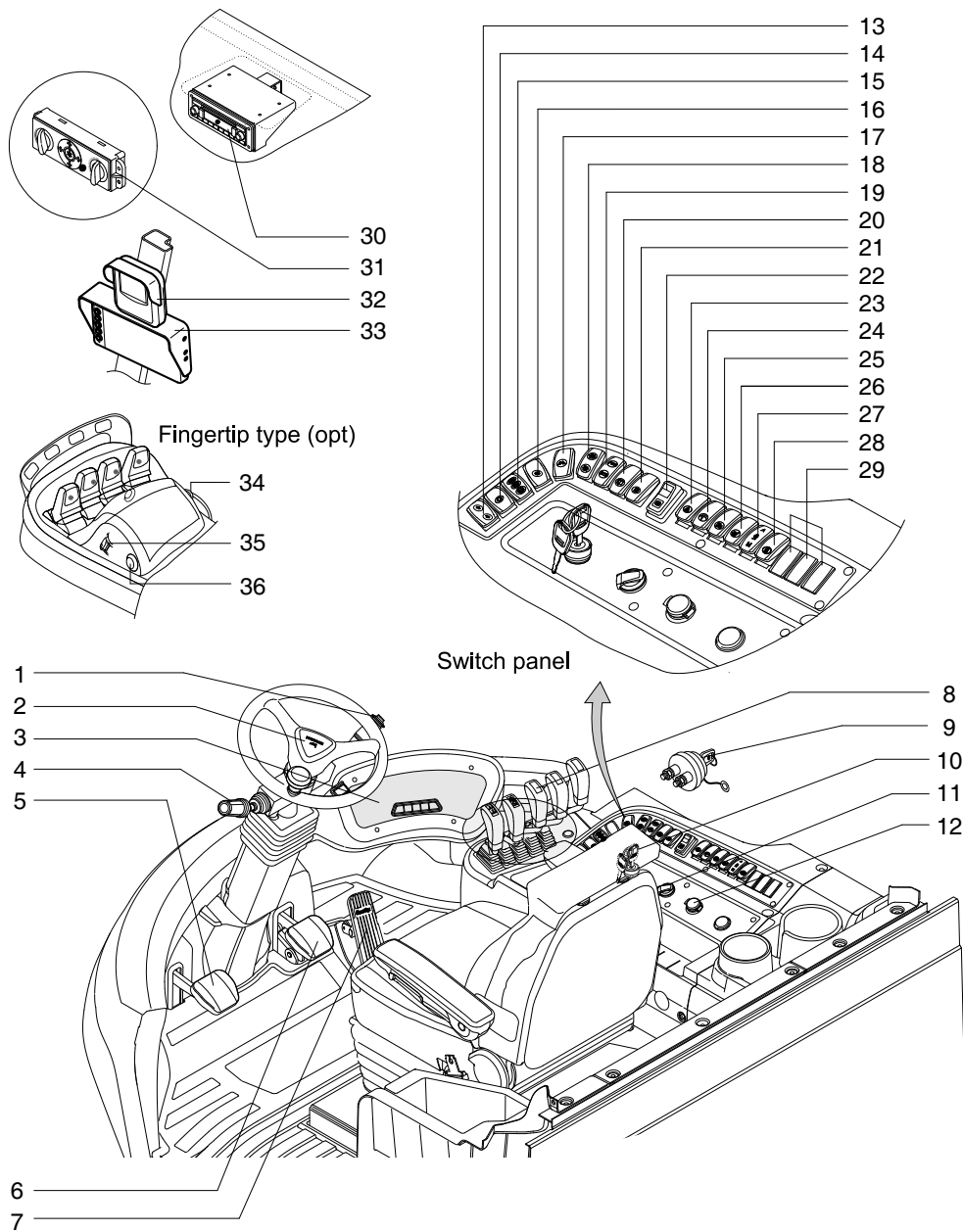


SECTION 7 ELECTRICAL SYSTEM

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GROUP 1 COMPONENT LOCATION

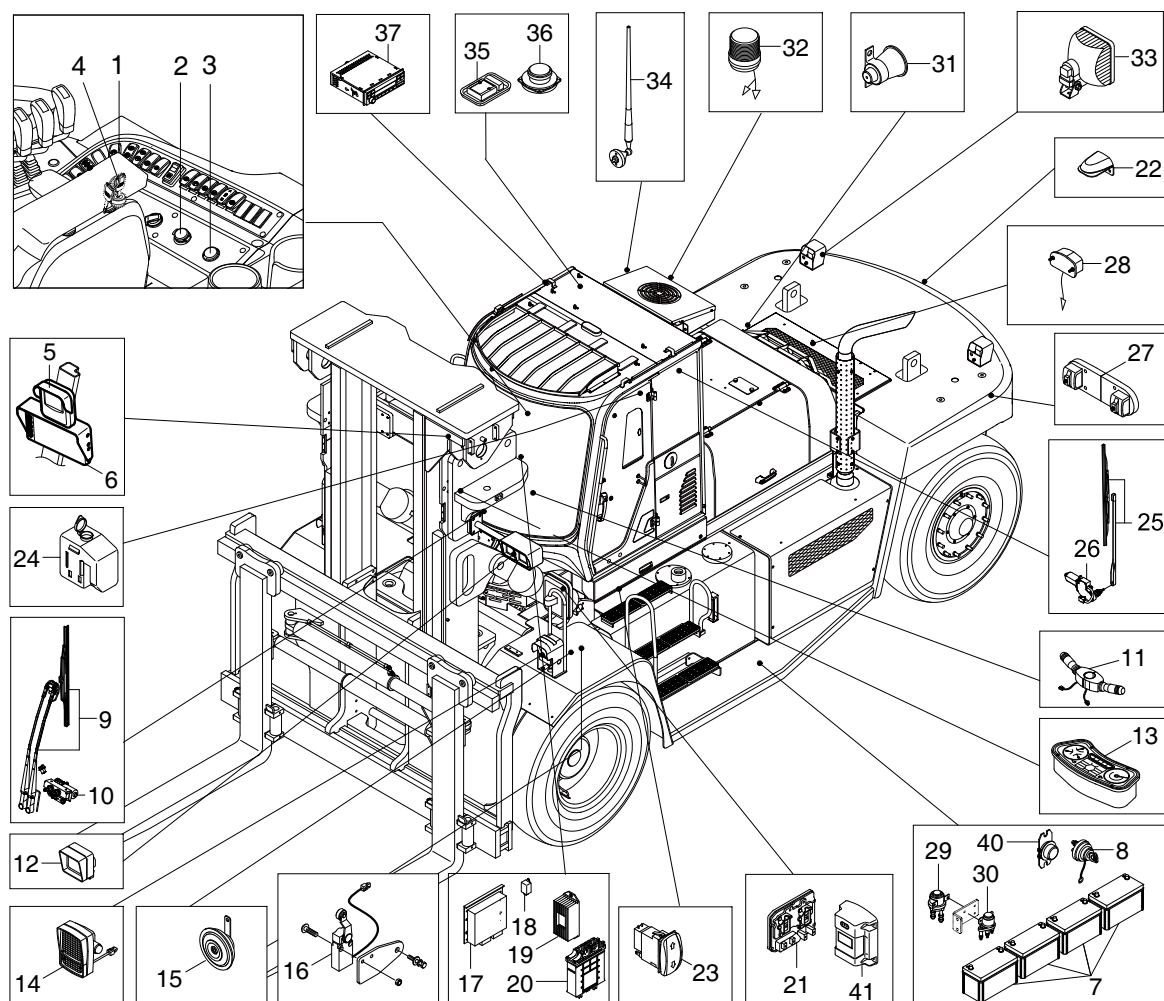
1. LOCATION 1



160D9VEL01

1 Multi function switch	13 Inc/decrease switch	25 Air compressor switch (opt)
2 Cluster	14 Main light switch	26 Seat heat switch (opt)
3 Horn button	15 Auto shift switch	27 Cooling fan control switch (opt)
4 Gear selector lever	16 Inching switch	28 Heated mirror switch (opt)
5 Inching pedal	17 Work lamp switch	29 Cover
6 Brake pedal	18 Exhaust system cleaning switch	30 Radio, USB, bluetooth player
7 Accelerator pedal	19 Engine mode switch	31 Air conditioner and heater switch
8 Remote control lever	20 Rear wiper/washer switch	32 Authentication device (opt)
9 Master switch (opt)	21 Fuel warmer switch	33 Monitor (opt)
10 Starting switch	22 Parking brake switch	34 FNR enable switch
11 USB charger	23 Hazard switch (opt)	35 FNR switch
12 12V socket	24 Top wiper/washer switch (opt)	36 Horn button

2. LOCATION 2

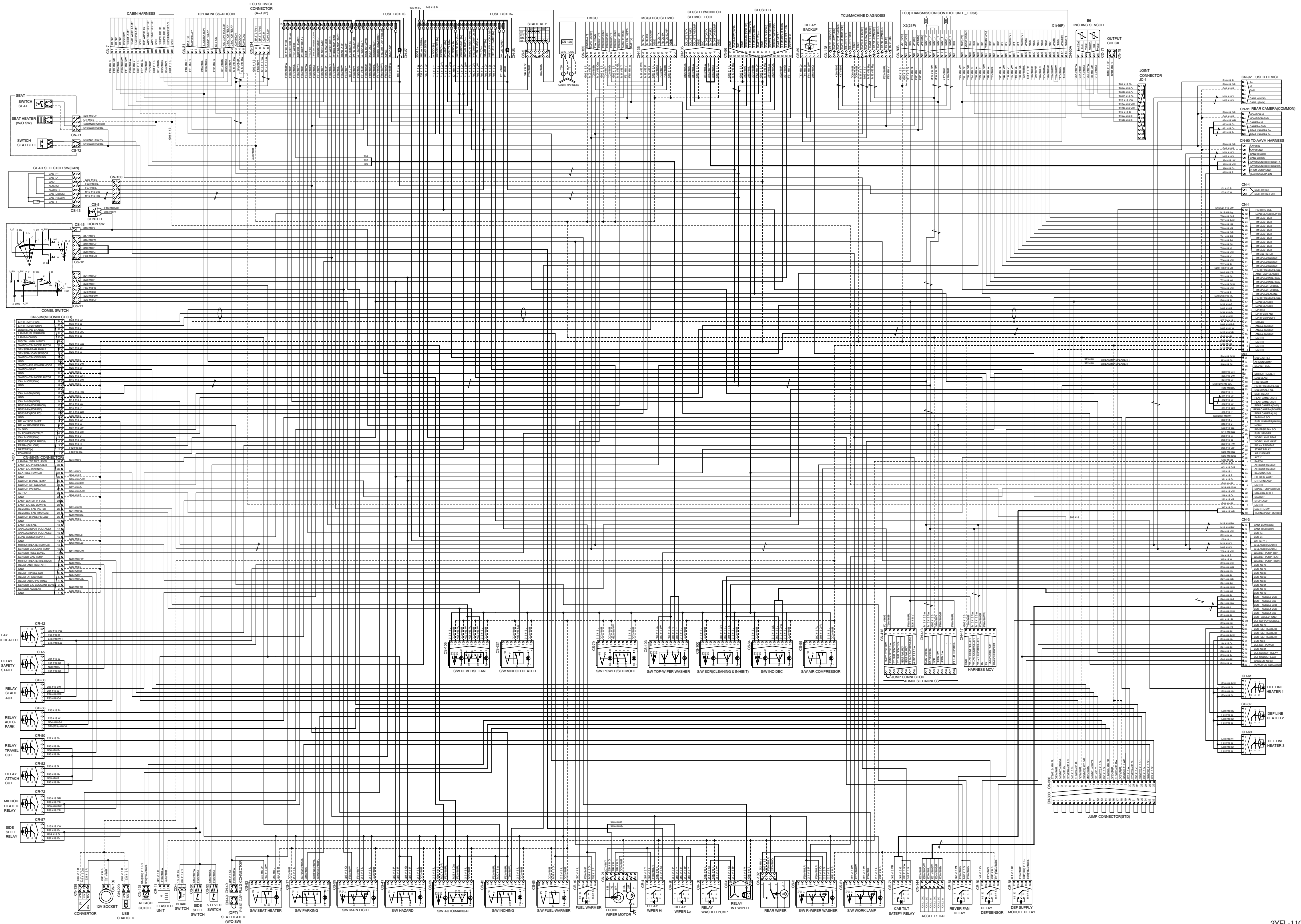


250D9VEL02

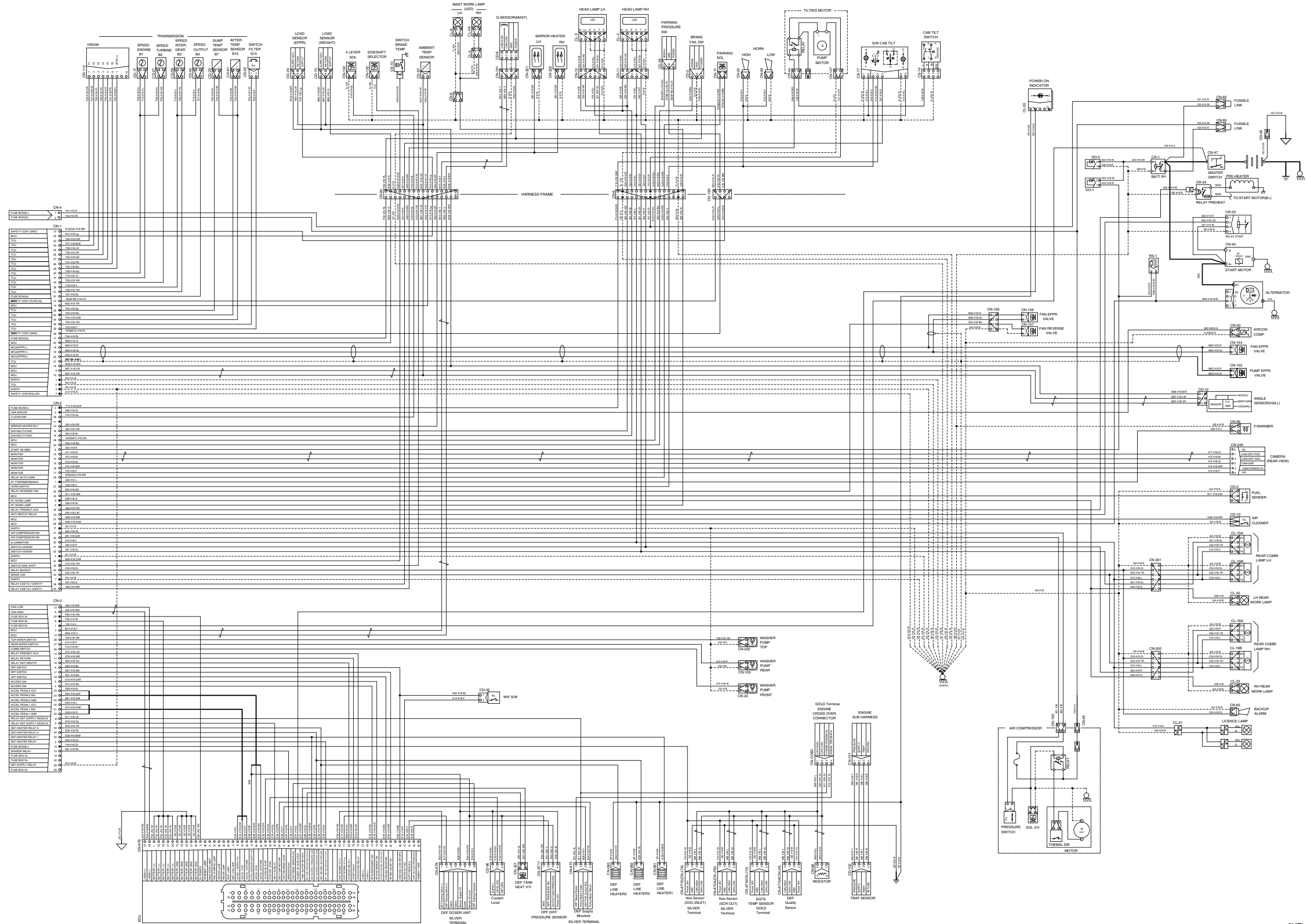
1	Switch panel	15	Horn	29	Start relay
2	USB charger	16	Tilt limit switch	30	Heater relay
3	12V socket	17	MCU	31	Back buzzer
4	Start switch	18	Int wiper relay	32	Beacon lamp
5	Authentication	19	DC-DC converter	33	Work lamp assembly
6	Monitor	20	TCU	34	Antenna
7	Battery	21	ECU	35	Room lamp
8	Master switch	22	Rear camera	36	Speaker assembly
9	Wiper assembly	23	Cabin tilt switch	37	Radio/USB/bluetooth player
10	Wiper motor	24	Washer reservoir tank	38	Aircon/Heater switch
11	Multifunction switch	25	Rear wiper assembly	40	Battery relay
12	Front work lamp	26	Rear wiper motor	41	RMCU
13	Cluster	27	Rear combination lamp		
14	Head/turn lamp	28	License lamp		

GROUP 2 ELECTRICAL CIRCUIT

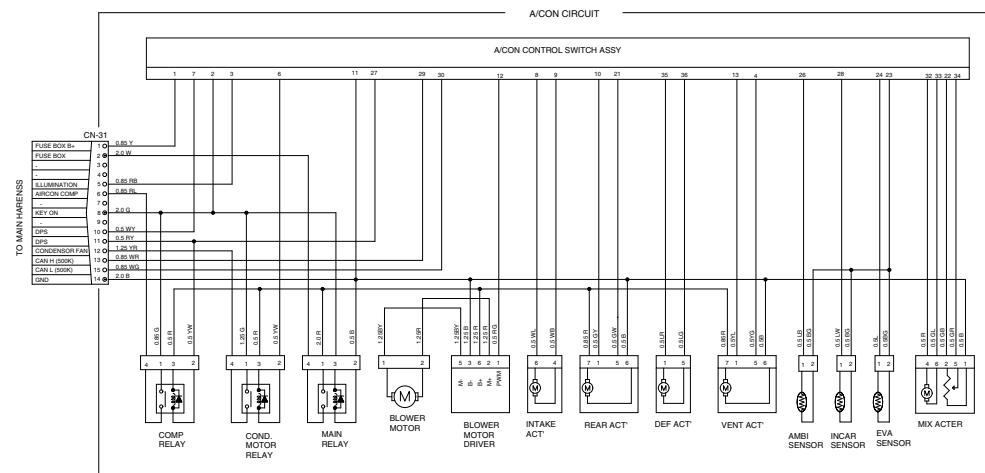
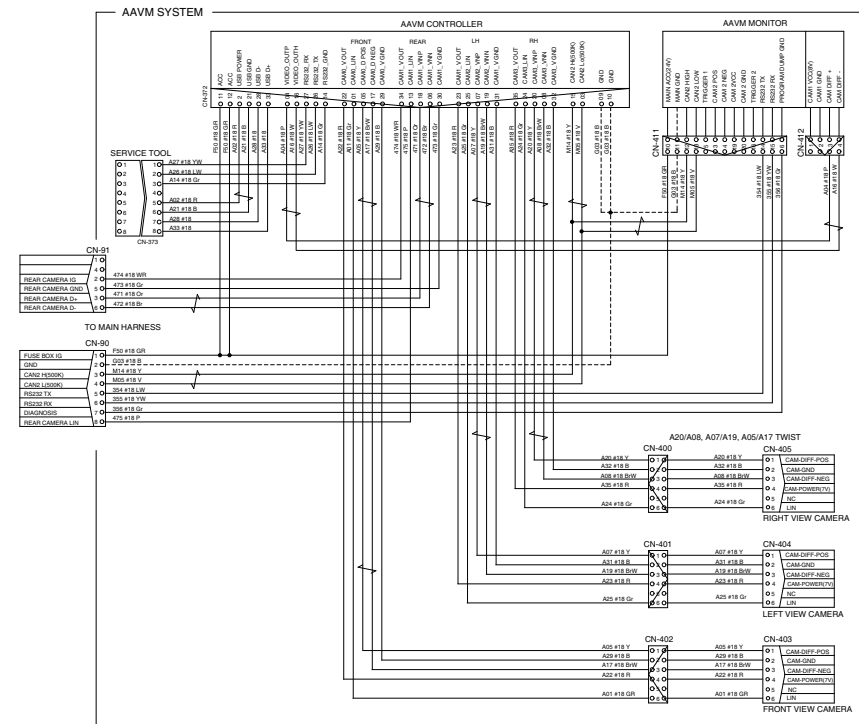
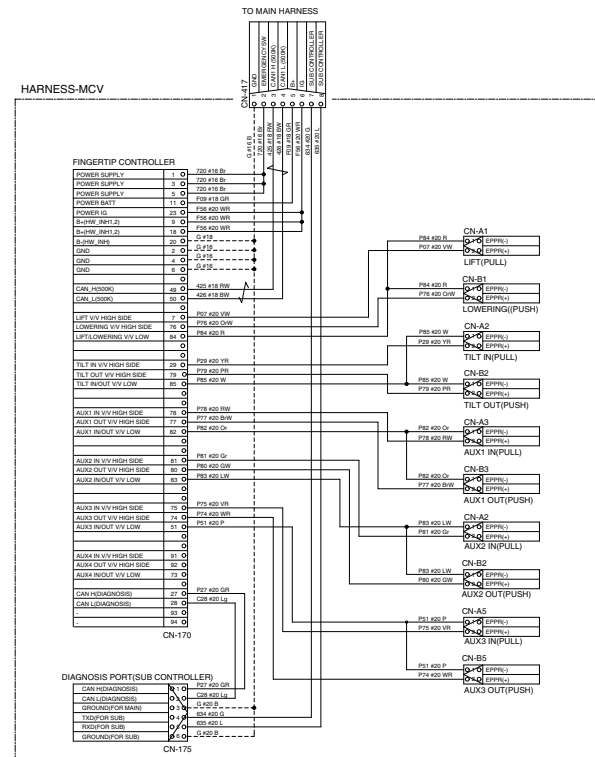
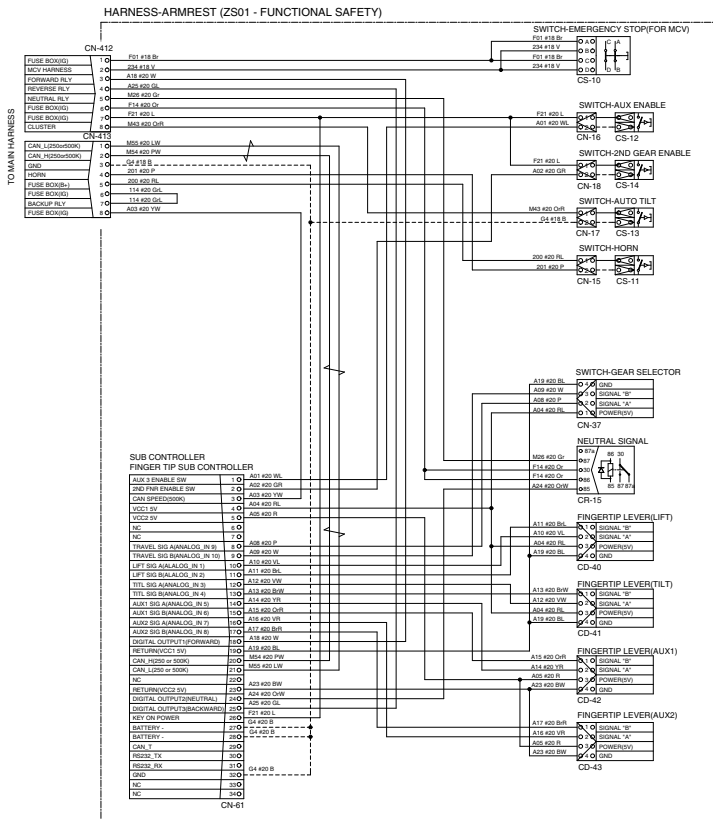
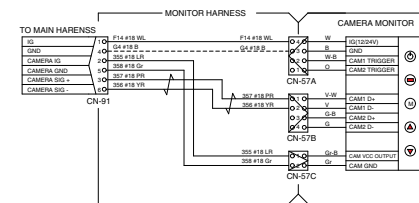
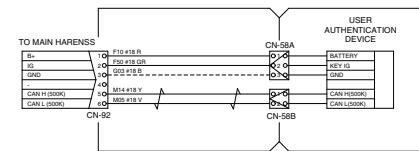
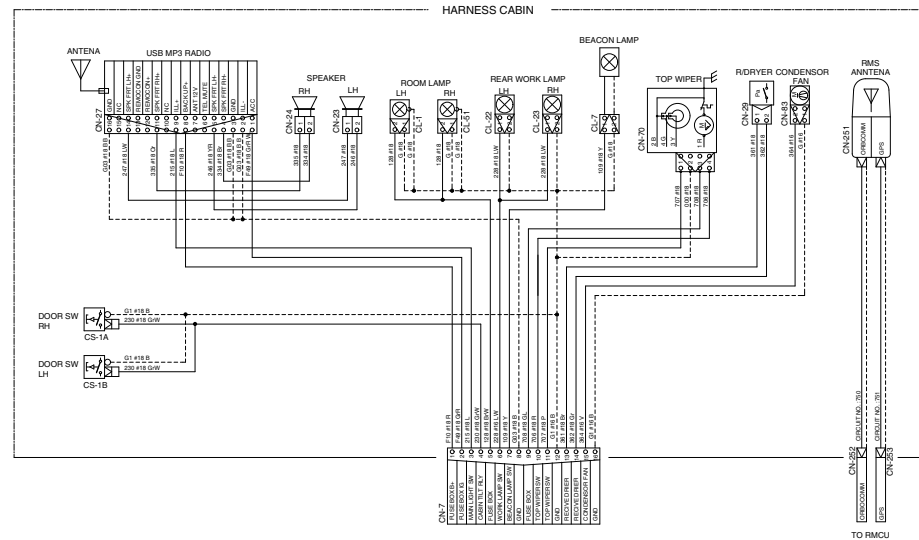
· ELECTRICAL CIRCUIT (1/3)



· · ELECTRICAL CIRCUIT (2/3)



• ELECTRICAL CIRCUIT (3/3)



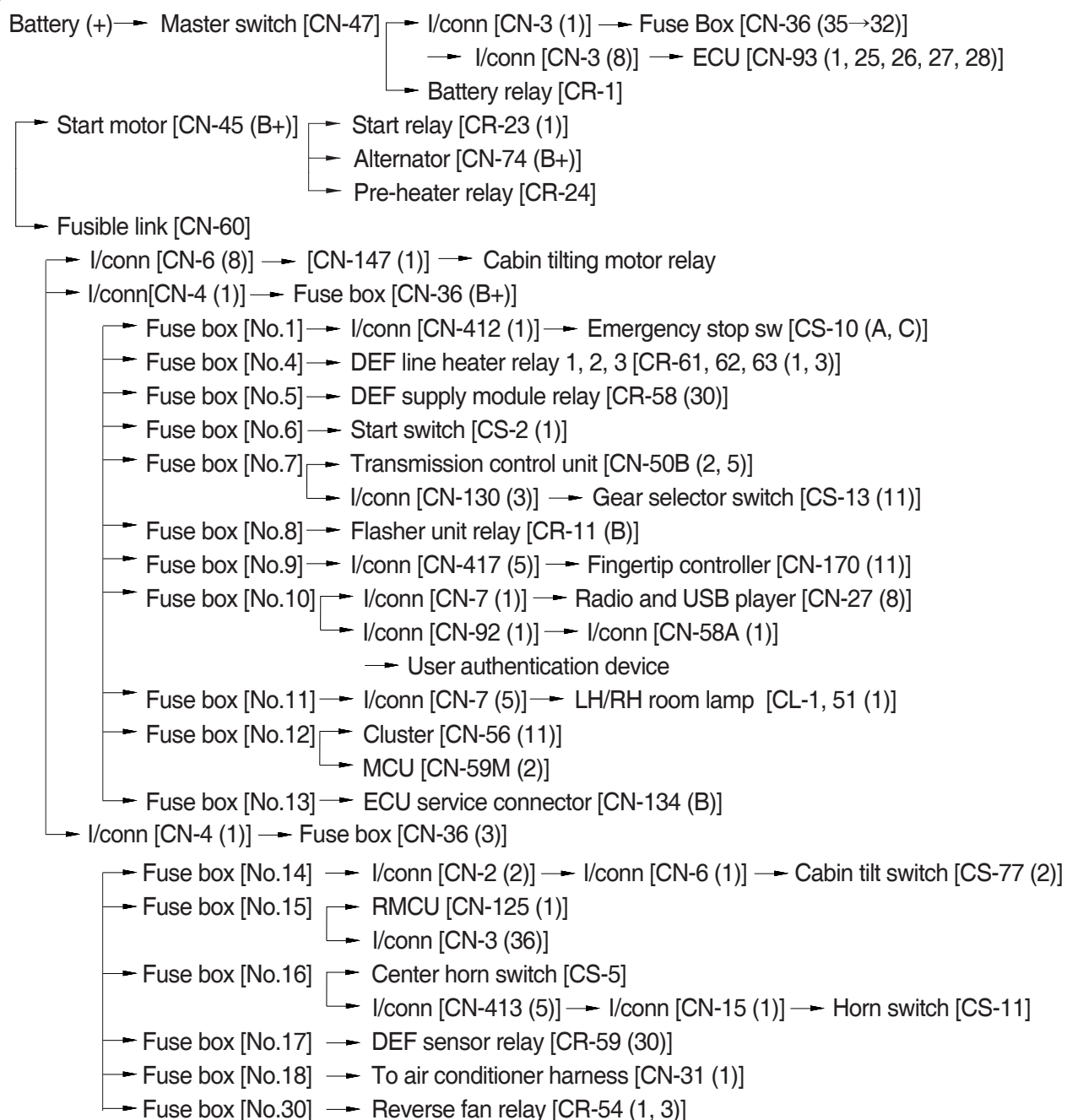
MEMORANDUM

1. POWER CIRCUIT

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

When the start switch is in the off position, the current flows from the positive battery terminal.

