	SW.MASTER

1	BATTERY POWER
2	KEY "IG"
3	CAN (HIGH)
4	RX232(1)-TX
5	GND (SERIAL)
6	RX232(2)-TX
7	RX232(2)-RX
8	CAN (SHIELD)
9	RX232(1)-RX
10	F/W DOWN
11	CAN (LOW)
12	MAIN GND

· ELECTRICAL CIRCUIT (3/3)







YANMAR SIDE

20M9-95130-00

MEMORANDUM

1. POWER CIRCUIT

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

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

1) OPERATING FLOW

Battery → Battery relay → Fusible link (CN-60) → I/conn [CN-13 (2)] → Master switch [CS-74A]

- → Fuse box [No.1]
  - → Start switch [CS-2 (1)]
  - → I/conn [CN-6 (7)] → Room lamp [CL-1 (2)]
- → Fuse box [No.2]
  - → Cluster [CN-56 (1)]
  - → I/conn [CN-1 (16)] → MCU [CN-51 (22)]
- → Fuse box [No.3]
  - → I/conn [CN-1 (22, 23)] → ECU [CN-93A (1), (3), (5)]
  - → Radio & USB player [CN-27 (8)]
  - → Hour meter [CN-48 (1)]
  - → EGR valve relay [CR-80 (30)]
- → Fuse box [No.4] → Aircon & heater controller [CN-31 (5)]

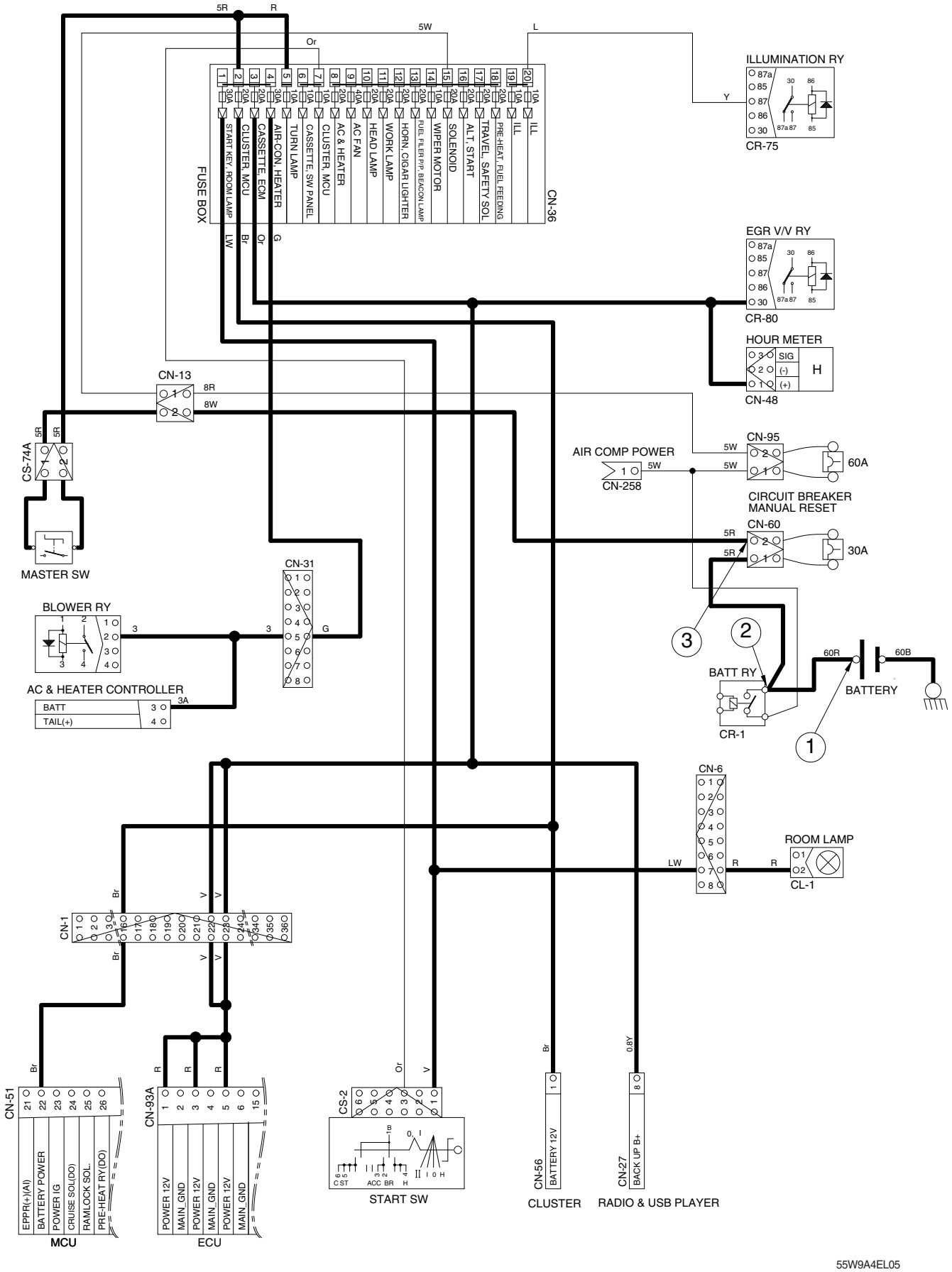
※ I/conn : Intermediate connector

2) CHECK POINT

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

※ GND : Ground

POWER CIRCUIT



2. STARTING CIRCUIT

1) OPERATING FLOW

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

※ Start switch : ON

→ Start switch ON [CS-2 (2)] → ECU IG power relay [CR-45 (30,86)]
→ I/conn [CN-4 (22)] →
Battery relay [CR-1] : Battery relay operating (all power is supplied with the electric component)
→ Start switch ON [CS-2 (3)] → Fuse box (all power is supplied with electric component)

※ Start switch : START

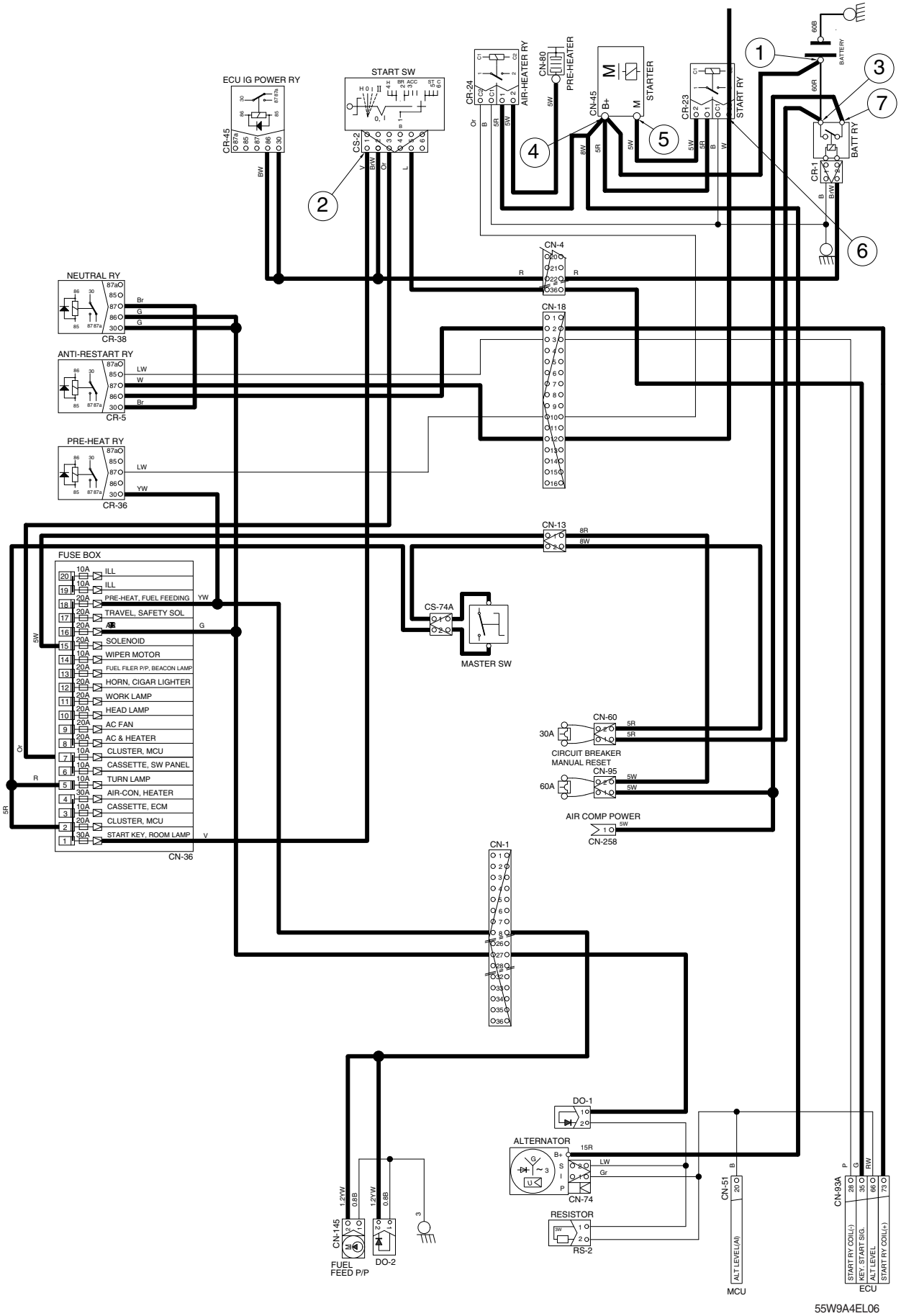
Start switch START [CS-2 (5)]
→ I/conn [CN-4 (36)] → ECU [CN-93A (35)→(28, 73)] → I/conn [CN-18 (2, 3)]
→ Anti-restart relay [CR-5 (30,86)→(87)] → I/conn [CN-18 (12)]
→ Start relay [CR-23 (1)→(2)] → Start motor operating

2) CHECK POINT

Engine	Start switch	Check point	Voltage
Operating	Start	① - GND (battery) ② - GND (start key) ③ - GND (battery relay M4) ④ - GND (starter B^+) ⑤ - GND (starter M) ⑥ - GND (start relay) ⑦ - GND (battery relay M8)	10~12.5V

※ GND : Ground

STARTING CIRCUIT



3. CHARGING CIRCUIT

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

Charging current generated by operating alternator flows into the battery through the Battery relay (CR-1).

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

1) OPERATING FLOW

(1) **Warning flow**

Alternator "L" terminal → MCU [CN-51 (20)] → Cluster warning lamp

(2) Charging flow

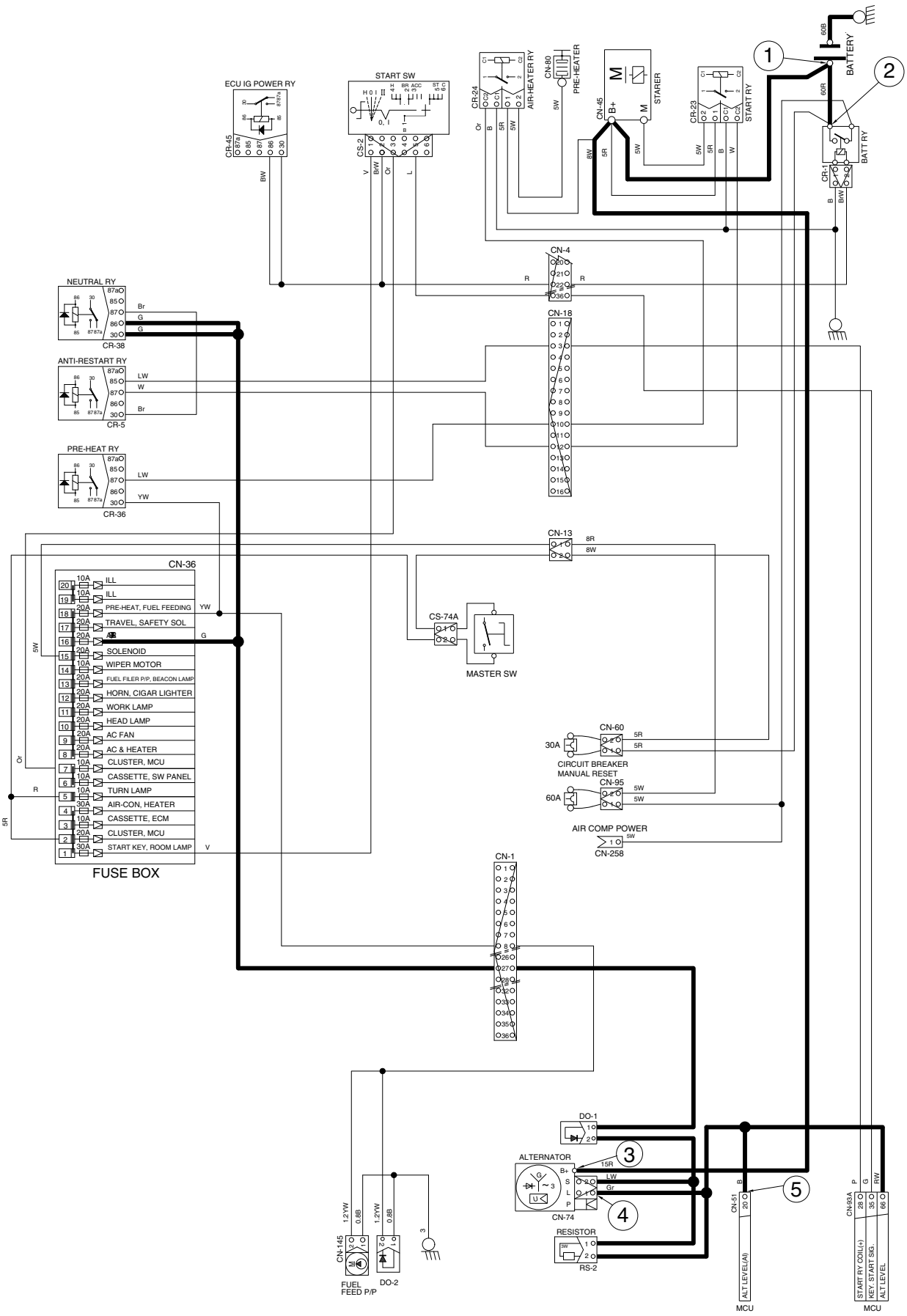
Alternator "B^+" terminal → Battery relay → Battery (+) terminal

