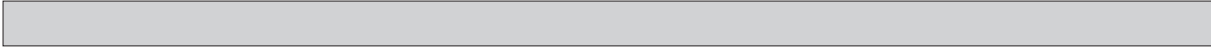


SECTION 7 ELECTRICAL SYSTEM

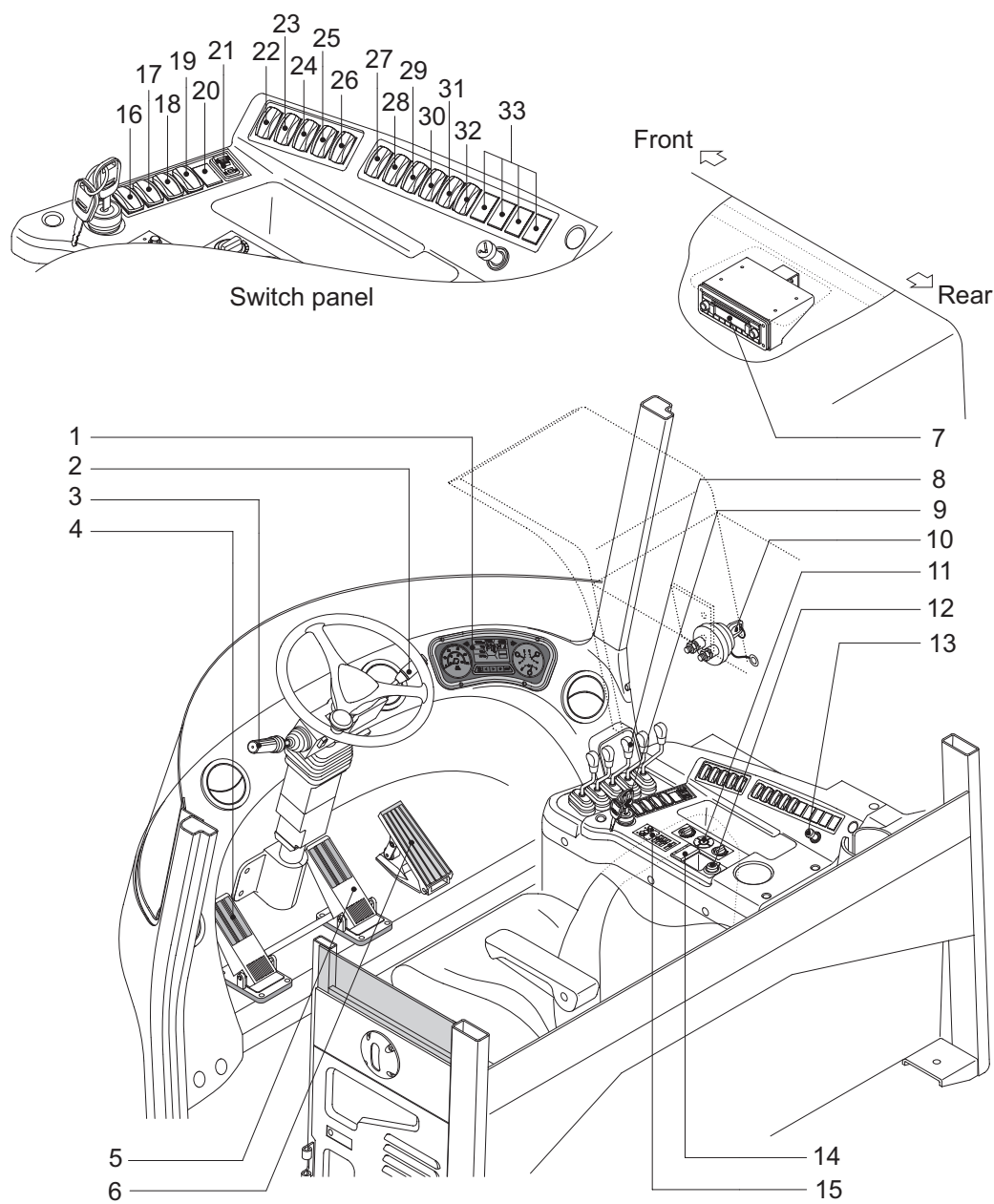


- Group 1 Component location 7-1
- Group 2 Electrical circuit 7-5
- Group 3 Cluster 7-21
- Group 4 Transmission message display 7-48
- Group 5 Switches 7-51
- Group 6 Electrical component specification 7-59
- Group 7 Connectors 7-68
- Group 8 Troubleshooting 7-88

SECTION 7 ELECTRICAL SYSTEM

GROUP 1 COMPONENT LOCATION

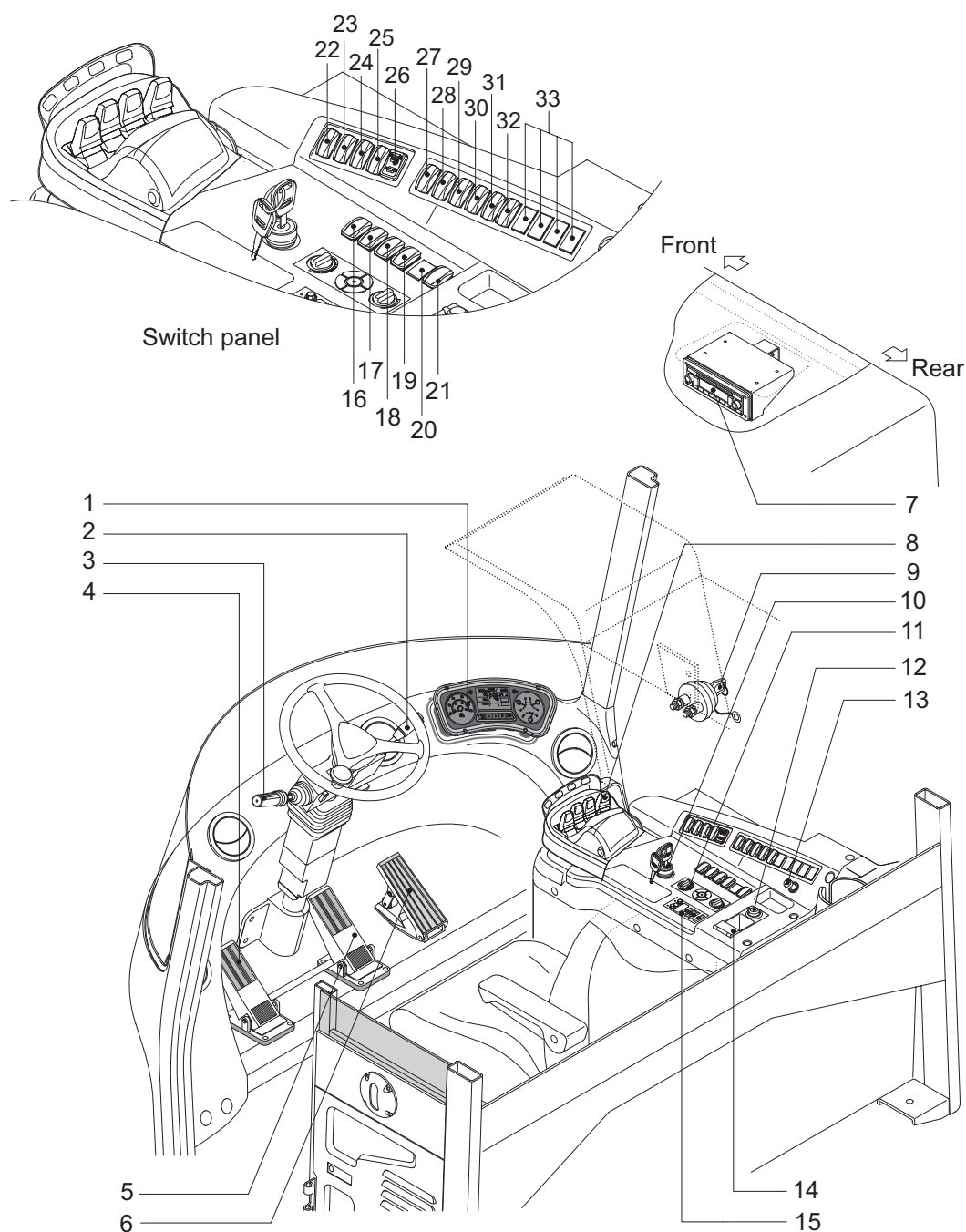
1. LOCATION 1 · REMOTE CONTROL LEVER TYPE



160D9LEL01

- | | | |
|----------------------------|-----------------------------------|-------------------------------------|
| 1 Cluster | 12 USB socket | 23 Inching switch |
| 2 Multi function switch | 13 Cigar lighter | 24 Fuel heater switch |
| 3 Gear selector lever | 14 Handsfree (opt) | 25 Inc/Dec switch |
| 4 Inching pedal | 15 Remote controller (opt) | 26 SCR cleaning switch |
| 5 Brake pedal | 16 Main light switch | 27 Power/standard switch |
| 6 Accelerator pedal | 17 Work lamp switch | 28 Rear wiper/washer switch |
| 7 Radio and USB player | 18 Hazard switch | 29 Top wiper/washer switch (opt) |
| 8 Remote control lever | 19 Beacon lamp switch (opt) | 30 Air compressor switch (opt) |
| 9 Start switch | 20 Cover | 31 Seat heat switch |
| 10 Master switch (opt) | 21 Parking brake switch | 32 Cooling fan control switch (opt) |
| 11 Air con & heater switch | 22 Transmission shift mode switch | 33 Cover |

· FINGERTIP TYPE

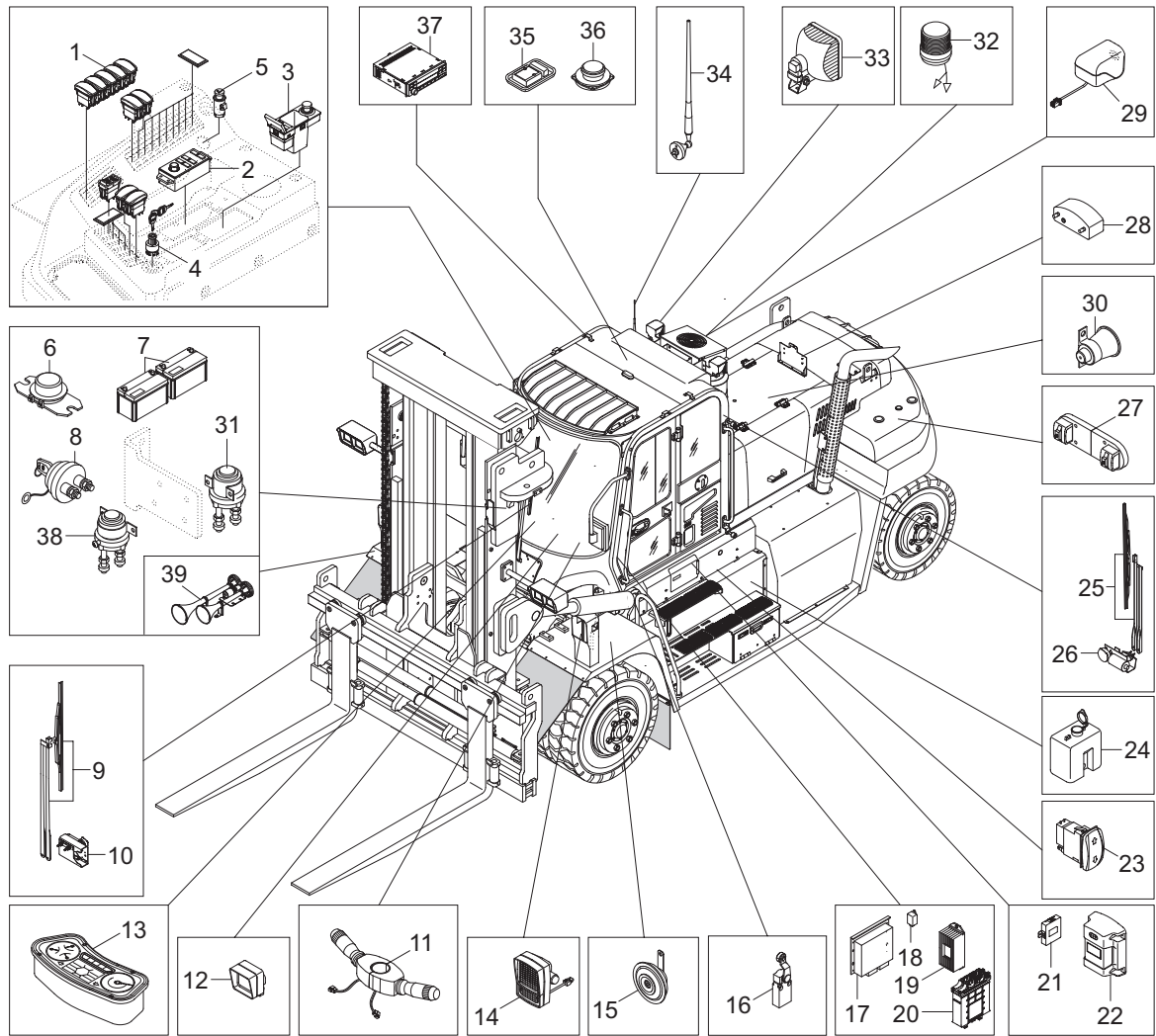


160D9LEL02

- | | | |
|----------------------------|-----------------------------------|-------------------------------------|
| 1 Cluster | 12 USB socket | 23 Work lamp switch |
| 2 Multi function switch | 13 Cigar lighter | 24 Hazard switch |
| 3 Gear selector lever | 14 Handsfree (opt) | 25 Beacon lamp switch (opt) |
| 4 Inching pedal | 15 Remote controller (opt) | 26 Parking brake switch |
| 5 Brake pedal | 16 Transmission shift mode switch | 27 Power/standard switch |
| 6 Accelerator pedal | 17 Inc/dec switch | 28 Rear wiper/washer switch |
| 7 Radio and USB player | 18 Fuel heater switch | 29 Top wiper/washer switch (opt) |
| 8 Fingertip | 19 Inching switch | 30 Air compressor switch (opt) |
| 9 Master switch (opt) | 20 Cover | 31 Seat heat switch |
| 10 Start switch | 21 SCR cleaning switch | 32 Cooling fan control switch (opt) |
| 11 Air con & heater switch | 22 Main light switch | 33 Cover |