1) OPERATING FLOW



2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	OFF	① - GND (Battery +) ② - GND (Fusible link) ③ - GND (Fuse No. 32) ④ - GND (Fuse box B+) ⑤ - GND (Start switch)	24V

※ GND : Ground

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

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

2. STARTING CIRCUIT

1) OPERATING FLOW

Battery (+) terminal → Master Switch [CN-47] → Battery relay [CR-1]
└→ Fusible link [CN-60] → I/conn [CN-4 (1)] → Fuse box [B+→(6)] → Start switch [CS-2 (1)]
└→ Start motor [CN-45 (B+)] → Start relay [CR-23 (1)]

※ The engine can be started only when the gear selector lever is in neutral position.

(1) When start switch is in ON position

Start switch ON [CS-2 (2)] → I/conn [CN-2 (9)] → Diode [DO-1] → Battery relay [CR-1]
→ Fusible link [CN-95] → I/conn [CN-4 (2)] → Fuse box [CN-37 (IG, No.3)]
→ Power is supply with the electric components.

(2) When start switch is START position

Start switch START [CS-2 (5)] → Fuse box B+ [CN-36 (34→31)] → Safety start relay [CR-5 (3→4)]
→ Start aux relay [CR-36 (3→4)] → I/conn [CN-2 (33)] → Start relay [CR-23 (2→3)]
→ Start motor [CN-45 (M)] → Start motor operating

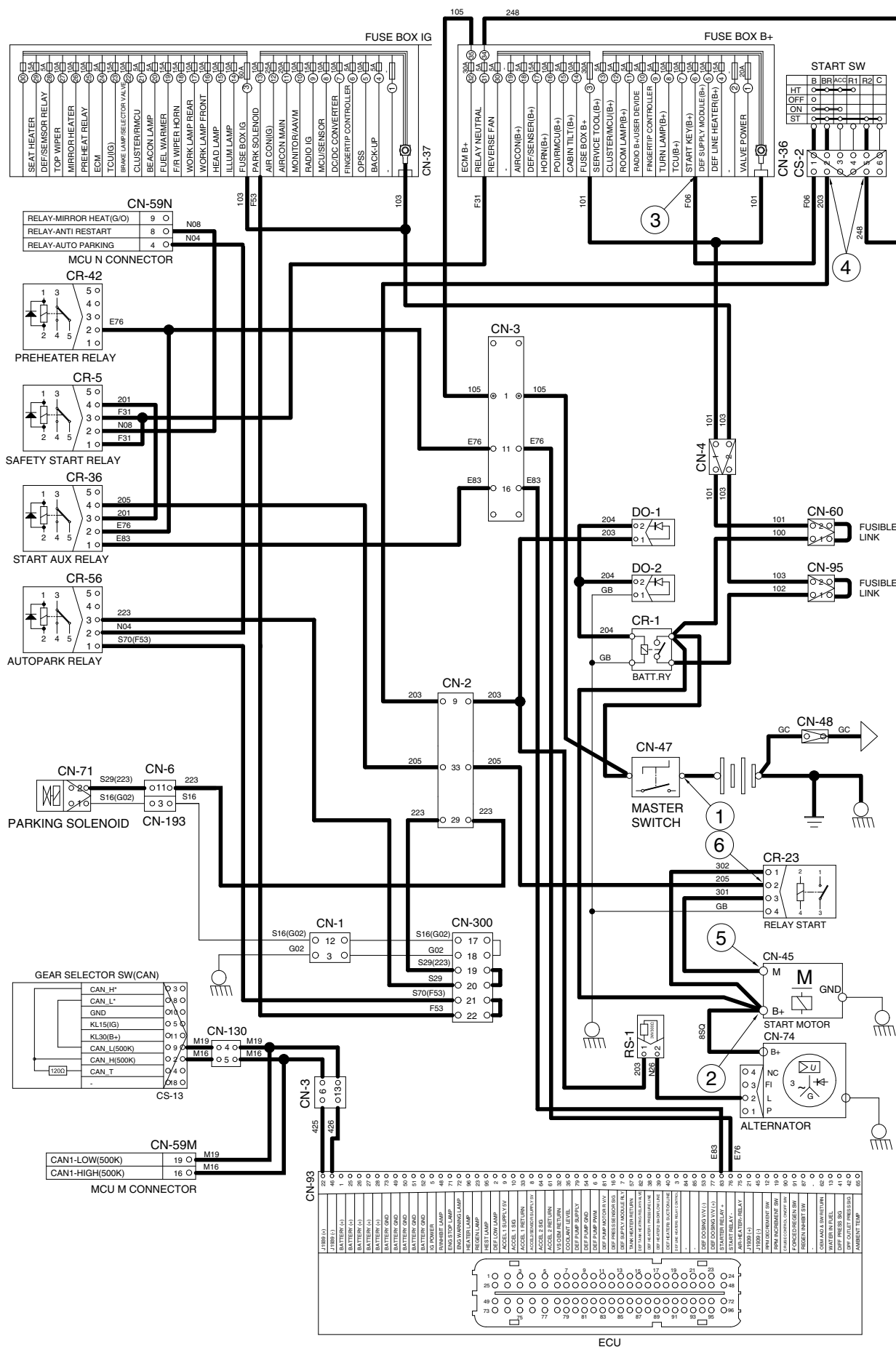
2) CHECK POINT

Engine	Start switch	Check point	Voltage
Running	ON	① - GND (Battery B+) ② - GND (Start motor B+) ③ - GND (Fuse box) ④ - GND (Start switch) ⑤ - GND (Start motor M) ⑥ - GND (Start relay)	24V

※ GND : Ground

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

STARTING CIRCUIT



3. CHARGING CIRCUIT

When the starter is activated and the engine is started, the operator release the start switch to the ON position. Charging current generated by operating alternator flows into the battery.

The current also flows from alternator to each electrical component through the fusible link (CN-60) and the fuse box.

1) OPERATING FLOW

(1) Warning flow

Alternator [CN-74 (2)] → I/conn [CN-2 (38)] → MCU alternator level [CN-59N (26)]
→ Cluster charging warning lamp (via CAN interface)

(2) Charging flow

Alternator [CN-74 (B+)] → Start motor [CN-45 (B+)] → Battery relay [CR-1]
→ Master switch [CN-47] → Battery (+) terminal → Charging

2) CHECK POINT

Engine	Start switch	Check point	Voltage
Running	ON	① - GND (Battery B+) ② - GND (Alternator B+) ③ - GND (Alternator 2) ④ - GND (MCU) ⑤ - GND (Fuse box)	24V

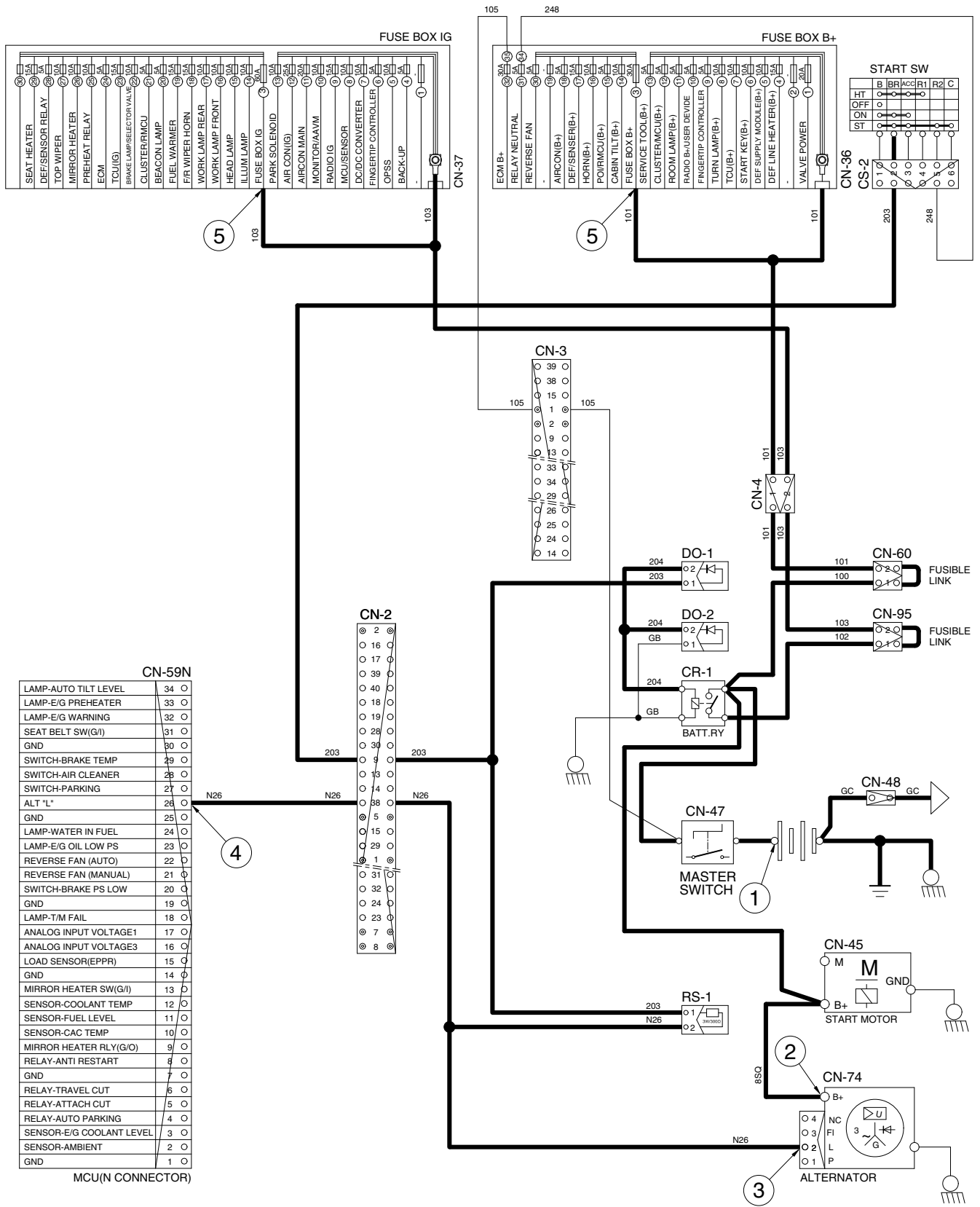
※ GND : Ground

※ Cautions

1. When using an arc welder, always disconnect the ground lead from the battery to prevent alternator or battery damage.
2. Attach the welding ground clamp as close to the weld area as possible to prevent welding current from damaging the bearings of the alternator.
3. Do not disconnect the battery when the engine is running. The voltage surge can damage the diode and resistors in the electrical system.
4. Do not disconnect an electric wire before the engine is stopped and the switches are OFF.

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

CHARGING CIRCUIT



250D9VEL07

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

4. PREHEATING CIRCUIT

Combustion chamber glow plugs are used in order to give satisfactory starting of low ambient temperatures.

1) OPERATING FLOW

Battery (+) terminal → Master switch [CN-47] → Battery relay [CR-1] → Start motor [CN-45 (B+)]
→ Preheater relay [CR-24]

※ When you turn the start switch to the ON position, the preheat relay makes the preheater plugs operated and the preheater lamp of the cluster turned ON.

Start switch ON [CS-2 (2)]

→ MCU [CN-59M (31)] → Fuel warmer switch [CS-95 (2)] → Fuel warmer relay [CR-49 (85→87)]
→ I/conn [CN-2 (1)] → Fuel warmer [CN-96 (1)] → Fuel warmer operating
→ ECU [CN-93 (75)] → I/conn [CN-3 (10)] → Preheater relay [CR-42 (1→4)]
→ I/conn [CN-2 (34)] → Preheater relay [CR-24] → Preheater operating

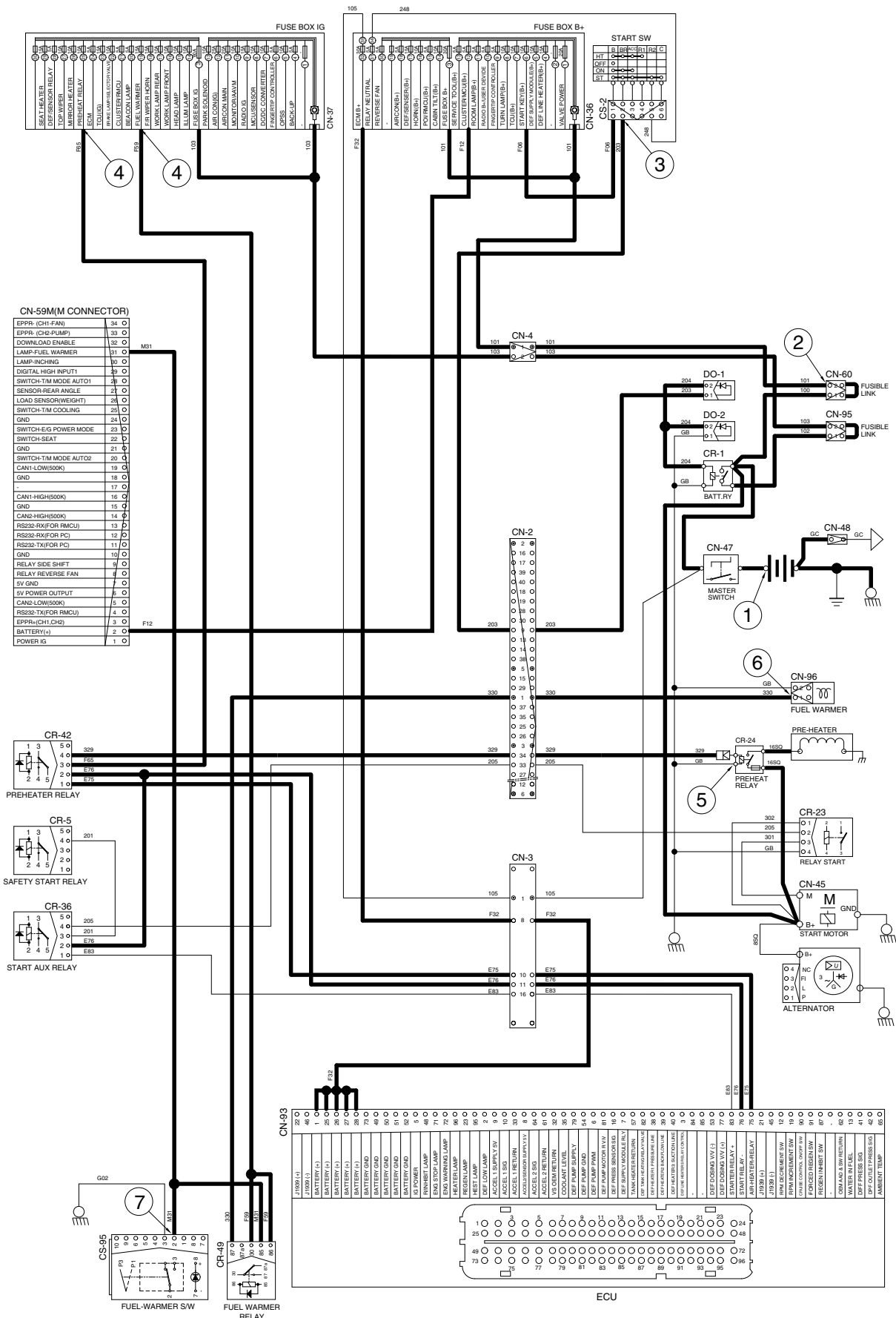
2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	ON	① - GND (Battery B+) ② - GND (Fusible link) ③ - GND (Start switch) ④ - GND (Fuse box) ⑤ - GND (Pre-heater relay) ⑥ - GND (Fuel warmer) ⑦ - GND (Fuel warmer switch)	24V

※ GND : Ground

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

PREHEATING CIRCUIT



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

250D9VEL08

5. HEAD LIGHT AND WORK LIGHT CIRCUIT

1) OPERATING FLOW

(1) Head light

Fuse box [CN-37 (No.55)] → Main light switch [CS-39 (5)] → Switch ON, 2nd step [CS-39 (6)]
 → Multi function switch [CS-11 (8)]

- Multi function switch MIDDLE [CS-11 (7)] → I/conn [CN-2 (18)] → I/conn [CN-6 (3)]
 - I/conn [CN-10 (4)] → LH head light low beam ON [CL-3 (2)]
 - I/conn [CN-11 (4)] → RH head light low beam ON [CL-4 (2)]
- Multi function switch DOWN [CS-11 (6)]
 - Cluster high beam pilot lamp ON [CN-56 (13)]
 - I/conn [CN-2 (19)] → I/conn [CN-6 (4)]
 - I/conn [CN-10 (6)] → LH head light high beam ON [CL-3 (1)]
 - I/conn [CN-11 (6)] → RH head light high beam ON [CL-4 (1)]

(2) Front work lamp

Fuse box [CN-37 (No.56)] → Work light switch [CS-21 (2)] → Switch ON, 1nd step [CS-21 (3)]
 → I/conn [CN-2 (3)] → I/conn [CN-6 (15)] → I/conn [CN-9 (1)]

- Mast work light ON [CL-6 (1)]
- I/conn [CL-5 (1)] → Mast work light ON [CL-5A (1)]

(3) Rear work light

Fuse box [CN-37 (No.57)] → Work light switch [CS-21 (5)] → Switch ON, 2nd step [CS-21 (6)]

- I/conn [CN-7 (6)]
 - LH canin rear work light ON [CL-22 (1)]
 - RH canin rear work light ON [CL-23 (1)]
- I/conn [CN-2 (6)]
 - I/conn [CN-201 (6)] → LH CWT rear work light ON [CL-22 (2)]
 - I/conn [CN-200 (6)] → RH CWT rear work light ON [CL-23 (2)]

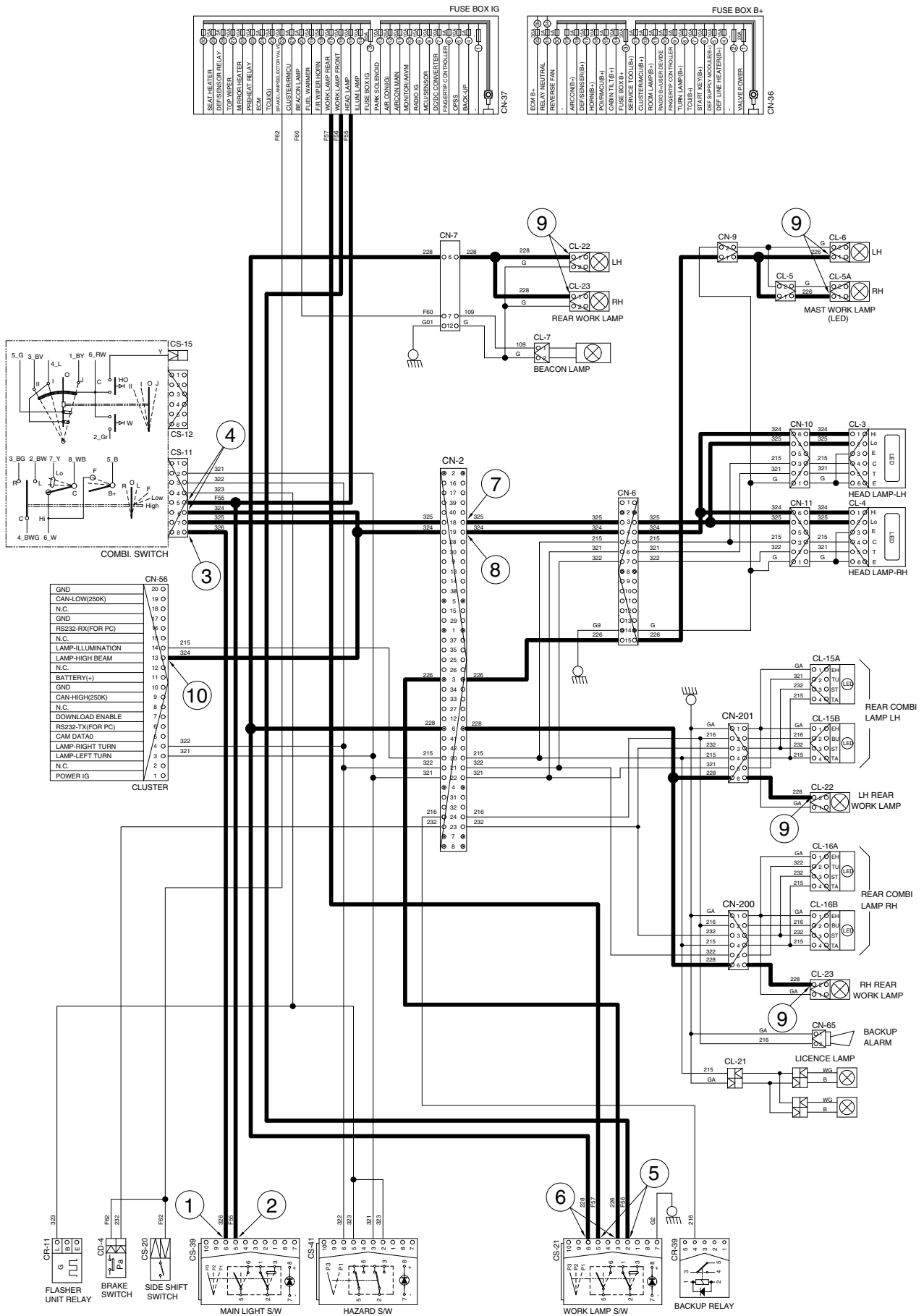
2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	ON	① - GND (Main light switch input) ② - GND (Main light switch output) ③ - GND (Multifunction switch input) ④ - GND (Multifunction switch output) ⑤ - GND (Work light switch input) ⑥ - GND (Work light switch output) ⑦ - GND (Low beam) ⑧ - GND (High beam) ⑨ - GND (Work light) ⑩ - GND (Cluster high beam pilot lamp input)	20~25V

※ GND : Ground

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

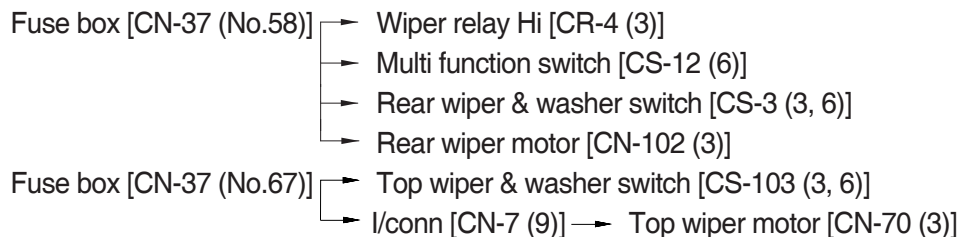
HEAD LAMP AND WORK LIGHT CIRCUIT



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

6. WIPER AND WASHER CIRCUIT

1) OPERATING FLOW



(1) Front washer switch ON

- ① Washer switch ON [CS-12 (6)→(2)]
 - I/conn [CN-3 (26)] → Washer tank [CN-22 (2)] → Front washer operating
 - Washer pump relay [CR-38 (1)→(3)] → Int wiper relay Lo [CR-6 (1)→(2)]
 - Wiper relay Lo [CR-26 (2)→(3)] → Front wiper motor [CN-21 (2)]
 - Wiper motor operating (low)

(2) Front wiper switch ON

- ① INT position
 - Wiper switch ON [CS-12 (6)→(1)] → Int wiper relay [CR-6 (3)] →
 - Wiper relay Lo [CR-26 (2)→(3)] → Front wiper motor [CN-21 (2)] →
 - Front wiper motor intermittently operating
- ② Lo position
 - Wiper switch ON [CS-12 (6)→(4)] → Wiper relay Lo [CR-26 (5)→(3)] →
 - Front wiper motor [CN-21 (2)] → Front wiper motor operating (low)
- ③ Hi position
 - Wiper switch ON [CS-12 (6)→(3)] → Wiper relay Hi [CR-4 (1)→(4)] →
 - Front wiper motor [CN-21 (4)] → Front wiper motor operating (high)

(3) Auto-parking (when switch OFF)

- Switch OFF [CS-12 (4)] → Wiper relay Lo [CR-26 (5)→(3)] → Front wiper motor [CN-21 (2)] →
- Wiper motor stop

(4) Rear wiper and washer switch

- ① Wiper switch ON (1st step)
 - Wiper switch ON [CS-3 (3)→(2)] → Rear wiper motor [CN-102 (4)] → Rear wiper motor operating
- ② Washer switch ON (2nd step)
 - Washer switch ON [CS-3 (6)→(5)] → I/conn [CN-3 (27)] → Rear washer tank [CN-103 (2)] →
 - Washer operating
 - Wiper switch ON [CS-3 (3)→(2)] → Rear wiper motor [CN-102 (4)] → Rear wiper motor operating

(5) Top wiper and washer switch

- ① Wiper switch ON (1st step)
 - Wiper switch ON [CS-103 (3)→(2)] → I/conn [CN-7 (10)] → Top wiper motor [CN-70 (4)] →
 - Top wiper motor operating
- ② Washer switch ON (2nd step)
 - Washer switch ON [CS-103 (6)→(5)] → I/conn [CN-3 (28)] → Top washer tank [CN-202 (2)] →
 - Washer operating
 - Wiper switch ON [CS-103 (3)→(2)] → I/conn [CN-7 (10)] → Top wiper motor [CN-70 (4)] →
 - Top wiper motor operating