2) CHECK POINT

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

※ GND : Ground

CHARGING CIRCUIT



55W9A4EL07

4. HEAD AND WORK LIGHT CIRCUIT

1) OPERATING FLOW

Fuse box (No.10) → Head lamp relay [CR-13 (30)→(86)] → I/conn [CN-8 (3)]
I/conn [CN-97 (10)] → Multifunction switch left lever
Head lamp power relay [CR-78 (30)→(85)] → Switch panel [CN-116 (3)]
Fuse box (No.11) → Work lamp relay [CR-3 (30)→(85)] → Switch panel [CN-116 (2)]

(1) Main light switch ON : 1st step

Head light switch ON [CN-116 (3)] → Head lamp power relay [CR-78 (85)→(87)]
→ I/conn [CN-8 (11)] → I/conn [CN-97 (11)] → Multifunction sw left lever [(4)→(5)]
→ I/conn [CN-97 (10)] → I/conn [CN-8 (3)] → Head light low relay [CR-13 (86),(87)]
→ I/conn [CN-8 (2)] → Head light ON [CL-3 (1), CL-4 (1)] : Head light ON

(2) Main light switch ON : 2nd step

Head light switch [CN-116 (3)] → Head lamp power relay [CR-78 (85)→(87)]
→ I/conn [CN-8 (11)] → I/conn [CN-97 (11)] → Multifunction sw left lever [(4)→(3)]
→ I/conn [CN-97 (9)] → I/conn [CN-8 (1)]
→ Head light high relay [CR-14 (86)→(87)] → I/conn [CN-8 (8)]
→ Head light ON [CL-3 (2), CL-4 (2)] : Head light high beam ON

(3) Work lamp switch ON :

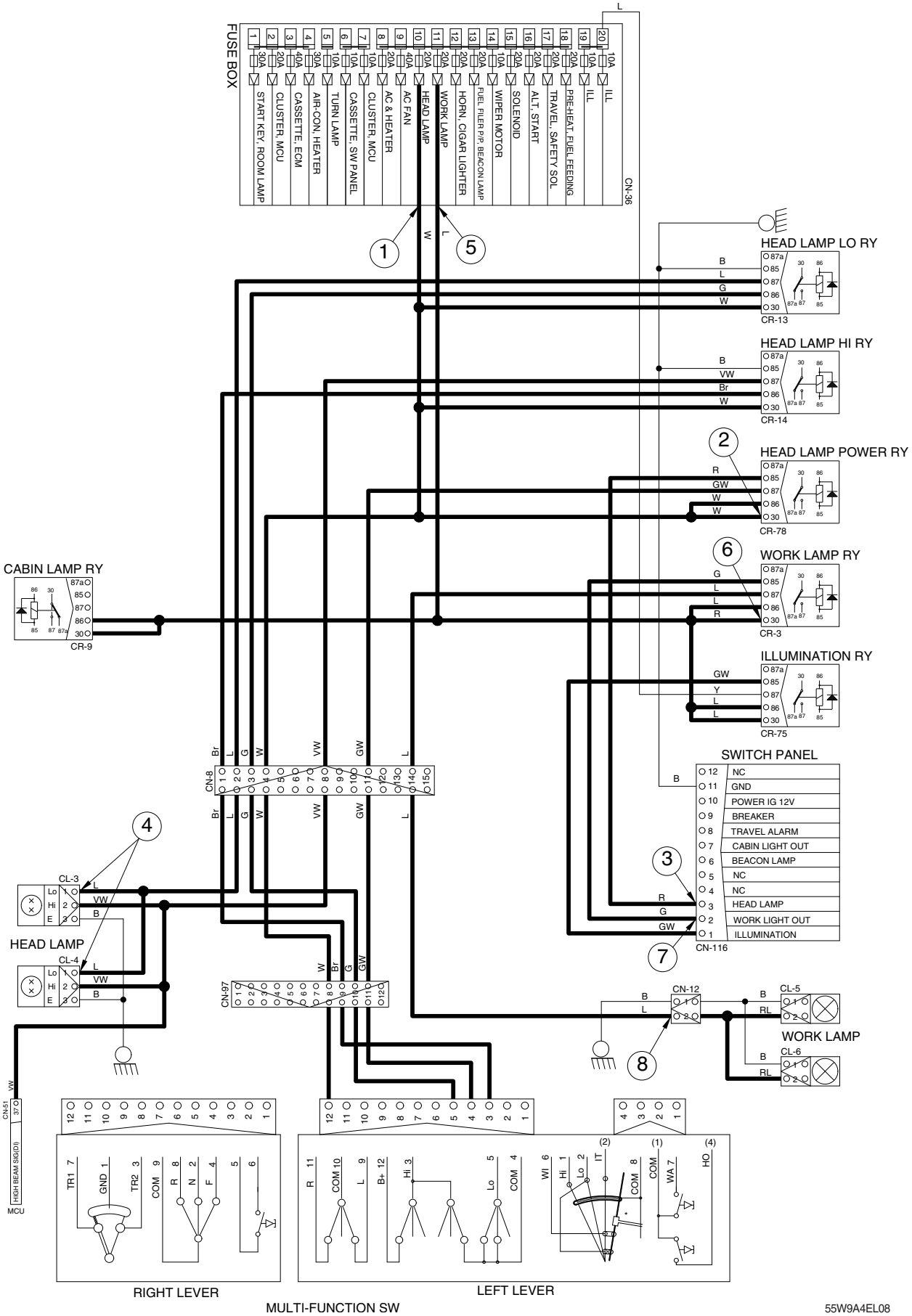
Work lamp switch ON [CS-116 (2)] → Work lamp relay [CR-3 (85)→(87)] → I/conn [CN-8 (14)]
→ I/conn [CN-12 (2)] → Work lamp ON [CL-5 (2), CL-6 (2)] : Work lamp ON

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 (head light) ⑤ - GND (fuse box) ⑥ - GND (switch power input) ⑦− GND (switch power output) ⑧ - GND (work light)	10~12.5V

※ GND : Ground

HEAD AND WORK LAMP CIRCUIT



55W9A4EL08

5. BEACON LAMP AND CAB LAMP CIRCUIT

1) OPERATING FLOW

Fuse box (No.13) → Beacon lamp relay [CR-85 (30)→(85)] → Switch panel [CN-116 (6)]
Fuse box (No.11) → Cab lamp relay [CR-9 (30)→(85)] → Switch panel [CN-116 (7)]

(1) Beacon lamp switch ON

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

(2) Cab lamp switch ON

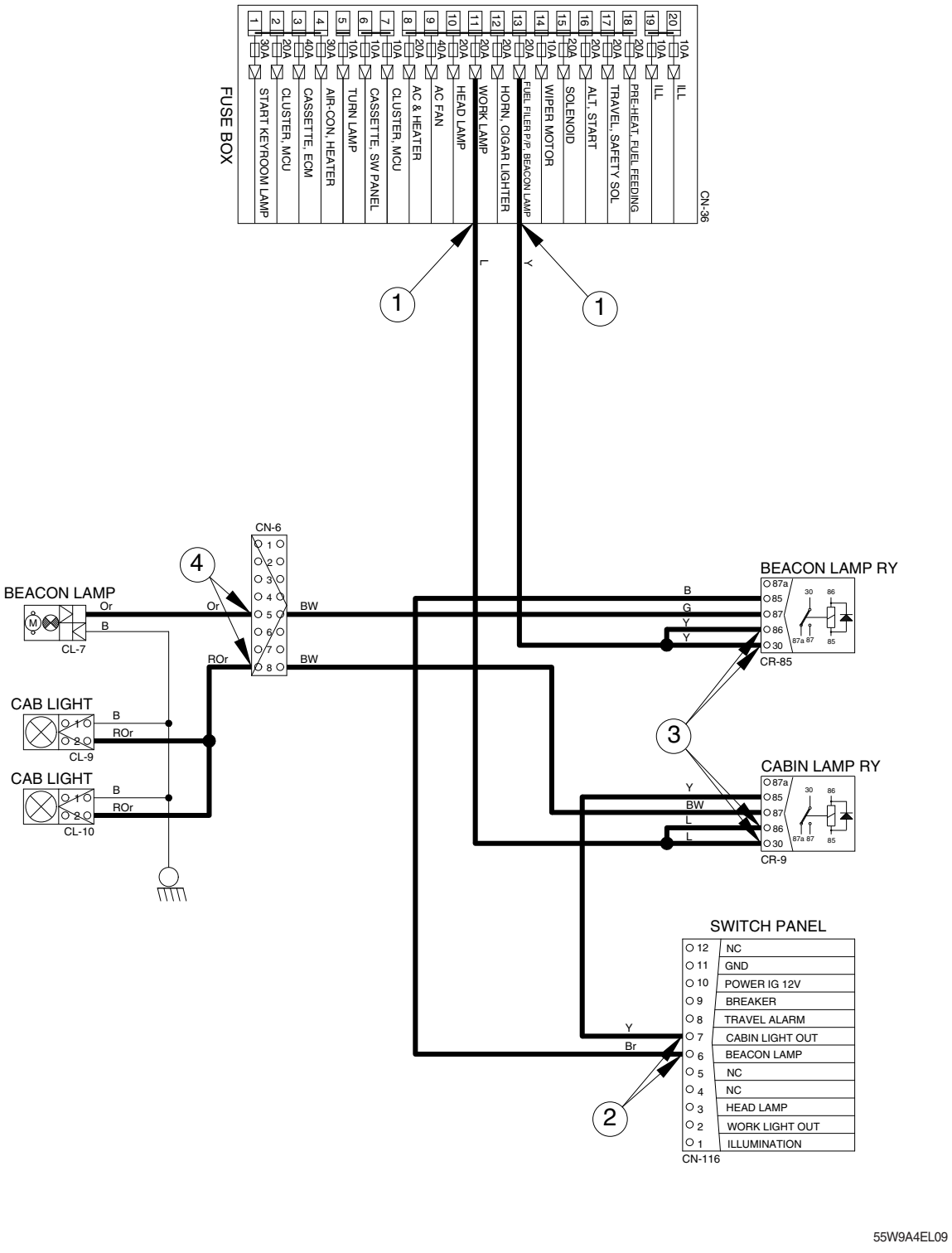
Switch panel [CN-116 (7)] → Cab lamp relay [CR-9 (85)→(87)] → I/conn [CN-6 (8)]
→ Cab light [CL-9 (2), CL-10 (2)]

2) CHECK POINT

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

※ GND : Ground

BEACON AND CAB LAMP CIRCUIT



55W9A4EL09

6. WIPER AND WASHER CIRCUIT

1) OPERATING FLOW

(1) Key switch ON

Fuse box (No.14) → Wiper motor [CN-21 (3)]
→ Int wiper relay [CR-6 (4)]
→ Wiper relay [CR-4 (86)]
→ Wiper relay [CR-4 (87)]
→ I/conn [CN-4 (34)] → Washer pump [CN-22 (2)]

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

Multifunction switch left lever (2) → I/conn [CN-98 (5)] → I/conn [CN-4 (13)]
→ Int wiper relay [CR-6 (6)] : Wiper motor intermittently operating → Int wiper relay [CR-6 (6)→(3)]
→ I/conn [CN-4 (12)] → I/conn [CN-98 (4)] → Multifunction switch left lever (6)→(2)
→ I/conn [CN98 (2)] → I/conn [CN-4 (10)] → Wiper relay [CR-4 (85)] : Wiper relay operating
→ Wiper relay [CR-4 (87)→(30)] → Wiper motor [CN-21 (4)] : Wiper motor operating

(3) Wiper switch ON : 2nd or 3rd step

Multifunction switch left lever (2) → I/conn [CN-98 (2)] → I/conn [CN-4 (10)]
→ Wiper relay [CR-4 (85)] : Wiper relay operating → Wiper relay [CR-4 (87)→(30)]
→ Wiper motor operating [CN-21(1)] : Wiper motor operating

(4) Auto parking (when switch OFF)

Wiper switch OFF → Wiper relay OFF
→ Int wiper relay OFF
→ Wiper motor [CN-21 (3)→(1)] → Wiper relay [CR4 (87a)→(30)]
→ Wiper motor [CN-21 (4)] : Wiper motor parking position