2. LOCATION 2

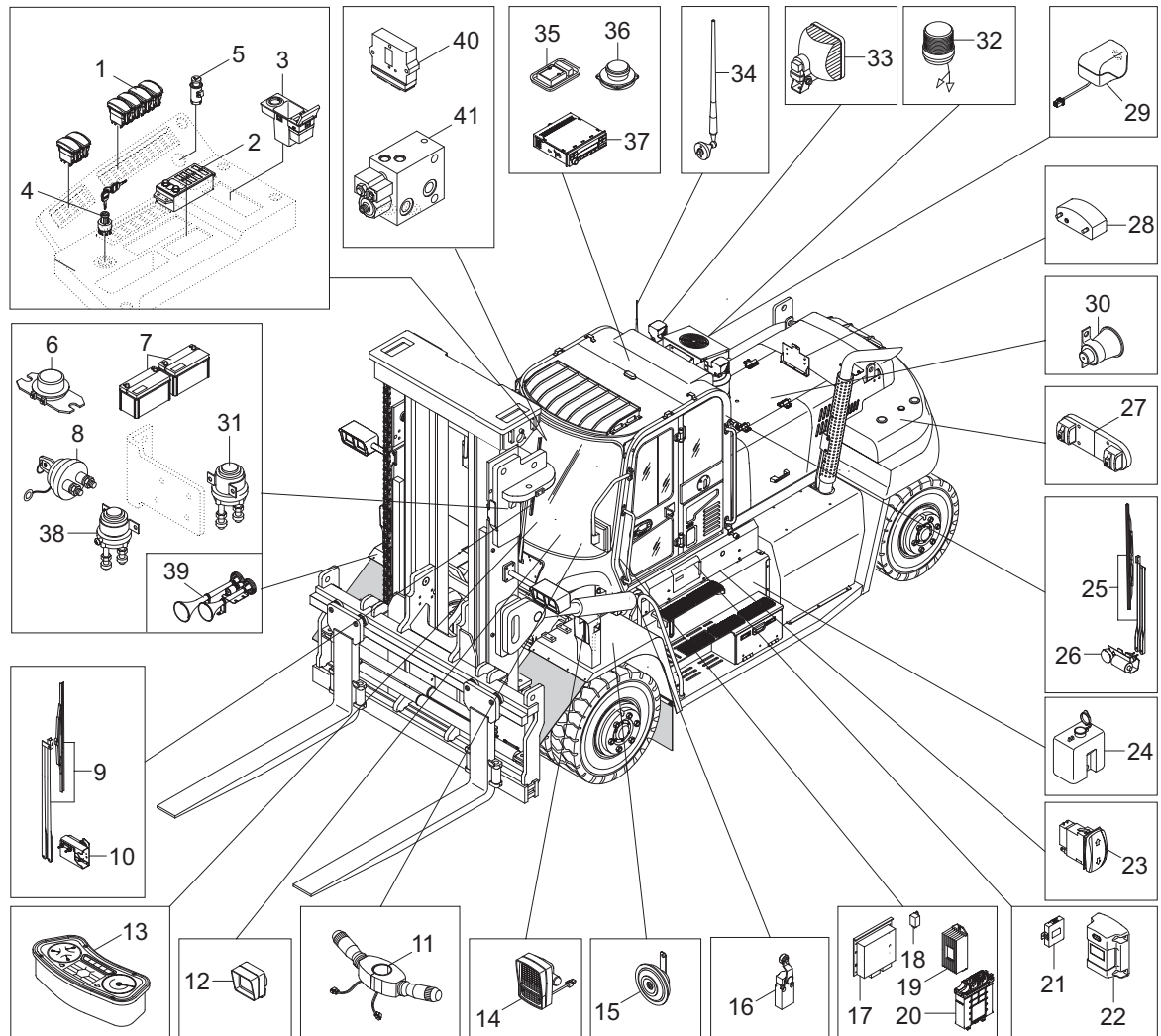
· REMOTE CONTROL LEVER TYPE



160D9LEL03

- | | | | | | |
|----|-----------------------|----|-----------------------|----|-----------------------|
| 1 | Switch panel | 14 | Head lamp | 27 | Rear combination lamp |
| 2 | Remote controller | 15 | Horn | 28 | License lamp |
| 3 | USB & socket assembly | 16 | Limit switch | 29 | Rear camera assy |
| 4 | Start switch | 17 | MCU | 30 | Travel alarm buzzer |
| 5 | Cigar lighter | 18 | Int wiper relay | 31 | Heater relay |
| 6 | Battery relay | 19 | DC-DC converter | 32 | Beacon lamp |
| 7 | Battery | 20 | TCU | 33 | Work lamp assembly |
| 8 | Master switch | 21 | Bluetooth handsfree | 34 | Mobile antenna |
| 9 | Wiper assembly | 22 | RMCU | 35 | Room lamp |
| 10 | Wiper motor | 23 | Cabin tilt switch | 36 | Speaker assembly |
| 11 | Multifunction switch | 24 | Washer reservoir tank | 37 | Radio and USB player |
| 12 | Front turn lamp | 25 | Rear wiper assembly | 38 | Start relay |
| 13 | Cluster | 26 | Rear wiper motor | 39 | Air horn assy |

· FINGERTIP TYPE



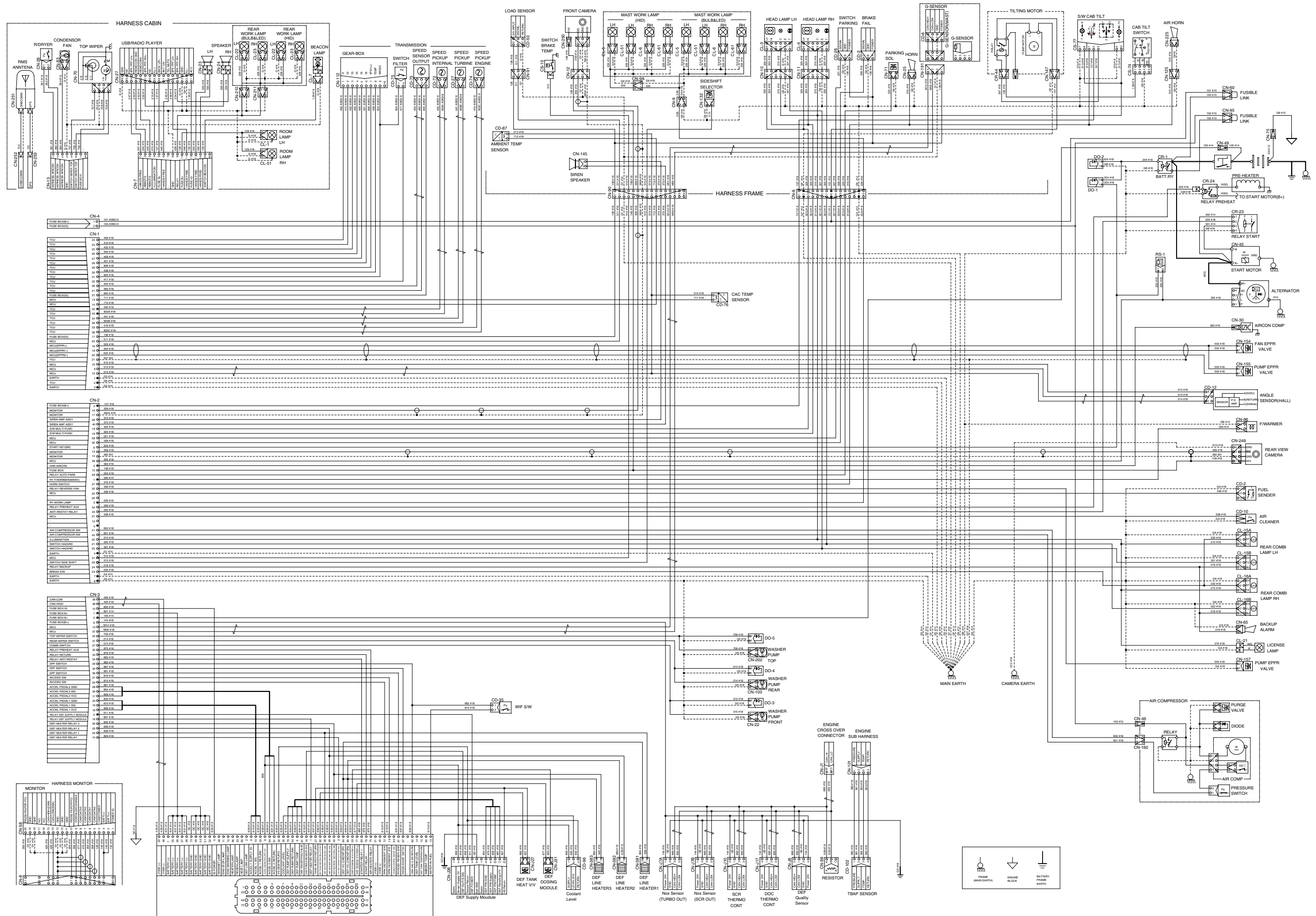
160D9LEL04

- | | | |
|-------------------------|--------------------------|----------------------------|
| 1 Switch panel | 14 Head lamp | 28 License lamp |
| 2 Remote controller | 15 Horn | 29 Rear camera assy |
| 3 USB & socket assembly | 16 Limit switch | 30 Travel alarm buzzer |
| 4 Start switch | 17 MCU | 31 Heater relay |
| 5 Cigar lighter | 18 Int wiper relay | 32 Beacon lamp |
| 6 Battery relay | 19 DC-DC converter | 33 Work lamp assembly |
| 7 Battery | 20 TCU | 34 Mobile antenna |
| 8 Master switch | 21 Bluetooth handsfree | 35 Room lamp |
| 9 Wiper assembly | 22 RMCU | 36 Speaker assembly |
| 10 Wiper motor | 23 Cabin tilt switch | 37 Radio and USB player |
| 11 Multifunction switch | 24 Washer reservoir tank | 38 Start relay |
| 12 Front turn lamp | 25 Rear wiper assembly | 39 Air horn assy |
| 13 Cluster | 26 Rear wiper motor | 40 Fingertip controller |
| | 27 Rear combination lamp | 41 Fingertip solenoid assy |

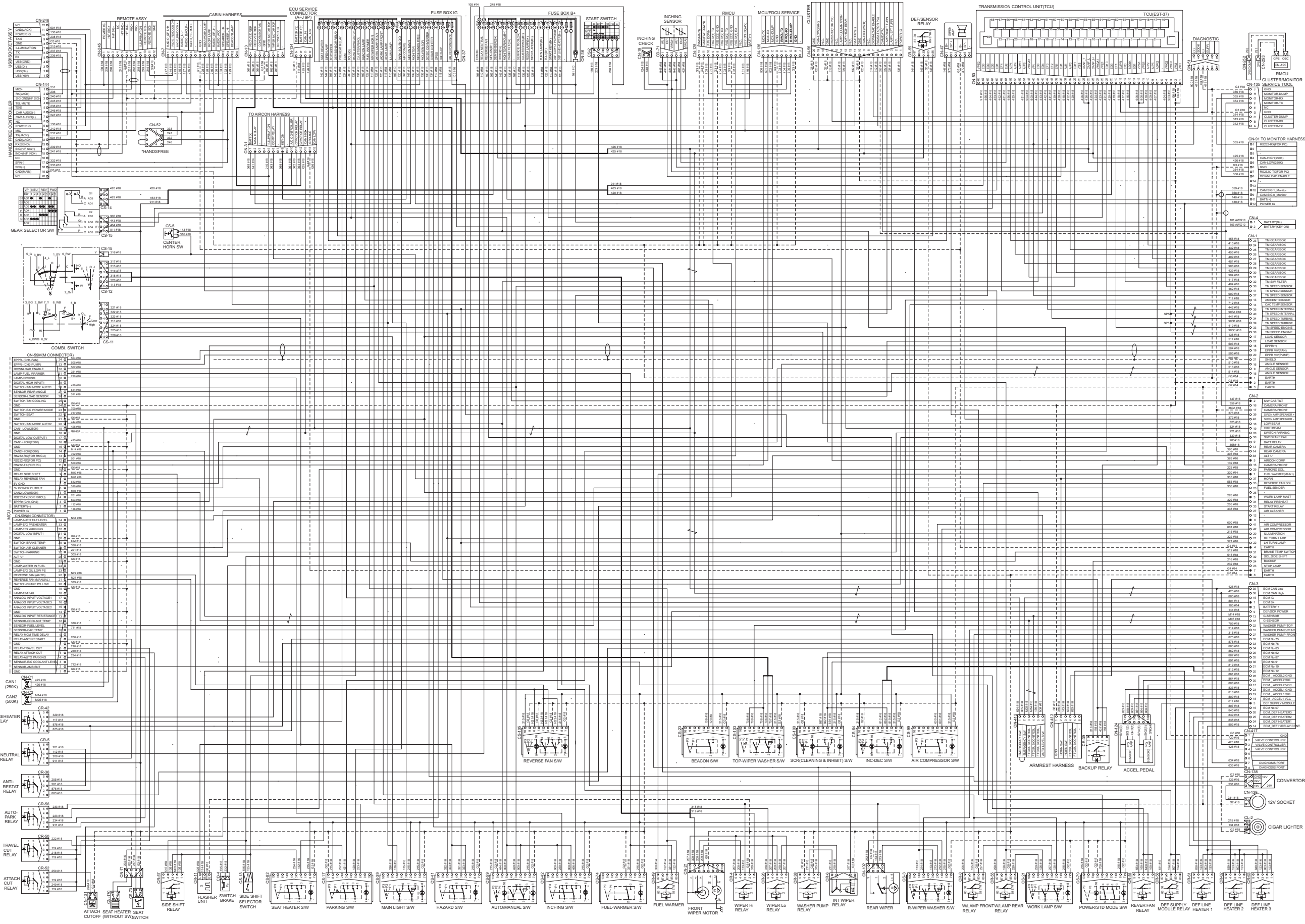
• ELECTRICAL CIRCUIT (1/6, 160D-9L : #0001-0004)