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

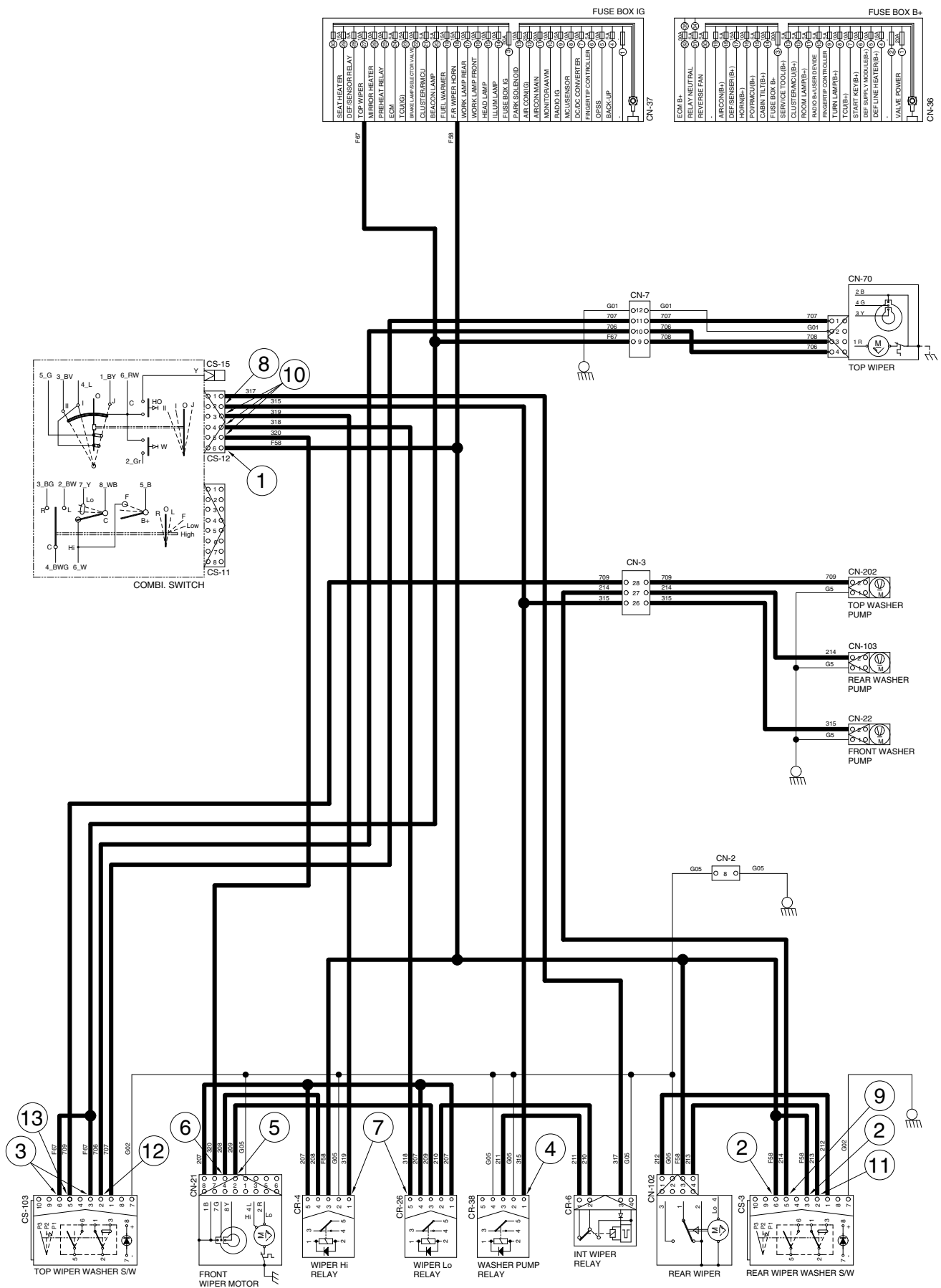
2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	ON	① - GND (Front wiper switch power input) ② - GND (Rear wiper switch power input) ③ - GND (Top wiper switch power input) ④ - GND (Washer pump relay power input) ⑤ - GND (Front wiper motor Lo power input) ⑥ - GND (Front wiper motor High power input) ⑦ - GND (Wiper relay power input) ⑧ - GND (Front washer power output) ⑨ - GND (Rear washer power output) ⑩ - GND (Front wiper motor power output) ⑪ - GND (Rear wiper motor power output) ⑫ - GND (Top wiper motor power output) ⑬ - GND (Top washer power output)	20~25V

※ GND : Ground

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

WIPER AND WASHER CIRCUIT



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

3. CLUSTER

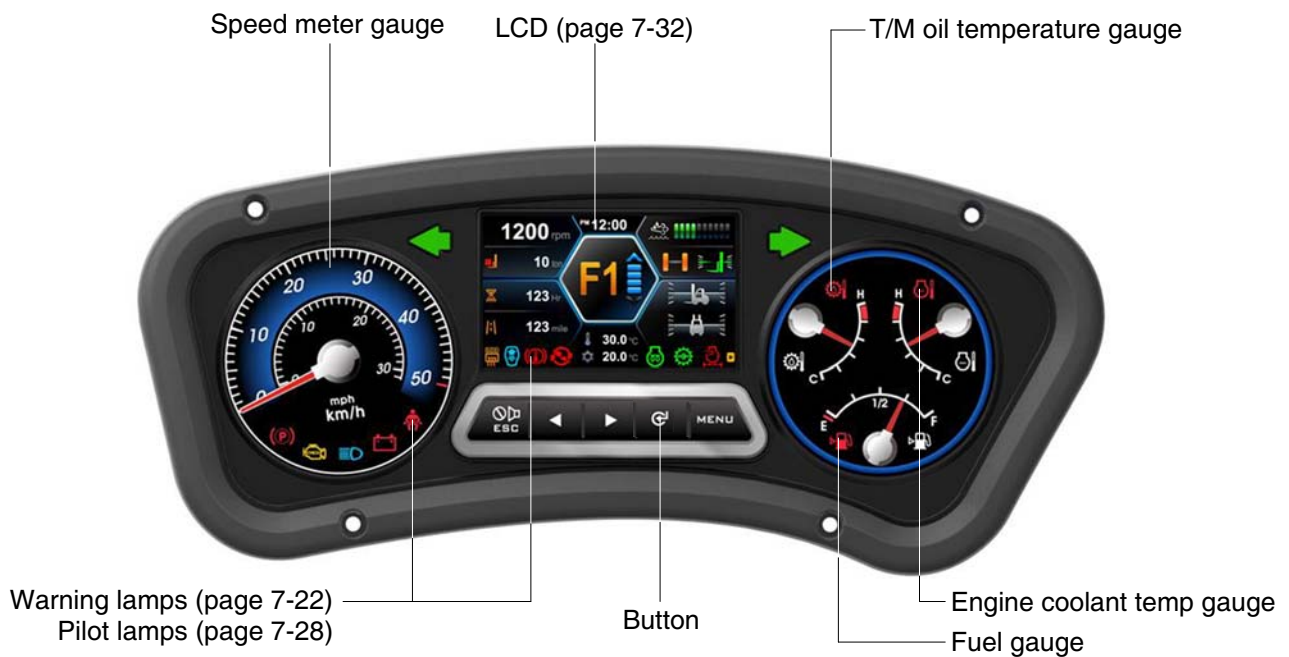
1) STRUCTURE

The cluster consists of gauges, lamps, buttons and LCD as shown below, to warn the operator in case of abnormal truck operation or conditions for the appropriate operation and inspection.

- Gauges : Indicate operating status of the truck.
- Warning lamps : Indicate abnormality of the truck.
- Pilot lamps : Indicate operating status of the truck.
- LCD : Display the truck model, error code and engine speed etc.
- Buttons : Select the truck model, error code and engine speed etc and stop the buzzer sound.

※ The cluster installed on this truck does not entirely guarantee the condition of the truck. Daily inspection should be performed according to operator's manual chapter 7. **PLANNED MAINTENANCE AND LUBRICATION.**

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



180D9V7CD03

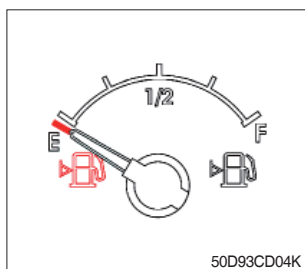
2) GAUGE

(1) Speed meter gauge



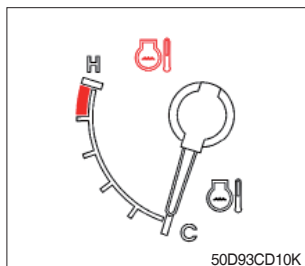
- ① The speed meter displays the speed of truck in mph and km/h.
 - 0~50 km/h
 - 0~31 mph

(2) Fuel gauge



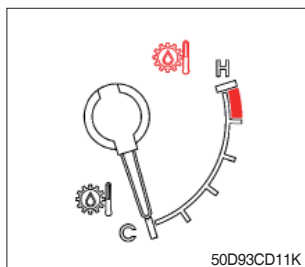
- ① This gauge indicates the amount of fuel in the fuel tank.
- ② Fill the fuel when the warning lamp lights ON or the indicator moves E point, refuel as soon as possible to avoid running out of fuel.
- ※ If the gauge indicates below E point even though the truck is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.

(3) Engine coolant temperature gauge



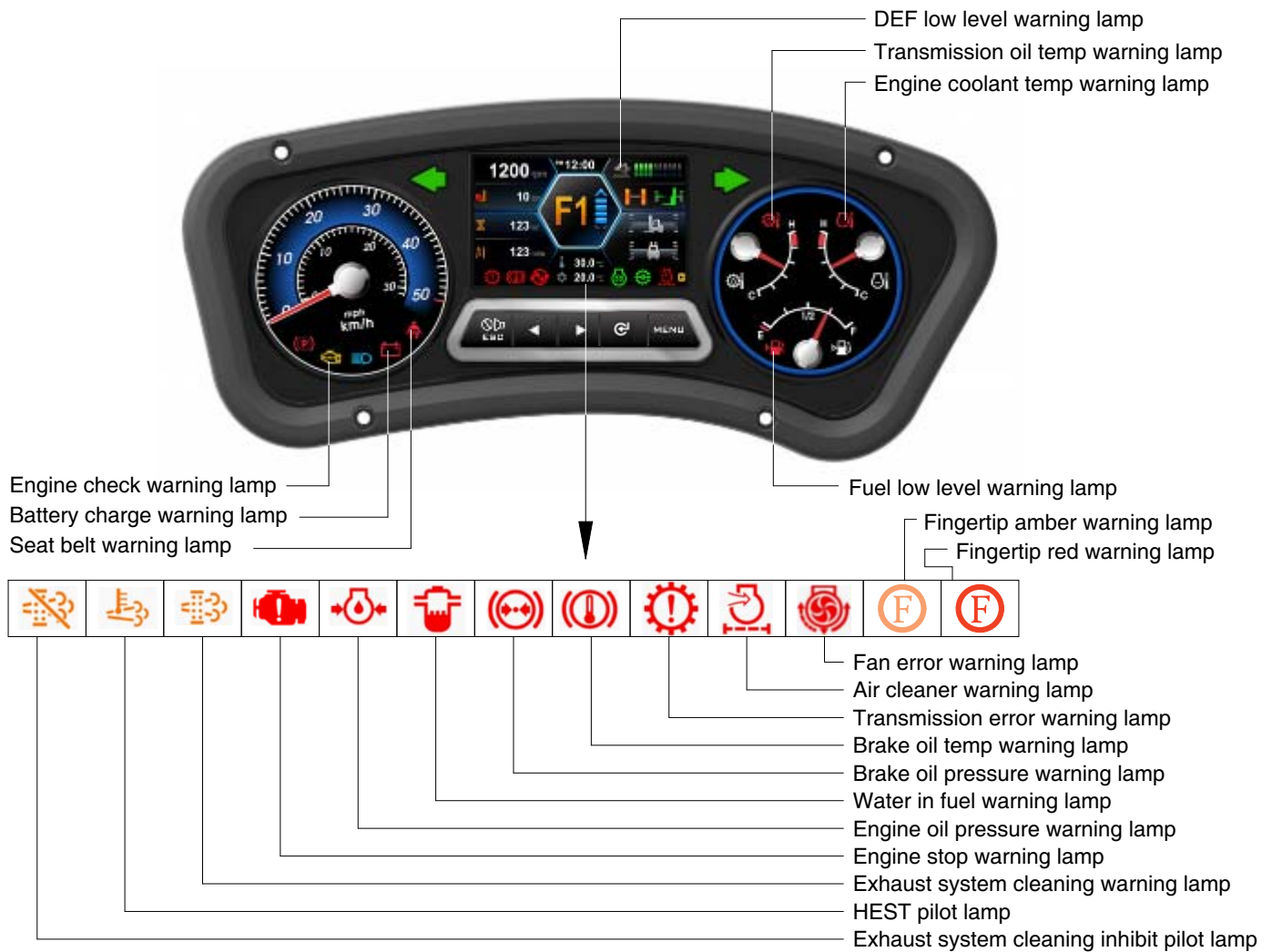
- ① This indicates the temperature of coolant.
 - White range : 40~107 °C (104~225 °F)
 - Red range : Above 107 °C (225 °F)
- ② Keep idling engine at low speed until the indicator is in the operating range.
- ③ If the indicator is in the red range, turn OFF the engine and check the radiator and engine.
- ※ If the gauge indicates red range even though the truck is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.

(4) Transmission oil temperature gauge



- ① This range indicates the temperature of transmission oil.
 - White range : 40~107 °C (104~225 °F)
 - Red range : Above 107 °C (225 °F)
- ② Keep idling engine at low speed until the indicator is in the operating range.
- ③ If the indicator is in the red range, it means the transmission is overheated. Be careful that the indicator does not move into the red range.

3) WARNING LAMPS



160D9V3CD04

※ When the warning and pilot lamps are illuminated more than display, you can display next lamps by push the button (▶).

(1) Engine check warning lamp



- ① This lamp lights ON during a nonfatal engine system error.
- ② The engine can still be run, but the fault should be corrected as soon as possible.

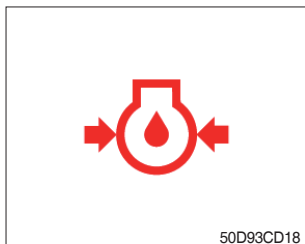
(2) Brake oil pressure warning lamp



- 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.

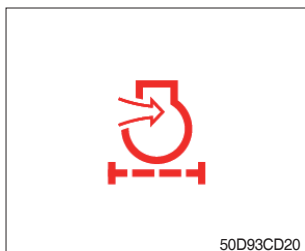
※ Do not operate until the problems are corrected.

(3) Engine oil pressure warning lamp



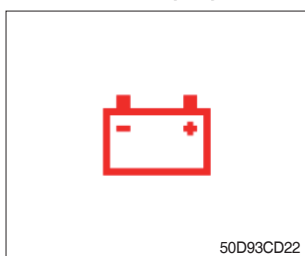
- ① This lamp comes ON for a while after starting the engine because of the low oil pressure.
- ② If the lamp comes ON during engine operation, shut OFF engine immediately. Check oil level.

(4) Air cleaner warning lamp



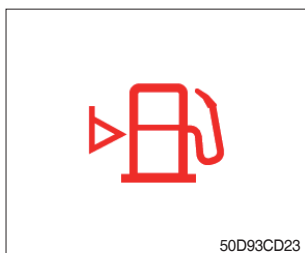
- ① This lamp operates by the vacuum caused inside when the filter of air cleaner is clogged.
- ② Check the filter and clean or replace it when the lamp is ON.

(5) Battery charging warning lamp



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

(6) Fuel low level warning lamp



- ① Fill the fuel immediately when the lamp is turned ON.

(7) Water in fuel warning lamp



- ① Light up when water in fuel.
- ② Stop the engine and please drain the water of the fuel prefilter.

(8) Seat belt warning lamp



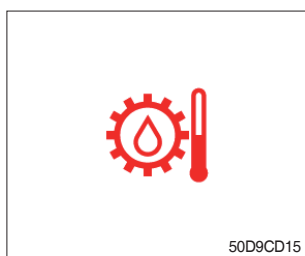
- ① This lamp lights ON for the first five seconds after starting the engine.

(9) Engine coolant temperature warning lamp



- ① This lamp is turned ON when the temperature of cooling water is over the normal temperature (108 °C, 226 °F).
- ② Check the cooling system when the lamp is ON.

(10) Transmission oil temperature warning lamp



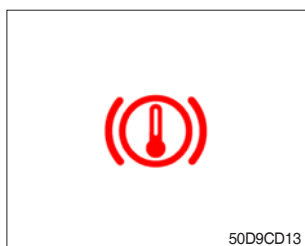
- ① This lamp informs the operator that transmission oil is above the specified temperature (107 °C, 225 °F).
 - Lamp ON : Abnormal
 - Lamp OFF : Normal
- ※ **When this lamp lights up during operation, stop the engine and check the truck.**

(11) Transmission error warning lamp



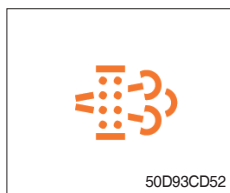
- ① This lamp lights ON and the information window of the LCD shows the error code when an error occurs in the transmission.
 - ② Immediately pull the truck to a convenient stop. Stop the engine. Investigate the cause.
- ※ **Consult a HYUNDAI dealer to investigate the cause.**
- ※ **Do not operate until the cause has been corrected.**

(12) Brake oil temperature warning lamp



- ① This lamp is turned ON when the brake oil temperature is too high.
- ② When the lamp is ON, stop the engine and check for its cause.

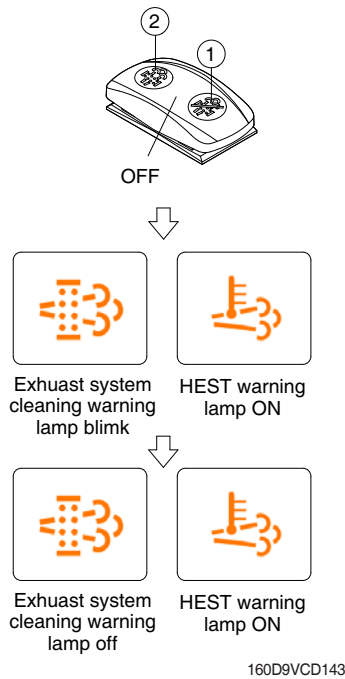
(13) Exhaust system cleaning warning lamp



- ① This warning lamp lights ON or flashes when exhaust system cleaning is needed as seen in the table below

Warning lamp				Remark
EXHAUST WARNING LAMP	DEF low lamp	Engine check lamp	Engine stop lamp	
				
On	-	-	-	1. Changing to a more challenging duty cycle. 2. Performing a manual (stationary) exhaust system cleaning.
On	-	On	-	1. The aftertreatment exhaust system needs to be cleaned immediately. 2. Engine power will be reduced automatically if action is not taken.
-	-	-	On	1 These lamps will be on when a manual (stationary) exhaust system cleaning is not performed 2. Stop the engine immediatary 3. Please contact your hyundai service center or local dealer
Flash	-	-	-	The status of a manual (stationary) exhaust system cleaning when the exhaust system cleaning switch has been activated.
-	On	-	-	DEF level initial warning DEF level 10% (engine error code 3497)
-	Flash	-	-	DEF level critical warning DEF level 5% (engine error code 3498)
-	Flash	On	-	DEF level first derate warning DEF level 2.5% (engine error code 1673, 25% derate)
-	Flash	On	-	DEF level secondary derate warning DEF level 0% (error code 3547, 3714, 50% derate, 30 min)
-	Flash	On	On	DEF level final derate warning Engine error code 3712 Contact Hyundai Service conter or dealer

※ Manual exhaust system cleaning



※ Manual exhaust system cleaning must be operated in a fireproof area.

※ To stop a manual exhaust system cleaning before it has completed, set to the exhaust system cleaning switch to the inhibit or turn OFF engine.

① Stop and park the truck.

② Push the switch to position ② to initiate the manual exhaust system cleaning.

※ Refer to the page 7-59 for the exhaust system cleaning switch operation.

※ The engine speed may increase during exhaust system cleaning and it will take approximately 20~60 minutes depending on condition.

③ The exhaust system cleaning warning lamp will flash and HEST warning lamp will light on during the exhaust system cleaning is operation.

④ The exhaust system cleaning and/or HEST warning lamp will light OFF when the exhaust system cleaning is completed.

(14) Exhaust system cleaning inhibit warning lamp



① This warning lamp lights ON when the exhaust system cleaning switch is pushed inhibit position, therefore automatic and manual exhaust system cleaning can not occur. It should inhibited, before caused fire due to the exhaust gas in high temperature.

※ Refer to the page 7-59 for the exhaust system cleaning switch.

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



① This warning lamp indicates, when illuminated, that exhaust temperatures are high due to exhaust system cleaning.

② The lamp will also illuminate during a manual exhaust system cleaning.

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 800 °C [1500 °F], which is hot enough to ignite or melt common materials, and to burn people.

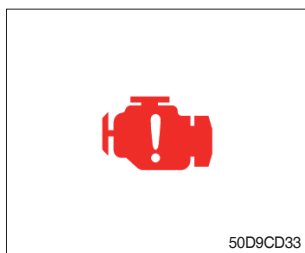
※ The lamp does not signify the need for any kind of equipment or engine service; It merely alerts the equipment operator to high exhaust temperatures. It will be common for the lamp to illuminate on and off during normal equipment operation as the engine completes the exhaust system cleaning.

(16) DEF (Diesel Exhaust Fluid) low warning lamp



- ① This warning lamp indicates, when illuminated or flashing, that the diesel exhaust fluid level is low.
- ※ **Add the diesel exhaust fluid into DEF tank.**
- ※ **Refer to the page 7-25 for detail.**

(17) Engine stop warning lamp



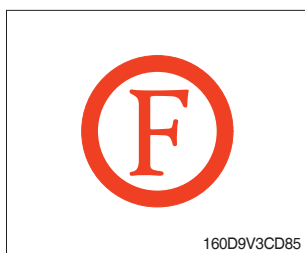
- ① When this warning lamp lights ON, stop the engine immediately and check the DEF level and related parts of the engine.
- ※ **Please contact your Hyundai service center or local dealer.**

(18) Fan error warning lamp



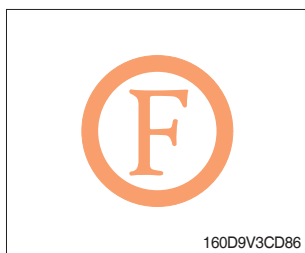
- ① This lamp is turned ON when the cooling fan error occurs.

(19) Fingertip red warning lamp



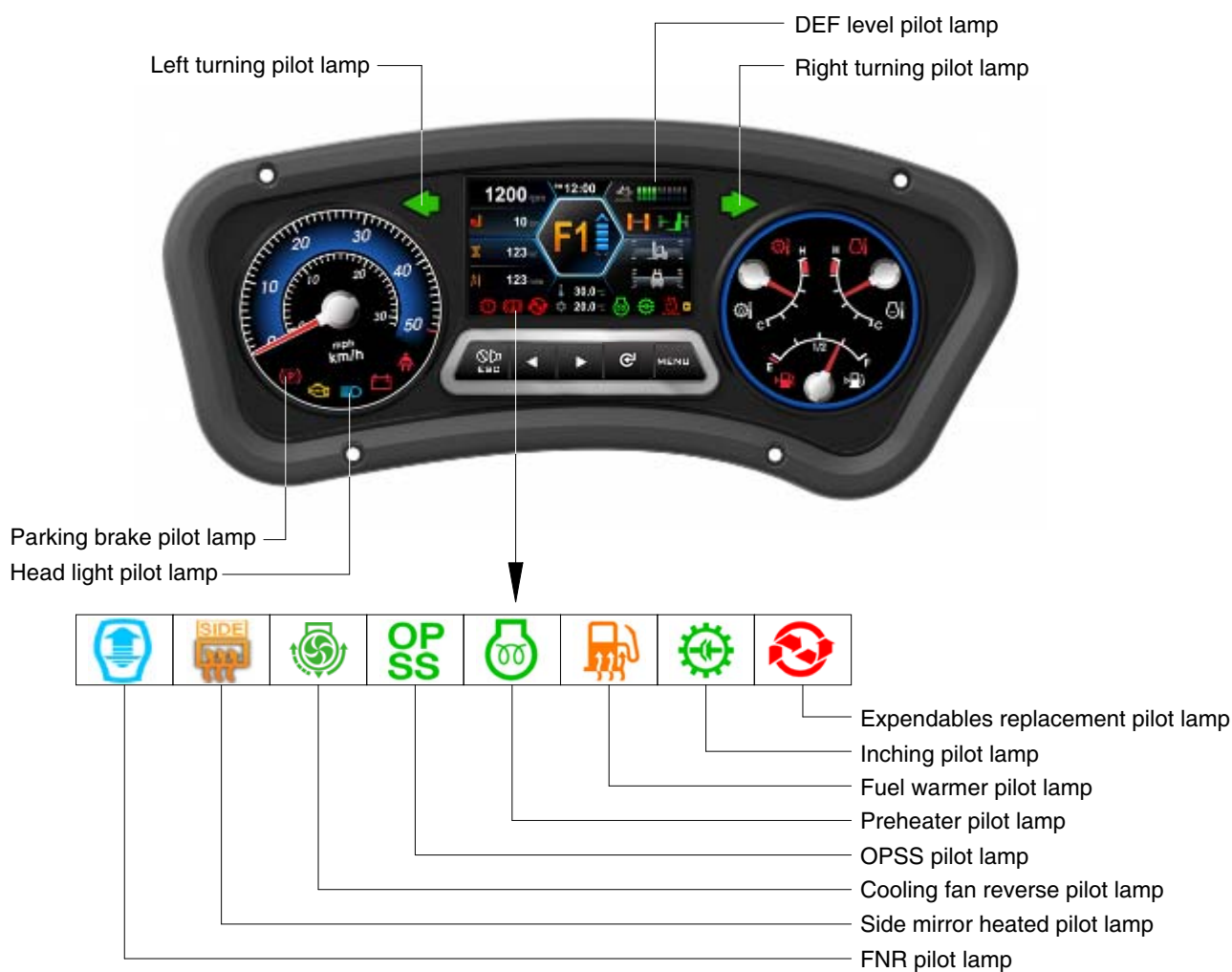
- ① This lamp lights ON when the forklift truck is in a condition that is serious enough to stop it.

(20) Fingertip amber warning lamp



- ① This lamp lights ON when there is a problem with the forklift truck system, but the vehicle does not need to be stopped immediately.

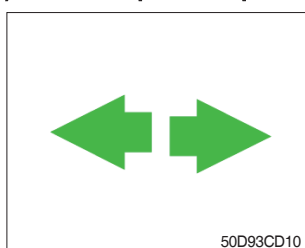
4) PILOT LAMPS



160D9V3CD05

※ When the warning and pilot lamps are illuminated more than display, you can display next lamps by push the button (▶).

(1) Direction pilot lamp



① This lamp flashes when the signal indicator lever is moved.

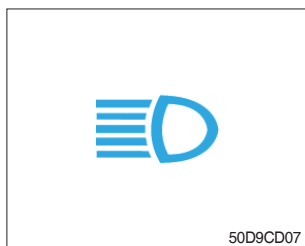
(2) Parking brake pilot lamp



① When the parking brake is actuated, the lamp lights ON.

※ Check the lamp is OFF before driving.

(3) Head light pilot lamp



- ① This lamp comes ON when the main light switch is operated to 2nd step.

(4) Preheater pilot lamp



- ① This lamp lights ON when start switch is turned clockwise to the ON position. Light will turn off after approximately 15~45 seconds, depending on engine coolant temperature, indicating that preheating is completed.
- ② When the lamp goes out the operator should start cranking the engine.

※ Refer to operator's manual page 5-16.

(5) Inching pilot lamp



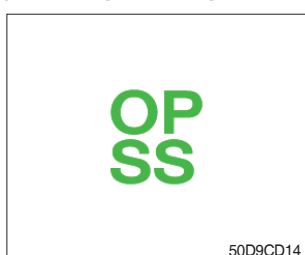
- ① When the inching switch is pressed, the lamp lights ON.