(5) Washer switch ON

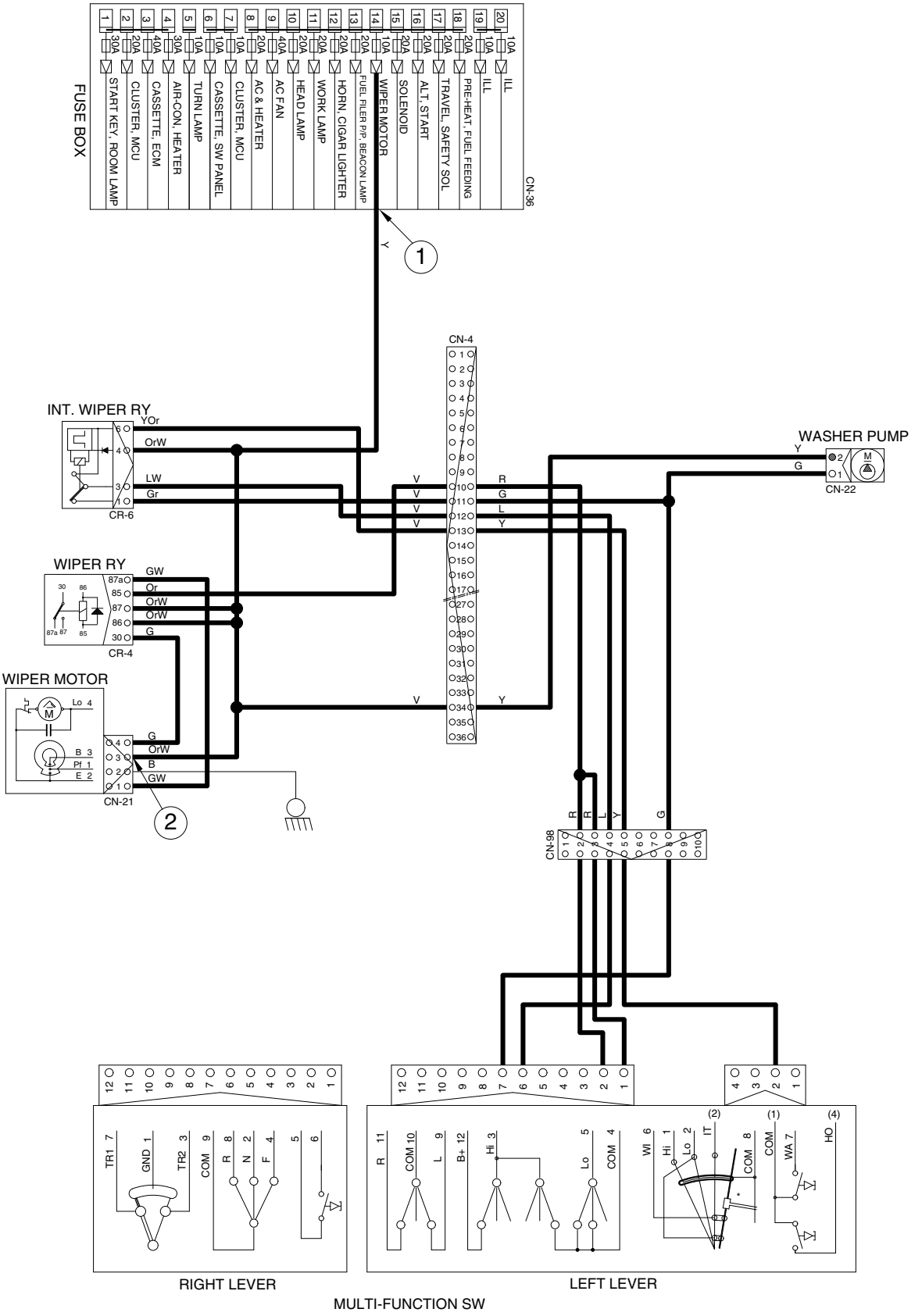
Multifunction sw left lever (7) → I/conn [CN-98 (8)] → Washer pump [CN-22 (1)] : Washer pump operating