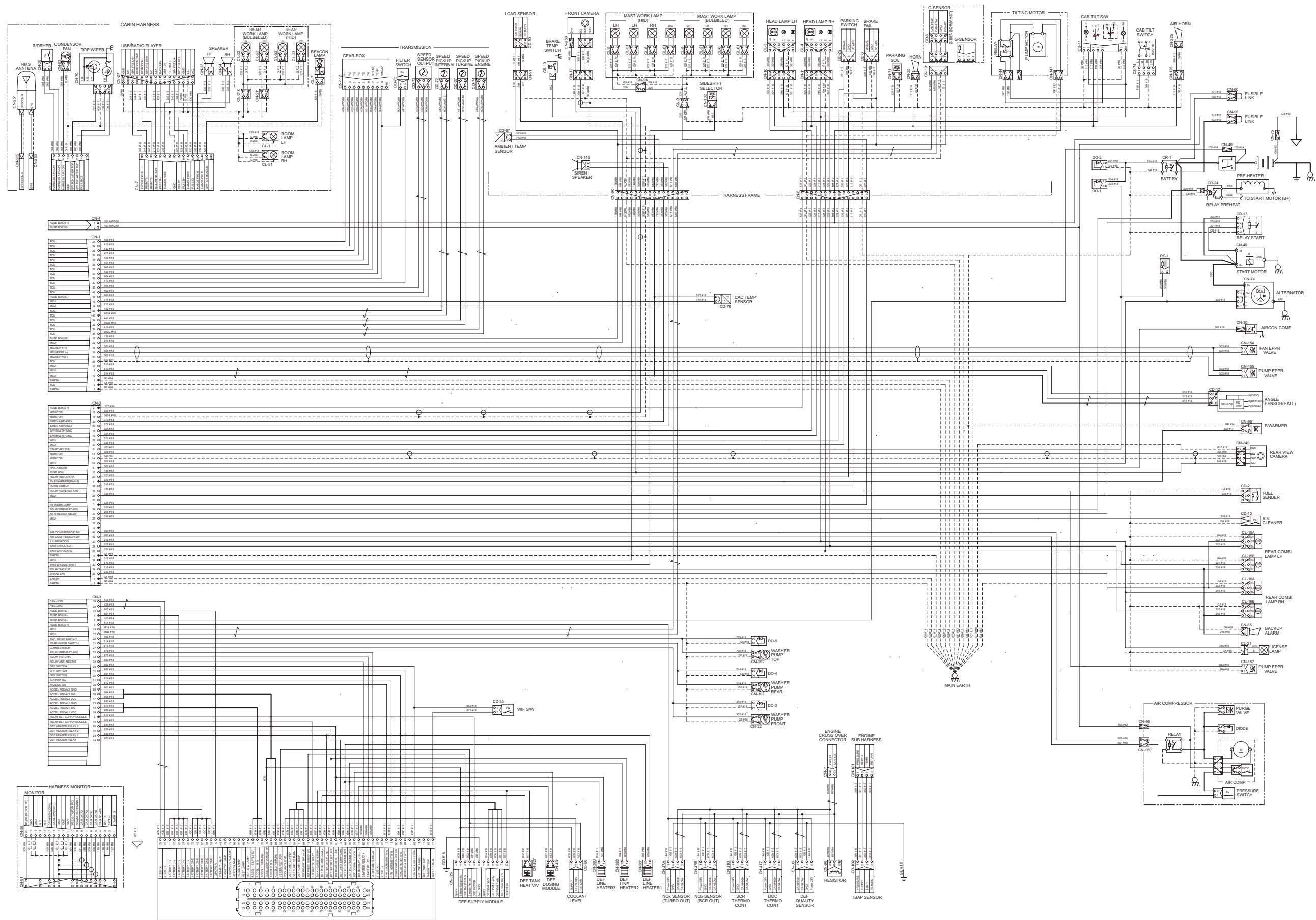
• ELECTRICAL CIRCUIT (2/6, 160D-9L : #0001-0004)



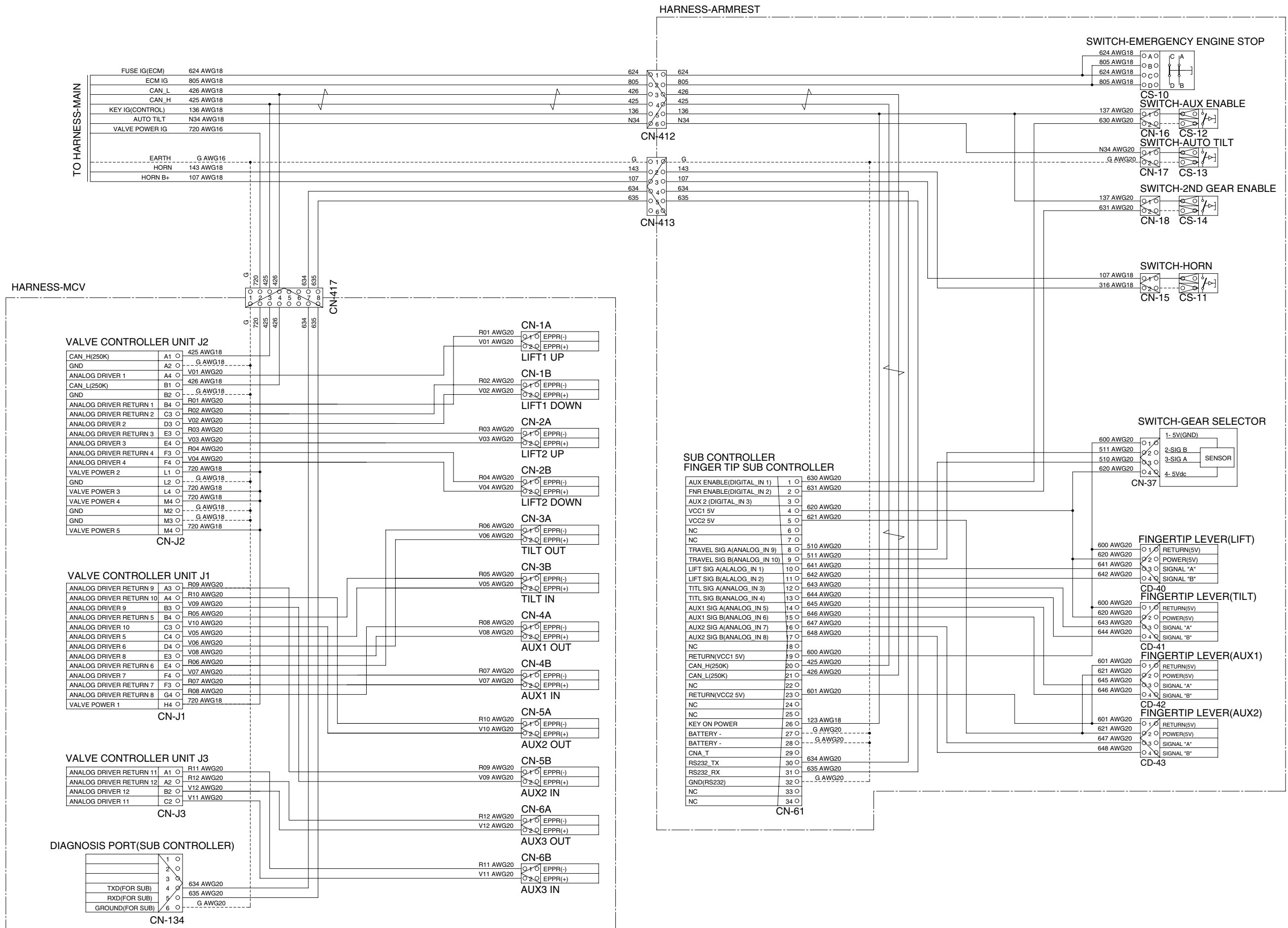
• ELECTRICAL CIRCUIT (3/6, 160D-9L : #0005-)



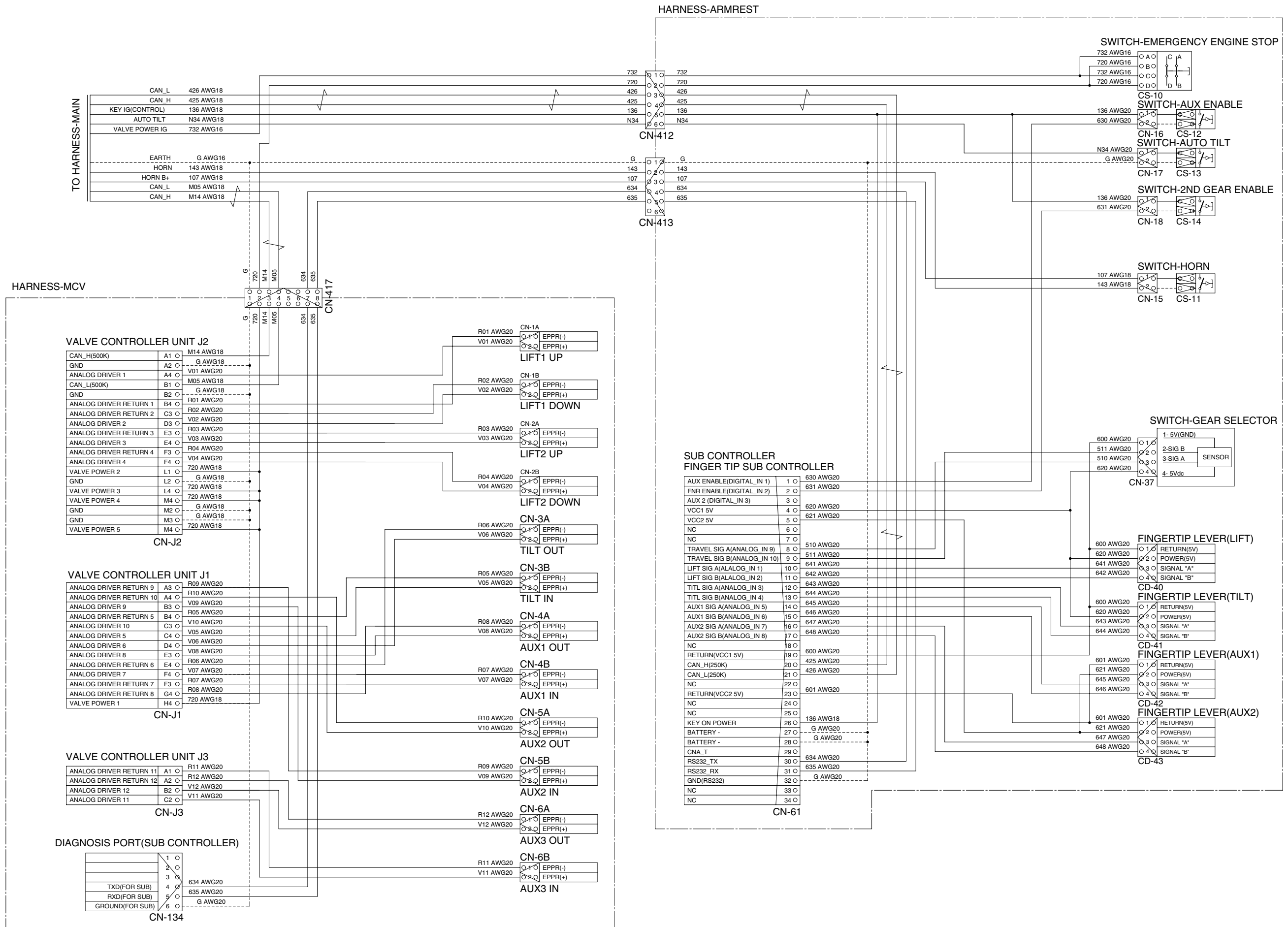
· ELECTRICAL CIRCUIT (4/6, 160D-9L : #0005-)



· ELECTRICAL CIRCUIT (5/6, FINGERTIP, 160D-9L : #0001-0004)



· ELECTRICAL CIRCUIT (6/6, FINGERTIP, 160D-9L : #0005-)

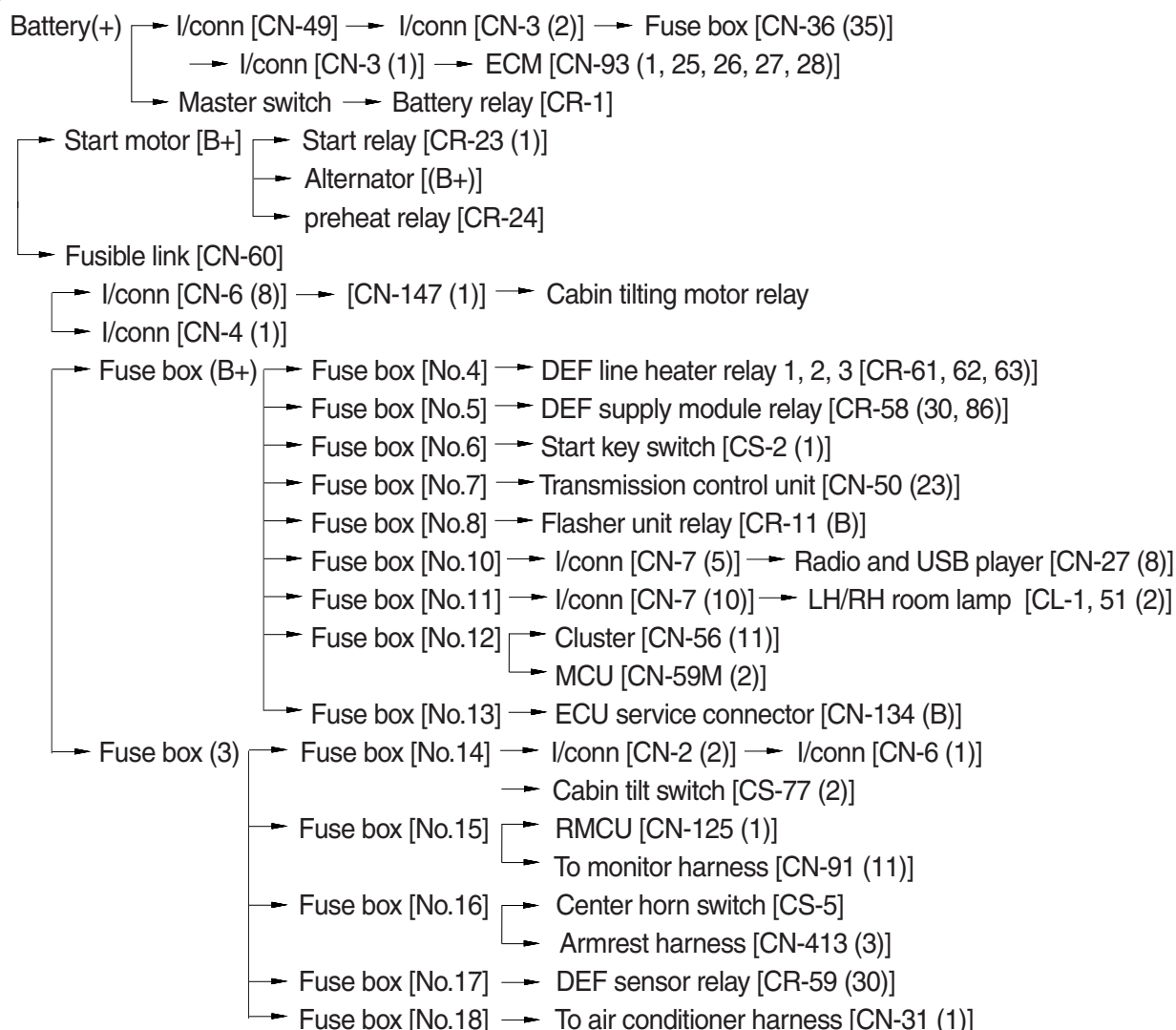


MEMORANDUM

1. POWER CIRCUIT

The negative terminal of the battery is grounded to the truck chassis and engine block.
When the start switch is in the off position, the current flows from the positive battery terminal.