(6) Fuel warmer pilot lamp



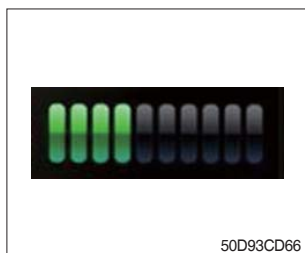
- ① Illuminates when the hydraulic fluid temperature is below 20 °C (68 °F) or engine coolant temperature is below 10 °C (50 °F).
- ② If the engine coolant temperature is above 60 °C (140 °F) or hydraulic fluid temperature is above 45 °C (113 °F) the start switch is in the ON position, automatic fuel heating is canceled.

(7) OPSS pilot lamp



- ① This signal lamp lights ON when the operator leaves the seat.
- ② Powered travel movement of the truck shall be possible only if the operator is in the normal operating position. Transmission will automatically shift to neutral upon the exiting of the operator.
- ③ The gear selector lever must be cycled through neutral with the operator in the normal operating position to regain powered direction control.

(8) DEF (Diesel Exhaust Fluid) level pilot lamp



- ① This gauge indicates the level of DEF (10 steps).
- ② Fill the DEF when the level is low.

(9) Expendables replacement pilot lamp



- ① This lamp lights ON if expendables which must be replaced are exist.
- ② The lamp will light up only 3 minutes since KEY ON, and then light off.
- ③ Please check the expendables management list in maintenance menu.

(10) Cooling fan reverse rotation pilot lamp



- ① This lamp lights ON when the cooling fan is operated to the reverse rotation.
- ※ Refer to page 7-60 for the operation of the cooling fan.

(11) Side mirror heated pilot lamp (option)



- ① When the heated mirror is operating, the lamp lights ON.

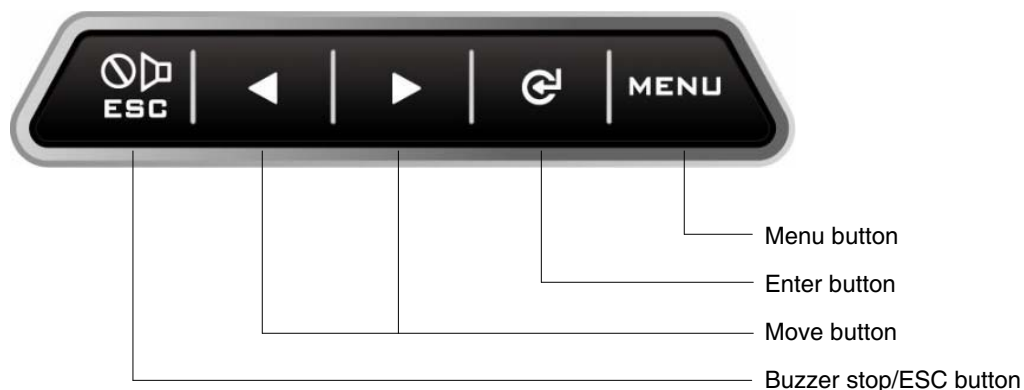
(12) FNR pilot lamp (option)



- ① This lamp lights ON when the 2nd FNR is activated.
- ② This function is optional.
- ※ Refer to page 7-61 for the FNR switch.

4) CLUSTER BUTTON

Each button has the following function.



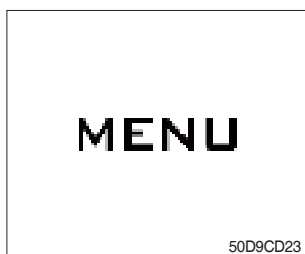
160D9VCD121

(1) Buzzer stop/ESC button



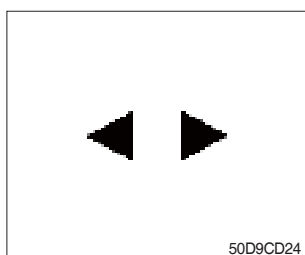
- ① This button is used to stop the buzzer sound.
- ② If another alarm condition occurs after this button has been pressed, the alarm buzzer will re-sound.

(2) Menu button



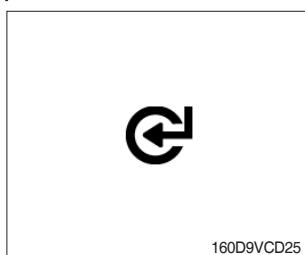
- ① Move in menu (left, up / right, down).

(3) Move button



- ① Move in menu (left, up / right, down).
- ② Decrease / Increase input value.
- ③ When the warning and pilot lamps occur over six, you can display next lamps by push the button (▶).

(4) Enter button



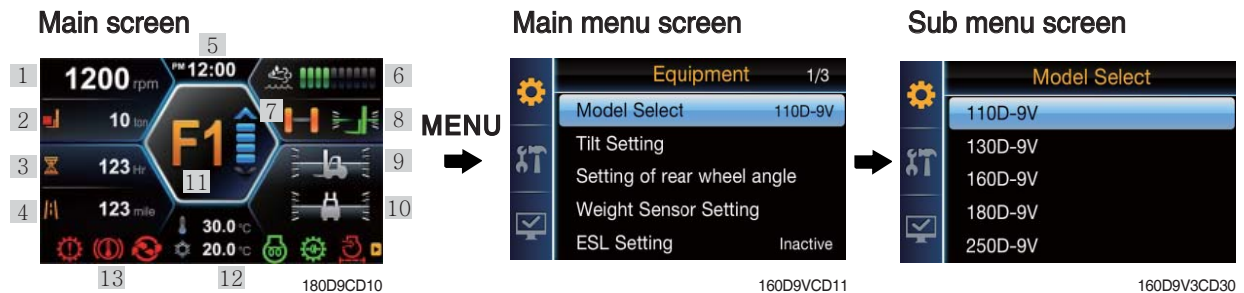
- ① This button is used to select menu.

5) LCD

(1) Main screen

※ You can select or set the menu by the button of the cluster.

※ Please refer to the page 7-31 for the selection and change of the menu and input value.



- 1 Engine rpm
- 2 Load indicator (opt)
- 3 Hour meter
- 4 Odometer
- 5 Current time
- 6 DEF level gauge
- 7 Rear wheel angle (opt)

- 8 Mast angle (opt)
- 9 Vehicle angle X
- 10 Vehicle angle Y
- 11 T/M info (error code, gear, warning)
- 12 Temperature (outdoor temp., setting temp)
- 13 Warning and pilot lamps

Communication error



※ Main screen when occurred communication error between the cluster and TCU/ MCU / ECU

Occurrence of the truck fault

While illuminates the engine, transmission or air conditioner warning lamp, when you press right button (▶) in the cluster button for about 4 seconds, it directly connected to the current failure screen.

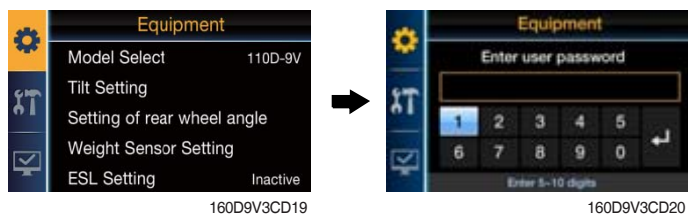
(Warning lamp : Engine (), Transmission () and Air conditioner ().

(2) Main menu

No.	Main menu	Sub menu	Description
1	 Equipment 50D9CD14K	Model select Tilt setting Rear angle setting Weight sensor setting ESL setting Vehicle max speed limit AEB setting (R) MCU/cluster information Cooling fan control Seat belt interlock (option) Finger tip setting (option)	Model select Tilt setting (mast and vehicle angle) Rear angle setting Cross-section, load weight adjust, weight display setting, load indicator buzzer ESL setting Vehicle max speed limit (10~30 km) AEB setting (R)MCU/cluster information Rotation direction, reverse interval and time Active, inactive Lever setting, valve setting
2	 Maintenance 50D9CD15K	Failure history Maintenance management Signal statue User password change Opening of communication	Current history, logged history and delete logged fault Replacement, Change interval oils and filters Display information of sensors User password change (5~10 digit) Orbcomm, GPS antenna
3	 Display setting 50D9CD16K	LCD adjustment Time setting Unit setting Language setting AS phone number ESL password change Maintenance management	LCD brightness setting Time setting Unit setting (temp, speed, weight, pressure) Language setting (13 languages) Check and change AS phone number ESL password change (5~10 digit) Maintenance information (cycle, elapsed time, change count, alarm info)

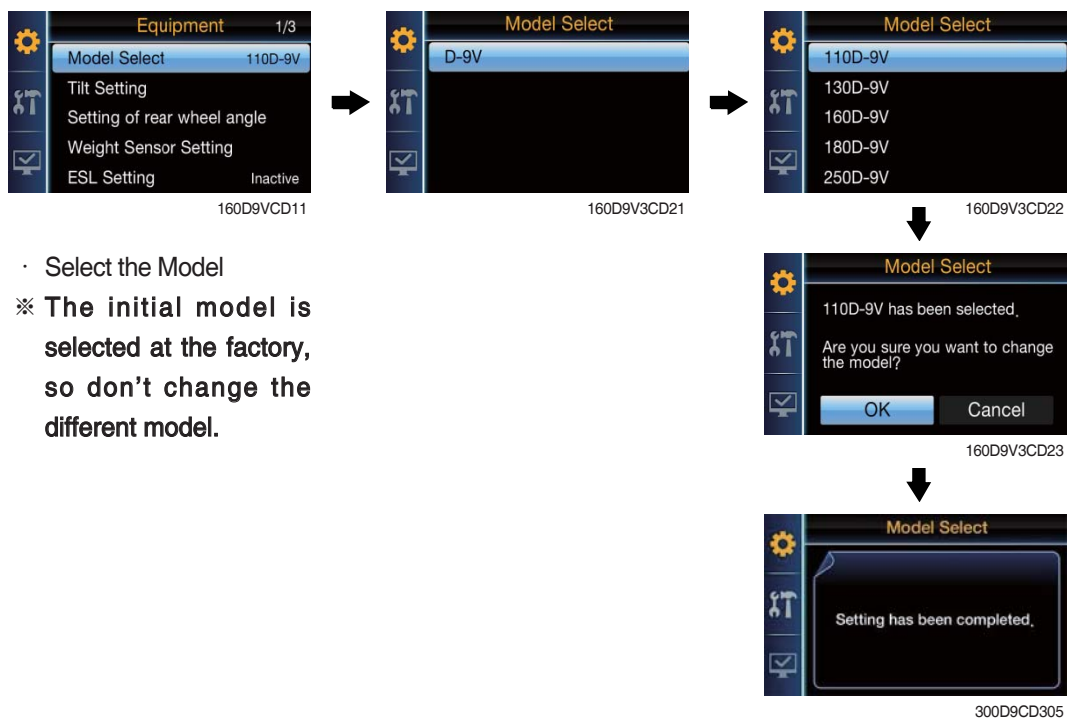
(3) Equipment

① Choose the equipment



- To enter the menu, you must input user password.
- Default password is '00000'
- You should set password by five to ten digit.

② Model select



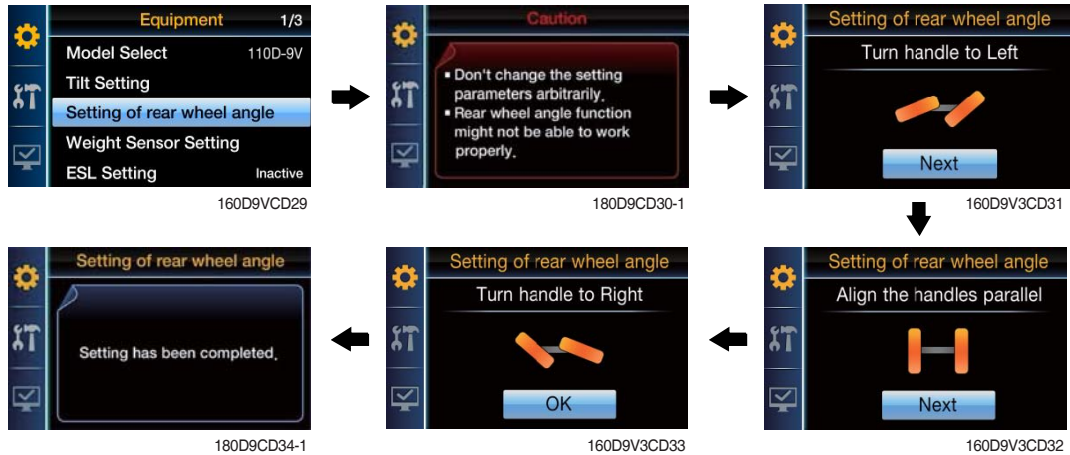
- Select the Model
- ※ **The initial model is selected at the factory, so don't change the different model.**

③ Tilt setting



- Set the offset about mast angle sensors and vehicle angle sensors.

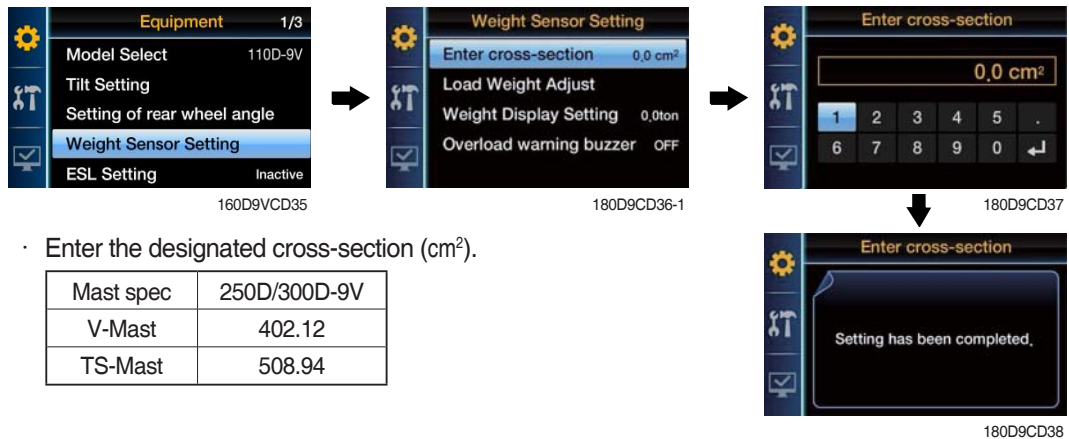
④ Setting for rear wheel angle



- The user revises a forklift truck steering angle.
- Display set to approve a condition.
 - Right set rear wheel calibration.
 - Center set rear wheel calibration.
 - Left set rear wheel calibration.

⑤ Weight sensor setting

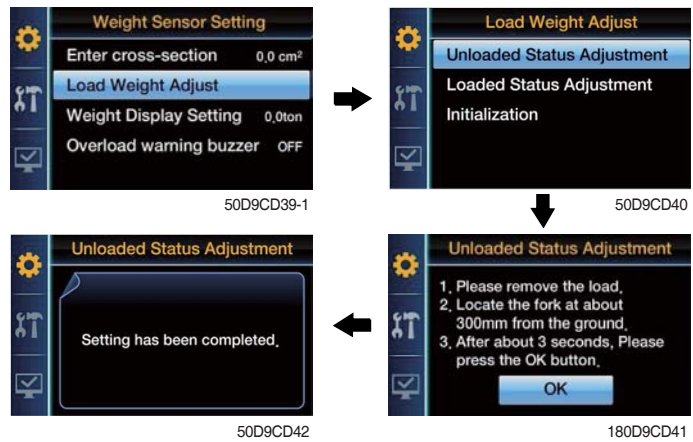
a. Cross-section



b. Load weight adjust

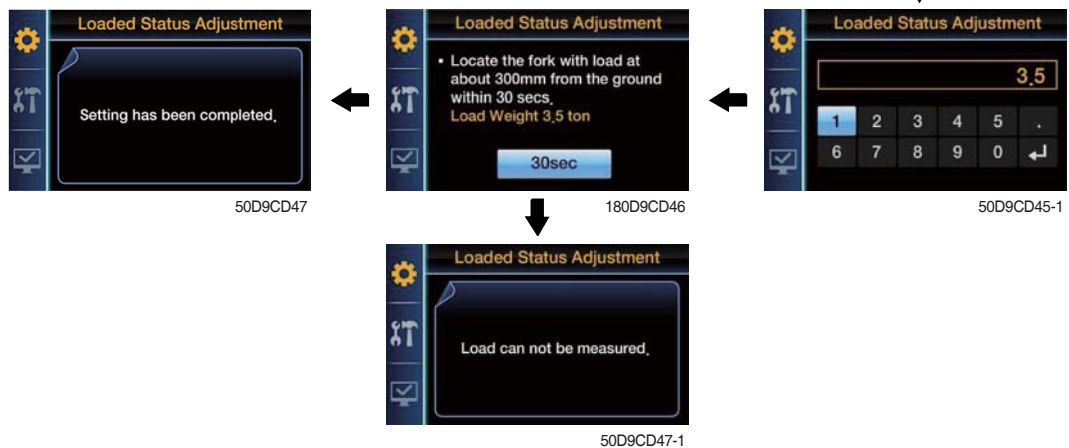
· Unloaded status adjustment

In the unloaded from the ground waiting 5 seconds after lift 30 cm, and tare ON.



· Loaded status adjustment

Loaded enter the weight.
 -> In the loaded from the ground waiting 5 seconds after lift 30 cm.
 -> Weight correction ON.





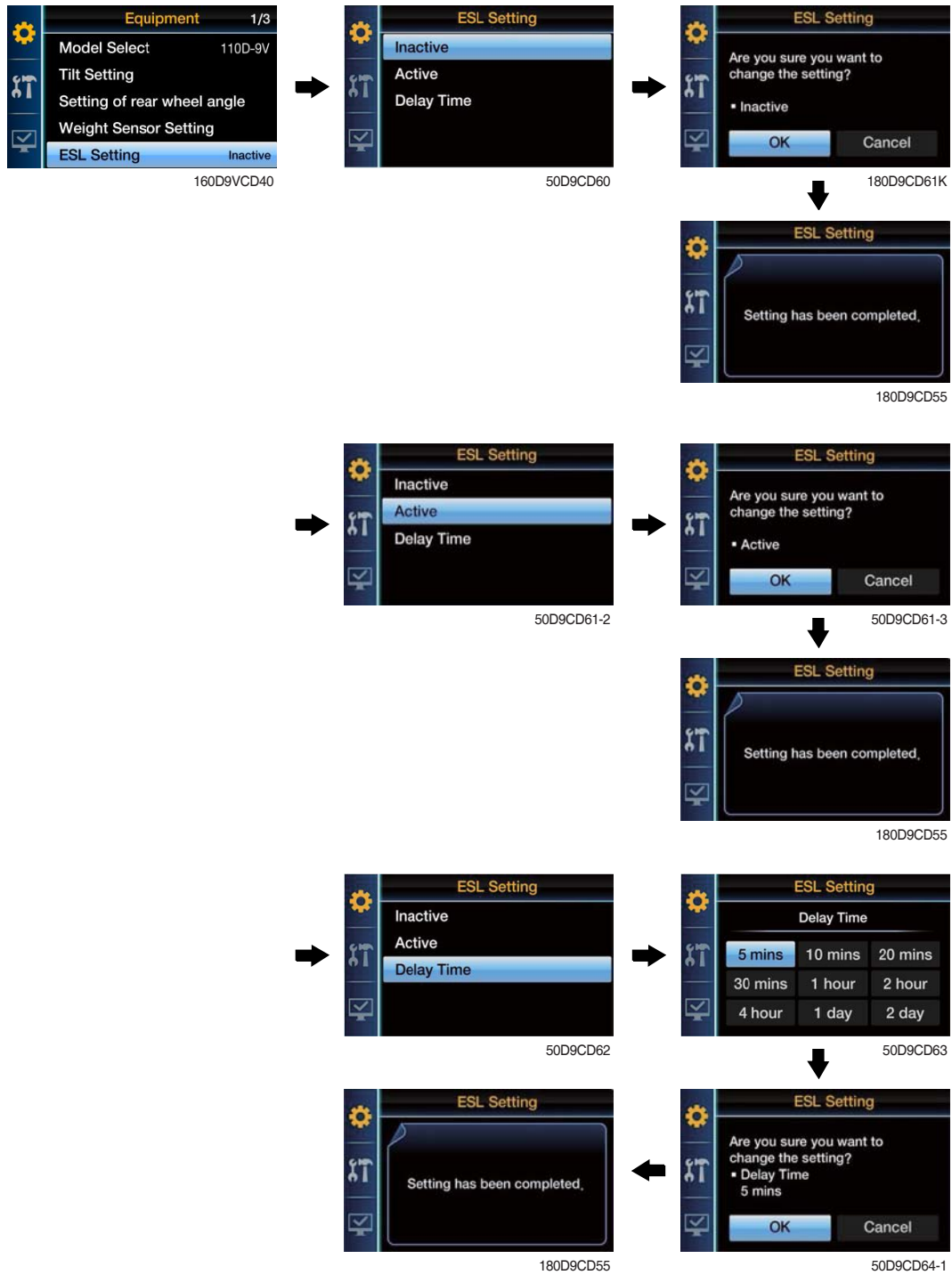
c. Weight display setting



d. Overload warning buzzer

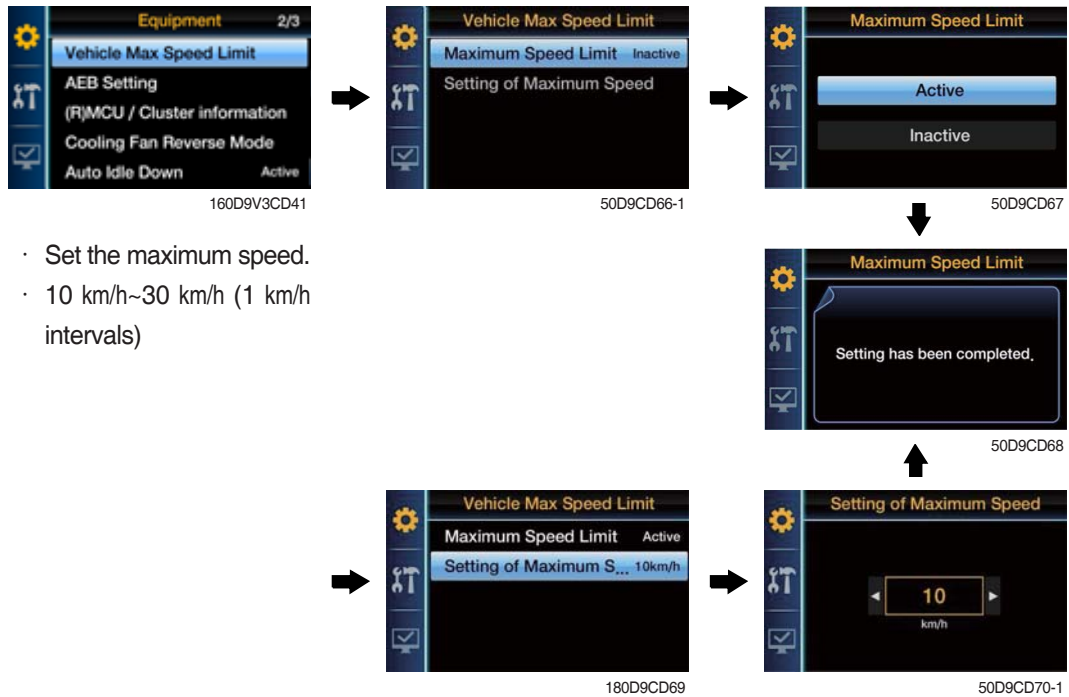


⑥ ESL setting



- Set ON/OFF function for using limitation of ignition and time for starting.
- Set time 5 minutes for starting :
In 5 minutes you can restart without password, but after 5 minutes, you should input password for starting.

⑦ Vehicle max speed limit



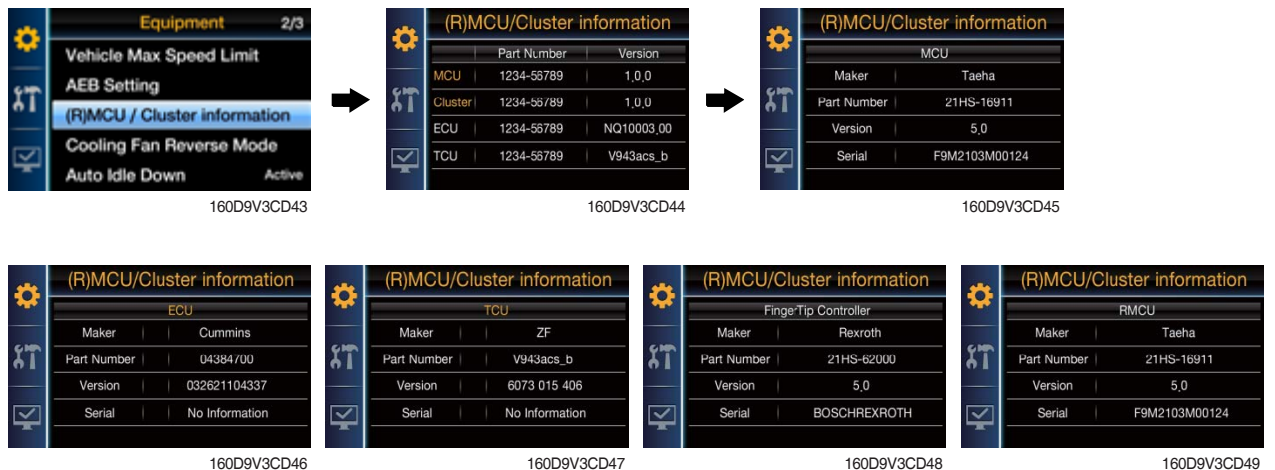
- Set the maximum speed.
- 10 km/h~30 km/h (1 km/h intervals)

⑧ AEB setting



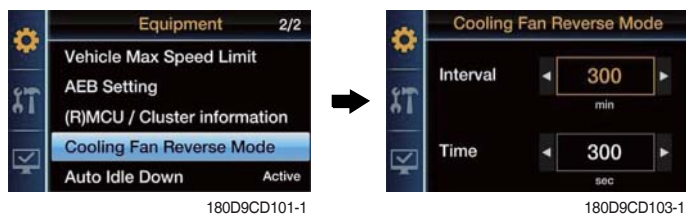
- Press OK button, then calibration will be started, for cancel, press Menu/ECS/Enter button.
- When it is finished (OK sign at gear box), Press Menu/ECS/Enter button.
- Start the engine : AEB start
- KEY ON : Brake pedal sensor calibration

⑨ (R) MCU / Cluster information



- Software version check for MCU/Cluster/RMCU.

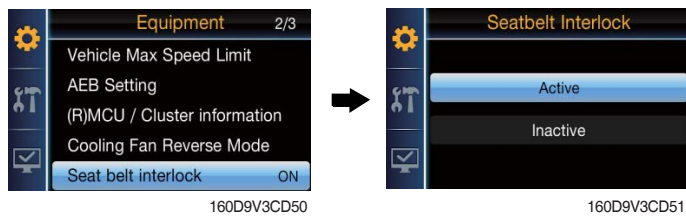
⑩ Cooling fan reverse mode



- Manual : The fan only rotate in reverse direction while you hold down the manual button.
- Automatic : The fan rotate in reverse direction at pre-set interval.
 - Interval : 30 minutes ~ 5 hours
 - Time : 30 seconds ~ 5 minutes

※ Refer to the page 7-60 for the cooling fan control switch.

⑪ Seat belt interlock (option)



- Turns on/off the seat belt interlock function.
- In the seat belt interlock option applied equipment, the menu is displayed only when the belt is fastened.