2) CHECK POINT

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

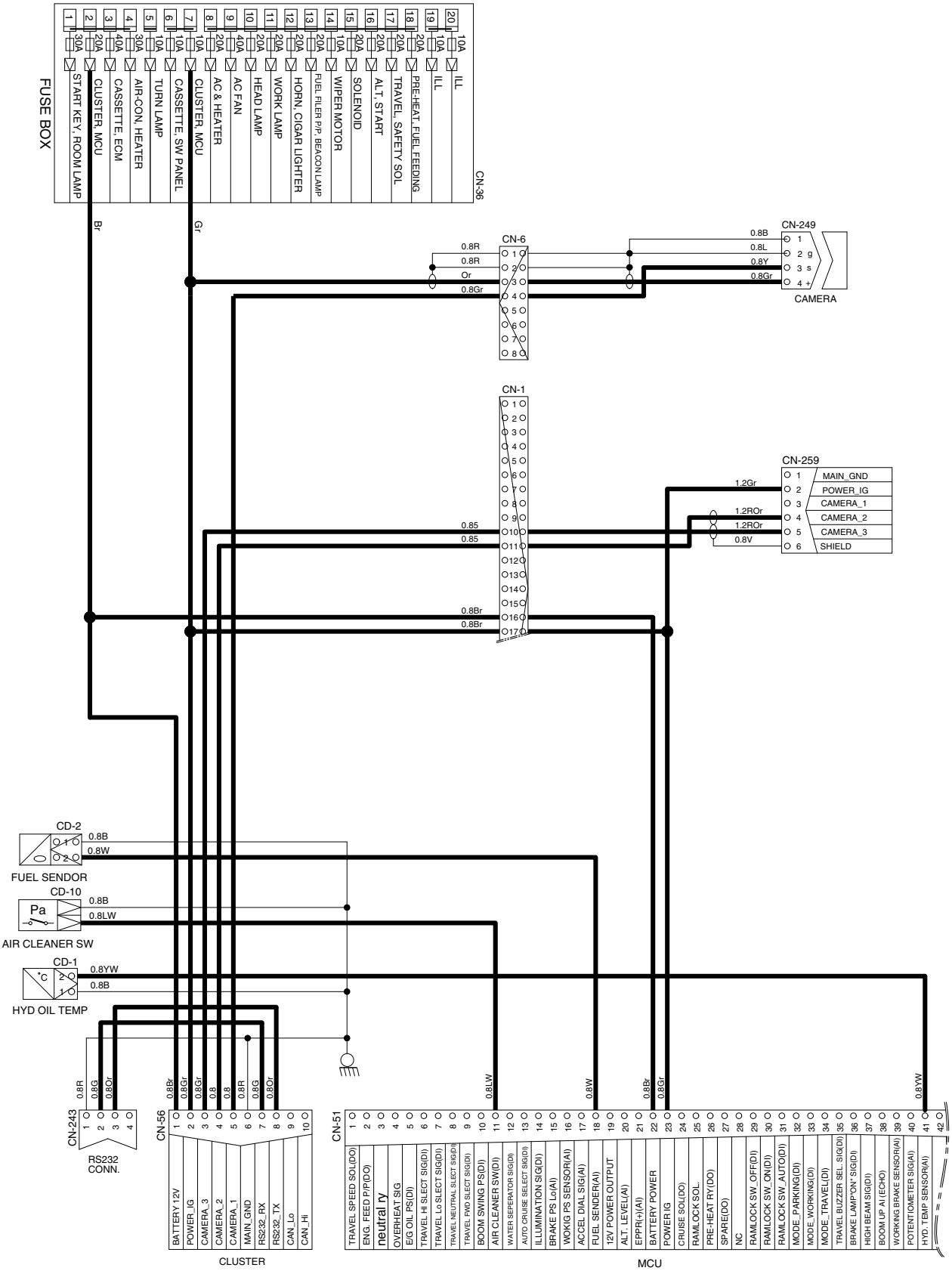
※ GND : Ground

WIPER AND WASHER CIRCUIT



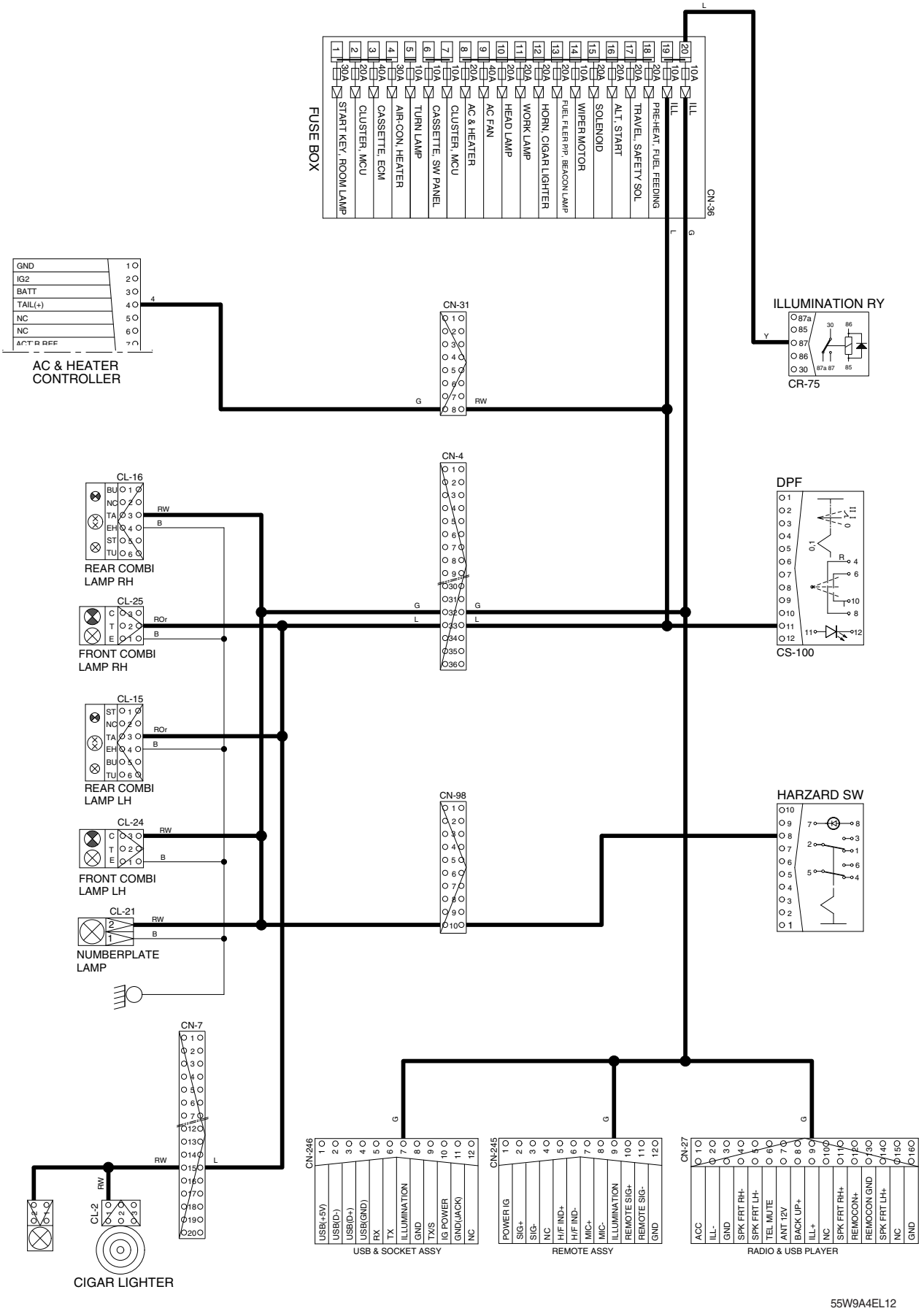
55W9A4EL10

MONITORING CIRCUIT

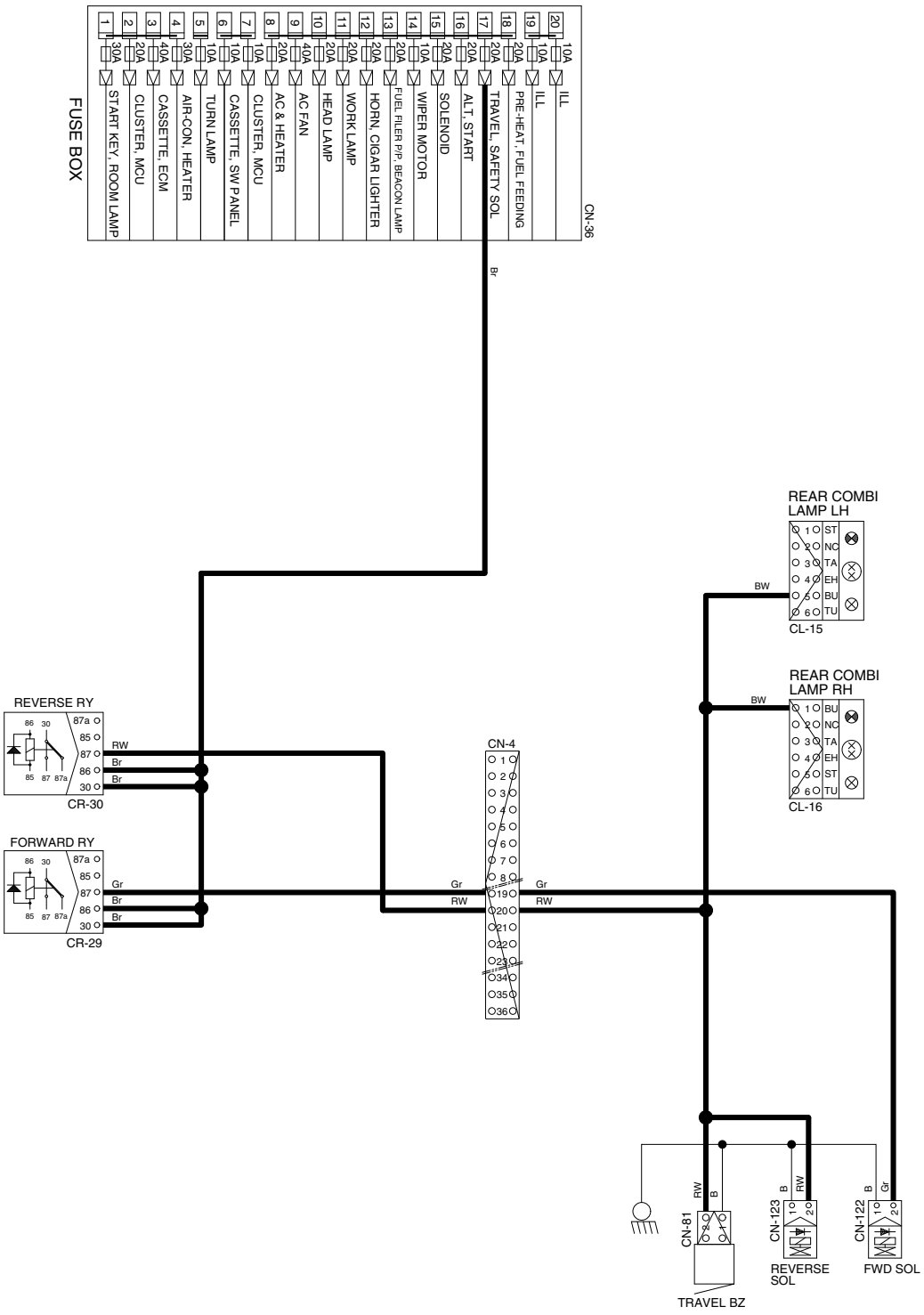


55W9A4EL11

ILLUMINATION CIRCUIT

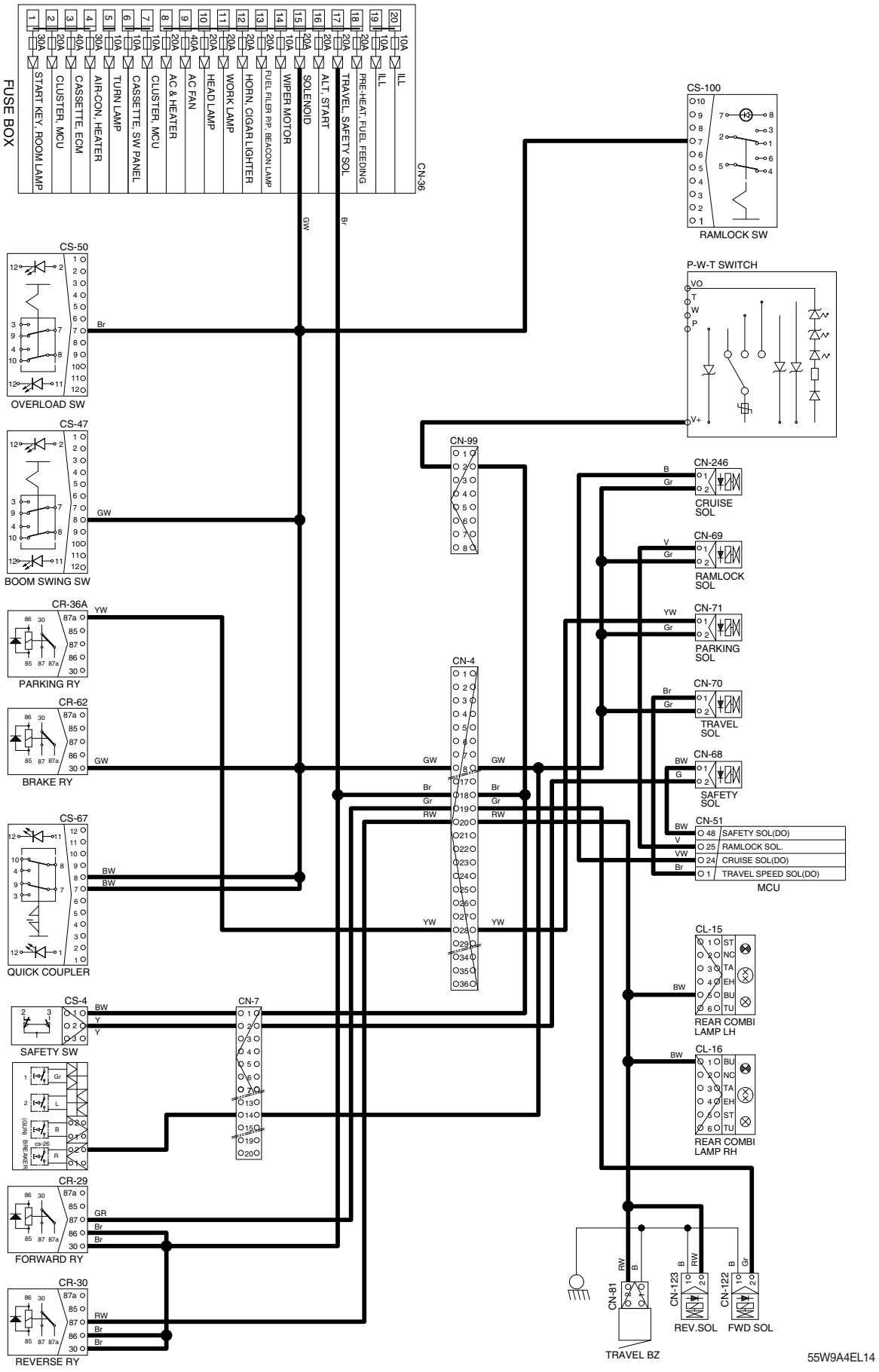


COMBINATION LAMP CIRCUIT

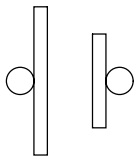
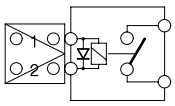
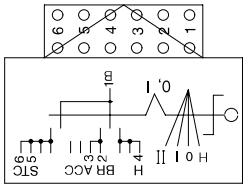
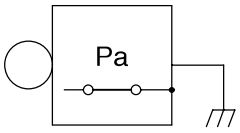
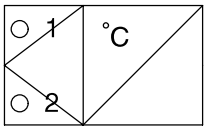


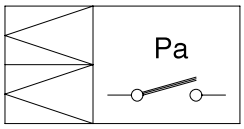
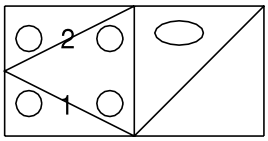
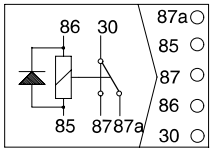
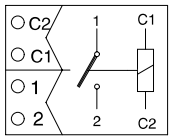
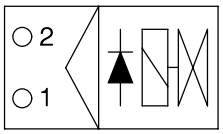
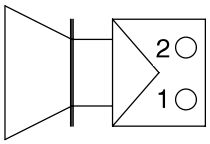
55W9A4EL13

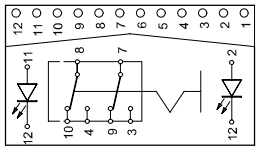
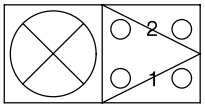
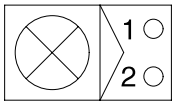
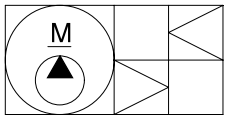
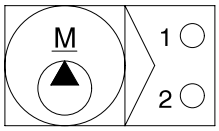
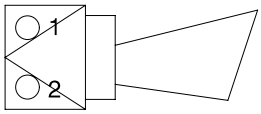
ELECTRIC CIRCUIT FOR HYDRAULIC

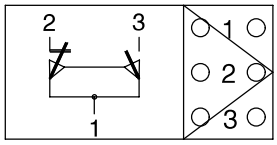
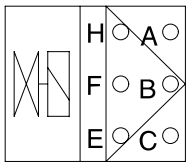
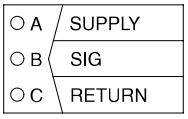
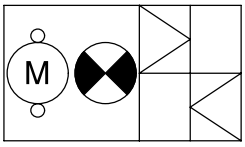
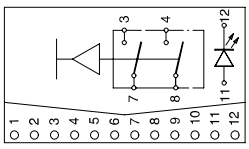
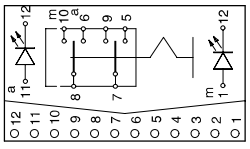


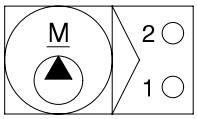
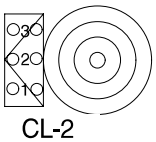
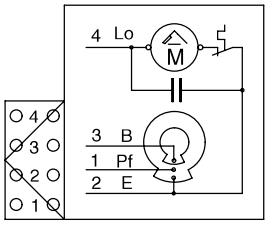
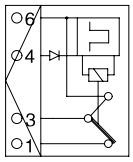
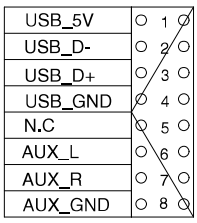
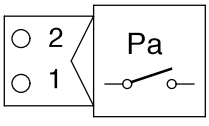
GROUP 4 ELECTRICAL COMPONENT SPECIFICATION

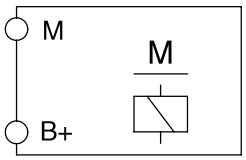
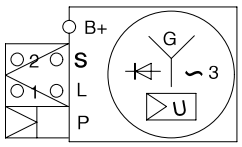
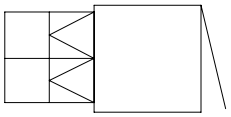
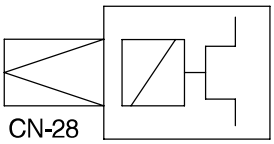
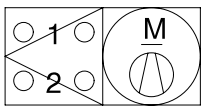
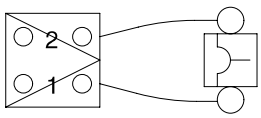
Part name	Symbol	Specification	Check
Battery		12V × 100Ah	※ Check specific gravity 1.280 over : Over charged 1.280 ~ 1.250 : Normal 1.250 below : Recharging
Battery relay	 CR-1	Rated load : 12V 100A (continuity) 1000A (30 second)	※ Check coil resistance Normal : about 12Ω ※ Check contact Normal : ∞Ω
Start key	 CS-2	12V	※Check contact OFF : ∞Ω (for each terminal) ON : 0Ω (for terminal 1-3 and 1-2) START : 0Ω (for terminal 1-5)
Pressure switch (for engine oil)	 CD-18	0.5 kgf/cm² (N.C TYPE)	※ Check resistance Normal : 0Ω (CLOSE)
Temperature sensor	 CD-1 CN-300B CD-8 CN-300C	-	※ Check resistance 50˚C : 804Ω 80˚C : 310Ω 100˚C : 180Ω

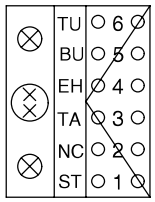
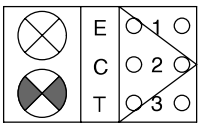
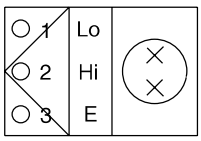
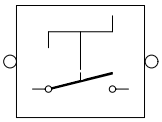
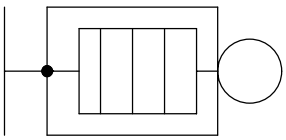
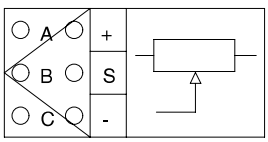
Part name	Symbol	Specification	Check
Air cleaner pressure switch	 CD-10	Pressure: 635mmH_2O (N.O TYPE)	※ Check contact Normal : ∞Ω
Fuel sender	 CD-2	-	※ Check resistance Full : 100Ω Low : 500Ω Empty warning :700Ω
Relay	 CR-2 CR-3 CR-4 CR-5 CR-6 CR-7 CR-9 CR-13 CR-14 CR-29 CR-30 CR-33 CR-36 CR-36A CR-38 CR-45 CR-62 CR-65 CR-63(1), (2) CR-75 CR-78 CR-80 CR-85	12V 20A	※ Check resistance Normal : About 200Ω (for terminal 85-86) : 0Ω(for terminal 30-87a)
Relay	 CR-23 CR-24 CR-47	12V 60A	※ Rated coil current 1.2±0.3A
Solenoid valve	 CN-66 CN-68 CN-69 CN-70 CN-71 CN-121 CN-122 CN-123 CN-140 CN-246	12V 1A	※ Check resistance Normal : 15~25Ω (for terminal 1-2)
Speaker	 CN-23(LH) CN-24(RH)	4Ω 20W	※Check resistance Normal : 4Ω