1) OPERATING FLOW



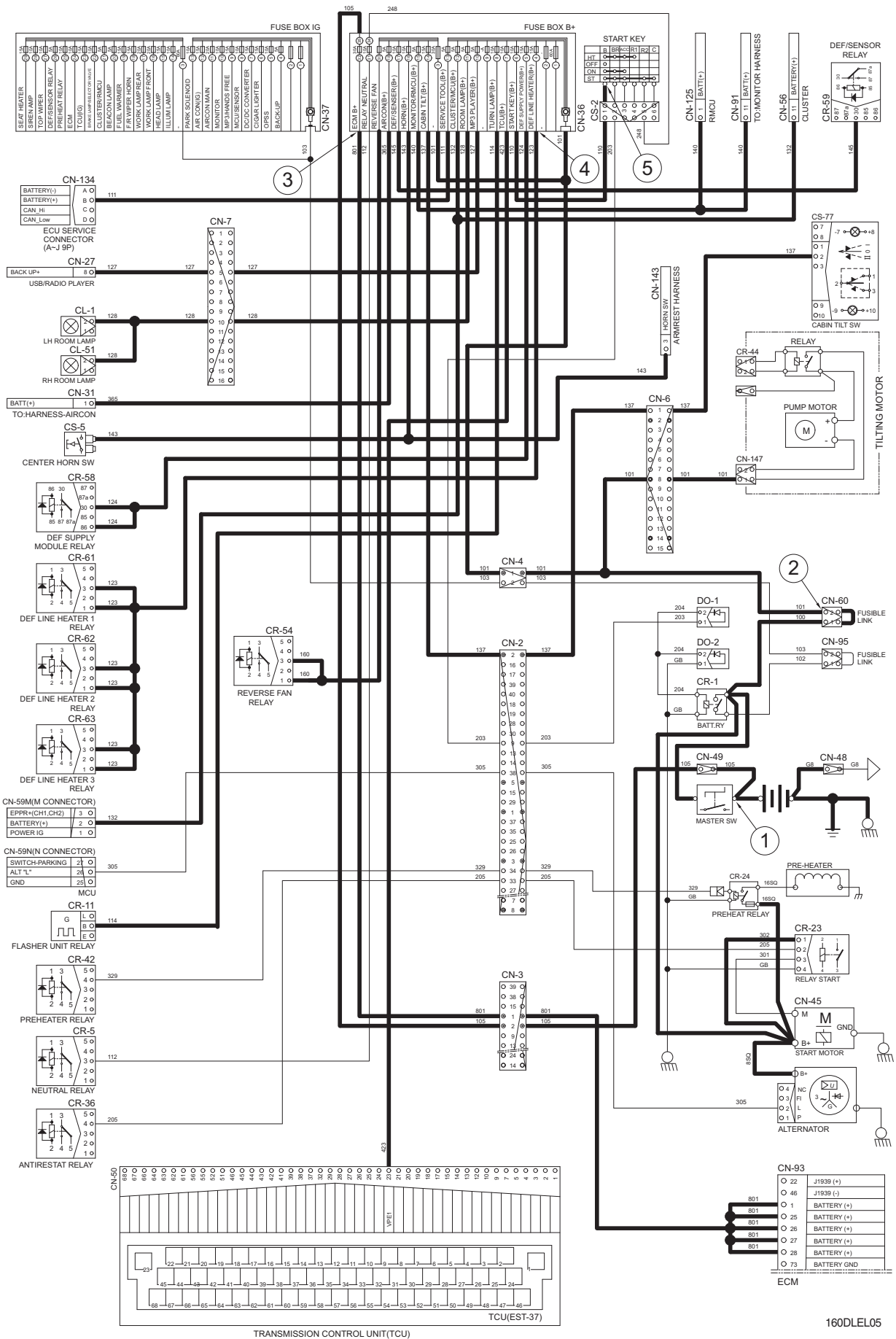
2) CHECK POINT

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.

POWER CIRCUIT



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

2. STARTING CIRCUIT

1) OPERATING FLOW

Battery(+) terminal → Master switch → 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 key switch is in ON position

Start switch ON [CS-2 (2)] → I/conn [CN-2 (9)] → 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 key switch is START position

Start switch START [CS-2(6)] → Fuse box B+ [CN-36 (34→31)] → Neutral relay [CR-5 (3→4)]
 → Anti start relay [CR-36 (3→4)] → I/conn [CN-2 (33)] → Start relay [CR-23 (2→3)]
 → Start motor [CN-45 (M)] → Start motor operating

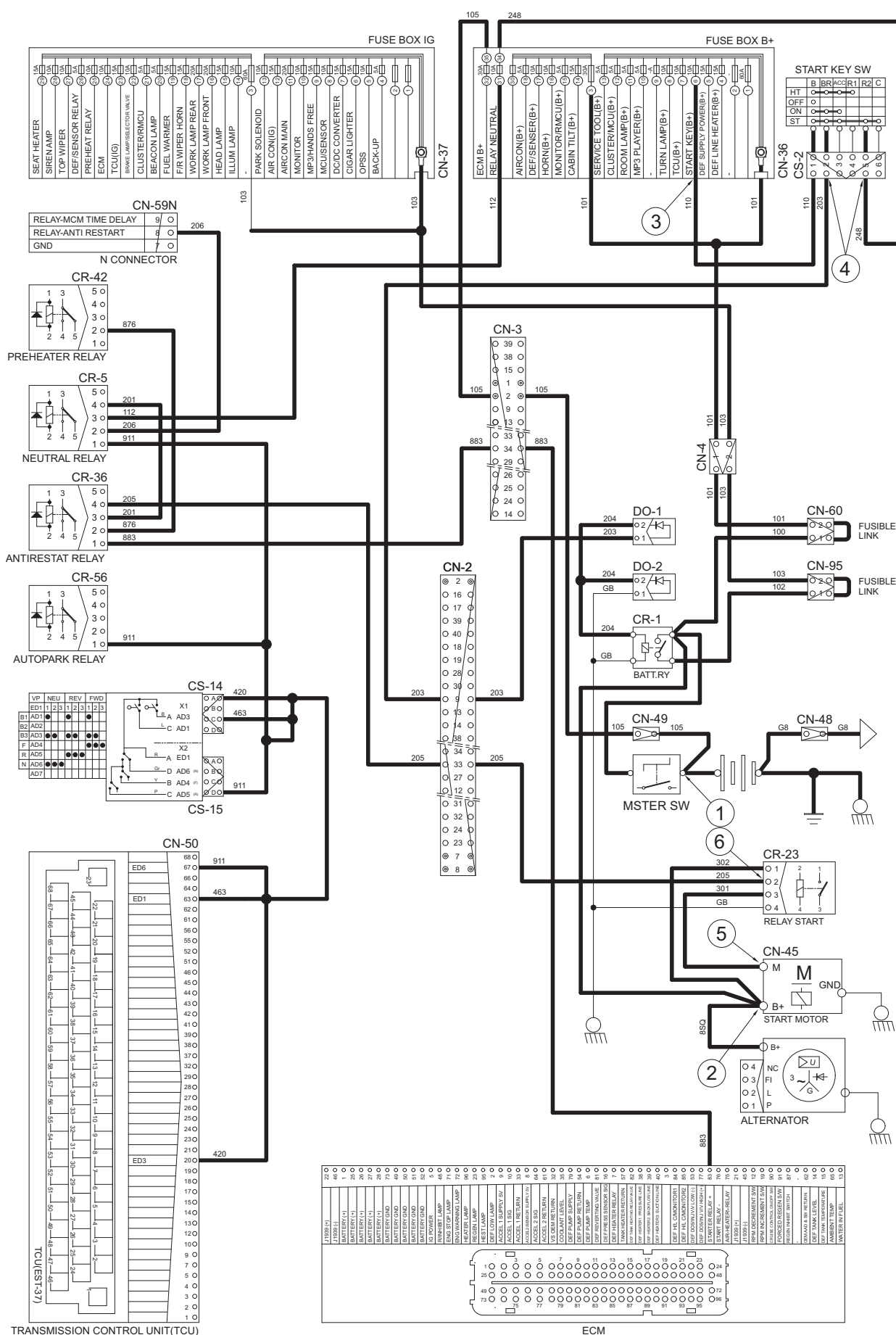
2) CHECK POINT

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



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

160D9LEL06

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 the alternator flows into the battery.

The current also flows from the alternator to each electrical component through the fusible link (CN-60, CN-95) 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
 - Battery (+) terminal → Charging
 - I/conn [CN-49] → I/conn [CN-3 (2)] → Fuse box B+ [CN-36 (35)]
- Fusible link [CN-60] → I/conn [CN-4 (1)] → Fuse box B+ [CN-36]
- Fusible link [CN-95] → I/conn [CN-4 (2)] → Fuse box IG [CN-37]

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

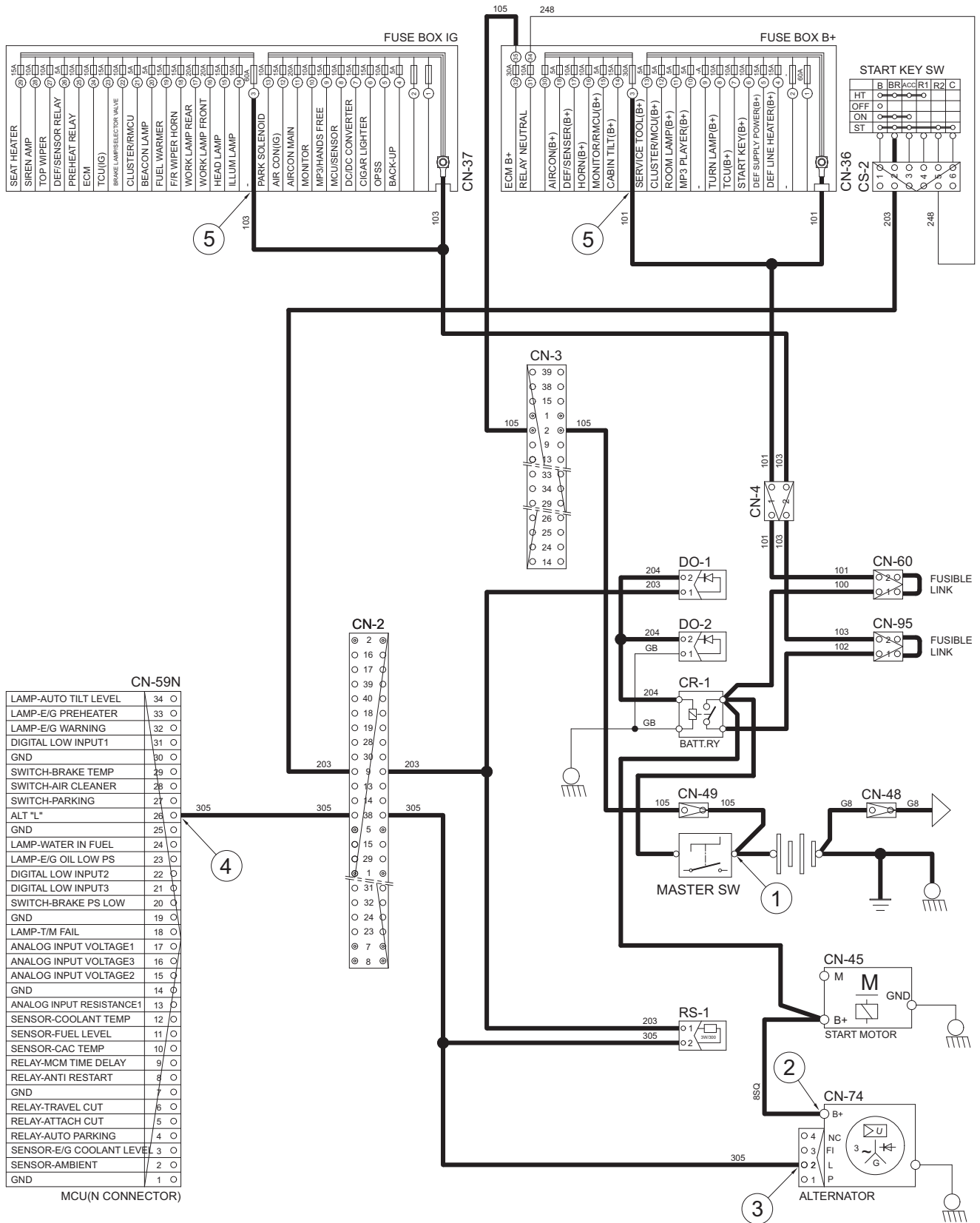
※ GND : Ground

※ Cautions

1. When using an arc welder, always disconnect the ground lead from the battery to prevent the 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



160D9LEL07

※ 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 → Battery relay [CR-1] → Start motor [CN-45 (B+)]
→ Preheater relay [CR-24]

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

Start switch ON [CS-2 (2)]

→ Fuse box IG [No.19] → Fuel warmer switch [CS-74 (2)] → Fuel warmer relay [CR-49 (85→87)]
→ I/conn [CN-2 (1)] → Fuel warmer [CN-96 (1)] → Fuel warmer operating
→ ECM [75] → I/conn [CN-3 (32)] → 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	HEAT	① - GND (Battery B+) ② - GND (Fusible link) ③ - GND (Preheater) ④ - GND (Preheater relay) ⑤ - GND (Fuel warmer switch) ⑥ - GND (Fuel warmer)	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.