⑪ Finger tip setting (option)
a. Lever position setting



- Ability to set up the maximum Pull, Push (Min, Max) value and neutral value (Mid) of lever.
- Finger Tip lever set up about 0.5V~2.5V~4.5V.
You must be to move with actual Lever. (Unit V)
ex) Min 0.48, Mid 2.52, Max 4.52

b. Lever deadzone setting

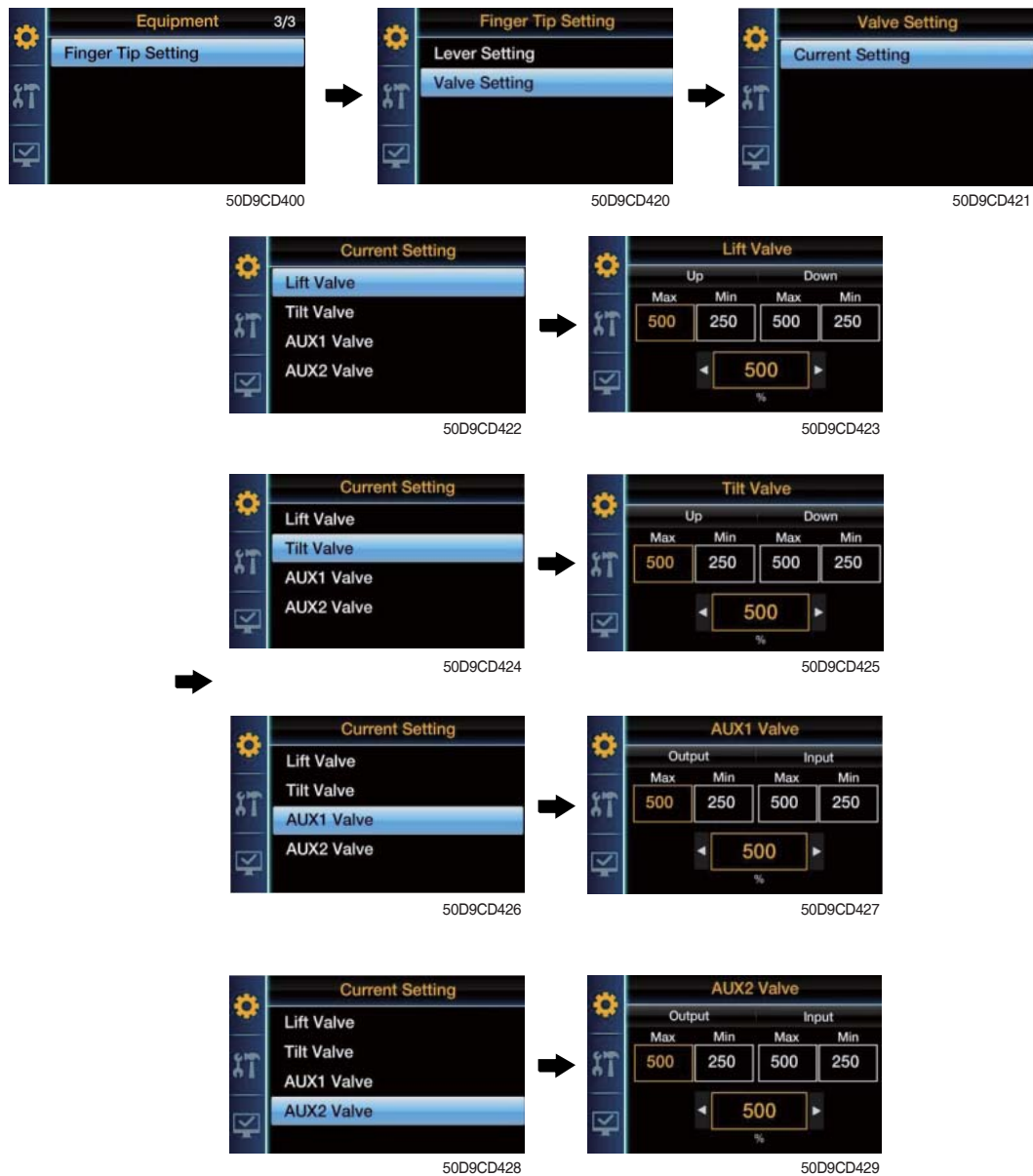


· Lever deadzone

- Ability to prevent the valve output due to a tiny error of the neutral Lever state (2.5V)
- It is not set below 0.20.

ex) If you set up the Upper : 0.26, Lower : 0.24, Lever operating range will be
 Upper zone : 2.76V (2.5+0.26) ~ 4.5V (Lever Max value)
 Lower zone : 2.26V (2.5-0.24) ~ 0.5V (Lever Min value)

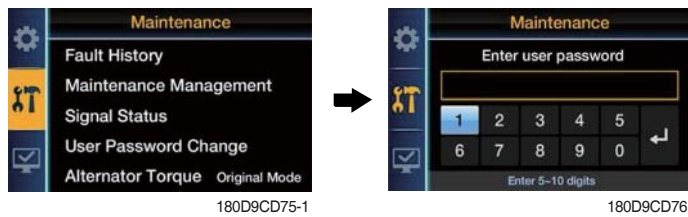
c. Valve setting



- **Current Setting** : Current setting for input each Valve Coil, it is to set up each maximum value of movements according to the current value (unit, %)
 ex) If the Max value increase, the maximum speed will also increase.
 If the Min value increase, the minimum speed will also increase.

(4) Maintenance

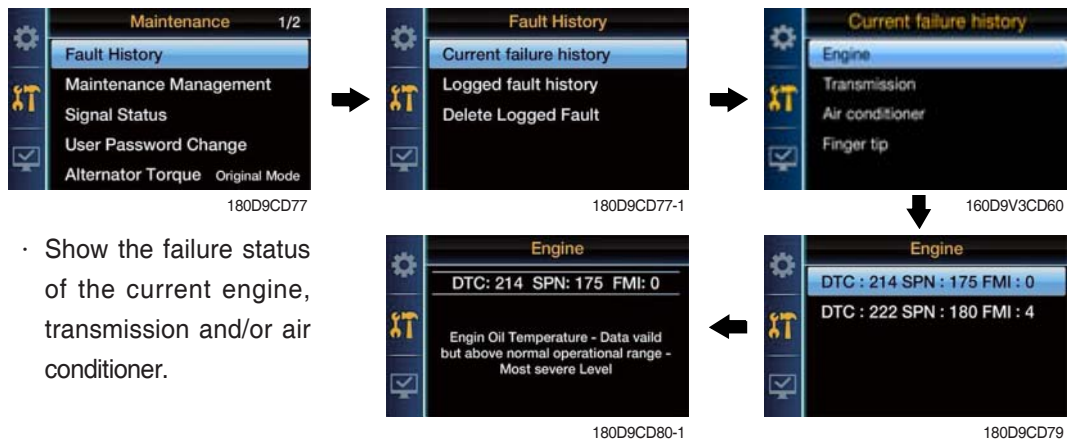
① Choose the maintenance



- To enter the Menu, you must input user password.
- Default password is '00000'
- You should set password by five to ten digit.

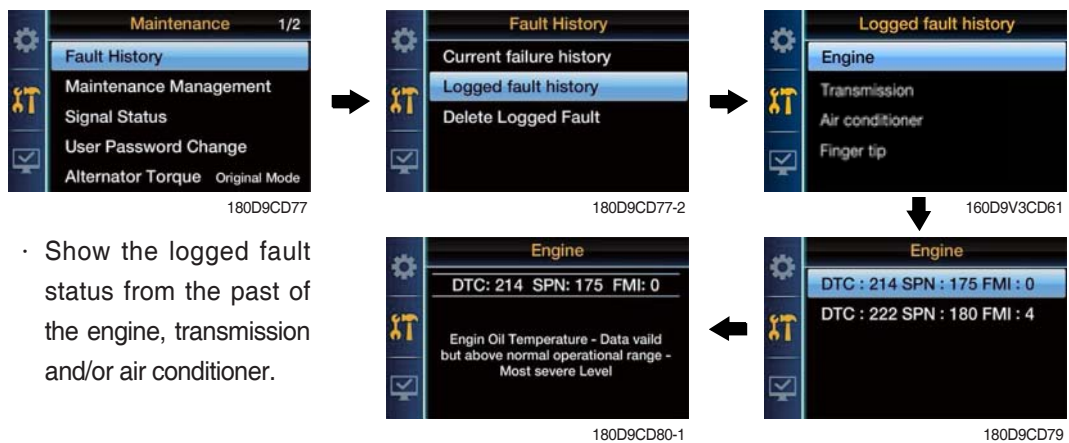
② Failure history

a. Current failure history



- Show the failure status of the current engine, transmission and/or air conditioner.

b. Logged fault history

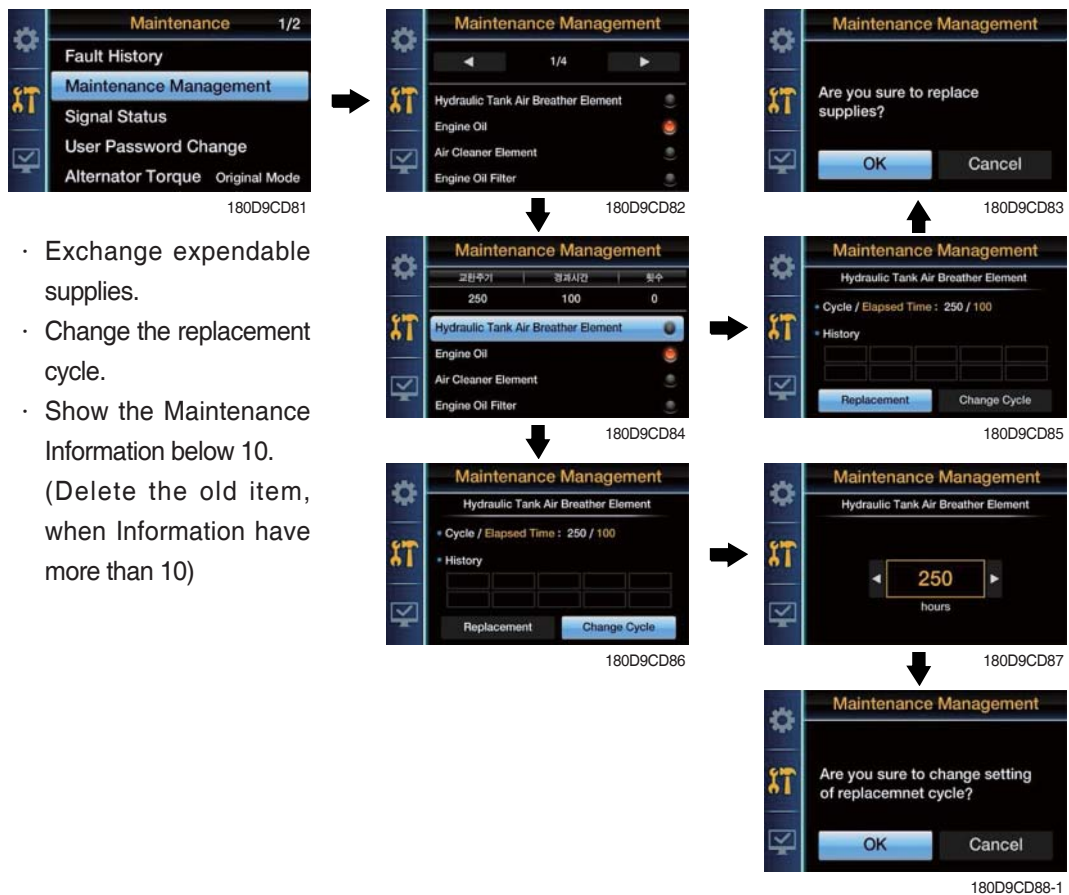


- Show the logged fault status from the past of the engine, transmission and/or air conditioner.

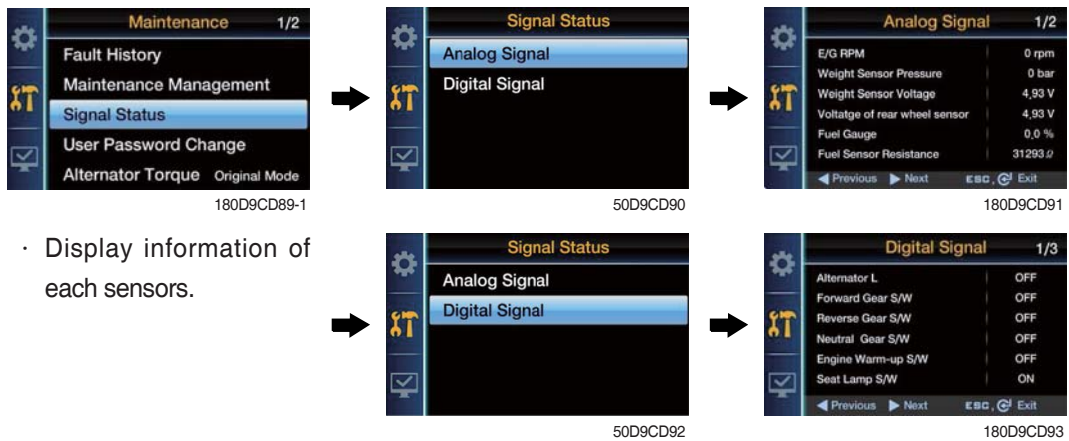
c. Delete logged fault



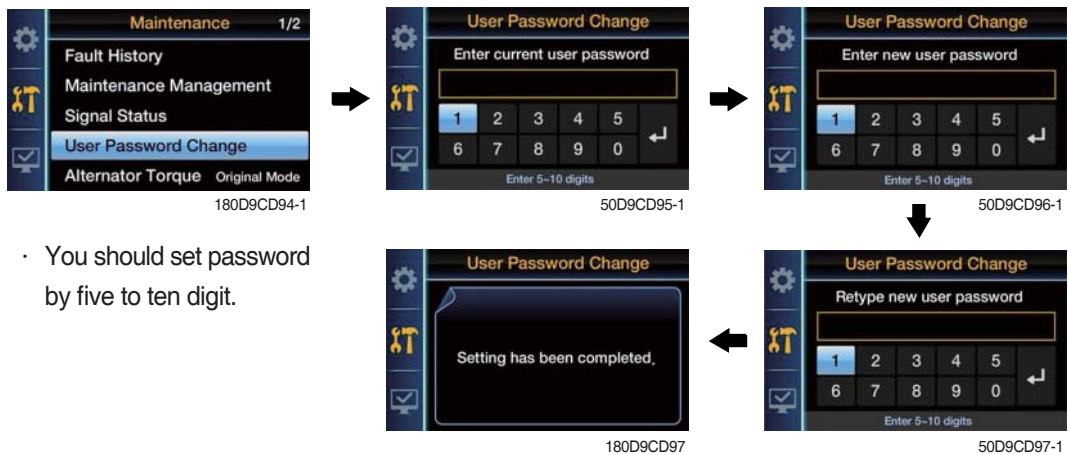
③ Maintenance management



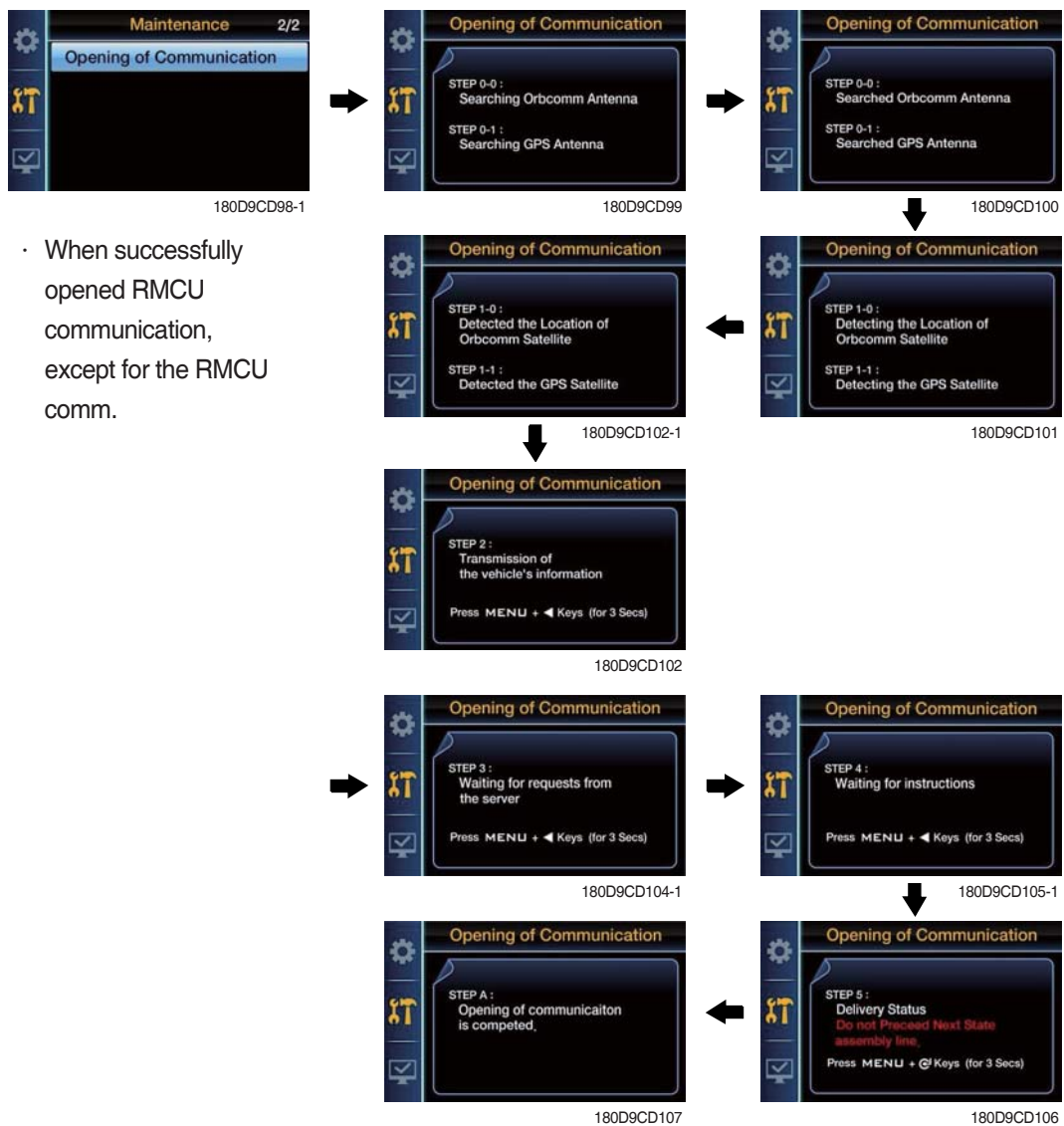
④ Signal status



⑤ User password change



⑥ Opening of communication



(5) Display setting

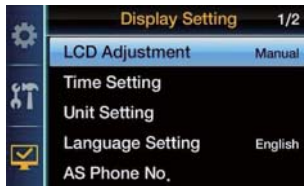
① Choose the display setting



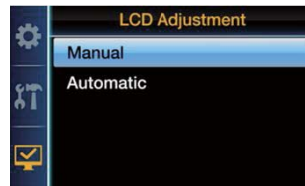
180D9CD108

- No password is required.

② LCD adjustment



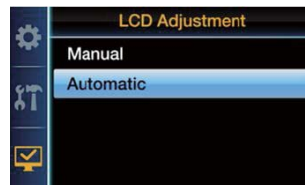
180D9CD109



50D9CD110



180D9CD111



50D9CD112



180D9CD113

- Manual : Manual setting for LCD brightness.
- Automatic : Automatic control of LCD brightness as set level of Day/Night.
- Setting day time : Set the time for daylight.
(If you set the time for daylight, the rest time will be night.)

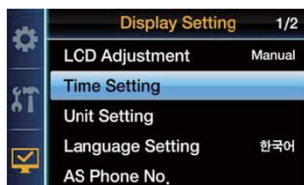


180D9CD114



180D9CD115

③ Time setting



50D9CD116



180D9CD117

- Set the time (Year, Month, Day, Hour, Minute, AM/PM).

④ Unit setting



- Change units of temperature / speed / wight / pressure.

⑤ Language setting



- Set the language used by your device.
(13 Multiple language)

⑥ A/S phone number



- Check and change of contact information for customer service.

⑦ ESL password change



- You should set password by five to ten digit.

⑧ Maintenance management



- Show the maintenance information (replacement cycle, elapsed time, change count, alarm information).

4.TRANSMISSION MESSAGE DISPLAY

1) FUNCTION

The display can be used with the gear selector (DW-3). It indicates speed and driving direction. When driving in the automatic mode, a bar indicator gives additionally also information about the selected driving range; The automatic range is symbolized by arrows above and below the bar indicator. In case of possible errors in the system, a wrench appears on the display, combined with indication of the error number. Also sporadically occurring errors can be indicated.

Transmission message display



180D93ACD33

※ If it happens error codes, consult with Hyundai service center to repair the fault.

2) DISPLAY DURING AEB-MODE

Symbol	Meaning	Remarks
K1.....K3 KV, KR	Calibrating clutch K1...K3, KV or KR resp.	
_and Kx	Wait for start, initialization of clutch Kx, x : 1, 2, 3, V, R	
≡and Kx	Fast fill time determination of clutch Kx	
=and Kx	Compensating pressure determination of clutch Kx	
OK	Calibration for all clutches finished	Transmission stays in neutral, you have to restart the TCU(ignition off/on) after removing AEB-Starter
STOP	AEB canceled(activation stopped)	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
STOP and Kx	AEB stopped, clutch Kx can't be calibrated	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
Spanner and Kx	Kx couldn't be calibrated, AEB finished	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
△E	Engine speed too low → raise enging speed	
▽E	Engine speed too high → lower enging speed	
△T	Transmission oil temperature too low → heat up transmission	
▽T	Transmission oil temperature too high → cool down transmission	
FT	Transmission temperature not in defined range during calibration	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
FB	Operating mode not NORMAL or transmission temperature sensor defective or storing of Calibrated values to EEPROM-has failed.	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
FO	Output speed_not_zero	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
FN	Shift lever not in Neutral position	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
FP	Park brake_not_applied	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
STOP	AEB-Starter was used incorrect or is defective. Wrong device or wrong cable used.	Transmission stays in neutral, you have to restart the TCU(ignition off/on)

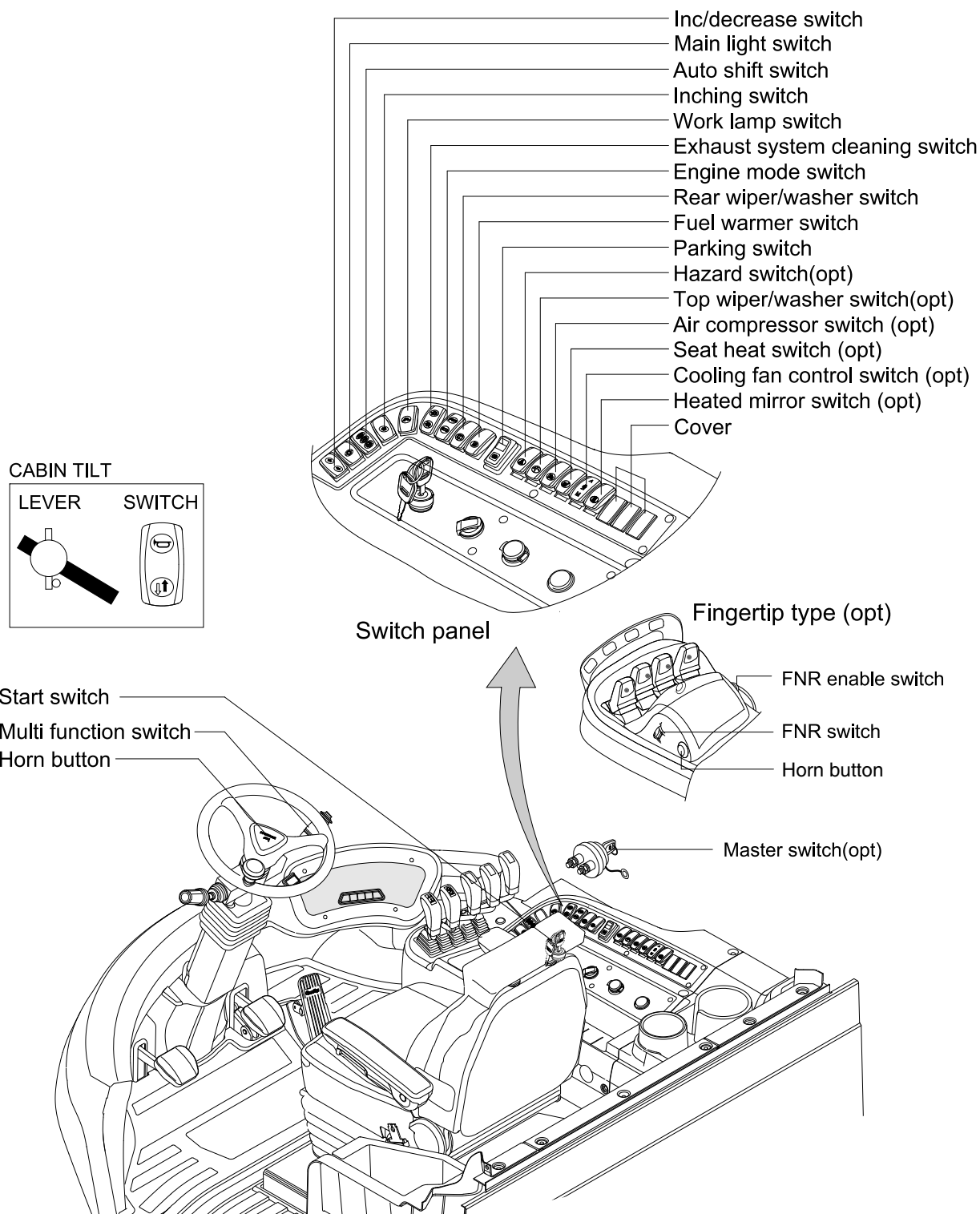
3) INITIALIZING THE INCHING SENSOR

- (1) Start engine after parking the truck on flat floor and blocking wheels.
- (2) Release parking brake and keep neutral gear shift.
- (3) Adjust the inching setting bolt so that the regular voltage is supplied to inching sensor when operating the pedal.
 - ※ Regular voltage : Before pedal operation ($1.0 \pm 0.3V$)
After pedal operation ($3.3 \pm 0.3V$)
- (4) Stop the engine and then just KEY ON. (Release parking brake, keep neutral gear)
- (5) Connect the AEB STARTER to the T/M controller.
- (6) Go into the AEB setting in the cluster menu. (refer to page 7-39)
- (7) Push OK button and execute as below.
- (8) If display shows "▲IP", release "OK"
- (9) After the successful completion, it displays "OK".
- (10) In case of abnormal running, it may display "STOP" with the appropriate error code.
- (11) After troubleshooting, start the truck again to repeat above.
 - ※ Above works are to be done with the parking brake released, so truck's wheels must be blocked for safety.

4) DISPLAY DURING INCHPEDAL CALIBRATION

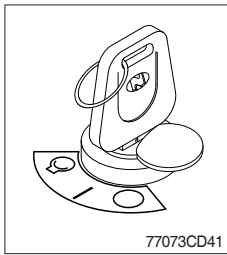
Symbol	Meaning	Remarks
▼IP	Push down the pedal slowly until endposition is reached and hold this position	
▲IP	Release the pedal slowly until endposition is reached	
IP blinkt	A problem occurred, release the pedal slowly until endposition is reached	If the expected endposition could not be reached, release the pedal and try again
OK	Finished inchpedal calibration successful	
FN and Stop	Shift lever not in Neutral position	Calibrations is aborted
FS and Stop	Sensor supply voltage AU1 is out of the specified range	Calibrations is aborted
FO and Stop	Outputspeed_not_zero	Calibrations is aborted
SL and Stop	Sensor voltage below specified range	Calibrations is aborted
SU and Stop	Sensor voltage below specified range	Calibrations is aborted
IL and Stop	Sensor position for released pedal out of specified range	Calibrations is aborted
IU and Stop	Sensor position for released pedal out of specified range	Calibrations is aborted
TO and Stop	Time-out calibration, pedal not moved after calibration start	Calibrations is aborted
DL and Stop	Angle between pedal positions released and pressed to small	Calibrations is aborted
DU and Stop	Angle between pedal positions released and pressed to small	Calibrations is aborted
FI and Stop	Sensor signal 1 and 2 don't match together	Calibrations is aborted

5. SWITCHES



160D9V3CD06

1) START SWITCH



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

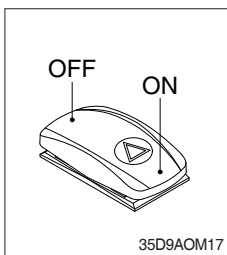
- ○ (OFF) : None of electrical circuits activate.
- | (ON) : All the systems of truck operate.
- ○ (START) : Use when starting the engine.