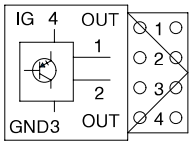
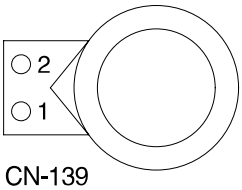
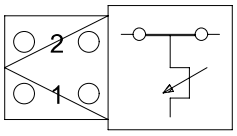
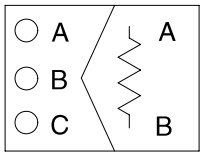
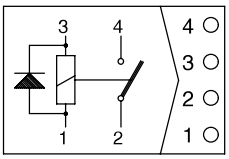
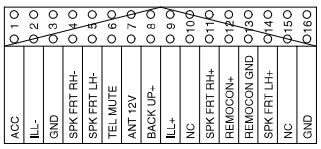
Part name	Symbol	Specification	Check
Switch (looking type)	 CS-47 CS-50 CS-67 CS-99	12V 16A	※ Check contact Normal OFF - ∞Ω(for terminal 1-5,2-6) - 0Ω(for terminal 5-7,6-8)
Work lamp	 CL-5 CL-6 CL-9 CL-10 CL-19 CL-20	12V 55W (H3 TYPE)	※ Check disconnection Normal : 1.2Ω
Room lamp	 CL-1	12V 10W	※ Check disconnection Normal : A few Ω
Fuel filler pump	 CN-61	12V 35 ℓ/min	※Check operation Supply power(for terminal 1) : 12V
Fuel feed pump	 CN-145	12V	-
Horn	 CN-20 CN-25	12V	100±5dB

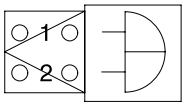
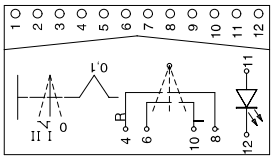
Part name	Symbol	Specification	Check
Safety switch	 CS-4 CS-4A	Micro	※ Check contact Normal : 0Ω (for terminal A-B) : ∞Ω (for terminal A-C) Operating : ∞Ω (for terminal A-B) : 0Ω (for terminal A-C)
Cut-off solenoid	 CN-79	12V	※ Check operation.
Pressure sensor	 CD-3 CD-4 CD-7 CD-26 CD-31 CD-32 CD-38 CD-73	8-30V	※ Check contact Normal : 0.1Ω
Beacon lamp	 CL-7	12V (strobe type)	※ Check disconnection Normal : A few Ω
Auto cruise switch	 CS-23	12V 16A	※ Check contact Normal : ∞Ω
Auto ram lock switch	 CS-100	12V 16A	※ Check contact Normal : 0Ω

Part name	Symbol	Specification	Check
Washer pump	 CN-22	12V 3.8A	※Check contact Normal : 3Ω(for terminal 1-2)
Cigar lighter	 CL-2	12V 10A 1.4W	※Check coil resistance Normal : About 1MΩ ※ Check contact Normal : ∞Ω Operating time : 5~15sec
Wiper motor	 CN-21	12V 3A	※Check contact Normal : 6Ω(for terminal 2-6)
Int wiper relay	 CR-6	12V 12A	–
Radio & USB player	 CN-27A	12V 3A	※ Check voltage 10 ~ 12.5V (for terminal 10-14,11-14)
Receiver dryer	 CN-29	12V	※ Check contact Normal : 0Ω

Part name	Symbol	Specification	Check
Starter	 CN-45	12V	※ Check contact Normal : 0.1Ω
Alternator	 CN-74	12V 80A	※ Check contact Normal : 0Ω (for terminal B^+-1) Normal : 10 ~ 12.5V
Travel buzzer	 CN-81	12V	-
Compressor	 CN-28	12V 38W	-
Air con fan motor	 CN-83	12V 8.5A	-
Circuit breaker manual reset	 CN-60 CN-95	12V, 30A (CN-65) 12V, 60A (CN-95)	-

Part name	Symbol	Specification	Check
Rear combination lamp-LH, RH	 CL-15 CL-16	12V 21W×2 12V 21/5W	※Normal : 4.8Ω (for terminal 1-4) Normal : 2.1Ω (for terminal 2-4, 4-5, 4-6)
Front combination lamp-LH, RH	 CL-24 CL-25	12V 21W 12V 5W	※Normal : 4.8Ω (for terminal 1-2) Normal : 2.1Ω (for terminal 2-3)
Head lamp -LH, RH	 CL-3 CL-4	12V 60/55W	※Normal : 1.0Ω (for terminal 1-3, 2-3) Normal : 1.5Ω (for terminal 1-2)
Master switch		12V 1000A	-
Preheater	 CN-80	12V 42A 500W	-
Accel dial	 CN-142	-	※ Check resistance Normal : about 5KΩ (for terminal A-C) ※ Check voltage Normal : about 5V (for terminal A-C) : 2-4.5V (for terminal C-B)

Part name	Symbol	Specification	Check
Timer	 CR-50	12V	-
12V socket	 CN-139	12V 120W	-
Dust sensor (switch)		1˚C OFF 4˚C ON	※Check resistance Normal : 0Ω (for terminal 1-2) The atmosphere temp : over 4˚C
Resistor	 RS-1	3W	※ Check resistance A-B : 120Ω
Relay (air con blower)		12V 20A	※ Check resistance Normal : About 200Ω (for terminal 1-3) 0 Ω (for terminal 2-4)
Radio & USB plalyer	 CN-27	12V 2A	※Check voltage 10~16V (for terminal 1-3, 3-8)

Part name	Symbol	Specification	Check
Quick clamp buzzer	 CN-113	12V 60mA 65dB Min	-
DPF switch	 CS-100	12V 16A	-

GROUP 5 CONNECTORS

1. CONNECTOR DESTINATION

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-1	AMP	36	I/conn (Cab room harness-Main harness)	1743059-2	1743062-2
CN-3	YAZAKI	2	I/conn (Cab room harness)	S813-030201	S813-130201
CN-4	AMP	36	I/conn (Cab room harness-Frame harness)	1743059-2	1743062-2
CN-6	DEUTSCH	8	I/conn (Frame harness-Console harness)	S816-008002	-
CN-7	AMP	20	I/conn (Main harness-Console harness)	936777-2	936780-2
CN-8	AMP	15	I/conn (Cab room harness-Cab harness)	2-85262-1	368301-1
CN-11	KET	2	Flasher unit	S810-002202	-
CN-12	AMP	2	I/conn (Boom harness-Main harness)	S816-002002	S816-102002
CN-13	KET	2	Master switch	MG620558	-
CN-14	KET	2	Earth	-	610557
CN-16	AMP	6	Emergency engine start	S816-006002	S816-106002
CN-16A	AMP	6	Emergency engine start	S816-006002	-
CN-16B	AMP	6	Emergency engine start	S816-006002	-
CN-18	AMP	16	I/conn (Cab room harness-Main harness)	368047-1	368050-1
CN-20	DEUTSCH	2	Horn	DT06-2S-EP06	-
CN-21	AMP	8	Wiper motor	S816-102002	-
CN-22	KET	2	Washer tank	MG640605	-
CN-23	KET	2	Speaker LH	HG610070	-
CN-24	KET	2	Speaker RH	HG610070	-
CN-25	DEUTSCH	2	Horn	DT06-2S-EP06	-
CN-27	-	16	Cassette radio	PK145-16017	-
CN-27A	-	8	Cassette radio	-	S816-108002
CN-28	AMP	1	Air-con comp	S810-001002	-
CN-29	KET	2	Receiver dryer	MG640795	-
CN-31	DEUTSCH	8	I/conn (Cab room harness-Aircon harness)	DT06-8S-EP06	DT04-8S-EP06
CN-36	-	-	Fuse box	21L7-00250	-
CN-45	TERM	1	Starter	ST710246-2	-
CN-51	AMP	70	MCU	1-968879-1	-
CN-52	DEUTSCH	24	Governor DC motor controller	DRC26-24SA	-
CN-56	AMP	10	Cluster	-	S816-110002
CN-57	AMP	16	Cluster	175966-2	-
CN-60	YAZAKI	2	Fusible link	-	7122-4125-50
CN-61	TERM	1	Fuel filler pump	S822-014000	-
CN-66	DEUTSCH	2	Breaker solenoid	DT06-2S-EP06	-
CN-68	DEUTSCH	2	Safety solenoid	DT06-2S-EP06	-
CN-69	DEUTSCH	2	Ram lock solenoid	DT06-2S-EP06	-
CN-70	DEUTSCH	2	Travel solenoid	DT06-2S-EP06	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-71	DEUTSCH	2	Parking solenoid	DT06-2S-EP06	-
CN-74	KET	2	Alternator	MG640188-5	-
CN-80	YAZAKI	1	Air heater	7323-3010	-
CN-81	DEUTSCH	2	Travel buzzer	DT06-2S-EP06	DT04-2P-E005
CN-83	KET	2	Air-con fan	MG640188-5	-
CN-92AB	KET	1	Safety	S814-001100	S814-101100
CN-93A	AMP	74	ECU	3-1355136-3	-
CN-93B	AMP	60	ECU	1897635-2	-
CN-95	KET	2	Fusible link	-	610557
CN-97	AMP	12	Multifunction switch	S816-012002	S816-112002
CN-98	AMP	10	Multifunction switch	S816-010002	S816-110002
CN-99	AMP	8	Multifunction switch	S816-008002	S816-108002
CN-113	-	2	Buzzer	S810-002202	-
CN-116	AMP	12	Switch panel	368542-1	-
CN-121	DEUTSCH	2	Boom swing solenoid	DT06-2S-EP06	-
CN-122	DEUTSCH	2	Forward solenoid	DT06-2S-EP06	-
CN-123	DEUTSCH	2	Reverse solenoid	DT06-2S-EP06	-
CN-126	DEUTSCH	4	RS232	DT06-4S-EP06	DT06-4P-E005
CN-139	AMP	2	12V socket	S810-002202	-
CN-140	DEUTSCH	2	Quick clamp solenoid	DT06-2S-EP06	DT04-2P-E005
CN-142	DEUTSCH	3	Accel dial	DT06-3S-EP06	-
CN-144A	KET	20	Handfree	MG610240	-
CN-144B	KET	8	Handfree	175964-2	-
CN-145	YAZAKI	2	Fuel feed pump	7123-6423-30	-
CN-148	DEUTSCH	6	Service tool	DTM06-6S-E008	ST710285-2
CN-157	-	1	Antena power	S822-014000	-
CN-170	PACKARD	2	Seat heat switch	12052641	-
CN-193	SUMITOMO	6	EGR step motor	6195-0021	-
CN-194	YAZAKI	3	Rack actuator	7323-7414-40	-
CN-243	DEUTSCH	4	RS232 connector	DT06-4S-EP06	DT04-4P-E004
CN-245A	AMP	12	Remote controller	368542-1	-
CN-245B	AMP	12	Remote controller	174045-2	-
CN-246	AMP	12	USB and socket	174045-2	-
CN-258	-	1	Aircon comp power	21N4-01311	-
CN-259	AMP	6	Aux camera	S816-006002	S816-106002
CN-263	DEUTSCH	2	Air comp relay	DT06-2S-EP06	DT04-2P-E005
CN-289	-	6	Amp assy	MG610049	-
CN-300A	AMP	6	DPF pressure	1438153-5	-
CN-300B	FCI	2	DPF mid temp	54200206	-
CN-300C	FCI	2	DPF inlet temp	54200208	-