5. HEAD LIGHT AND WORK LIGHT CIRCUIT

1) OPERATING FLOW

(1) Head light

Fuse box (No.15) → 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 (6)] → LH Head light low beam ON [CL-3 (6)]
 - I/conn [CN-11 (6)] → RH Head light low beam ON [CL-4 (6)]
- Multi function switch DOWN [CS-11 (6)]
 - Cluster high beam pilot lamp ON [CN-56 (13)]
 - I/conn [CN-2 (9)] → I/conn [CN-6 (4)]
 - I/conn [CN-10 (4)] → LH Head light high beam ON [CL-3 (4)]
 - I/conn [CN-11 (4)] → RH Head light high beam ON [CL-4 (4)]

(2) Front work lamp

Fuse box (No.16) → Work light switch [CS-21 (2)] → Switch ON, 1nd step [CS-21 (3)]
 → Front work lamp relay [CR-3 (86→87)] → I/conn [CN-2 (3)] → I/conn [CN-6 (15)]
 → I/conn [CN-9 (1)] → Mast work light ON [CL-5, 6, 51, 61 (2)]

(3) Rear work light

Fuse box (No.17) → Work light switch [CS-21 (5)] → Switch ON, 2nd step [CS-21 (6)]
 → Rear work lamp relay [CR-55 (86→87)] → I/conn [CN-7 (9)]

- I/conn [CN-210 (1)] → LH rear work light ON [CL-22 (2)]
- I/conn [CN-211 (1)] → RH rear work light ON [CL-23 (2)]

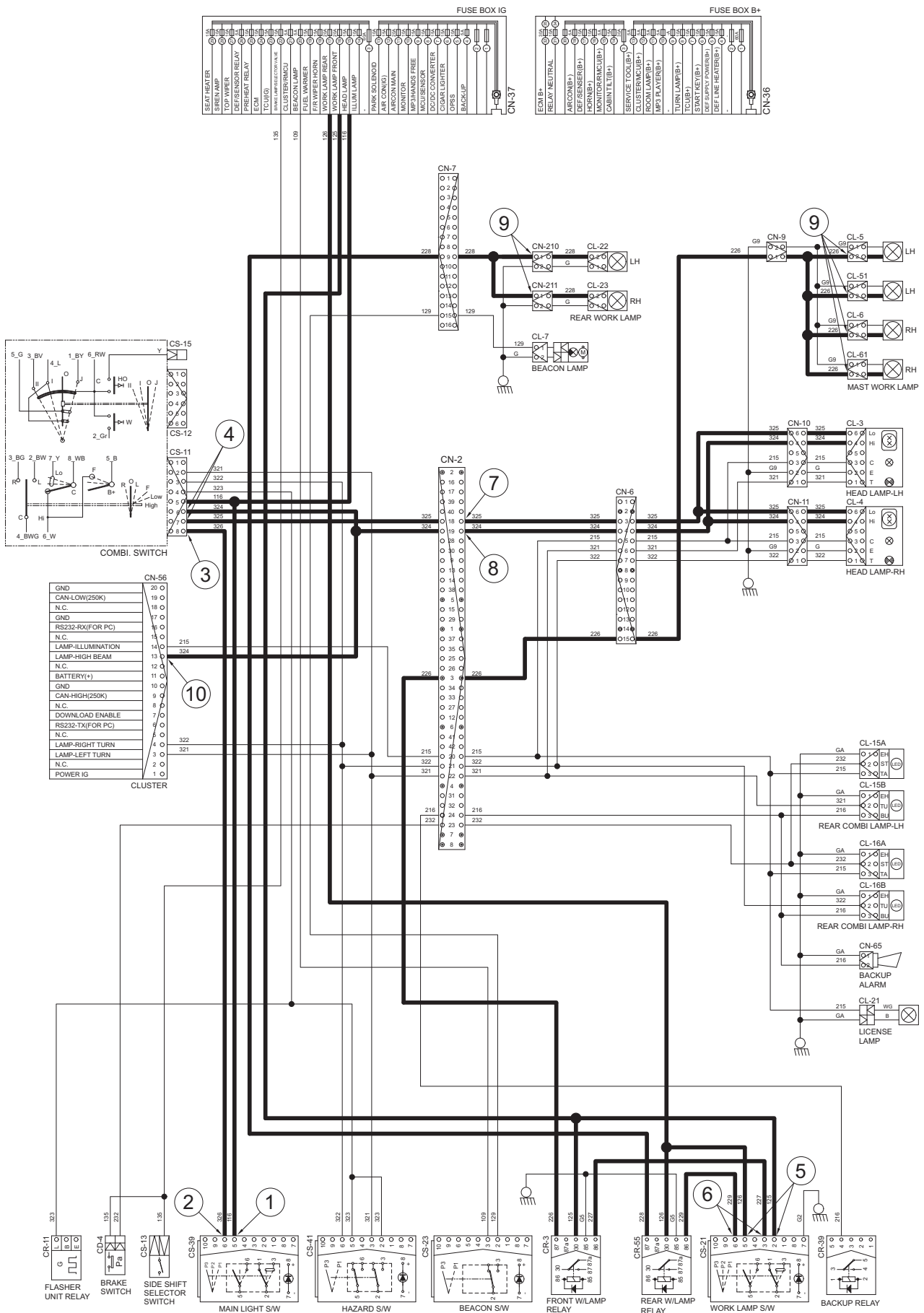
2) CHECK POINT

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

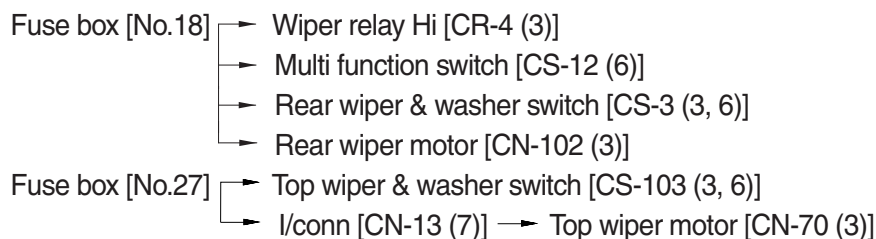


※ The circuit diagram may differ from the equipment, so please check before a repair.

160D9LEL09

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 (27)] → Front washer pump [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)] → (2)
 - 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 (31)] → Rear washer pump [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-13 (6)] → 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 (22)] → Top washer pump [CN-202 (2)] → Washer operating
 - Wiper switch ON [CS-103 (3)→(2)] → I/conn [CN-13 (6)] → Top wiper motor [CN-70 (4)] → Top wiper motor operating

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

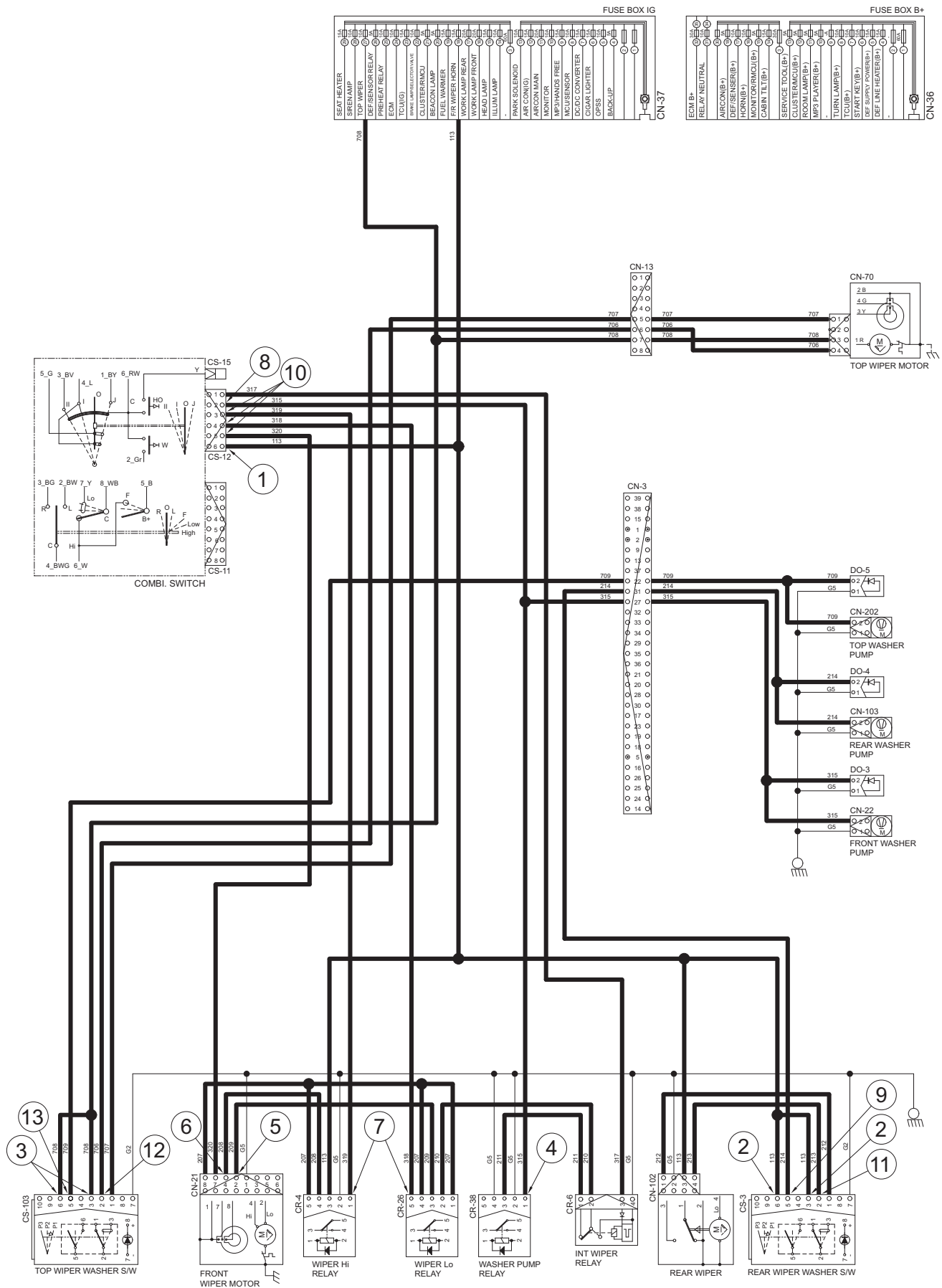
2) CHECK POINT

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 washer power output) ⑬ - GND (Top wiper motor power output)	20~25V

※ GND : Ground

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

WIPER AND WASHER CIRCUIT



160D9LEL10

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

GROUP 3 CLUSTER

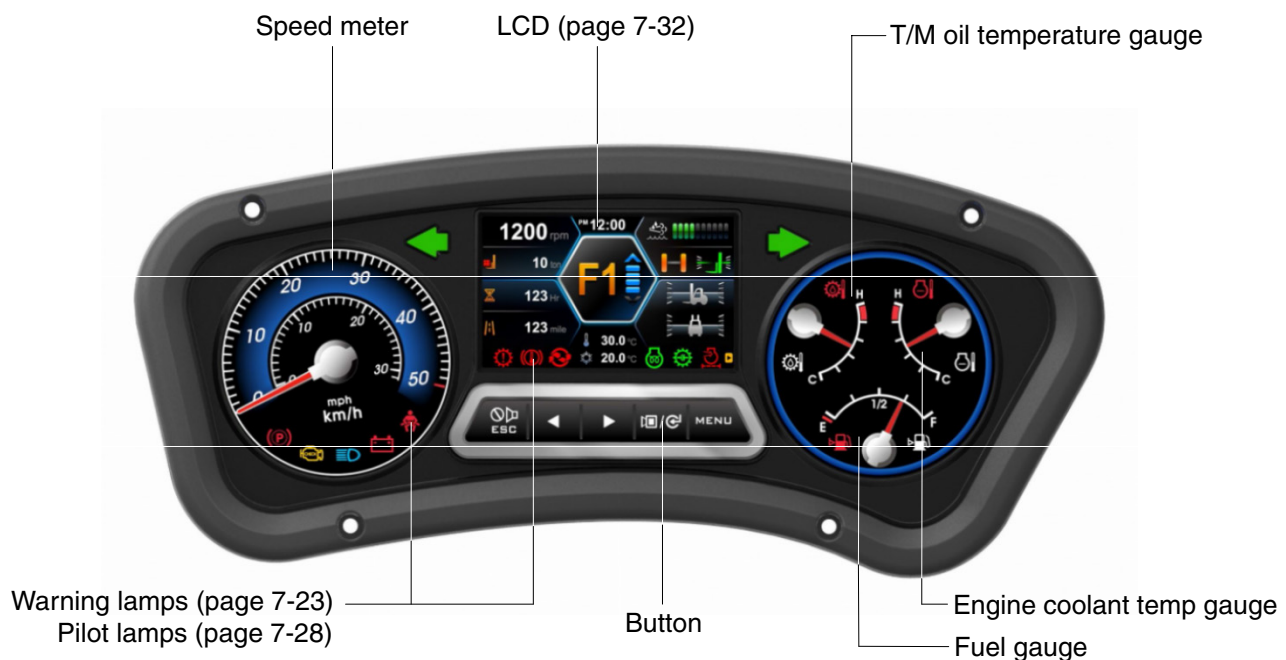
1) STRUCTURE

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 chapter 7. **PLANNED MAINTENANCE AND LUBRICATION** of the operator's manual.

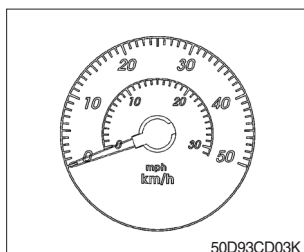
※ When the cluster provides a warning immediately check the problem, and perform the required action.