Release key immediately after starting.

※ **Before starting, set gear selector lever at NEUTRAL and place parking brake switch to LOCK position.**

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

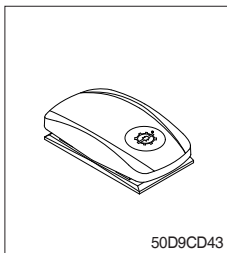
2) HAZARD SWITCH (OPTION)



(1) Use for parking, or loading truck.

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

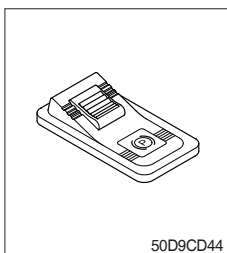
3) INCHING SWITCH



(1) If this switch is pressed, inching operation is applied to inching pedal.

(2) Also, inching lamp on the cluster is illuminated.

4) PARKING BRAKE SWITCH

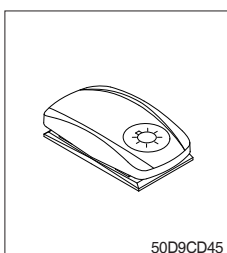


(1) This switch is used to parking brake lock or release.

(2) If this switch is pressed, the parking brake is applied and the warning lamp on the cluster will come ON.

※ **When operating the gear selector lever, be sure to release the parking brake. If the truck is operated with the parking brake engaged, the brake will overheat and may cause the brake system to go out of order.**

5) MAIN LIGHT SWITCH



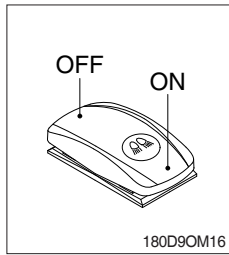
(1) This switch is used to operate the head light by one steps.

① First step : Clearance lamp and cluster illumination lamp come ON. Also, all of the pilot lamps of switches come ON.

② Second step : Head lamp comes ON.

※ **Refer to page 7-58 for head lamp.**

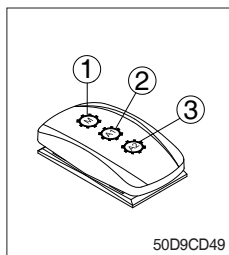
6) WORK LAMP SWITCH



(1) This switch is used to operate the work lamps by two steps.

- ① First step : Front work lamp comes ON.
- ② Second step : Rear work lamp comes ON.

7) AUTO SHIFT SWITCH



(1) Manual mode (①)

Press the top of the switch for the manual mode of the autoshift function. The operator selects the desired speed and the desired direction in the manual mode with the gear selector lever.

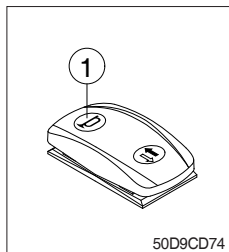
(2) Automatic 1st mode (②)

Place the switch in the middle position for the autoshift function changing from 1st to 3rd gear shift mode.

(3) Automatic 2nd mode (③)

Press the bottom of the switch fully for the autoshift function changing from 2nd to 3rd gear shift mode.

8) CABIN TILT SWITCH



(1) Horn (🔊)

By pressing position ①, the horn sounds and by releasing, the horn stops.

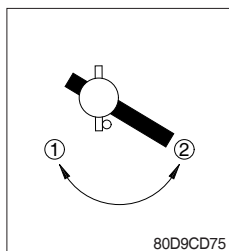
▲ Sound the horn to warn near by personnel, before tilting the cabin.

(2) Tilting of the cabin (⬆, ⬇)

Press the cabin tilt switch in order to tilt the cabin to right side or return to original location.

※ Refer to operator's manual page 7-16 for the tilting method of the cabin.

9) HAND PUMP LEVER

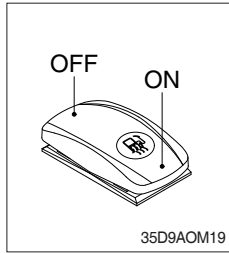


(1) This lever is used when tilting the cabin.

(2) Turn the hand pump lever to clockwise direction (①), the cabin shall be tilted to right side by the cabin tilt switch.

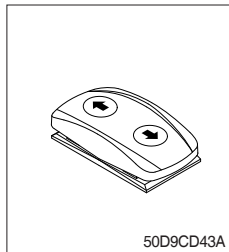
(3) Turn the hand pump lever to counterclockwise direction (②), the cabin shall be returned to original location by the cabin tilt switch.

10) FUEL WARMER SWITCH



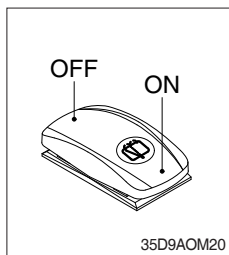
- (1) This switch is used to heat the fuel of pre-heater.

11) INC/DECREMENT SWITCH



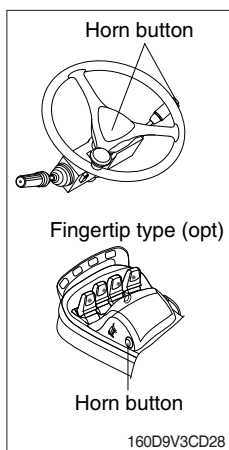
- (1) When engine running, the low idle rpm of engine increase or decrease by 25 rpm by operating this switch.
(2) Engine low idle rpm returns to normal value when engine restarted.

12) TOP WIPER AND WASHER SWITCH (OPTION)



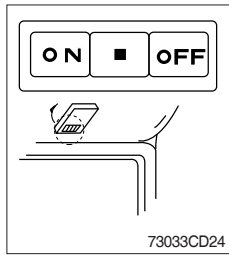
- (1) This switch is used to operate the wiper and washer on the top of the cab.
(2) The washer liquid is sprayed and the wiper is operated only while pressing this switch.

13) HORN BUTTON



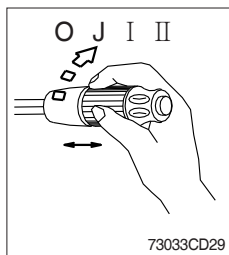
- (1) If you press the button on the top of the multifunction switch, the center of the steering wheel and the button on the fingertip body (option), the horn will sound.

14) CAB LAMP SWITCH



- (1) This switch turns ON the cab room lamp.

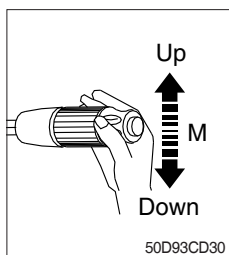
15) MULTI FUNCTION SWITCH



- (1) Front wiper and washer switch

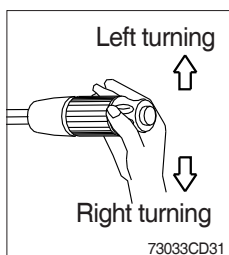
- ① When the switch is in J position, the wiper moves intermittently.
- ② When placed in I or II position, the wiper moves continuously.
- ③ If you push the grip of the lever, washer liquid will be sprayed and the wiper will be activated 2-3 times.

※ **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 the tank is 1 liter.**



- (2) Dimmer switch

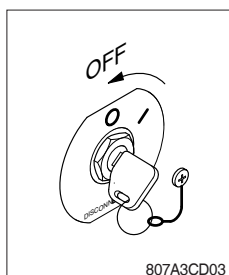
- ① This switch is used to turn the head light direction.
- ② Switch positions
 - Up : To flash for passing
 - Middle : Head light low beam ON
 - Down : Head light high beam ON
- ③ If you release the switch when it's in up position, the switch will return to middle.



- (3) Turning signal switch

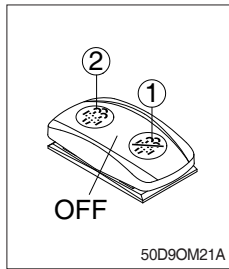
- ① This switch is used to warn or signal the turning direction of the truck to other vehicles or equipment.
- ② Push the lever up for turning left, pull the lever down for turning right.

16) MASTER SWITCH (OPTION)



- (1) This switch is used to shut off the entire electrical system.
When the truck is not operated for a long time, turn OFF the master switch for the safety purpose.
- (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. Engine and electrical system damage could result.**

17) EXHAUST SYSTEM CLEANING SWITCH



(1) This switch is used to select the cleaning function of the exhaust system.

(2) Inhibit position (①)

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

(3) OFF position

This position will initiate a automatic exhaust system cleaning when needed.

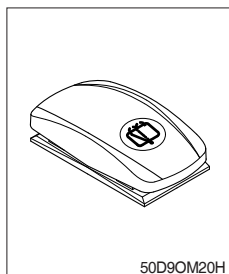
(4) Manual position (②)

- ① This position will only initiate a manual exhaust system cleaning and the exhaust system cleaning lamp is illuminated.
- ② HEST lamp will be illuminated during the entire exhaust system cleaning.

※ Refer to the page 7-26 for details.

※ This switch return to the OFF position when released the manual position (②).

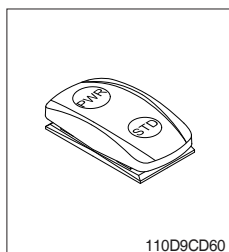
18) REAR WIPER/WASHER SWITCH



(1) This switch is used to operate the wiper and washer on the rear of the cab.

(2) The washer liquid is sprayed and the wiper is operated only while pressing this switch.

19) ENGINE MODE SWITCH



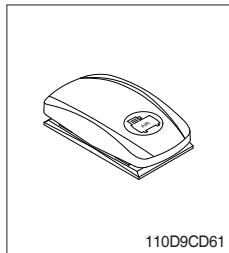
(1) This switch offers two selectable operating mode.

The operator can adjust the truck's performance with this selection switch.

(2) Function

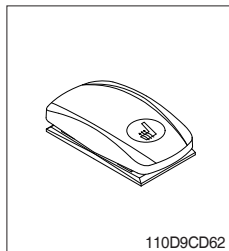
- ① STANDARD MODE : This mode provides maximum fuel efficiency for general loading.
- ② POWER MODE : This mode provides maximum power output for heavy loading or hill climb.

20) AIR COMPRESSOR SWITCH (option)



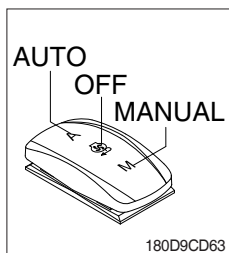
(1) This switch is used to activate the air compressor.

21) SEAT HEAT SWITCH (option)



(1) This switch is used to heat the seat.

22) COOLING FAN CONTROL SWITCH (option)



(1) This switch use to control the cooling fan.

(2) This switch has three positions.

- AUTO : The fan automatically work in reverse according to set up interval and time of the cooling fan reverse mode.

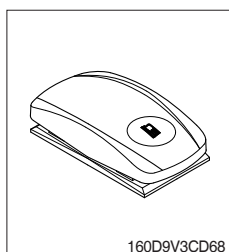
※ Refer to page 7-40 to set of the cluster.

- OFF : Only forward rotation is possible.
- MANUAL : The fan rotates reverse only while pressing this position.

(3) If release the switch, return to the OFF position.

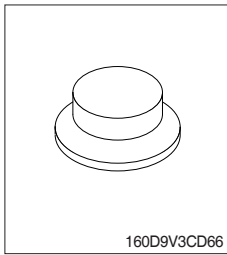
※ The reverse rotation pilot lamp lights up on the area of the warning and pilot lamp of the LCD when the cooling fan is operated to the reverse rotation.

23) HEATED MIRROR SWITCH (option)



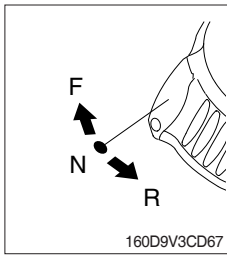
(1) This switch is used to heat the mirror.

24) FNR ENABLE SWITCH (option)



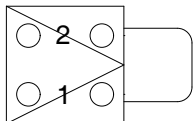
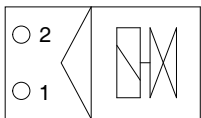
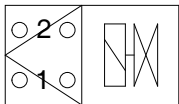
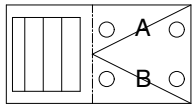
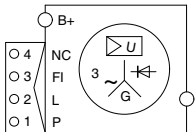
- (1) This switch makes FNR to enable when the fingertip is equipped as an option.

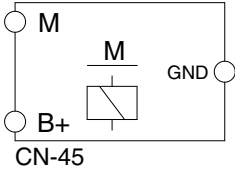
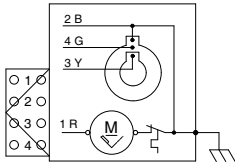
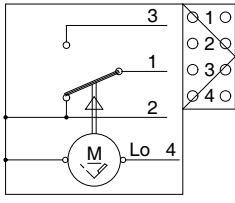
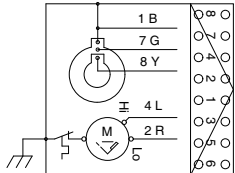
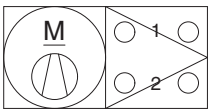
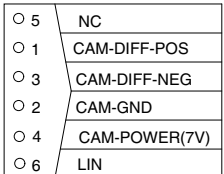
25) FNR SWITCH (option)



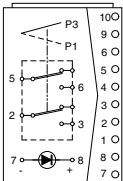
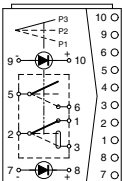
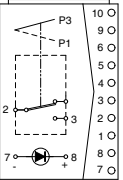
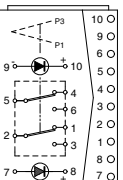
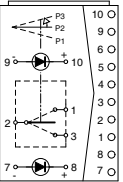
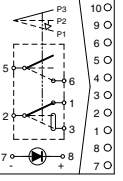
- (1) This switch changes travel direction of truck only when the FNR enable switch is selected ON.
- F : Truck moves forward
 - N : Neutral position
 - R : Truck moves backward

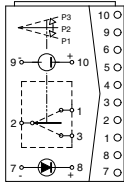
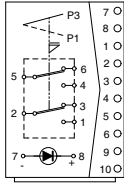
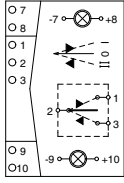
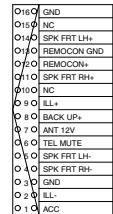
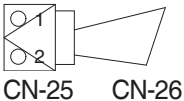
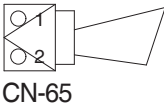
GROUP 6 ELECTRICAL COMPONENT SPECIFICATION

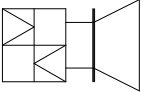
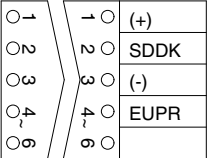
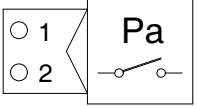
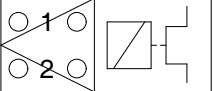
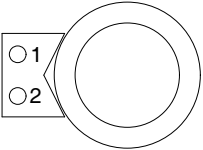
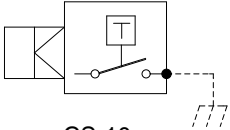
Part name	Symbol	Specifications	Check
Battery		12V × 80Ah (2EA)	※ When checking the battery charging indicator, Green : Normal condition Black : Discharge condition Transparency : Change
Fusible link	 CN-60 CN-95	CN-60 : 24V 45A CN-95 : 24V 45A	※ Check disconnection Normal : 0Ω (Connect ring terminal and check resistance between terminal 1 and 2)
EPPR valve (Pump, Fan)	 CN-154 CN-155 CN-156 CN-157	24V 300A	※ Check resistance About 24Ω
Solenoid valve (Parking, Attach cut off, Side shift selector, DEF tank heater, DEF dosing module)	 CN-71 CN-130 CN-131 CN-132 CN-J27	24V 1.2A	※ Check LED lamp. ※ Check resistance About 24Ω
Heater (Seat, DEF line heater 1, 2, 3)	 CN-381 CN-382 CN-383 SEAT	24V	※ Check resistance Normal : About 200Ω (for terminal 1-3) 0Ω (for terminal 2-4)
Alternator	 CN-74	24V 70A	※ Check voltage Normal : 24~28V

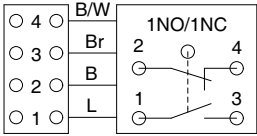
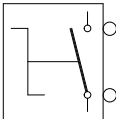
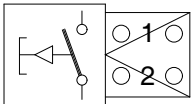
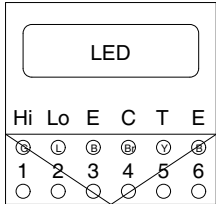
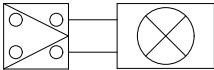
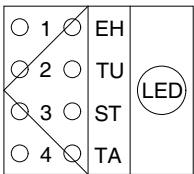
Part name	Symbol	Specifications	Check
Start motor	 CN-45	DENSO 24V 7.8kW	※ Operating or not
Top wiper motor	 CN-70	24V 1.5A 1-speed Auto parking	-
Rear wiper motor	 CN-102	24V 1A 1-speed Auto parking	-
Front wiper motor	 CN-102	24V 1A 2-speed Auto parking	-
Motor (Washer pump, Condensor fan)	 CN-22 CN-83 CN-103 CN-202	24V 2.5A	※ Check contact Normal : 26.4Ω (For terminal 1-2)
Camera	 CN-249 CN-403 CN-404 CN-405	24V 2.5W Signaling : NTSC Angle of view : 145°	-

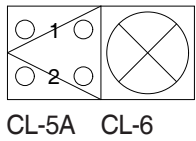
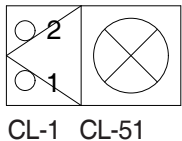
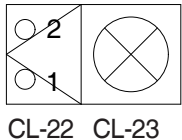
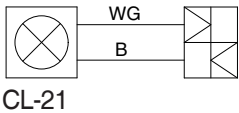
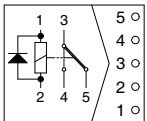
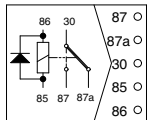
Part name	Symbol	Specifications	Check
Accel pedal	CN-144	5V, hall sensor	※ Check voltage 0.5~3.9V (2-1)
Resistor	CN-98	3W 300Ω	※ Check resistance Normal : 300Ω (A-B)
RMS antenna	CN-251	3.0~5.0V 20mA	-
Fuel warmer	CN-96	24V 15A	※ Check resistance Abnormal : ∞Ω
DC/DC converter	CN-138	24V 10A Output voltage : 13±1VDC	※ Check resistance Normal : A fewΩ (1-2, 1-3)
Start switch	CS-2	DC 24V	※ Check contact OFF : ∞Ω (For each terminal) ON : 0Ω (For terminal 1-3) ∞Ω (For terminal 1-5) START : 0Ω (For terminal 1-3 and 1-5)

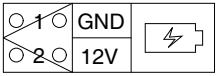
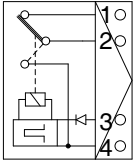
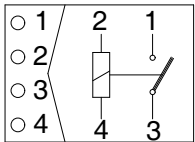
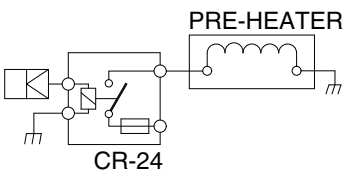
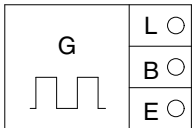
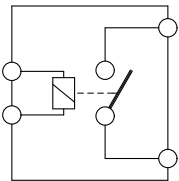
Part name	Symbol	Specifications	Check
Switch (Hazard, Inching)	 CS-41 CS-42	24V 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-3, 5-6)
Switch (Auto/manual)	 CS-59	24V 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-3, 5-6)
Switch (Air compressor)	 CS-99	24V 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-3)
Switch (Power/ std mode)	 CS-79	24V 8A	※ Check contact Normal ON : 0Ω (For terminal 2-3, 5-6) $\infty \Omega$ (For terminal 1-2, 4-5) OFF : $\infty \Omega$ (For terminal 2-3, 5-6) 0Ω (For terminal 1-2, 4-5)
Switch (SCR)	 CS-100	24V 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-1, 2-3)
Switch (Main light, wiper washer, work lamp)	 CS-3 CS-21 CS-39 CS-103	24V 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-3, 5-6) 0Ω (For terminal 2-1)

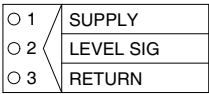
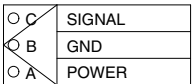
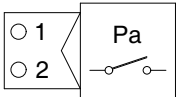
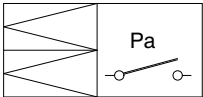
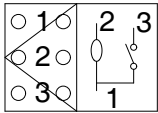
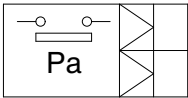
Part name	Symbol	Specifications	Check
Switch (Inc/dec)	 CS-64	24V 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-1, 2-3)
Switch (Parking)	 CS-17	24V 8A	※ Check contact Normal ON: 0Ω (For terminal 1-2, 4-5) $\infty \Omega$ (For terminal 2-3, 5-6) OFF: $\infty \Omega$ (For terminal 1-2, 4-5) 0Ω (For terminal 2-3, 5-6)
Cab tilt switch (Non-locking type)	 CS-77	24V 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-1, 2-3)
Radio/USB player	 CN-27	12~32V 20W x 2	※ Check resistance Power ON : $4 \Omega + 4 \Omega$ (For terminal 1-6, 4-8)
Horn	 CN-25 CN-26	20~28V, 1.5A 100~115dB (at 25V, 2m)	※ Check operation Supply power (24V) to each terminal and connect ground.
Back up alarm	 CN-65	18~32V, 0.5A 115±3dB (at 1m)	※ Check operation Supply power (24V) to each terminal and connect ground.

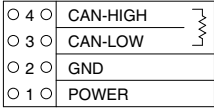
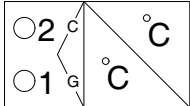
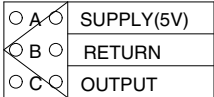
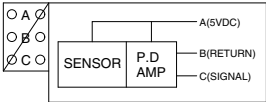
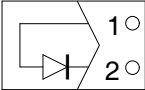
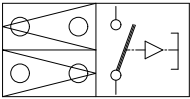
Part name	Symbol	Specifications	Check
Speaker	 CN-23(LH) CN-24(RH)	4Ω 20W	※ Check resistance Normal : 50Ω
TM diagoustic connector	 CN-51	-	-
Receiver dryer	 CN-29	N.O type	※ Check resistance Normal : Ω
Air conditioner compressor	 CN-30	24V 79W	※ Check contact Normal : 13.4Ω
12V socket	 CN-139	12V 10A Rated ampere	※ Check resistance Normal : A few Ω (1-2)
Brake temp switch	 CS-10	N.O type	※ Check resistance Normal : ∞Ω

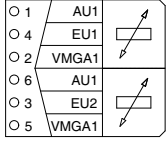
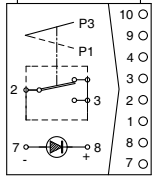
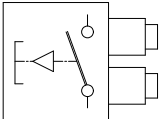
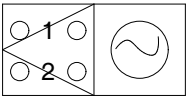
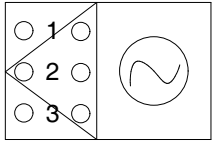
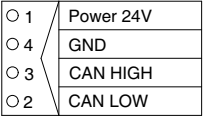
Part name	Symbol	Specifications	Check
Cabin tilt switch	 CS-74	24V 8A	※ Check contact S/W open : $\infty \Omega$ (For terminal NO-COM) : 0Ω (For terminal NC-COM) S/W closed : 0Ω (For terminal NO-COM) : $\infty \Omega$ (For terminal NC-COM)
Master switch	 CN-47	Continuous Capacity : 180Amp Push in capacity : 1000Amp	※ Check contact OFF : $\infty \Omega$
Seat switch		24V 8A	※ Check contact OFF : $\infty \Omega$
Head lamp	 CL-3 CL-4	24V LED	※ Check disconnection Normal : $\infty \Omega$ (6-2, 4-2, 3-2, 1-2)
Beacon lamp	 CL-7	24V LED	※ Check disconnection Normal : A few Ω Abnormal : $\infty \Omega$
Rear combination lamp	 CL-15A CL-15B CL-16A CL-16B	24V LED 24V LED	※ Check disconnection Normal : A few Ω

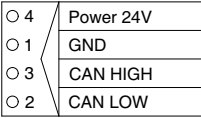
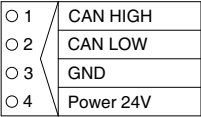
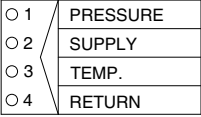
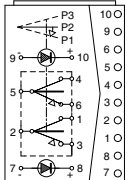
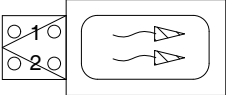
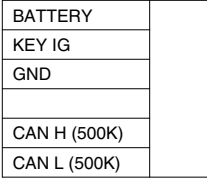
Part name	Symbol	Specifications	Check
Mast work lamp	 CL-5A CL-6	24V LED	※ Check disconnection Normal : A few Ω
Room lamp	 CL-1 CL-51	24V 10W	※ Check resistance Normal : A few Ω
Rear work lamp	 CL-22 CL-23	24V LED	※ Check resistance Normal : A few Ω
License lamp	 CL-21	24V 10W	※ Check resistance Normal : A few Ω
Relay (5 pin)	 CR-4 CR-5 CR-26 CR-36 CR-38 CR-39 CR-42 CR-50 CR-52 CR-54 CR-56 CR-57 CR-61 CR-62 CR-63 CR-71 CR-72	24V 3-4 : 15A (85°C) 3-5 : 10A (85°C)	※ Check resistance Normal : 0 Ω (For terminal 3-4) : $\infty \Omega$ (For terminal 3-5)
Relay (5 pin)	 CR-49 CR-58 CR-59	24V 30-87 : 20A 30-87a : 15A	※ Check resistance Normal : 0 Ω (For terminal 30-87a) : $\infty \Omega$ (For terminal 30-87)

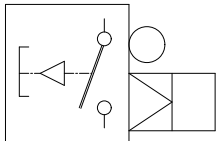
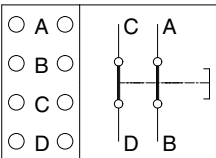
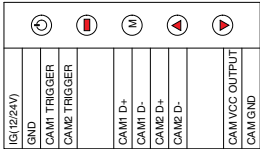
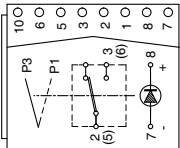
Part name	Symbol	Specifications	Check
USB charger	 CN-229	12V	—
Int wiper relay	 CR-6	24V 5A Operating time : 2.5 ± 1 sec	※ Check resistance Normal : 0Ω (FFor terminal 1-2) : $\infty \Omega$ (FFor terminal 1-3)
Start relay	 CR-23	24V 300A	※ Check resistance Normal : 10Ω (FFor terminal 2-4) : $\infty \Omega$ (FFor terminal 1-3)
Preheat relay	 CR-24	24V 200A Exciting current : 2.3A	※ Check resistance Normal : 10Ω (FFor terminal coil) : 0Ω (Between ring term)
Flasher unit	 CR-11	24V 85 ± 10 C/M 50dB	-
Battery relay	 CR-1	Rated load 24V 100A (continuity) 1000A (30 seconds)	※ Check coil resistance (M4 to M4) Normal : About 50Ω ※ Check contact Normal : $\infty \Omega$