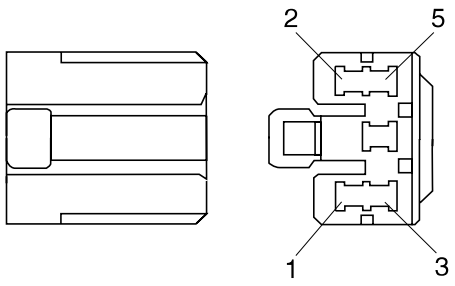
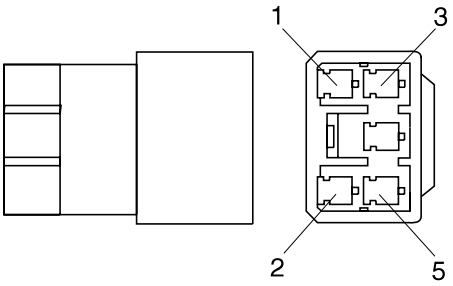
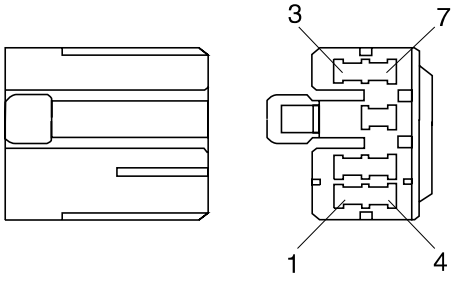
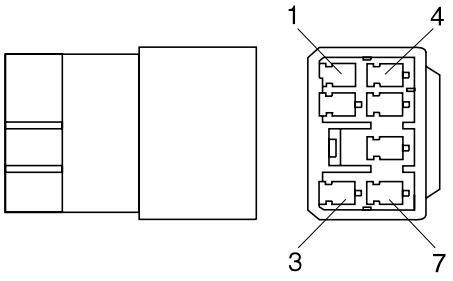
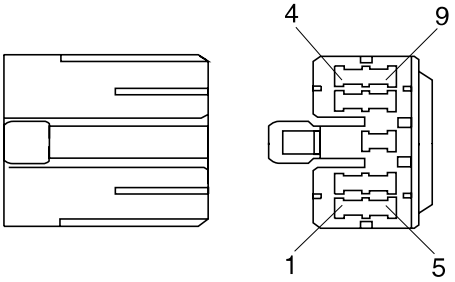
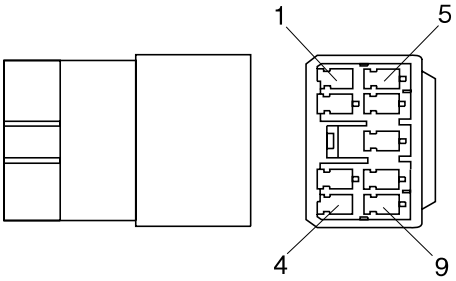
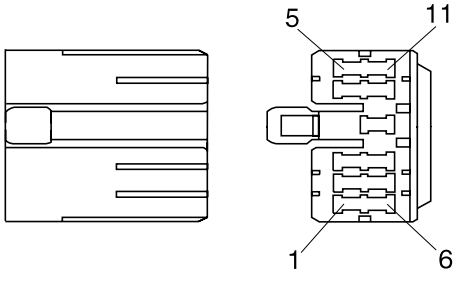
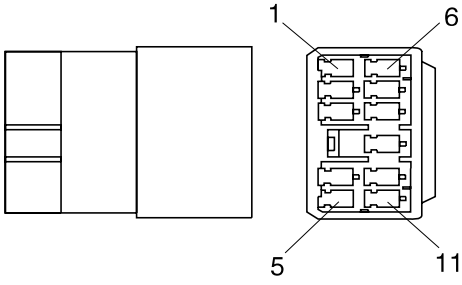
Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN301	AMP	8	EGR sensor	776532-1	-
CN302	AMP	12	EGR valve	776533-1	-
CN303	AMP	12	Engine sensor	776533-2	-
CN304	AMP	12	C/rail	776533-3	-
· LAMP					
CL-1	KET	2	Room lamp	MG610392	-
CL-2	AMP	3	Cigar lighter	S810-003201	-
CL-3	KET	3	Head lamp	S810-003702	-
CL-4	KET	3	Head lamp	S810-003702	-
CL-5	DEUTSCH	2	Work lamp	DT06-2S-EP06	-
CL-7	-	1	Beacon lamp	S822-014000	S822-114000
CL-9	DEUTSCH	2	Cabin lamp	DT06-2S-EP06	-
CL-10	DEUTSCH	2	Cabin lamp	DT06-2S-EP06	-
CL-15	DEUTSCH	6	Rear combination lamp-LH	DT06-6S-EP06	-
CL-16	DEUTSCH	6	Rear combination lamp-RH	DT06-6S-EP06	-
CL-19	AMP	2	Side maker lamp-LH	S816-002002	-
CL-20	AMP	2	Side maker lamp-RH	S816-002002	-
CL-21	KET	2	Number plate lamp	GP890469	-
CL-24	KET	3	Front combination lamp-LH	S814-003001	-
CL-25	KET	3	Front combination lamp-RH	S814-003001	-
· RELAY					
CR-1	AMP	2	Battery relay	S816-002002	S816-102002
CR-2	HELLA	5	Horn relay	SJA003526-001	-
CR-3	HELLA	5	Work lamp relay	SJA003526-001	-
CR-4	HELLA	5	Wiper relay	SJA003526-001	-
CR-5	HELLA	5	Anti-restart relay	SJA003526-001	-
CR-6	AMP	6	Int wiper relay	S810-006002	-
CR-7	HELLA	4	Aircon comp relay	SJA003526-001	-
CR-9	HELLA	4	Cabin lamp relay	SJA003526-001	-
CR-11	HELLA	3	Flasher unit relay	SJA003526-001	-
CR-13	HELLA	4	Head lamp low relay	SJA003526-001	-
CR-14	HELLA	4	Head lamp high relay	SJA003526-001	-
CR-18	HELLA	5	Ram lock	SJA003526-001	-
CR-23	KET	2	Start relay	S814-002001	-
	HMC	2		S810-002302	-
CR-24	KET	2	Air heater relay	S814-002001	-
	HMC	2		S810-002302	-
CR-29	HELLA	4	Forward relay	SJA003526-001	-
CR-30	HELLA	4	Reverse relay	SJA003526-001	-
CR-33	HELLA	4	Air-con fan relay	SJA003526-001	-

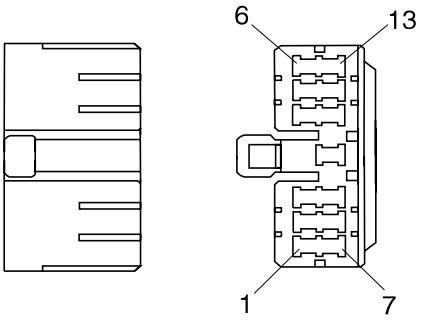
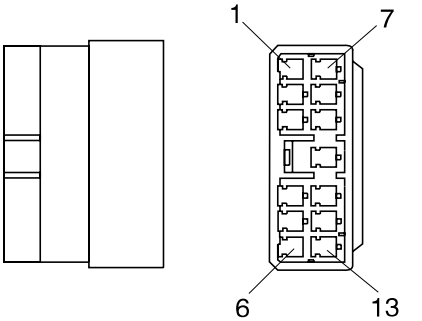
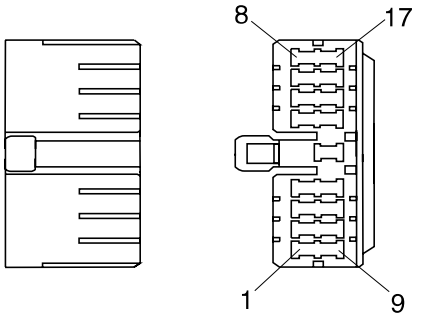
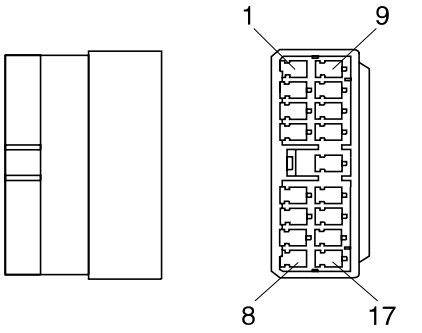
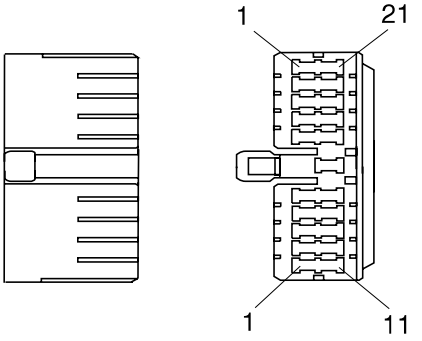
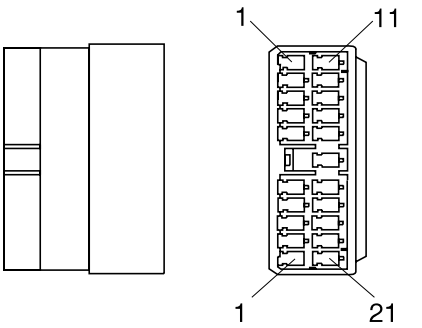
Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CR-36A	HELLA	4	Pre-heater relay	SJA003526-001	-
CR-38	HELLA	4	Neutral relay	SJA003526-001	-
CR-45	HELLA	4	ECU power relay	SJA003526-001	-
CR-53	HELLA	2	Timer stop lamp	S810-002202	-
CR-62	HELLA	4	Breaker relay	SJA003526-001	-
CR-63B	HELLA	4	Stop lamp relay	SJA003526-001	-
CR-67	AMP	6	Rack actuator	S816-002002	-
CR-68	AMP	6	ECU main power	S816-002002	-
CR-71	HELLA	4	Boom swing relay	SJA003526-001	-
CR-75	HELLA	4	Illumination relay	SJA003526-001	-
CR-78	HELLA	4	Head lamp relay	SJA003526-001	-
CR-80	HELLA	5	EGR valve	SJA003526-001	-
CR-85	HELLA	4	Beacon lamp relay	SJA003526-001	-
· SENDER					
CD-1	AMP	2	Hydraulic temp sender	85202-1	-
CD-2	AMP	2	Fuel sender	-	S816-102002
CD-3	DEUTSCH	3	Brake oil pressure switch	DT06-3S-EP06	-
CD-4	DEUTSCH	3	Stop lamp pressure switch	DT06-3S-EP06	-
CD-7	DEUTSCH	3	Working pressure switch	DT06-3S-EP06	-
CD-8	AMP	2	Water temp sender	1-178390-2	-
CD-10	KET	1	Air cleaner switch	ST730057-2	-
CD-17	SUMITOMO	2	Tacho sensor	6189-0552	-
CD-18	YAZAKI	1	Engine oil pressure switch	7123-5014	-
CD-26	DEUTSCH	3	Parking pressure switch	DT06-3S-EP06	-
CD-30	AMP	2	Water temp	85202-1	-
CD-31	DEUTSCH	3	Overload pressure switch	DT06-3S-EP06	-
CD-32	DEUTSCH	3	Boom up pressure switch	DT06-3S-EP06	-
CD-38	DEUTSCH	3	Working brake	DT06-3S-EP06	-
CD-62	YAZAKI	3	CSD	7323-7414-40	-
CD-73	DEUTSCH	3	Forward pressure switch	DT06-3S-EP06	-
· SWITCH					
CS-2	KET	6	Start key switch	S814-006000	-
CS-4	AMP	3	Safety switch	S816-003002	-
CS-4A	AMP	3	Safety switch	-	174359-2
CS-5	DEUTSCH	2	Horn-switch	-	DT04-2P-E005
CS-16	KET	2	Fuel pump switch	S810-002201	-
CS-26	DEUTSCH	2	Breaker switch	-	DT04-2P-E005
CS-29	DEUTSCH	2	Spare	DT06-2S-EP06	-
CS-47	SWF	12	Boom swing switch	589790	-
CS-50	SWF	12	Overload switch	589790	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CS-67	SWF	12	Quick clamp switch	589790	-
CS-74	YAZAKI	2	Master switch	MG620558	-
CS-99	SWF	12	Air comp switch	589790	-
CS-100	SWF	12	Ram lock switch	589790	-
CS-106	SWF	12	DPF switch	589790	-
· DIODE					
DO-1	-	2	Diode (alternator)	21EA-50550	-
DO-2	-	2	Diode (fuel feed pump)	21EA-50550	-
DO-3	-	2	Diode (neutral)	21EA-50550	-

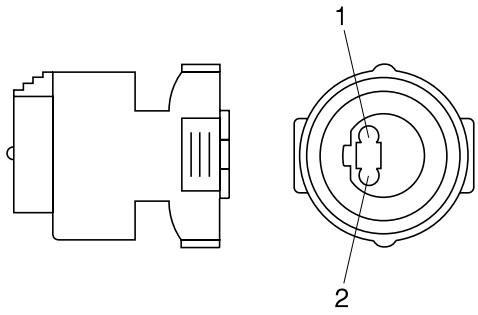
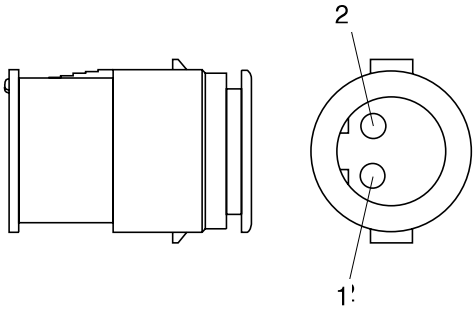
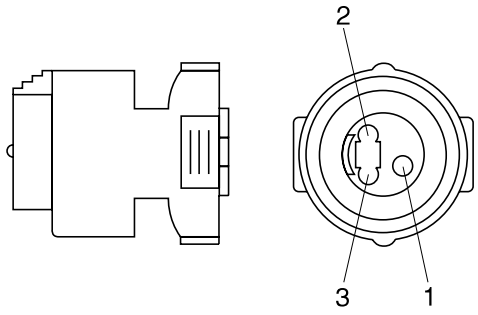
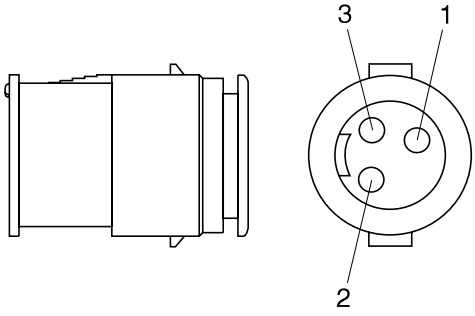
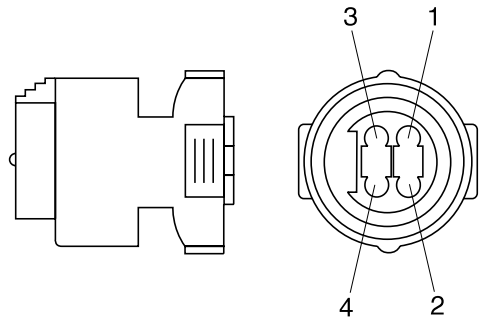
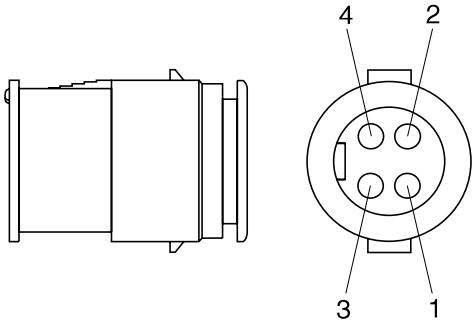
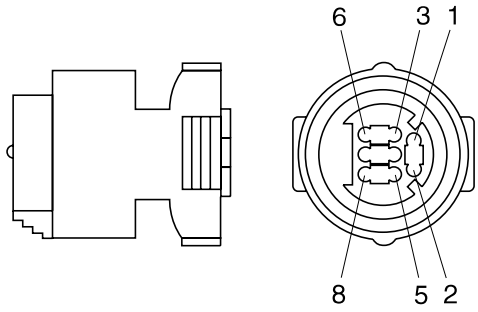
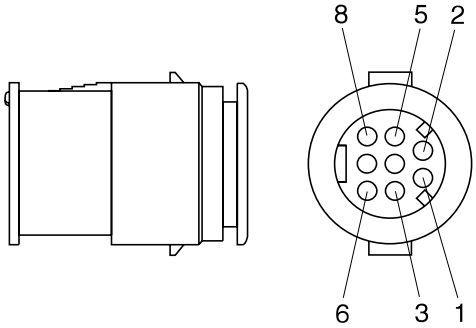
2. CONNECTION TABLE FOR CONNECTORS