160D9LCD03-01

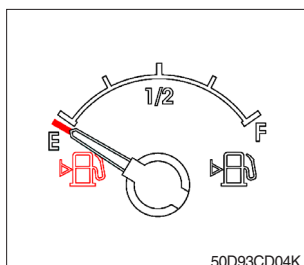
2) GAUGE

(1) Speed meter



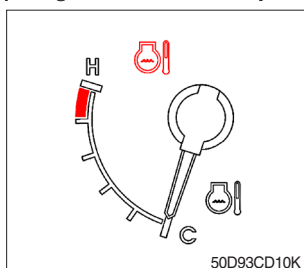
- ① The speed meter displays the speed of truck in mph and km/h.
 - 0~50 km/h
 - 0~31 mph

(2) Fuel gauge



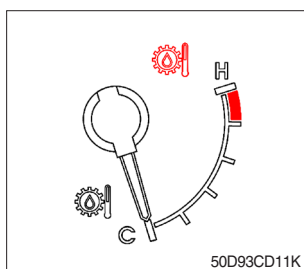
- ① This gauge indicates the amount of fuel in the fuel tank.
- ② Fill the fuel when the warning lamp lights ON or the indicator moves E point, refuel as soon as possible to avoid running out of fuel.
- ※ If the gauge indicates below E point even though the truck is on the normal condition, check the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

(3) Engine coolant temperature gauge



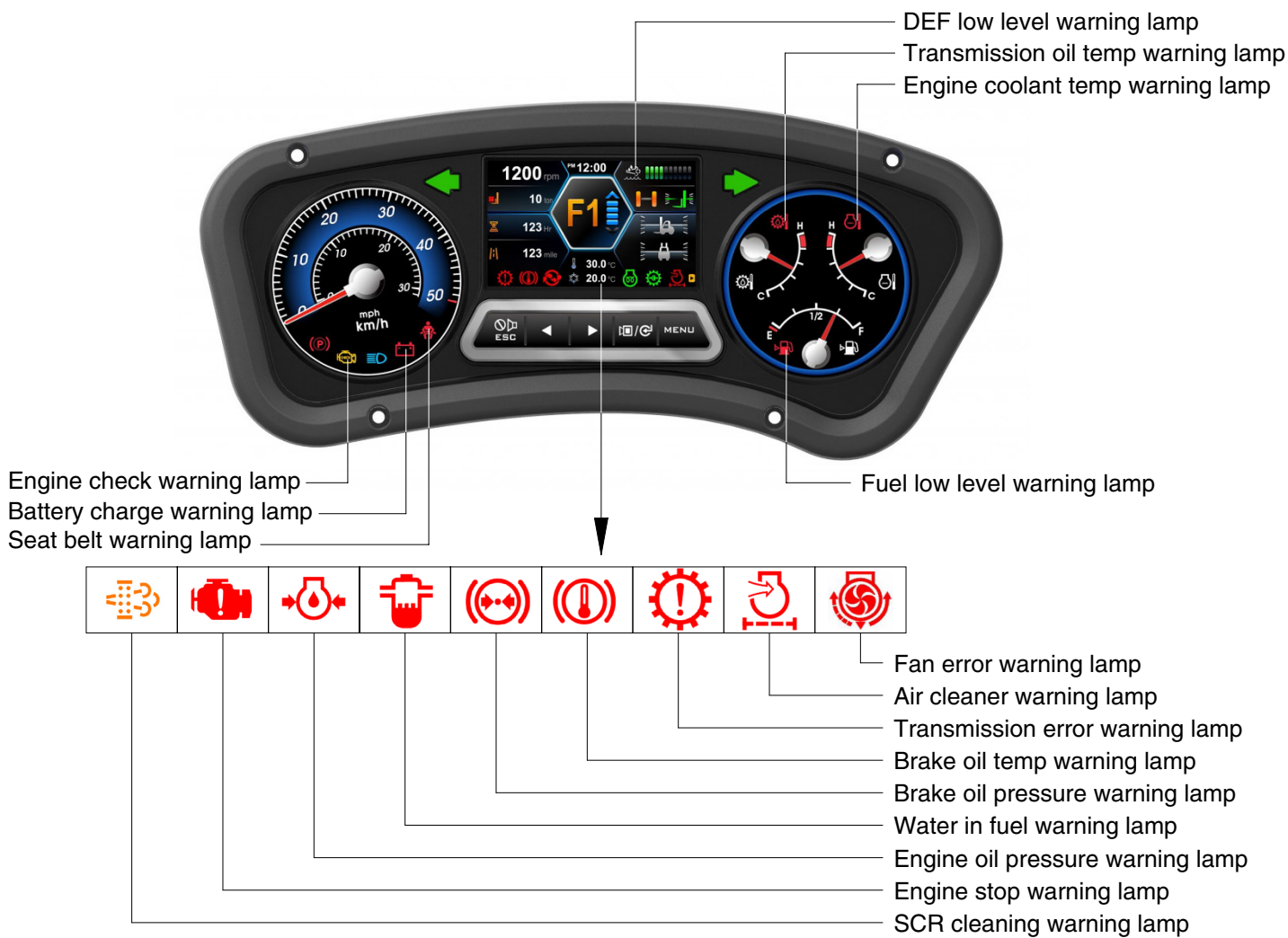
- ① This indicates the temperature of coolant.
 - White range : 40~104 °C (104~219 °F)
 - Red range : Above 104 °C (219 °F)
- ② Keep idling engine at low speed until the indicator is in the operating range.
- ③ If the indicator is in the red range, turn OFF the engine and check the radiator and engine.
- ※ 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.

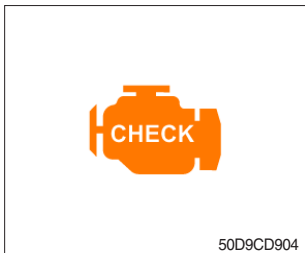
3) WARNING LAMPS



300D9CD02-1

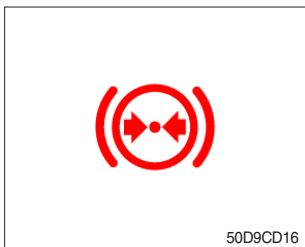
※ When the warning and pilot lamps are illuminated more than display, you can display next lamps by push the button (▶).

(1) Engine check lamp



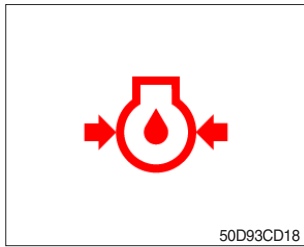
- ① This lamp lights ON during a nonfatal engine system error.
- ② The engine can still be run, but the fault should be corrected as soon as possible.

(2) Brake oil pressure warning lamp



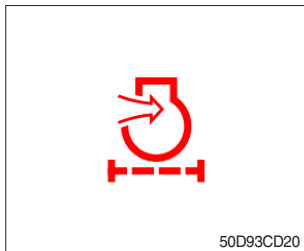
- ① The lamp lights ON when the oil pressure of service brake drops below the normal range.
 - ② When the lamp is ON, stop the engine and check for its cause.
- ※ Do not operate until the problems are corrected.

(3) Engine oil pressure warning lamp



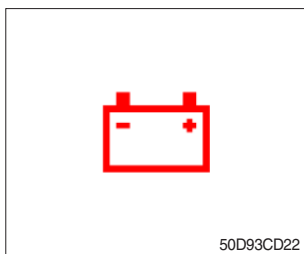
- ① This lamp comes ON for a while after starting the engine because of the low oil pressure.
- ② If the lamp comes ON during engine operation, shut OFF engine immediately. Check oil level.

(4) Air cleaner warning lamp



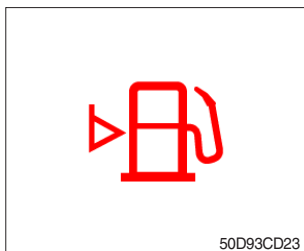
- ① This lamp operates by the vacuum caused inside when the filter of air cleaner is clogged.
- ② Check the filter and clean or replace it when the lamp is ON.

(5) Battery charging warning lamp



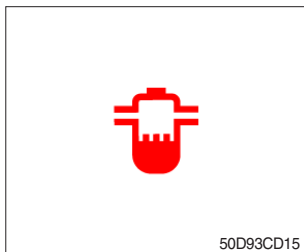
- ① This lamp is ON after start switch is turned ON, it is turned OFF after starting the engine.
- ② Check the battery charging circuit when this lamp comes ON during engine operation.

(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



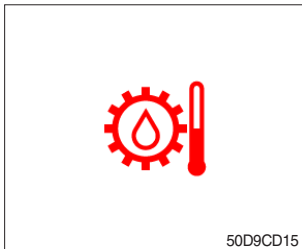
- ① This lamp lights ON for the first five seconds after starting the engine.

(9) Engine coolant temperature warning lamp



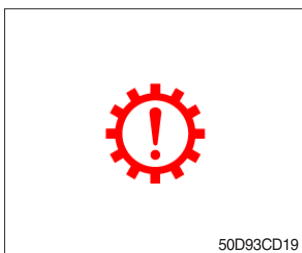
- ① This lamp is turned ON when the temperature of cooling water is over the normal temperature (104 °C, 209 °F).
- ② Check the cooling system when the lamp is ON.

(10) Transmission oil temperature warning lamp



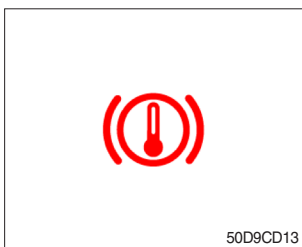
- ① This lamp informs the operator that transmission oil is above the specified temperature (107 °C, 225 °F).
 - Lamp ON : Abnormal
 - Lamp OFF : Normal
- ※ **When this lamp lights up during operation, stop the engine and check the truck.**

(11) Transmission error warning lamp



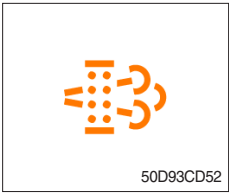
- ① This lamp lights ON and the information window of the LCD shows the error code when an error occurs in the transmission.
 - ② Immediately pull the truck to a convenient stop. Stop the engine. Investigate the cause.
- ※ **Consult a HYUNDAI dealer to investigate the cause.**
- ※ **Do not operate until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

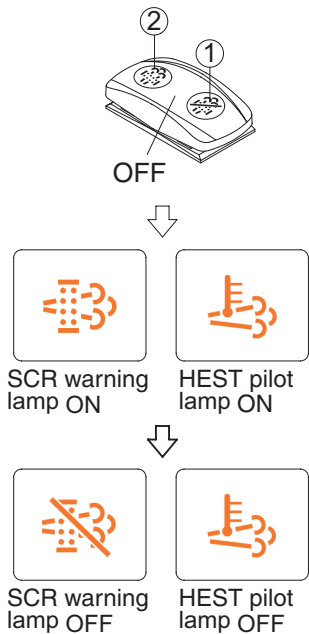
(13) SCR (Selective Catalytic Reduction) CLEANING WARNING LAMP



① This lamp lights ON when the SCR cleaning is needed and lamp flashes when manual SCR cleaning is activated as table below.

Condition	Warning lamp				Remark
	SCR cleaning lamp	DEF Low Lamp	Engine Check Lamp	Engine Stop Lamp	
SCR needs to be cleaned	On	-	-	-	1. Change to a more challenging duty cycle. 2. Perform manual SCR cleaning.
SCR needs to be cleaned immediately	On	-	On	-	Manual SCR cleaning is required.
Stationary SCR cleaning status	Flash	-	-	-	-
DEF level initial warning	-	On	-	-	DEF level 10% Engine error code 3497
DEF level critical warning	-	Flash	-	-	DEF level 5% Engine error code 3498
DEF level initial warning	-	Flash	On	-	DEF level 2.5% Engine error code 1673, 25% derate
DEF level secondary derate warning	-	Flash	On	-	DEF level 0% Engine error code 3547,3714 50% derate, 30 min.
DEF level final derate warning	-	Flash	On	On	Engine error code 3712 Contact Hyundai service center or dealer.

※ Manual SCR cleaning method



300D9CD143

※ Manual SCR cleaning applies if the truck is in a fireproof area and there is no plan to turn off the truck during the SCR cleaning.

① Stop and park the truck.

② Push the switch to position ② to initiate the manual SCR cleaning.

※ Refer to the page 7-57 for the switch operation.

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

③ The SCR cleaning warning lamp flash and HEST pilot lamp will light on during the manual SCR cleaning function is operating.

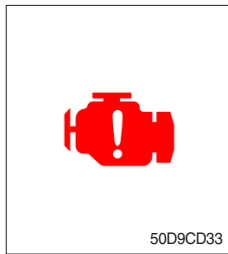
④ The SCR cleaning warning and/or HEST pilot lamp will light OFF when the SCR cleaning function is completed.

(14) 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 7-26 for detail.**

(15) Engine stop warning lamp



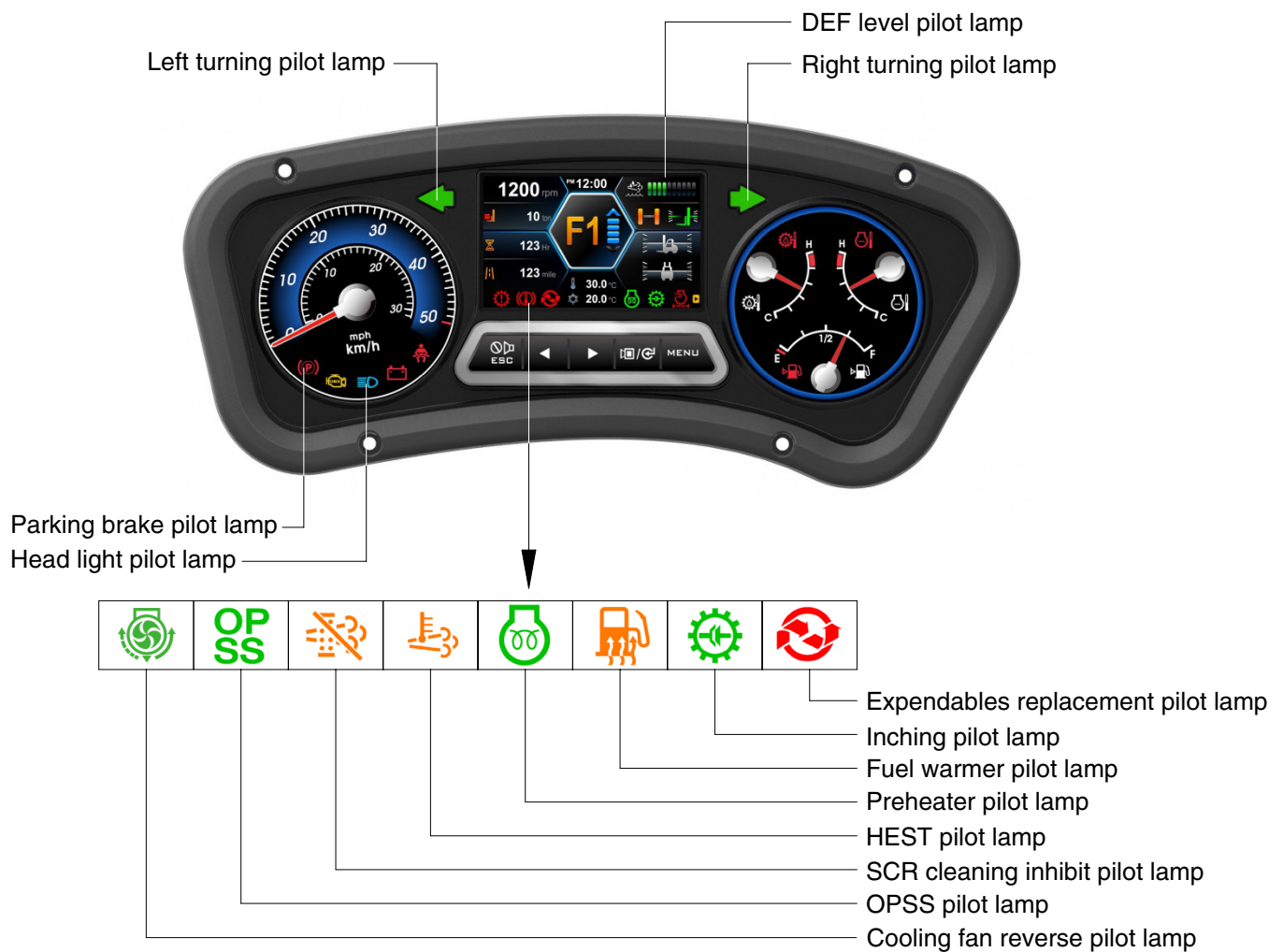
- ① When this warning lamp lights ON, stop the engine immediately and check the DEF level and related parts of the engine.
- ※ **Please contact your Hyundai service center or local dealer.**

(16) Fan error warning lamp



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

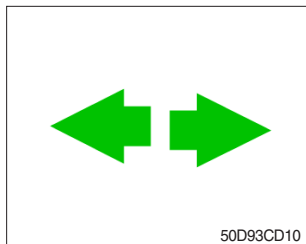
4) PILOT LAMPS



300D9CD02-2

※ 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.