Part name	Symbol	Specifications	Check
Coolant level switch	 CD-96	4.75~5.25V 12.5mA	-
Pressure switch (Parking, brake fail)	 CD-3 CD-26	N.C type	※ Check contact Normal : 0Ω (CLOSE)
Pressure switch (Wif, T/M filter)	 CD-35 CD-75	N.O type	※ Check contact Normal : ∞Ω (OPEN)
Air cleaner pressure switch	 CD-10	Pressure : 635mmH ₂ O (N.O type)	※ Check contact Normal : ∞Ω
Fuel sender	 CD-2	Reed switch : Magnetic type	※ Check resistance Full : About 50Ω Low level : About 700Ω
Brake switch	 CD-4	N.O type	※ Check resistance Normal : ∞Ω

Part name	Symbol	Specifications	Check
G-sensor	 CD-6	24V, 5W	-
Temperature sensor (Ambient)	 CD-87	-	-
Load sensor (EPPR, weight)	 CD-23 CD-70	24V, hall sensor	※ Check voltage 0.5~4.5 VDC (1-2)
Angle sensor	 CD-12	5V, hall sensor	※ Check voltage 0.4~4.5 VDC (B-C)
Diode	 DO-1 DO-2	Diode spec : 1N5406	-
Switch (Fingertip, side shift)	 CS-11 CS-12 CS-13 CS-14 CS-20 CS-92	24V (N.O type)	※ Check contact Normal : $\infty \Omega$

Part name	Symbol	Specifications	Check
Inching sensor	 CD-71	-	-
Switch (Mirror heater, fuel warmer)	 CS-74 CS-221	24V 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-3)
Center horn	 CS-5	24V	-
Transmission speed pick up sensor (Internal, Turbine, Engine)	 CD-27 CD-74 CD-72	-	-
Transmission speed sensor (output)	 CD-73	-	-
Engine sensor (NOx)	 CN-AT1E CN-AT2A	-	-

Part name	Symbol	Specifications	Check
Engine sensor (EGTS)	 CN-AT9A	-	-
DEF quality sensor	 CN-AT10A	-	-
TBAP sensor	 CD-102	-	-
Reverse fan switch	 CS-105	24V 8A	※ Check contact normal OFF : $\infty \Omega$ (For terminal 2-1, 2-3, 5-4, 5-6)
Mirror heater	 CN-221 CN-222	24V	-
User Authentication device		24V	-

Part name	Symbol	Specifications	Check
Door switch	 CS-1A CS-1B	N.O type	※ Check resistance Normal : $\infty \Omega$
Emergency stop switch	 CS-10	-	-
Camera monitor		-	-
Switch (Seat heater)	 CS-82	24V 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-3)

GROUP 7 CONNECTORS

1. CONNECTOR DESTINATION

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-1	AMP	42	I/conn(Engine harness-Main harness)	936421	936429
CN-2	AMP	42	I/conn(Main harness-Engine harness)	936421	936429
CN-3	AMP	36	I/conn(Engine harness-Main harness)	1743059-2	1743062-2
CN-4	KET	2	I/conn(Engine harness-Main harness)	MG642928	MG652934-5
CN-6	AMP	15	I/conn(Engine harness-Frame harness)	2-85262-1	368301-1
CN-7	AMP	16	I/conn(Main harness-Cabin harness)	368047-1	368050-1
CN-9	DEUTSCH	2	I/conn(Mast w/lamp harness-Frame harness)	DT06-2S	DT04-2P
CN-10	DEUTSCH	6	I/conn(Fender harness-Frame harness)-LH	DT06-6S	DT04-6P
CN-11	DEUTSCH	6	I/conn(Fender harness-Frame harness)-RH	DT06-6S	DT04-6P
CN-15	MOLEX	2	Horn harness-fingertip	52213-0211	-
CN-16	MOLEX	2	Aux enable harness-fingertip	52213-0211	-
CN-17	MOLEX	2	Auto tilt harness-fingertip	52213-0211	-
CN-18	MOLEX	2	2nd gear enable harness-fingertip	52213-0211	-
CN-19	KET	2	Inching potentiometer	MG610320	MG640322
CN-21	DEUTSCH	8	Front wiper	DT06-8S	-
CN-22	KET	2	Front washer pump	MG610320	-
CN-23	KET	2	Speaker LH	MG610070	-
CN-24	KET	2	Speaker RH	MG610070	-
CN-25	Molex	2	Horn-high	35825-0211	-
CN-26	Molex	2	Horn-low	35825-0211	-
CN-27	KUM	16	Radio & USB player	PK145-16017	-
CN-29	AMP	2	Receiver dryer	MG640795	-
CN-30	KET	2	Compressor	MG610043	-
CN-31	AMP	15	Aircon harness	2-85262-1	-
CN-36	QPL	1	Fuse box	21HN-55010	-
CN-37	QPL	1	Fuse box	21HN-55010	-
CN-37	MOLEX	4	Gear selector switch	52213-0417	-
CN-45	Ring term	1	Start motor (M)	S820-205000	-
		1	Start motor (B+)	S820-312000	-
CN-46	KET	1	Air compressor harness	MG640944-5	MG650943-5
CN-47	KET	1	Battery (+)	MG640944-5	MG650943-5
	KET	1	Master switch (B+)	S820-312000	-
CN-49	AMP	2	Seat cap	174352-2	174354-2
CN-50	AMP	68	Transmission control unit	963598-1	-
CN-51	AMP	6	Transmission control unit service tool	480704-0	926682-3

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-56	AMP	20	Cluster	174047-2	-
CN-57A	MOLEX	4	Monitor power	522 13-0417	-
CN-57B	MOLEX	4	Monitor signal	-	52266-0417
CN-57C	MOLEX	2	Monitor trigger	-	52266-0211
CN-58A	DAEDONG	3	User authentication device power	110-3R	-
CN-58B	DAEDONG	2	User authentication device CAN	110-2R	-
CN-59M	AMP	34	MCU (Machine control unit)	4-1437290-0	-
CN-59N	AMP	34	MCU (Machine control unit)	4-1437290-1	-
CN-60	KET	2	Fusible link	-	MG620558
CN-61	AMP	34	Fingertip sub controller	4-1437290-1	-
CN-65	DEUTSCH	2	Back-up buzzer	DT06-2S-EP06	-
CN-70	AMP	4	Top wiper motor	180900	-
CN-71	DEUTSCH	2	Parking solenoid	DT06-2S	-
CN-71	DEUTSCH	4	Seat switch	-	DT04-4P
CN-74	PACKARD	4	Alternator	12186568	-
CN-75	KET	1	Battery (-) terminal	MG640944-5	-
CN-83	KUM	2	Condensor fan	PB625-02027	-
CN-90	AMP	8	AAVM monitor	174982-2	174984-2
CN-90	AMP	16	I/conn (Engine harness-Frame harness)	368047-1	368050-1
CN-91	AMP	6	Rear camera	174262-2	174264-2
CN-92	AMP	6	User authentic device	174262-2	174264-2
CN-93	DELPHI	96	ECU connector (J2)	13964577	-
CN-95	KET	2	Fusible link	-	MG620558
CN-96	PACKARD	2	Fuel warmer	15300027	-
CN-98	DEUTSCH	3	Resistor	DT06-3S-EP06	DT04-3P-EP10
CN-101	FRAMTIME	4	Engine TBAP sensor	-	54200415
CN-102	AMP	4	Rear wiper motor	180900	-
CN-103	KET	2	Rear washer pump	MG610320	-
CN-112	ZF	16	Gear box	21L7-60290	-
CN-124	AMP	6	Accel pedal	174262-2	-
CN-125	DEUTSCH	12	RMCU (Remote control unit)	DT06-12S	DT04-12P
CN-125	-	1	GPS	-	SMA-C-316R/V
CN-125	-	1	ORBCOMM	-	TNC-058
CN-130	DEUTSCH	2	5-lever solenoid	DT06-2S	DT04-2P
CN-131	DEUTSCH	2	Attachment cut off	DT06-2S	-
CN-132	DEUTSCH	2	Side shift select solenoid	DT06-2S	DT04-2P
CN-134	DEUTSCH	9	ECU service tool	-	HD10-9-1939P
CN-135	DEUTSCH	9	Cluster/Monitor service tool	-	HD10-9-96P
CN-136	DEUTSCH	9	MCU/RMCU service tool	-	HD10-9-96P

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-138	KET	3	DC/DC connector	MG610045	-
CN-139	KET	2	12V socket	MG610043	-
CN-144	-	6	Accel pedal	-	-
CN-147	KET	2	Cabin tilt (Pump motor)	MG640188-4	-
CN-154	DEUTSCH	2	Fan motor EPPR valve	DT06-2S-EP06	-
CN-155	DEUTSCH	2	Pump EPPR valve	DT06-2S-EP06	-
CN-156	DEUTSCH	2	Fan EPPR valve	DT06-2S	-
CN-157	AMP	2	Fan reverse valve	85202-5	-
CN-158	AMP	4	Fan harness	174257-2	174259-2
CN-160	DEUTSCH	2	Air compressor harness	DT06-2S-EP06	DT04-2P-E005
CN-170	BOSCH	94	Fingertip control unit	1-928-A00-326	-
CN-175	KET	6	Fingertip diagnosis connector	MG610335	-
CN-191	AMP	4	I/conn (Frame harness-G sensor)	174257-2	174259-2
CN-193	DEUTSCH	4	I/conn (Engine harness-Front harness)	DT06-4S	DT04-4P
CN-200	AMP	6	Work lamp-RH	174262-2	174264-2
CN-201	AMP	6	Work lamp-LH	174262-2	174264-2
CN-202	KET	2	Top washer pump	MG610043	-
CN-221	DEUTSCH	2	Mirror heater-LH	DT06-2S	-
CN-222	DEUTSCH	2	Mirror heater-RH	DT06-2S	-
CN-229	AMP	2	USB charger	172434-2	-
CN-249	DEUTSCH	6	Rear camera	DT06-6S	DT04-6P
CN-251	KET	1	RMS antenna	-	S820-106000
CN-252	-	1	ORBCOMM connector	TNC-C-58	-
CN-253	-	1	GPS connector	SMA-C-316R/V	-
CN-300	AMP	26	Functional safety	1897009-2	1897013-2
CN-372	AMP	35	AAVM controller	776164-1	-
CN-373	KET	8	Service tool	MG610339	MG640341
CN-381	DEUTSCH	2	DEF hose heating 1 (Pressure)	DT06-2S-EP06	-
CN-382	DEUTSCH	2	DEF hose heating 2 (Backflow)	DT06-2S-EP06	-
CN-383	DEUTSCH	2	DEF hose heating 3 (Suction line)	DT06-2S-EP06	-
CN-400	AMP	6	AAVM ext harness	174262-2	174264-2
CN-401	AMP	6	AAVM ext harness	174262-2	174264-2
CN-402	AMP	6	AAVM ext harness	174262-2	174264-2
CN-403	DEUTSCH	6	Front camera	-	DT04-6P
CN-404	DEUTSCH	6	Left camera	-	DT04-6P
CN-405	DEUTSCH	6	Right camera	-	DT04-6P
CN-412	AMP	6	I/con (Fingertip harness - Main harness)	174262-2	174264-2
CN-413	AMP	6	I/con (Main harness - Fingertip harness)	174262-2	174264-2
CN-417	AMP	8	Fingertip harness	174982-2	174984-2

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-A1	DEUTSCH	2	Mast lifting EPPR-Fingertip	DT06-2S	-
CN-B1	DEUTSCH	2	Mast lowering EPPR-Fingertip	DT06-2S	-
CN-A2	DEUTSCH	2	Tilt out EPPR-Fingertip	DT06-2S	-
CN-B2	DEUTSCH	2	Tilt in EPPR-Fingertip	DT06-2S	-
CN-A3	DEUTSCH	2	Aux1 EPPR (pull)-Fingertip	DT06-2S	-
CN-B3	DEUTSCH	2	Aux1 EPPR (push)-Fingertip	DT06-2S	-
CN-A4	DEUTSCH	2	Aux2 EPPR (pull)-Fingertip	DT06-2S	-
CN-B4	DEUTSCH	2	Aux2 EPPR (push)-Fingertip	DT06-2S	-
CN-A5	DEUTSCH	2	Aux3 EPPR (pull)-Fingertip	DT06-2S	-
CN-B5	DEUTSCH	2	Aux3 EPPR (push)-Fingertip	DT06-2S	-
CN-AT1E	TYCO	4	DOC NOx sensor	2-1418390-1	-
CN-AT2A	TYCO	4	SCR NOx sensor	1-1418390-1	-
CN-AT5	TYCO	4	DEF supply module	2-1418390-1	-
CN-AT6	TYCO	4	DEF doser unit	1-1418479-1	-
CN-AT9	TYCO	4	EGTS temperture sensor	4-1418390-1	-
CN-AT10A	DEUTSCH	4	DEF quality sensor	DT06-4S	-
CN-AT11	AMP	4	DPF diff pressure sensor	F715600	-
CN-C1	KET	2	CAN 1 harness	MG610320	MG640322
CN-C2	KET	2	CAN 2 harness	MG610320	MG640322
CN-CC8D	DEUTSCH	4	Engine CAN connector	DT06-4S	-
CN-J27	TYCO	4	Coolant valve	1-967325-03	-
JC-1	KET	4	Joint connector	MG610754	-
Switch					
CS-1A	KET/JO	1	Door switch - RH	S822-014022	JOR 1.5-5
CS-1B	KET/JO	1	Door switch - LH	S822-014022	JOR 1.5-5
CS-2	KET	6	Start key	MG610335	-
CS-3	QPL	10	Rear wiper switch	21HN-56300	-
CS-5	KET	2	Center horn	-	MG640322
CS-5A	KET	2	Center horn	MG610320	-
CS-5B	Ring term	-	Center horn	-	S820-105000
CS-10	KET	1	Brake cooling switch	ST730018-3	-
CS-10	RINGTERM	-	Emergency stop switch-fingertip	-	S820-204000
CS-11	KET	8	Multifunction switch	MG610339	-
CS-11	-	2	Horn switch-fingertip	-	-
CS-12	KET	6	Multifunction switch	MG610335	-
CS-12	-	2	Aux enable switch-fingertip	-	-
CS-13	-	2	Auto tilt switch-fingertip	-	-
CS-13	DEUTSCH	18	Gear selelctor (CAN)	DT16-18SA-K004	-
CS-14	-	2	2nd gear enable switch-fingertip	-	-

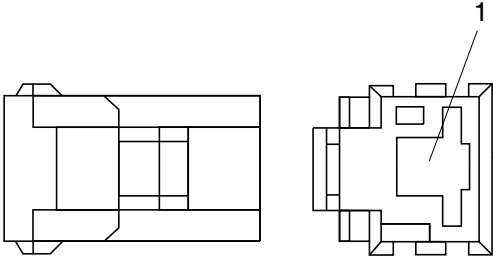
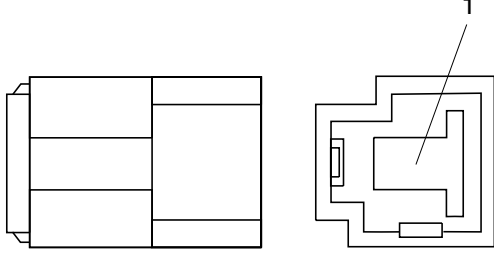
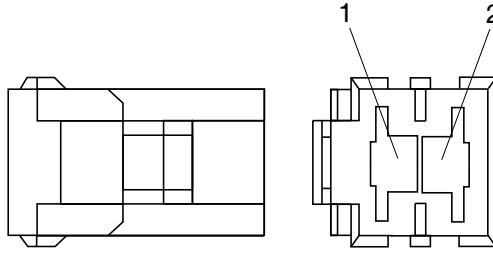
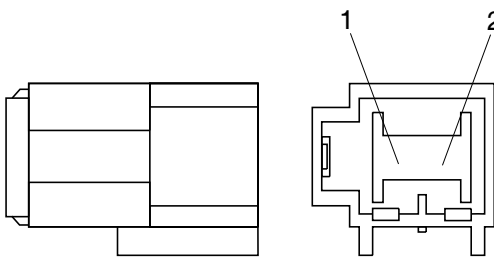
Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CS-15	KET	1	Horn switch	ST730018-3	-
CS-17	QPL	10	Parking switch	21HN-56300	-
CS-20	KET	1	Side shift selector switch	ST730018-3	ST750036-3
CS-21	QPL	10	Work lamp switch	QPL-CN-0001	-
CS-39	QPL	10	Main switch	QPL-CN-0001	-
CS-41	QPL	10	Hazard switch	QPL-CN-0001	-
CS-42	QPL	10	Inching switch	QPL-CN-0001	-
CS-59	QPL	10	Auto/manual switch	QPL-CN-0001	-
CS-64	QPL	10	Inc/dec switch	QPL-CN-0001	-
CS-72	DEUTSCH	2	Seat switch	DT06-2S	-
CS-74	DEUTSCH	4	Tilt switch	-	DT04-4P
CS-77	QPL	10	Tilt operation switch	QPL-CN-0001	-
CS-79	QPL	10	Engine mode switch	QPL-CN-0001	-
CS-82	QPL	10	Seat heat switch	QPL-CN-0001	-
CS-92	KET	1	5-lever switch	ST730018-3	ST750036-3
CS-95	QPL	10	Fuel warmer switch	QPL-CN-0001	-
CS-99	QPL	10	Air compressor switch	QPL-CN-0001	-
CS-100	QPL	10	Exhaust system cleaning switch	QPL-CN-0001	-
CS-103	QPL	10	Top wiper switch	QPL-CN-0001	-
CS-105	QPL	10	Reverse fan switch	QPL-CN-0001	-
CS-221	QPL	10	Mirror heater switch	QPL-CN-0001	-
Lamp					
CL-1	KET	2	Room lamp LH	MG610392	-
CL-3	DEUTSCH	6	Head lamp-LH	HP285-06021	-
CL-4	DEUTSCH	6	Head lamp-RH	HP285-06021	-
CL-5A	DEUTSCH	2	Work lamp (Mast, RH)	-	DT04-2P
CL-6	DEUTSCH	2	Work lamp (Mast, LH)	-	DT04-2P
CL-7	DEUTSCH	2	Beacon lamp	DT06-2S	DT04-2P
CL-15A	AMP	4	Rear combi lamp (Illum/stop, LH)	184050-2	-
CL-15B	AMP	4	Rear combi lamp (Turn/back up, LH)	184050-2	-
CL-16A	AMP	4	Rear combi lamp (Illum/stop, RH)	184050-2	-
CL-16B	AMP	4	Rear combi lamp (Turn/back up, RH)	184050-2	-
CL-21	KET	1	License lamp	ST730018-3	ST750036-3
CL-22	DEUTSCH	2	R/work lamp LH	DT06-2S	DT04-2P
CL-23	DEUTSCH	2	R/work lamp RH	DT06-2S	DT04-2P
CL-51	KET	2	Room lamp RH	MG610392	-
CL-55	CALRING	10	Power ON indicator	21HN-56300	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
Relay					
CR-1	KET	1	Battery relay (IG, B+)	S820-308000	-
	KET	1	Battery relay (coil, earth)	S820-104000	-
CR-4	AMP	5	Wiper high speed relay	VCFM-1002	-
CR-5	AMP	5	Safety start relay	VCFM-1002	-
CR-6	KET	4	Internal wiper relay	MG610047	-
CR-11	HELLA/TYCO	5	Flasher unit relay	8JA003526-001	21LM-01600
CR-23	KET	4	Start relay	MG610047	-
CR-24	Ring term	1	Preheat relay	-	S832-106000
	KET	1	Preheat relay	ST730018-3	-
CR-26	AMP	5	Wiper low speed relay	VCFM-1002	-
CR-36	AMP	5	Start aux relay	VCFM-1002	-
CR-38	AMP	5	Water pump relay	VCFM-1002	-
CR-39	AMP	5	Backup relay	VCFM-1002	-
CR-42	AMP	5	Preheat relay	VCFM-1002	-
CR-44	AMP	2	Cabin tilt relay	174352-2	-
CR-49	HELLA/OMRON	5	Fuel warmer relay	8JA003536-001	24L1-05100
CR-50	AMP	5	Travel cut relay	VCFM-1002	-
CR-52	AMP	5	Attach cut-off relay	VCFM-1002	-
CR-54	AMP	5	Reverse fan relay	VCFM-1002	-
CR-56	AMP	5	Auto park relay	VCFM-1002	-
CR-57	AMP	5	Side shift relay	VCFM-1002	-
CR-58	HELLA/OMRON	5	DEF supply module relay	8JA003526-001	24L1-05100
CR-59	HELLA/OMRON	5	DEF sensor relay	8JA003526-001	24L1-05100
CR-61	AMP	5	DEF line heater 1	VCFM-1002	-
CR-62	AMP	5	DEF line heater 2	VCFM-1002	-
CR-63	AMP	5	DEF line heater 3	VCFM-1002	-
CR-72	AMP	5	Mirror heater relay	VCFM-1002	-
Sensor and pressure switch					
CD-2	DEUTSCH	3	Fuel sender	DT06-3S-EP06	-
CD-3	DEUTSCH	3	Accumulator fail switch	DT06-3S	-
CD-4	AMP	1	Brake switch	171809-2	-
CD-6	DEUTSCH	4	G-sensor	DT06-4S	-
CD-10	KET	1	Air cleaner switch	ST730057-2	-
CD-12	DEUTSCH	3	Angle sensor	DT06-3S-EP06	DT04-3P-CE03
CD-17	AMP	2	Engine speed	1-1418483-1	-
CD-23	DEUTSCH	3	Load sensor (EPPR)	DT06-3S	DT04-3P
CD-25	AMP	2	Filter switch	282080-1	-
CD-26	DEUTSCH	3	Parking pressure switch	DT06-3S	-

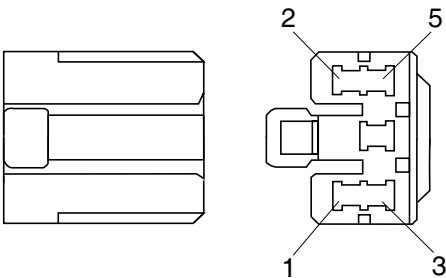
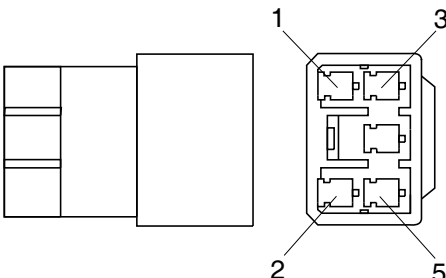
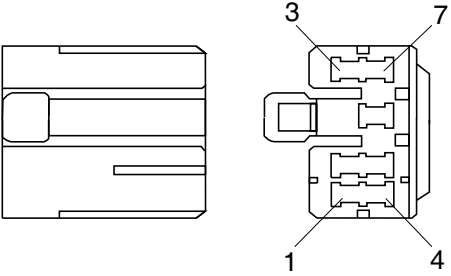
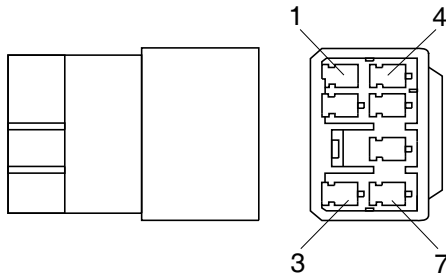
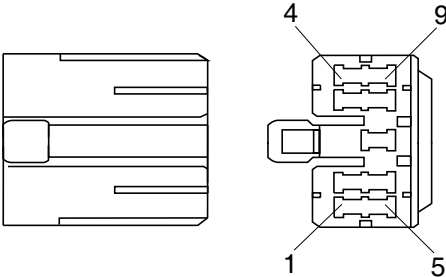
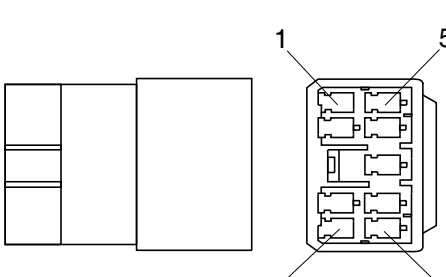
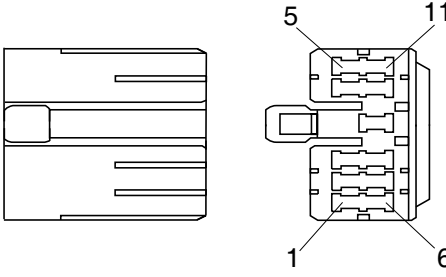
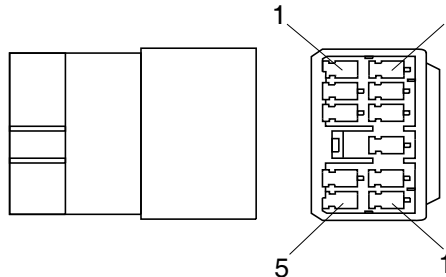
Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CD-27	AMP	2	Turbine speed pick-up	963040-2	-
CD-27	AMP	2	Turbine speed	1-1418483-1	-
CD-29	AMP	2	Sump temp sensor	963040-3	-
CD-35	DEUTSCH	2	Water in fuel switch	DT06-2S-EP06	-
CD-39	AMP	2	Inter gear speed	1-1418483-1	-
CD-40	MOLEX	4	Lift switch-fingertip	52216-0417	-
CD-40	AMP	2	Sensor output speed	1-1418483-1	-
CD-41	MOLEX	4	Tilt switch-fingertip	52216-0417	-
CD-42	MOLEX	4	Aux1 switch-fingertip	52216-0417	-
CD-43	MOLEX	4	Aux2 switch-fingertip	52216-0417	-
CD-70	DEUTSCH	3	Loader sensor (weight)	DT06-3S	DT04-3P
CD-71	AMP	6	Inching sensor	1-967616-1	-
CD-87	KET	2	Ambient temp sensor	MG610320	-
CD-91	AMP	2	Transmission after temp sensor	963040-3	-
CD-96	PACKARD	3	Coolant level sensor	12110293	-
CD-102	SUMITOMO	4	Engine TBAP sensor (Temp. Barometric Absolute Pressure)	6098-0144	-
Diode					
DO-1	AMP	2	Diode	174352-2	21EA-50550
DO-2	AMP	2	Diode	174352-2	21EA-50550
Resistor					
RS-1	KET/QPL	2	Resistor (300Ω)	MG610043	21FT-10810

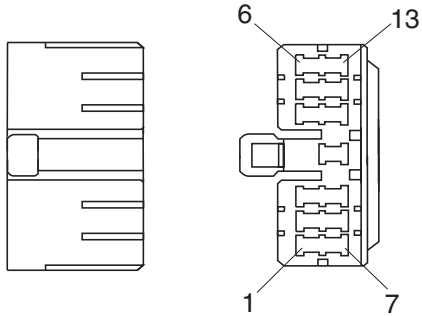
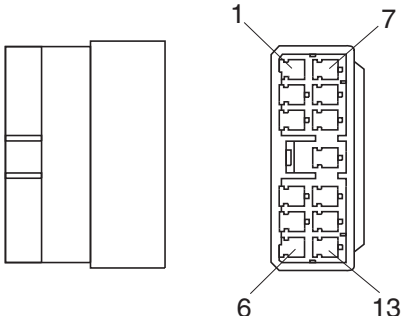
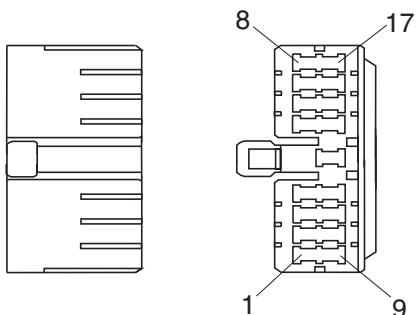
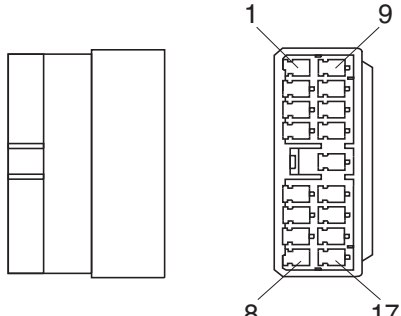
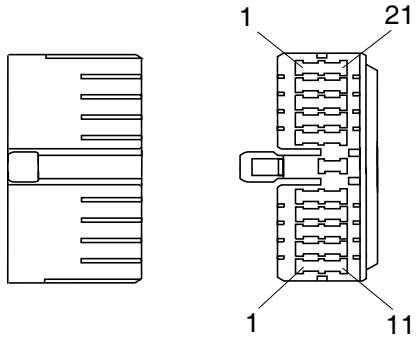
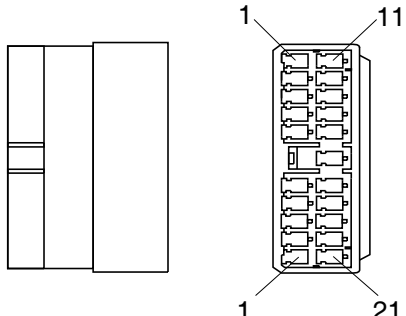
2. CONNECTION TABLE FOR CONNECTORS