1) PA TYPE CONNECTOR

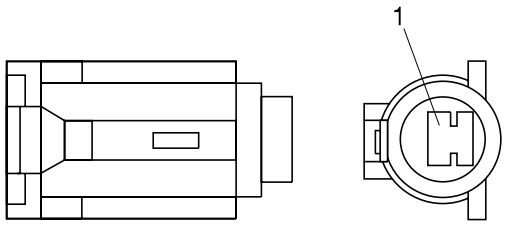
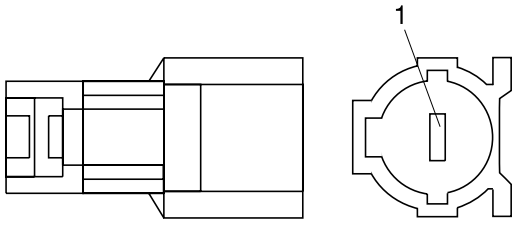
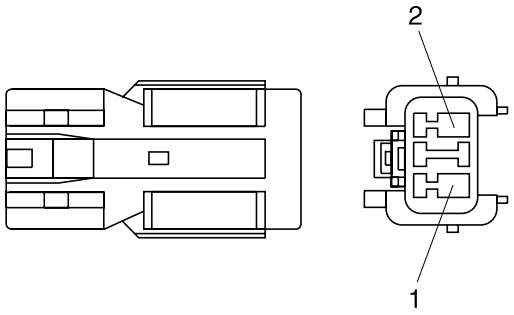
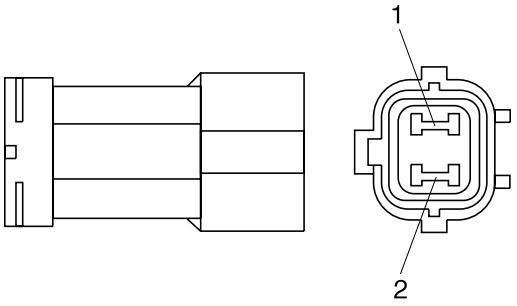
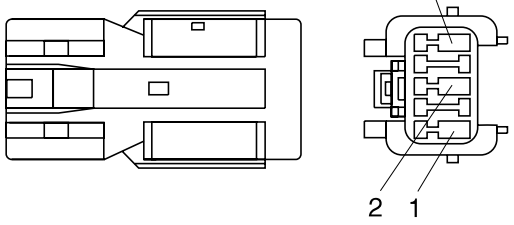
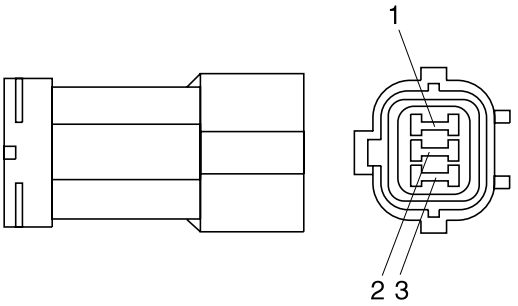
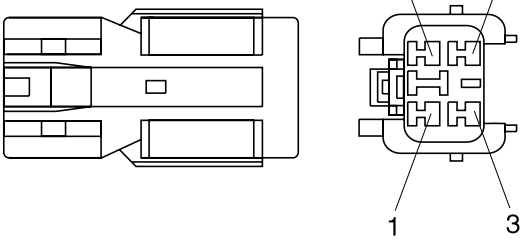
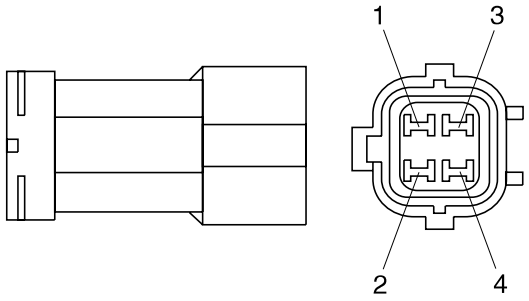
No. of pin	Connector (female)	Connector (male)
5	 S811-005002	 S811-105002
7	 S811-007002	 S811-107002
9	 S811-009002	 3S811-109002
11	 S811-011002	 S811-111002

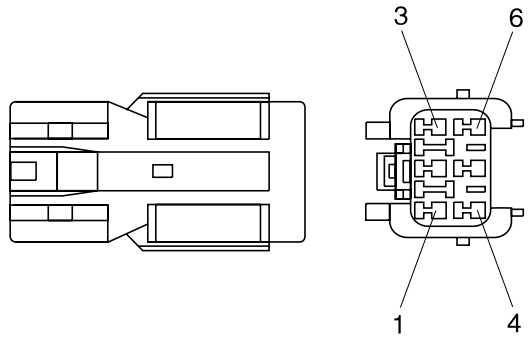
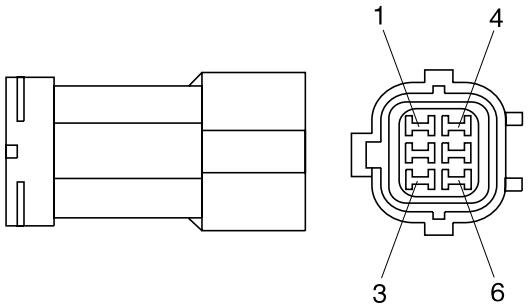
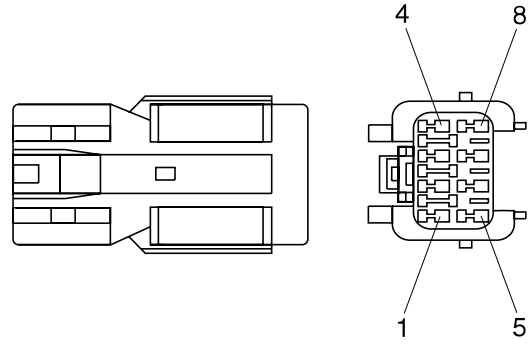
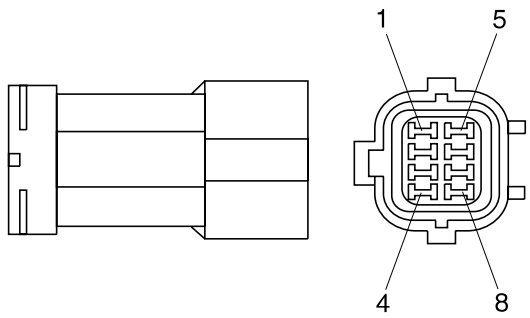
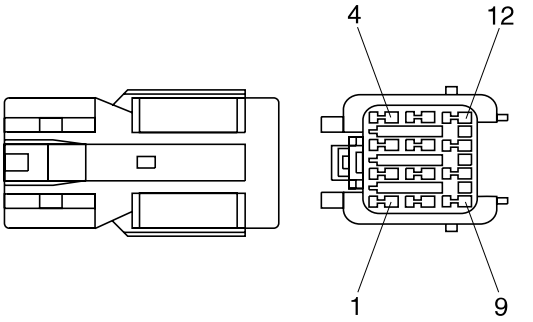
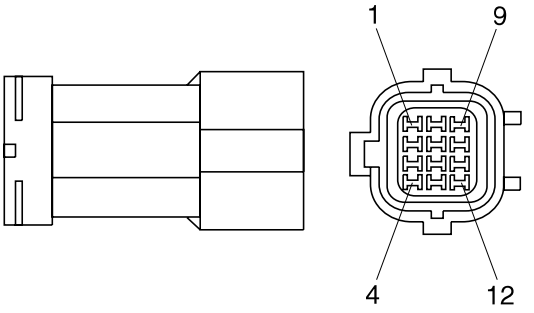
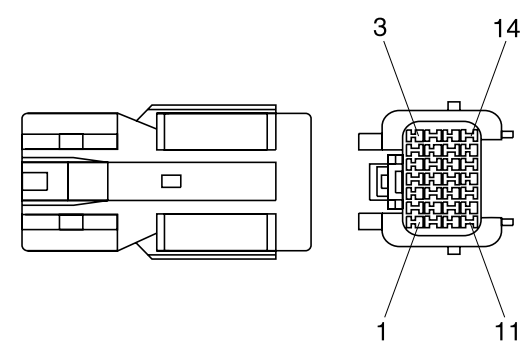
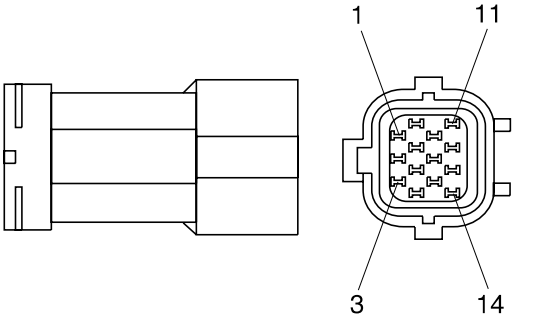
No. of pin	Connector (female)	Connector (male)
13	 S811-013002	 S811-113002
17	 S811-017002	 S811-117002
21	 S811-021002	 S811-121002

2) J TYPE CONNECTOR

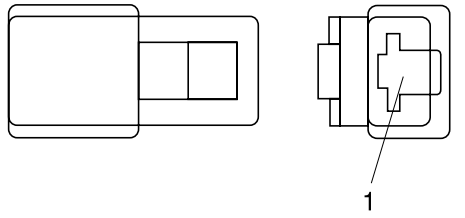
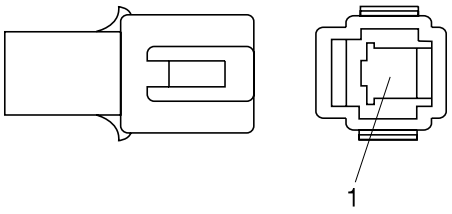
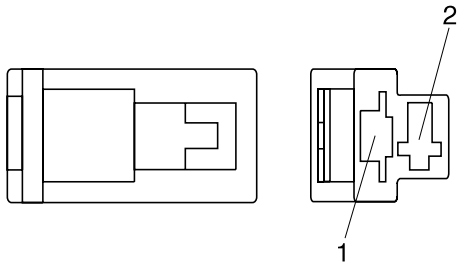
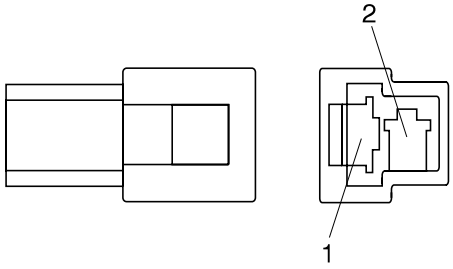
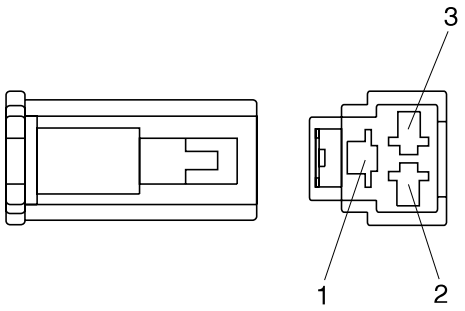
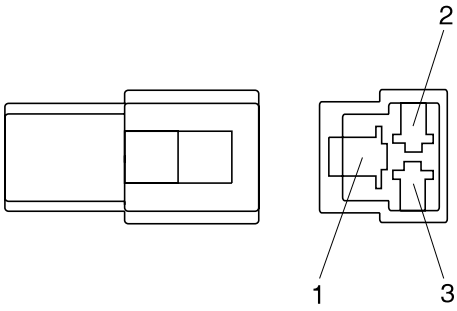
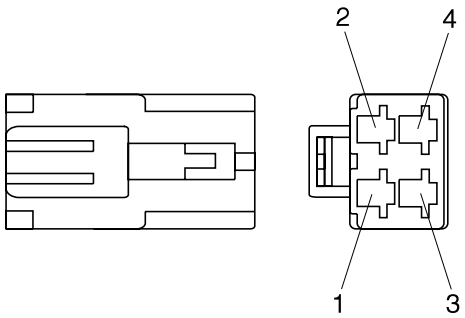
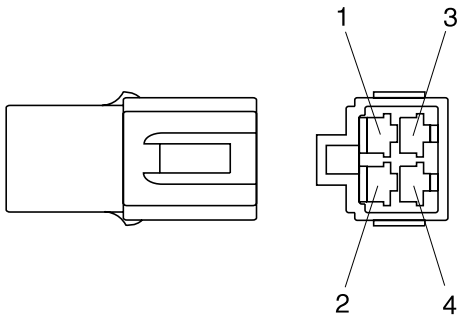
No. of pin	Connector (female)	Connector (male)
2	 S816-002001	 S816-102001
3	 S816-003001	 S816-103001
4	 S816-004001	 S816-104001
8	 S816-008001	 S816-108001