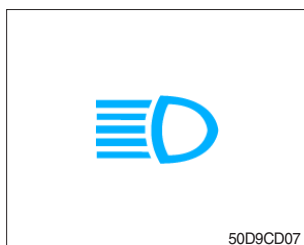
(2) Parking brake pilot lamp



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.

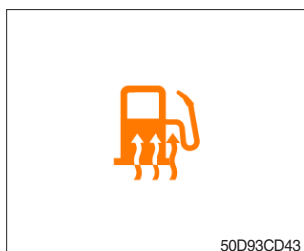
※ Refer to page 5-13 of the operator's manual.

(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) SCR cleaning inhibit pilot lamp



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

※ Refer to the page 7-57 for the SCR cleaning switch.

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

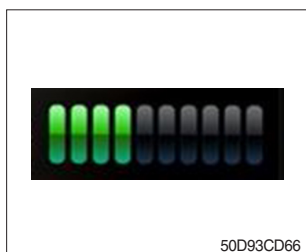


- ① This warning lamp indicates, when illuminated, that exhaust temperatures are high due to SCR cleaning.
- ② The lamp will also illuminate during a manual SCR cleaning.
- ③ When this lamp is illuminated, be sure the exhaust pipe outlet is not directed at any surface or material that can melt, burn,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

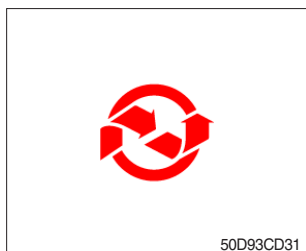
※ The lamp does not signify the need for any kind of equipment or engine service; It merely alerts the equipment operator to high exhaust temperatures. It will be common for the lamp to illuminate on and off during normal equipment operation as the engine completes the SCR cleaning.

(10) 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.

(11) 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 start switch ON, and then light off.
- ③ Please check the expendables management list in maintenance menu.

(12) Cooling fan reverse rotation pilot lamp

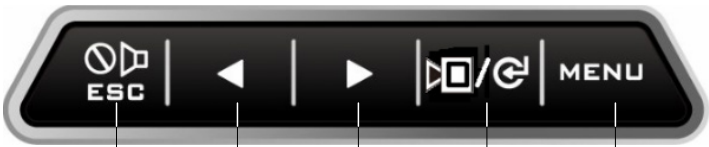


- ① This lamp lights ON when the cooling fan is operated to the reverse rotation.

※ Refer to page 7-58 for the operation of the cooling fan.

4) CLUSTER BUTTON

Each button has the following function.



- Menu button
- Camera/Enter button
- Move button
- Buzzer stop/ESC button

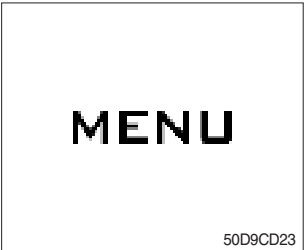
160D9LCD121

(1) Buzzer stop/ESC button



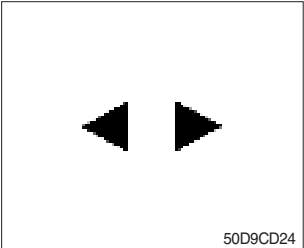
- ① This button is used to stop the buzzer sound.
- ② If another alarm condition occurs after this button has been pressed, the alarm buzzer will re-sound.

(2) Menu button



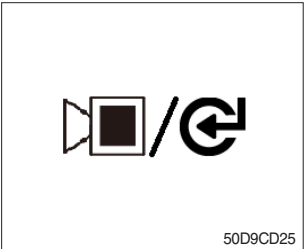
- ① Move in menu (left, up / right, down).

(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

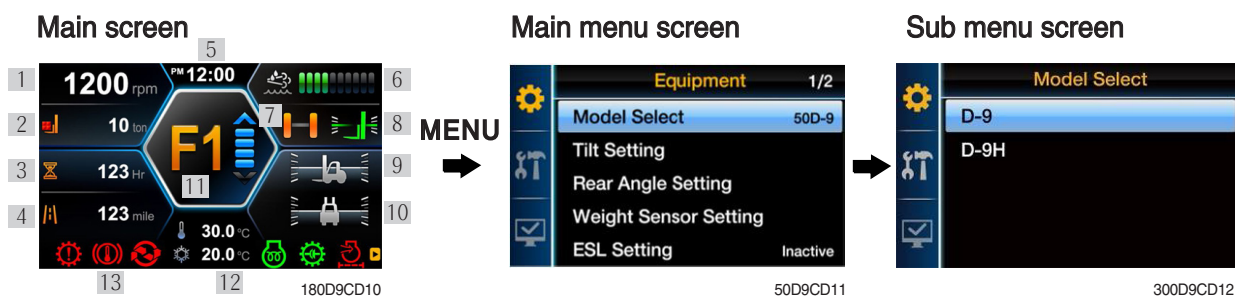


- ① Change the camera screen on main
- ② This button is used to select menu.

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 | 8 Mast angle (opt) |
| 2 Load indicator (opt) | 9 Vehicle angle X (opt) |
| 3 Hour meter | 10 Vehicle angle Y (opt) |
| 4 Odometer | 11 T/M info (error code, gear, warning) |
| 5 Current time | 12 Temperature (outdoor temp., setting temp) (cabin opt) |
| 6 DEF level gauge | 13 Warning and pilot lamps |
| 7 Rear wheel angle (opt) | |

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) Camera screen

- ① Depending on the gear, if the gear is rear position, screen is changed to camera screen.
- ② If the camera is not mounted or the camera signal is abnormal, the current screen remains.

(3) 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	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
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)

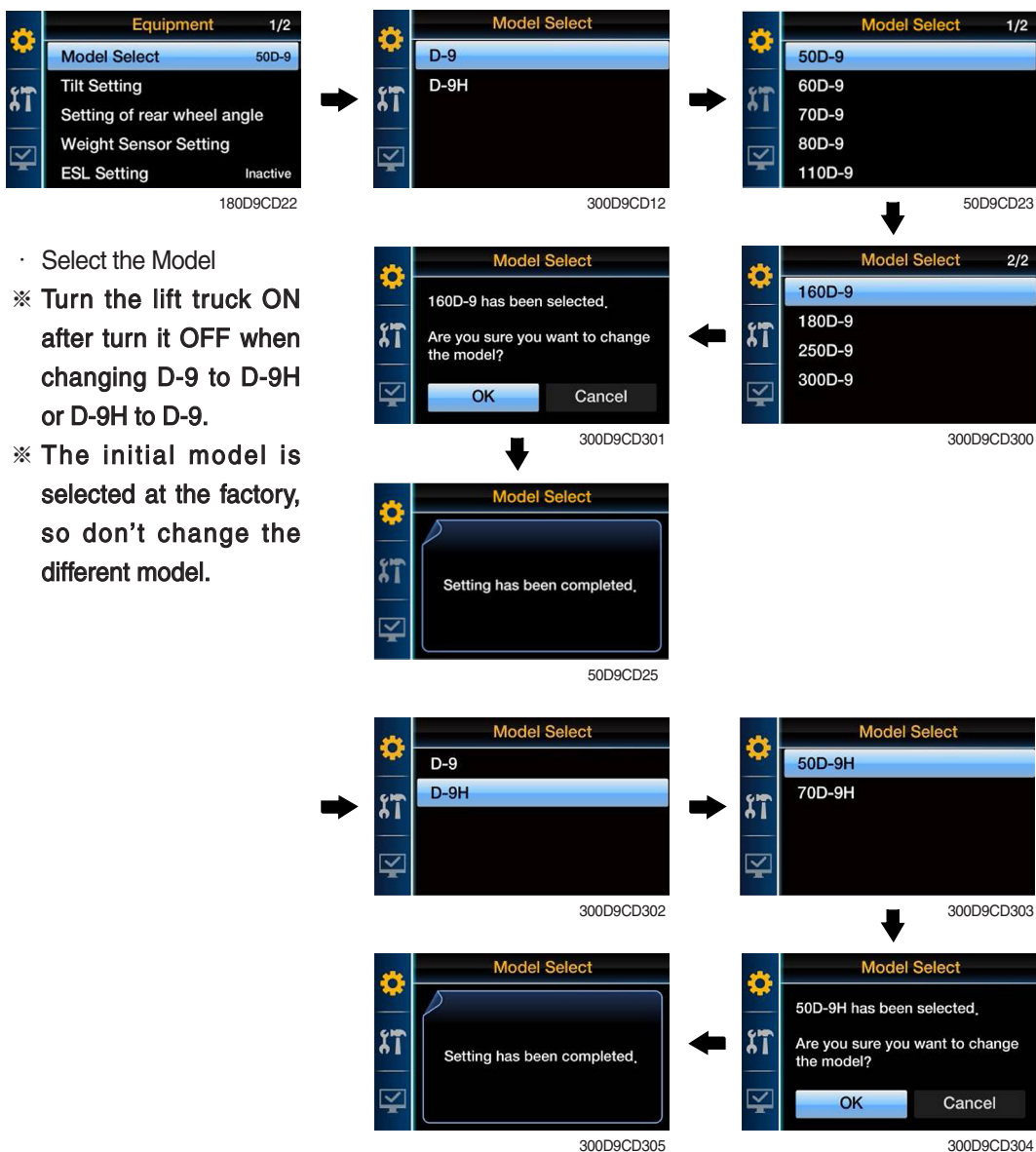
(3) Equipment

① Choose the equipment



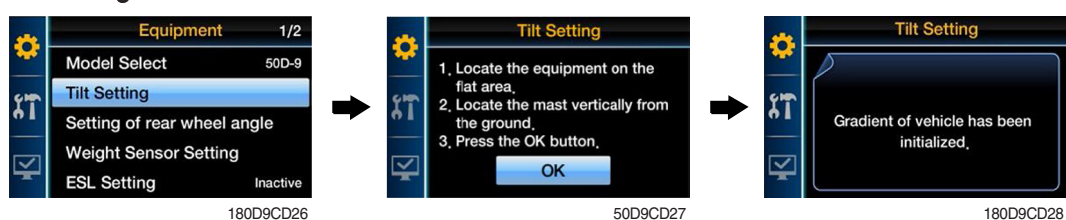
- To enter the menu, you must input user password.
- Default password is '00000'
- You should set password by five to ten digit.

② Model select



- Select the Model
- ※ Turn the lift truck ON after turn it OFF when changing D-9 to D-9H or D-9H to D-9.
- ※ 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.