1) 58-L TYPE CONNECTOR

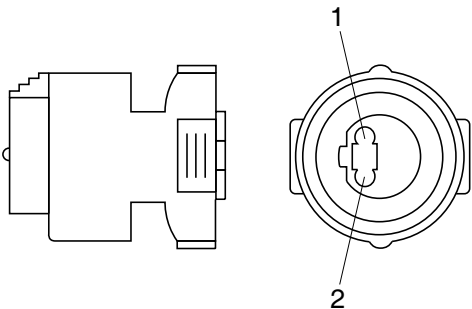
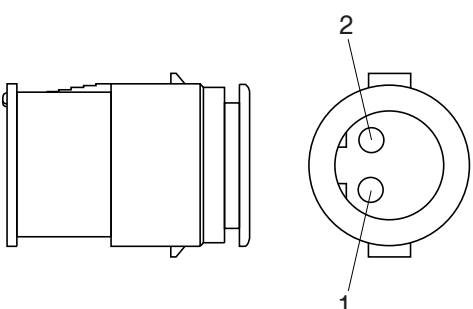
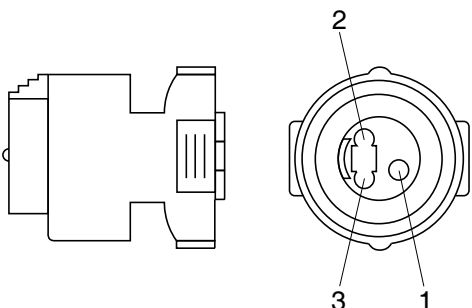
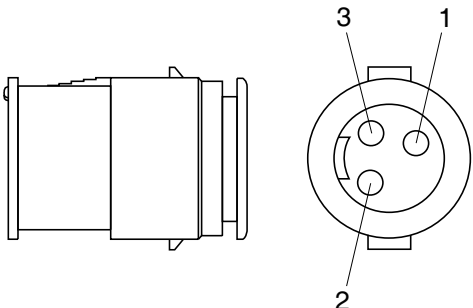
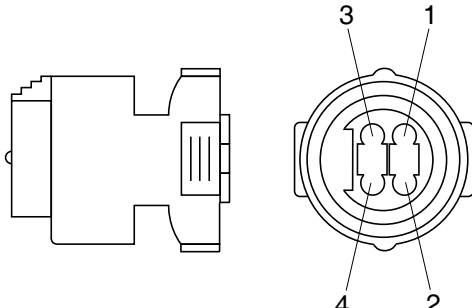
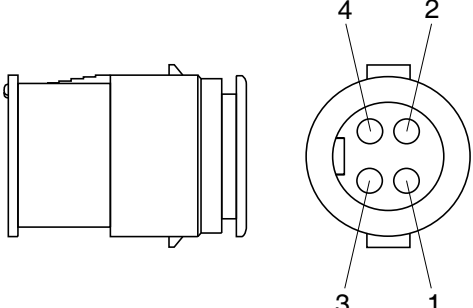
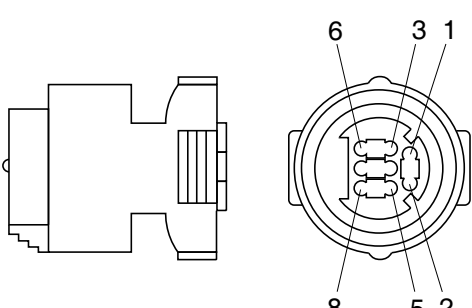
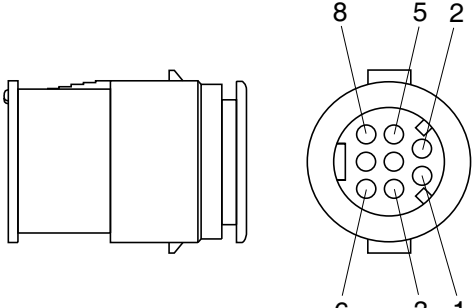
No. of pin	Receptacle connector (Female)	Plug connector (Male)
1	 S813-030100	 S813-130100
2	 S813-030200	 S813-130200

2) PA TYPE CONNECTOR

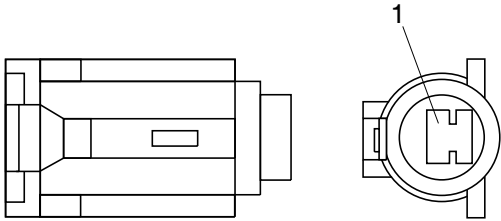
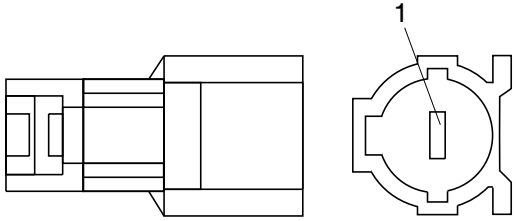
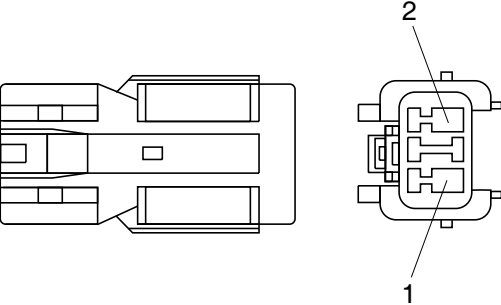
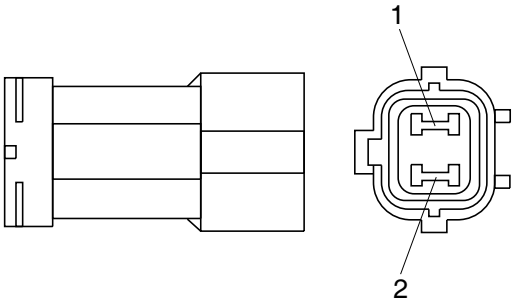
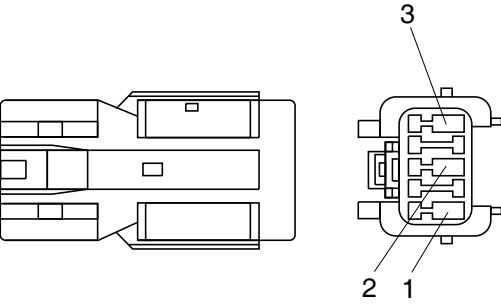
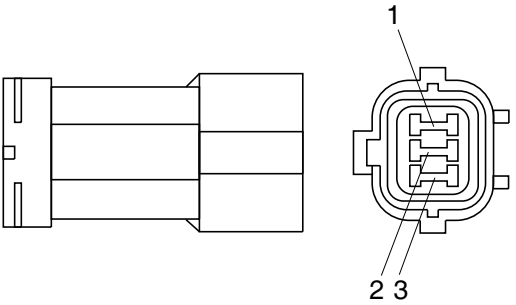
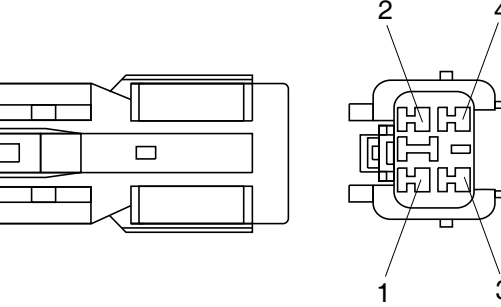
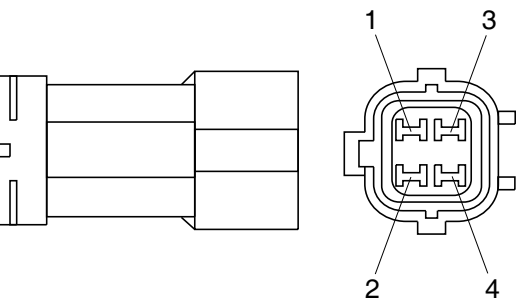
No. of pin	Receptacle connector (Female)	Plug connector (Male)
5	 S811-005002	 S811-105002
7	 S811-007002	 S811-107002
9	 S811-009002	 S811-109002
11	 S811-011002	 S811-111002

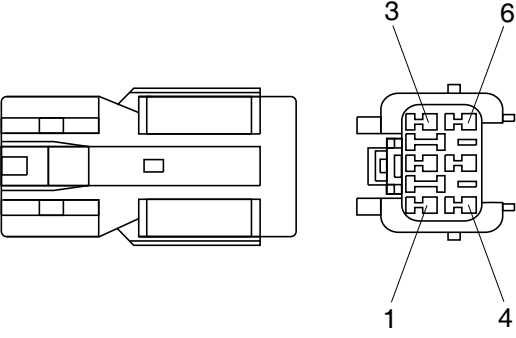
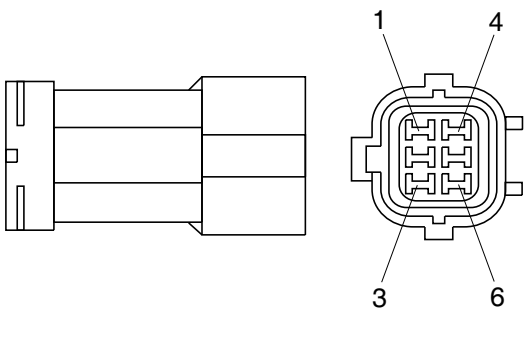
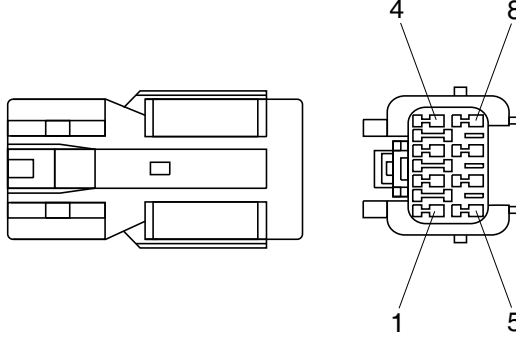
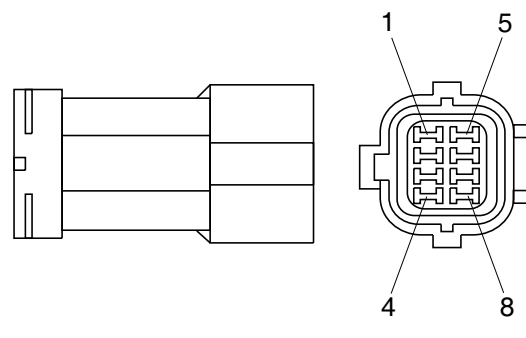
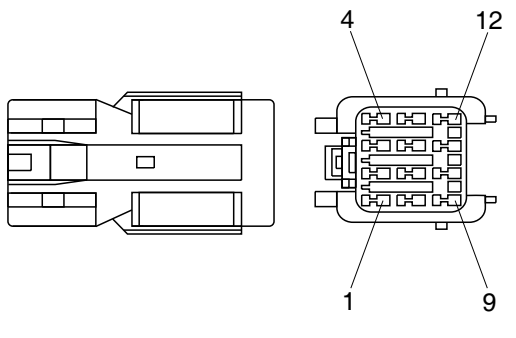
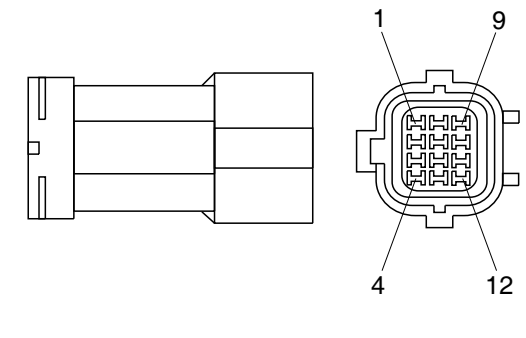
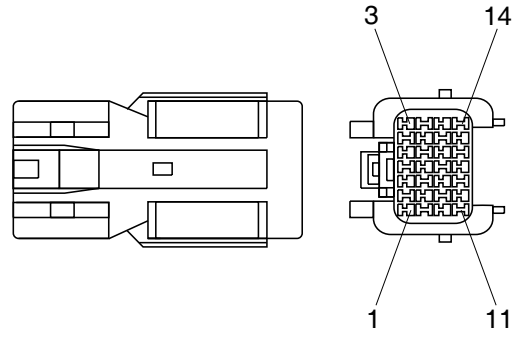
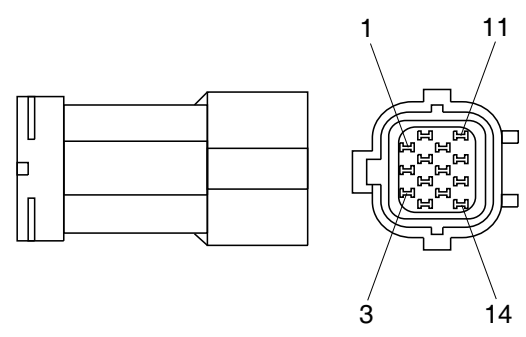
No. of pin	Receptacle connector (Female)	Plug connector (Male)
13	 S811-013002	 S811-113002
17	 S811-017002	 S811-117002
21	 S811-021002	 S811-121002

3) J TYPE CONNECTOR

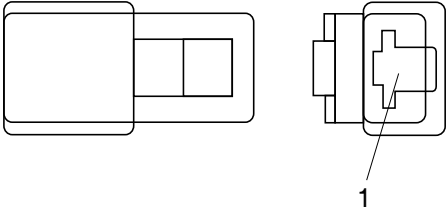
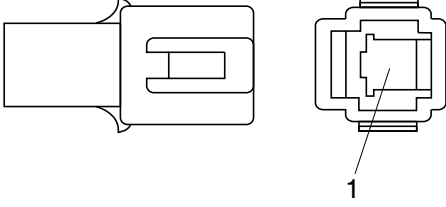
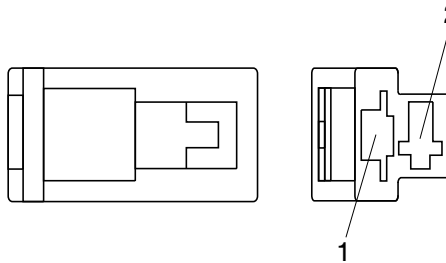
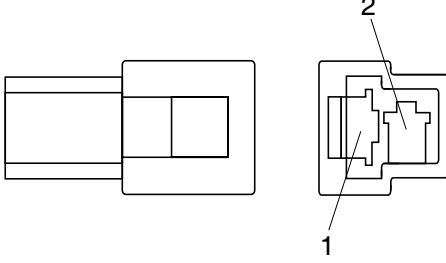
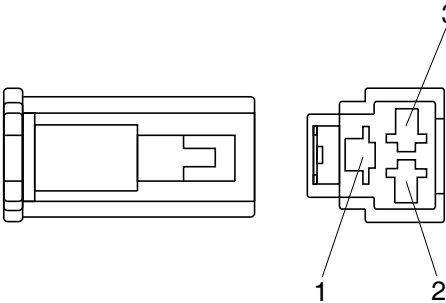
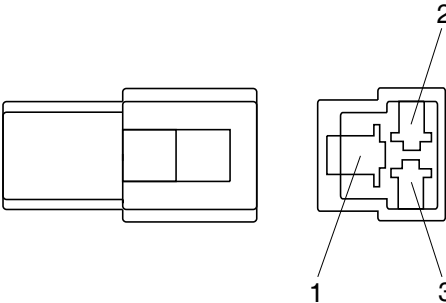
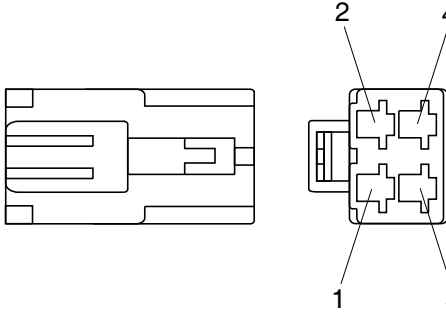
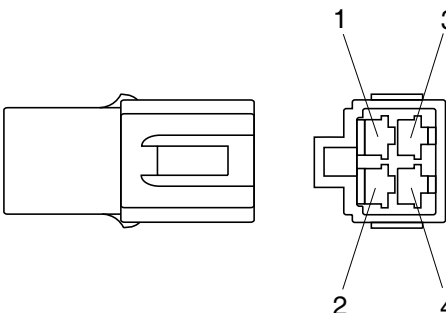
No. of pin	Receptacle connector (Female)	Plug connector (Male)
2	 S816-002001	 S816-102001
3	 S816-003001	 S816-103001
4	 S816-004001	 S816-104001
8	 S816-008001	 S816-108001

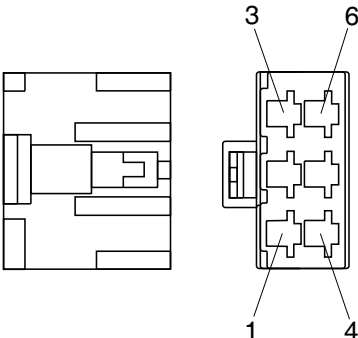
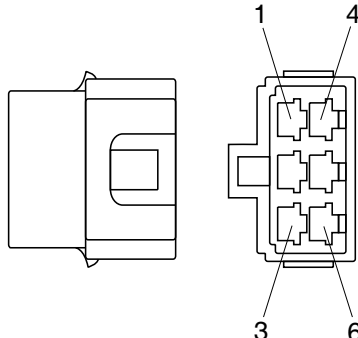
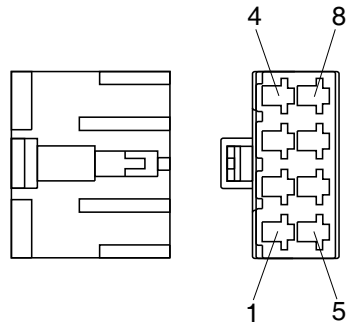
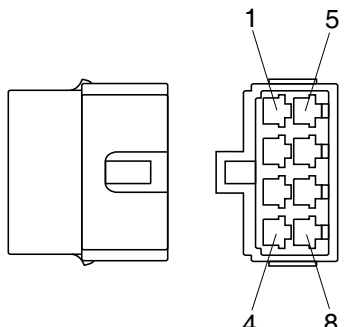
4) SWP TYPE CONNECTOR

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

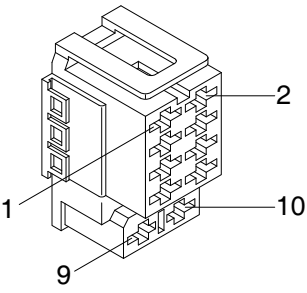
No. of pin	Receptacle connector (Female)	Plug connector (Male)
6	 S814-006000	 S814-106000
8	 S814-008000	 S814-108000
12	 S814-012000	 S814-112000
14	 S814-014000	 S814-114000

5) CN TYPE CONNECTOR

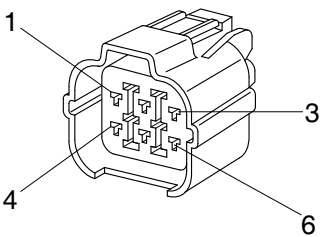
No. of pin	Receptacle connector (Female)	Plug connector (Male)
1	 S810-001202	 S810-101202
2	 S810-002202	 S810-102202
3	 S810-003202	 S810-103202
4	 S810-004202	 S810-104202

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

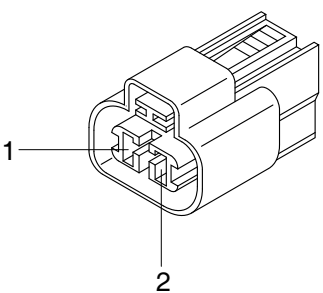
6) ITT SWF CONNECTOR

No. of pin	Receptacle connector (Female)	Plug connector (Male)
10	 SWF593757	

7) HW090 SEALED CONNECTOR

No. of pin	Receptacle connector (Female)	Plug connector (Male)
6	 6189-0133	

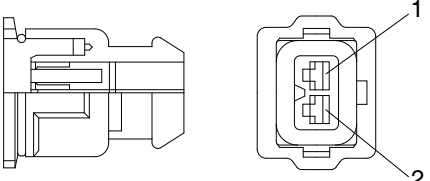
8) MWP02F-B CONNECTOR

No. of pin	Receptacle connector (Female)	Plug connector (Male)
2	 PH805-02028	

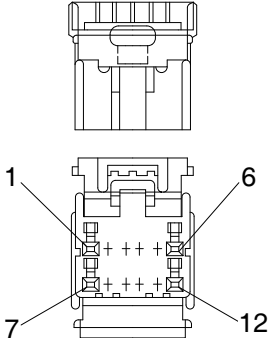
9) AMP ECONOSEAL CONNECTOR

No. of pin	Receptacle connector(Female)	Plug connector(Male)
36	344111-1	344108-1

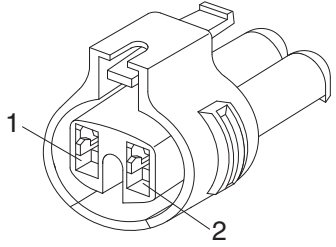
10) AMP TIMER CONNECTOR

No. of pin	Receptacle connector(Female)	Plug connector(Male)
2	 85202-1	

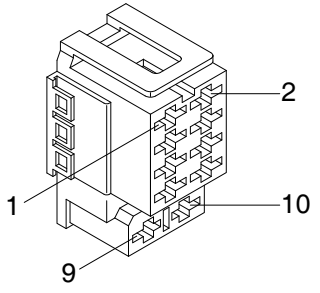
11) AMP 040 MULTILOCK CONNECTOR

No. of pin	Receptacle connector(Female)	Plug connector(Male)
12	 174045-2	

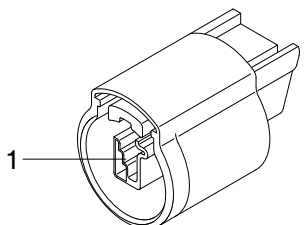
12)KET 090 WP CONNECTORS

No. of pin	Receptacle connector (Female)	Plug connector (Male)
2	 MG640795	

13)ITT SWF CONNECTOR

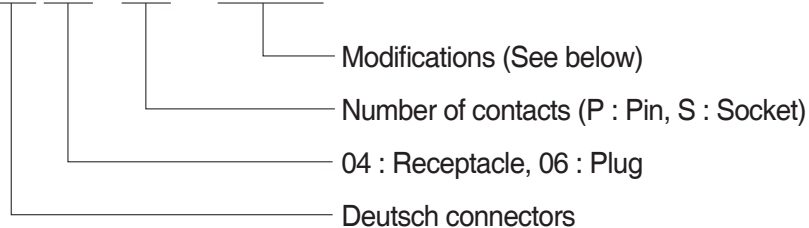
No. of pin	Receptacle connector (Female)	Plug connector (Male)
10	 SWF593757	

14)MWP NMWP CONNECTOR

No. of pin	Receptacle connector (Female)	Plug connector (Male)
1	 NMWP01F-B	

15) DEUTSCH DT CONNECTORS

DT 06 - 3S - ★★★★★



※ Modification

E003 : Standard end cap - gray

E004 : Color of connector to be black

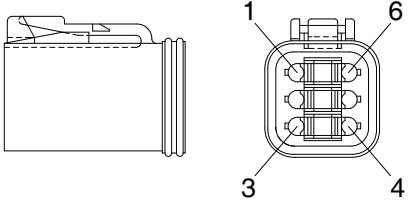
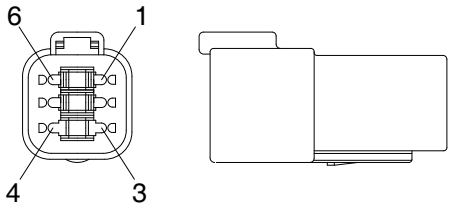
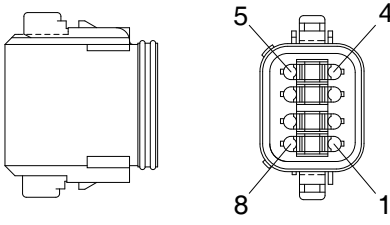
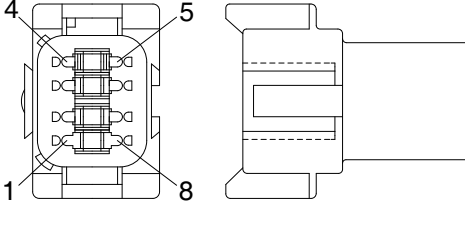
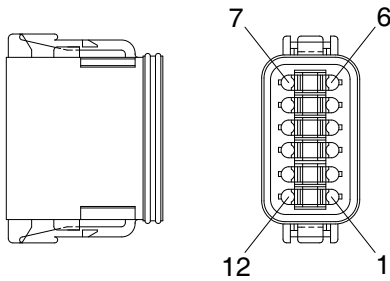
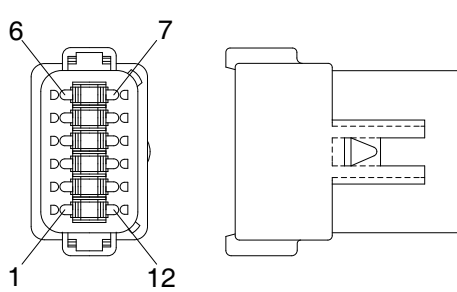
E005 : Combination - E004 & E003

EP04 : End cap

EP06 : Combination P012 & EP04

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

No. of pin	Receptacle connector (Female)	Plug connector (Male)
2	DT06-2S	DT04-2P
3	DT06-3S	DT04-3P
4	DT06-4S	DT04-4P

No. of pin	Receptacle connector(Female)	Plug connector(Male)
6	 DT06-6S	 DT04-6P
8	 DT06-8S	 DT04-8P
12	 DT06-12S	 DT04-12P

GROUP 8 TROUBLESHOOTING

Trouble symptom	Probable cause	Remedy
Lamps dimming even at maximum engine speed.	· Faulty wiring.	· Check for loose terminal and disconnected wire.
Lamps flicker during engine operation.	· Improper belt tension.	· Adjust belt tension.
Charge lamp does not light during normal engine oper.	· Charge lamp defective. · Faulty wiring.	· Replace. · Check and repair.
Alternator makes abnormal sounds.	· Alternator defective.	· Replace
Starting motor fails to run.	· Faulty wiring. · Insufficient battery voltage.	· Check and repair. · Recharge battery.
Starting motor pinion repeats going in and out.	· Insufficient battery voltage.	· Recharge battery.
Excessively low starting motor speed.	· Insufficient battery voltage. · Starting motor defective.	· Recharge battery. · Replace
Starting motor comes to a stop before engine starts up.	· Faulty wiring. · Insufficient battery voltage.	· Check and repair. · Recharge battery.
Heater signal does not become red.	· Faulty wiring. · Glow plug damaged.	· Check and repair. · Replace
Engine oil pressure caution lamp does not light when engine is stopped (with starting switch left in "ON" position).	· Caution lamp defective. · Caution lamp switch defective.	· Replace · Replace