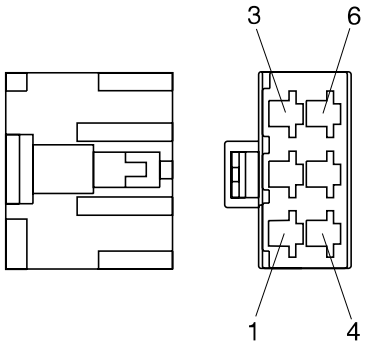
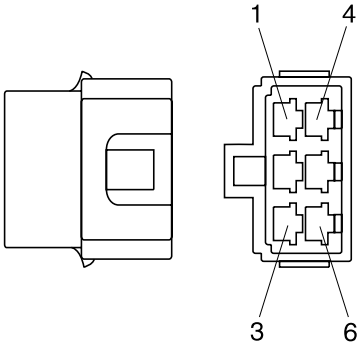
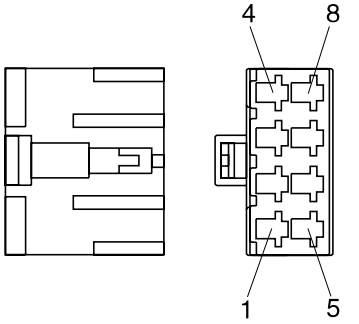
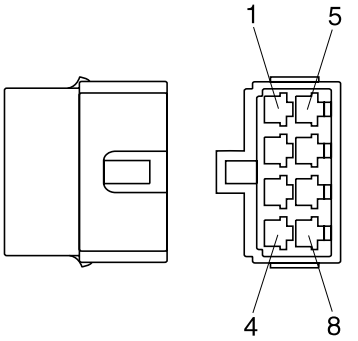
3) SWP TYPE CONNECTOR

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

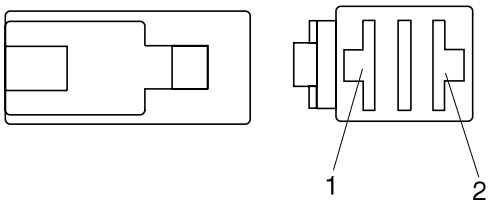
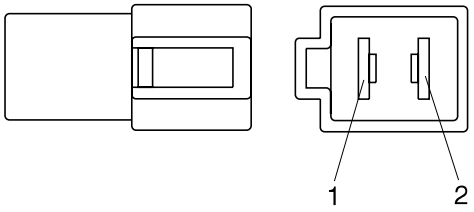
No. of pin	Connector (female)	Connector (male)
6	 S814-006000	 S814-106000
8	 S814-008000	 S814-108000
12	 S814-012000	 S814-112000
14	 S814-014000	 S814-114000

4) CN TYPE CONNECTOR

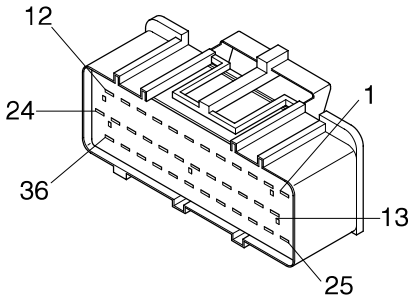
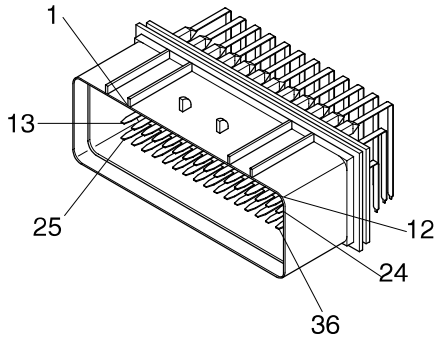
No. of pin	Connector (female)	Connector (male)
1	 S810-001202	 S810-101202
2	 S810-002202	 S810-102202
3	 S810-003202	 S810-103202
4	 S810-004202	 S810-104202

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

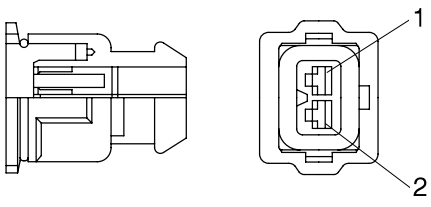
5) 375 FASTEN TYPE CONNECTOR

No. of pin	Connector (female)	Connector (male)
2	 S810-002402	 S810-102402

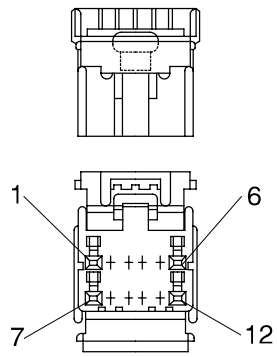
6) AMP ECONOSEAL CONNECTOR

No. of pin	Connector (female)	Connector (male)
36	 344111-1	 344108-1

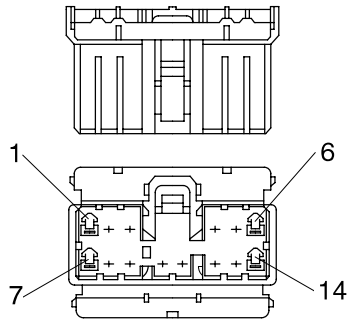
7) AMP TIMER CONNECTOR

No. of pin	Connector (female)	Connector (male)
2	 85202-1	

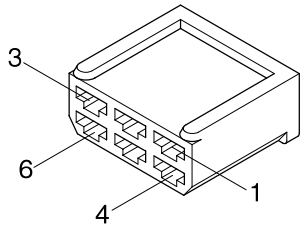
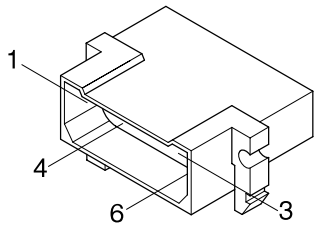
8) AMP 040 MULTILOCK CONNECTOR

No. of pin	Connector (female)	Connector (male)
12	 174045-2	

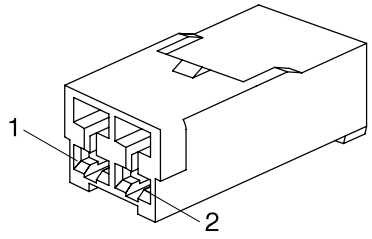
9) AMP 070 MULTILOCK CONNECTOR

No. of pin	Connector (female)	Connector (male)
14	 173852	

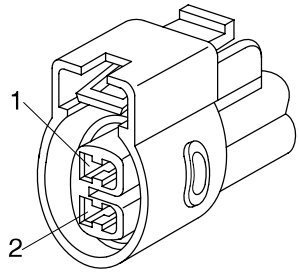
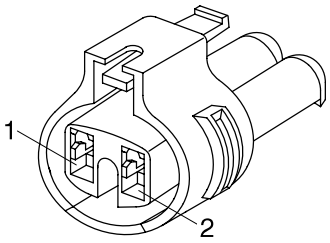
10) AMP FASTIN - FASTON CONNECTOR

No. of pin	Connector (female)	Connector (male)
6	 925276-0	 480003-9

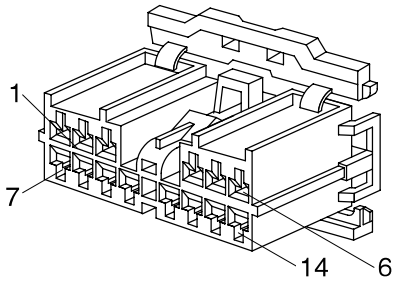
11) KET 090 CONNECTOR

No. of pin	Connector (female)	Connector (male)
2	 MG610070	

12) KET 090 WP CONNECTORS

No. of pin	Connector (female)	Connector (male)
2	 MG640605	
2	 MG640795	

13) KET SDL CONNECTOR

No. of pin	Connector (female)	Connector (male)
14	 MG610406	

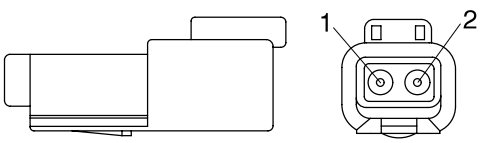
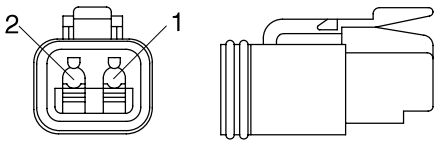
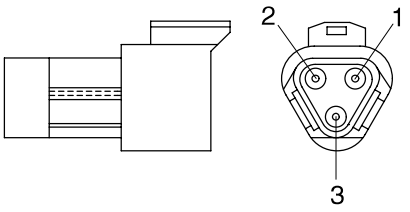
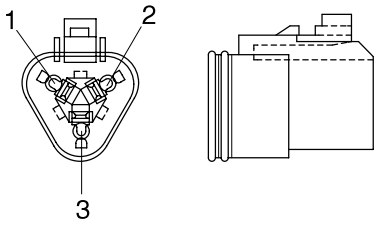
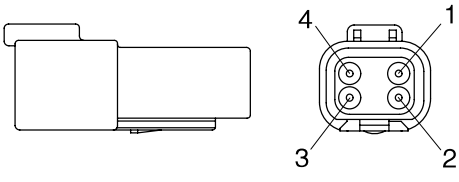
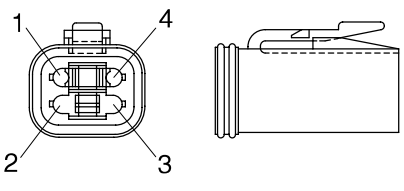
14) DEUTSCH DT CONNECTORS

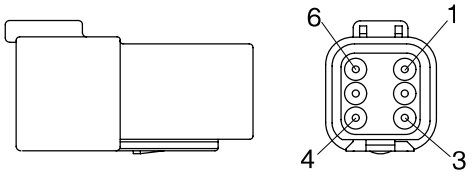
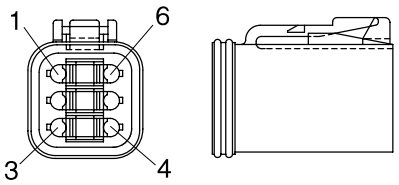
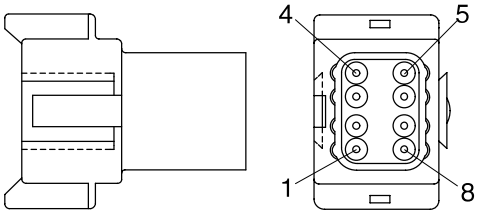
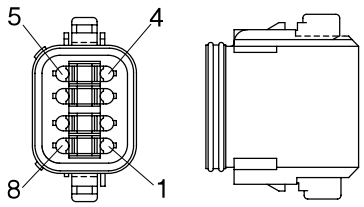
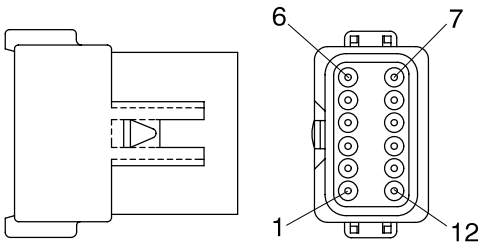
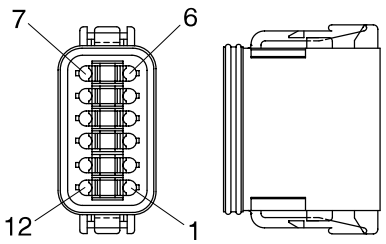
DT 06 - 3S - ★★★★

- ★★★★ : Modifications (see below)
- 3S : Number of contacts (P : Pin, S : Socket)
- 06 : 04 : Receptacle, 06 : Plug
- DT : Deutsch connectors

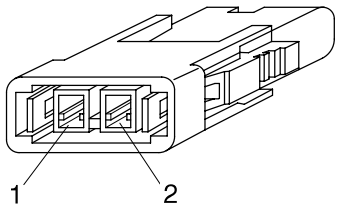
※ Modification

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

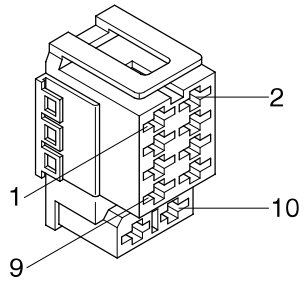
No. of pin	Connector (female)	Connector (male)
2	 DT06-2S	 DT06-2P
3	 DT06-3S	 DT06-3P
4	 DT06-4S	 DT06-4P

No. of pin	Connector (female)	Connector (male)
6	 DT06-6S	 DT06-6P
8	 DT06-8S	 DT06-8P
12	 DT06-12S	 DT06-12P

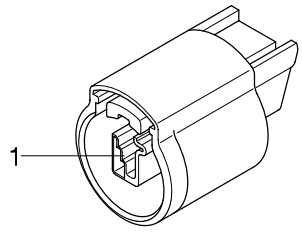
15) MOLEX 2CKTS CONNECTOR

No. of pin	Connector (female)	Connector (male)
2	 35215-0200	

16) ITT SWF CONNECTOR

No. of pin	Connector (female)	Connector (male)
10	 SWF593757	

17) MWP NMWP CONNECTOR

No. of pin	Connector (female)	Connector (male)
1	 NMWP01F-B	

GROUP 6 FAULT CODES

1. MACHINE FAULT CODE

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

2. ENGINE FAULT CODE

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

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

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

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

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

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