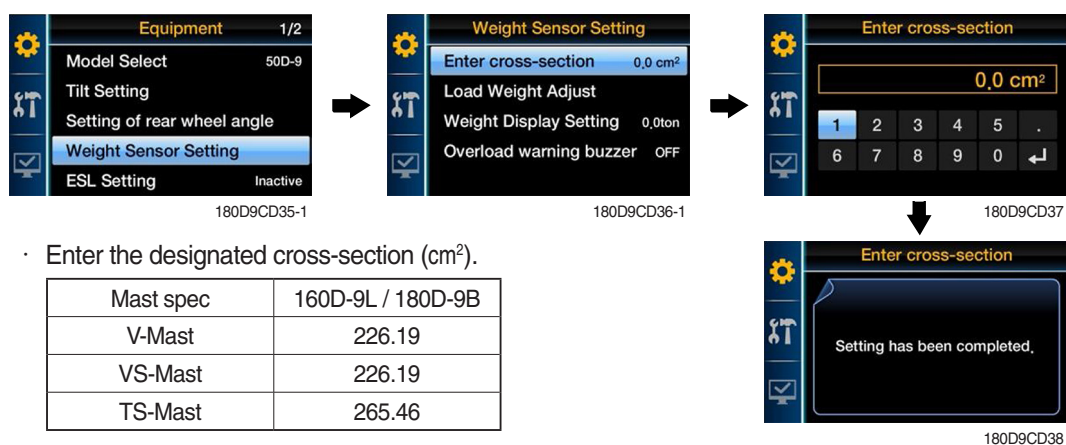
④ Setting for rear wheel angle



- 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

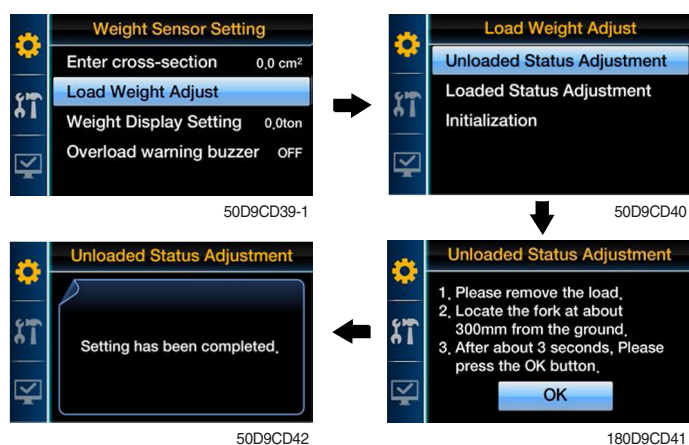
a. Cross-section



b. Load weight adjust

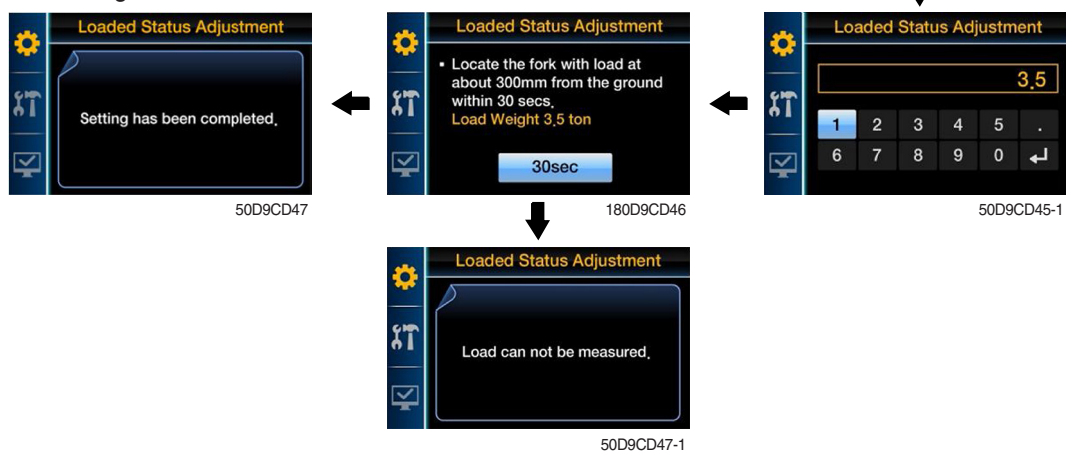
· Unloaded status adjustment

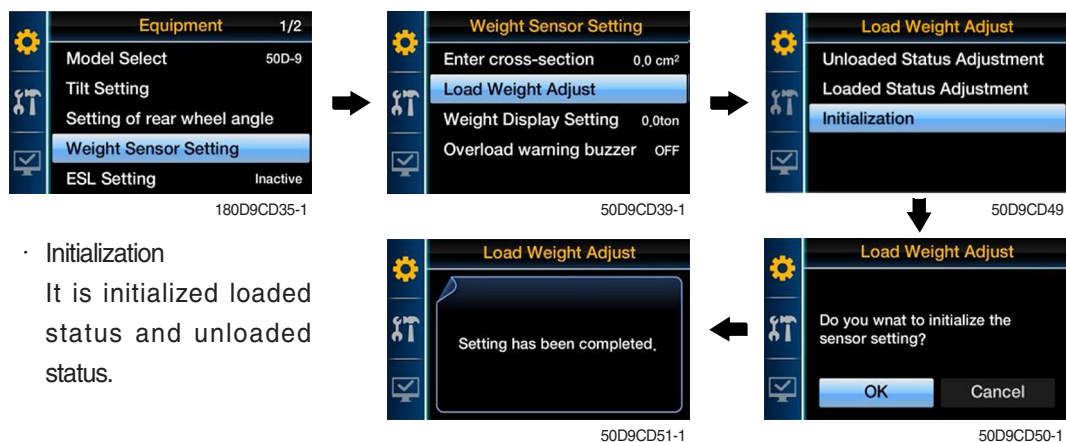
In the unloaded from the ground waiting 5 seconds after lift 30 cm, and tare ON.



· Loaded status adjustment

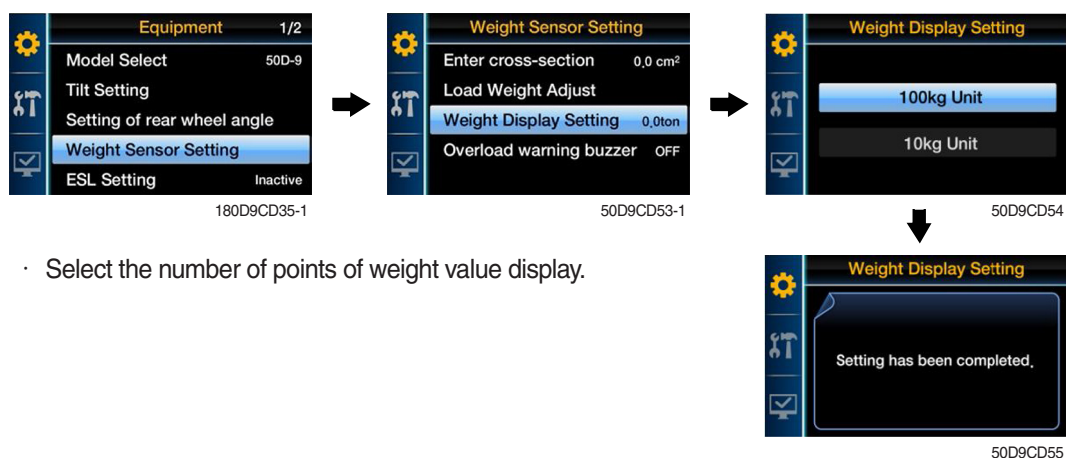
Loaded enter the weight.
-> In the loaded from the ground waiting 5 seconds after lift 30 cm.
-> Weight correction ON.





- Initialization
It is initialized loaded status and unloaded status.

c. Weight display setting



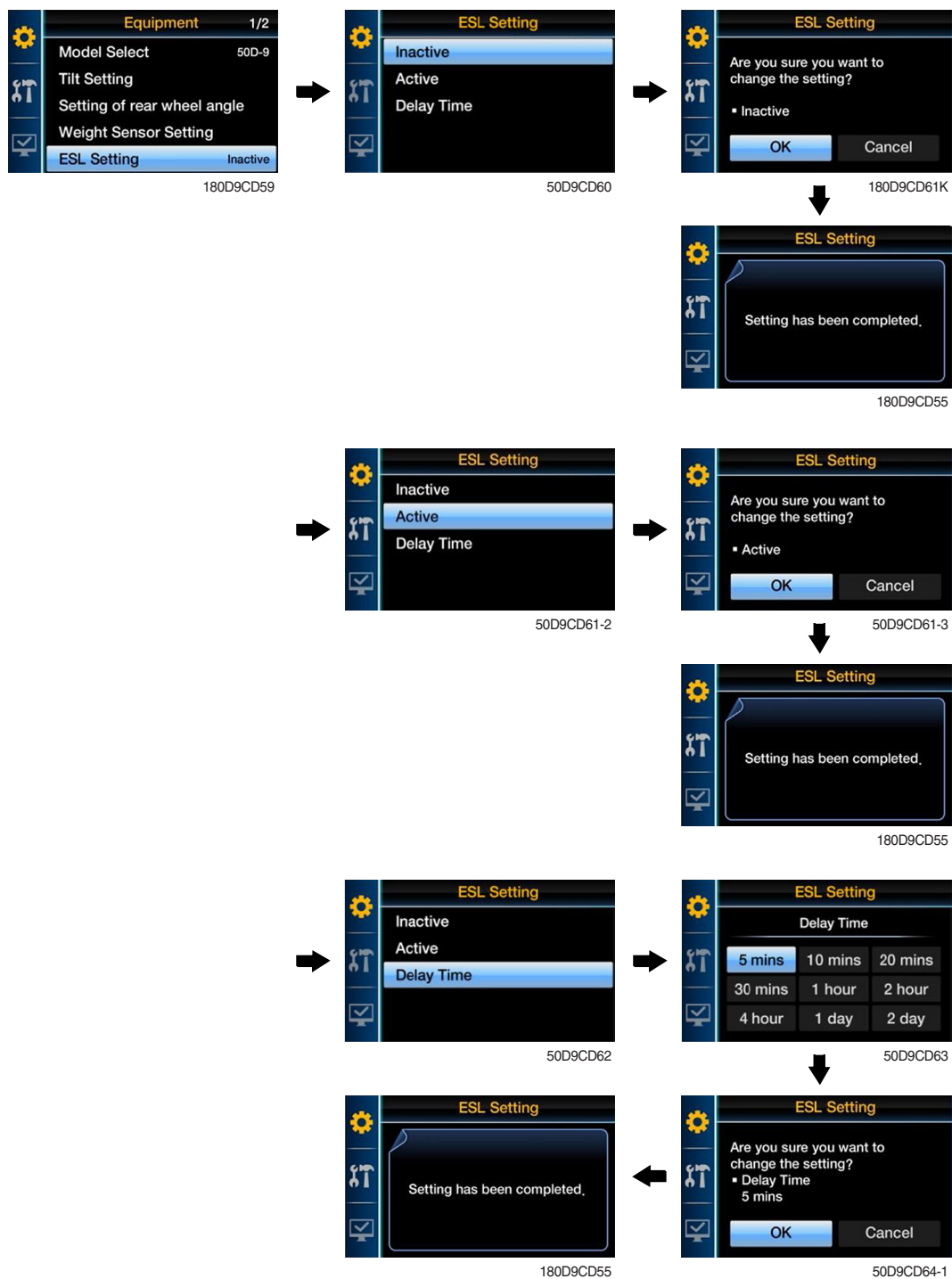
- Select the number of points of weight value display.

d. Overload warning buzzer



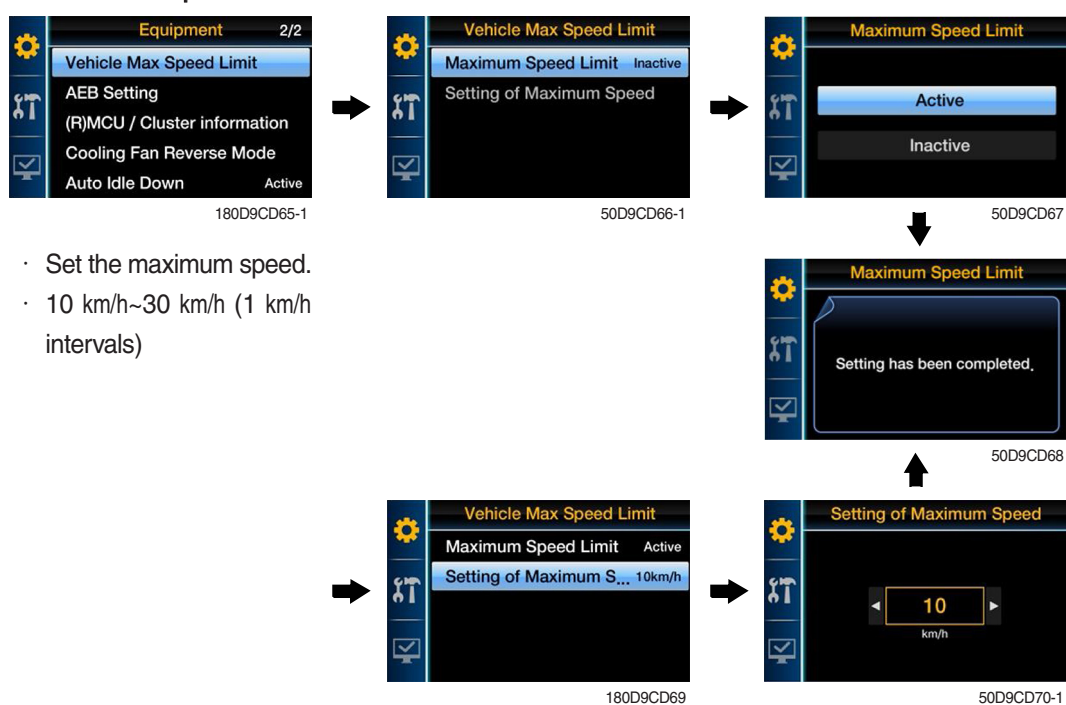
- Choose using buzzer when over weight.

⑥ ESL setting



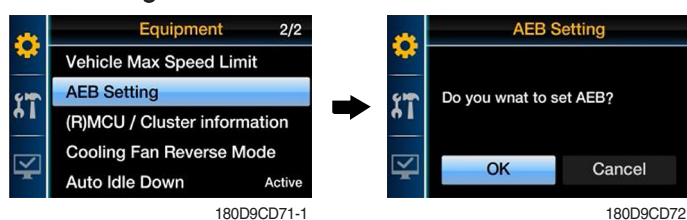
- Set ON/OFF function for using limitation of ignition and time for starting.
- Set time 5 minutes for starting :
In 5 minutes you can restart without password, but after 5 minutes, you should input password for starting.

⑦ Vehicle max speed limit



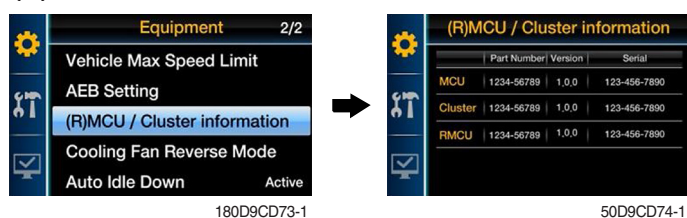
- Set the maximum speed.
- 10 km/h~30 km/h (1 km/h intervals)

⑧ AEB setting



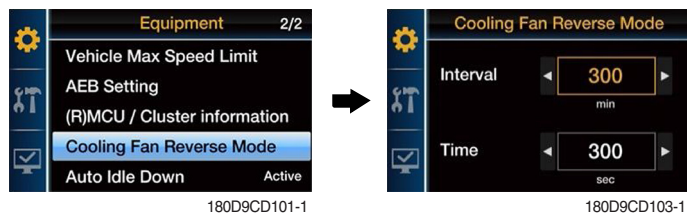
- Press OK button, then calibration will be started, for cancel, press Menu/ECS/Enter button.
- When it is finished (OK sign at gear box), Press Menu/ECS/Enter button.
- Start the engine : AEB start
- Start switch ON : Brake pedal sensor calibration

⑨ (R) MCU / Cluster information



- Software version check for MCU/Cluster/RMCU.

⑩ Cooling fan reverse mode

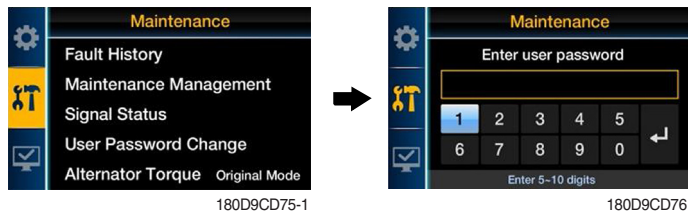


- Manual : The fan only rotate in reverse direction while you hold down the manual button.
- Automatic : The fan rotate in reverse direction at pre-set interval.
 - Interval : 30 minutes ~ 5 hours
 - Time : 30 seconds ~ 5 minutes

※ Refer to the page 7-58 for the cooling fan control switch.

(4) Maintenance

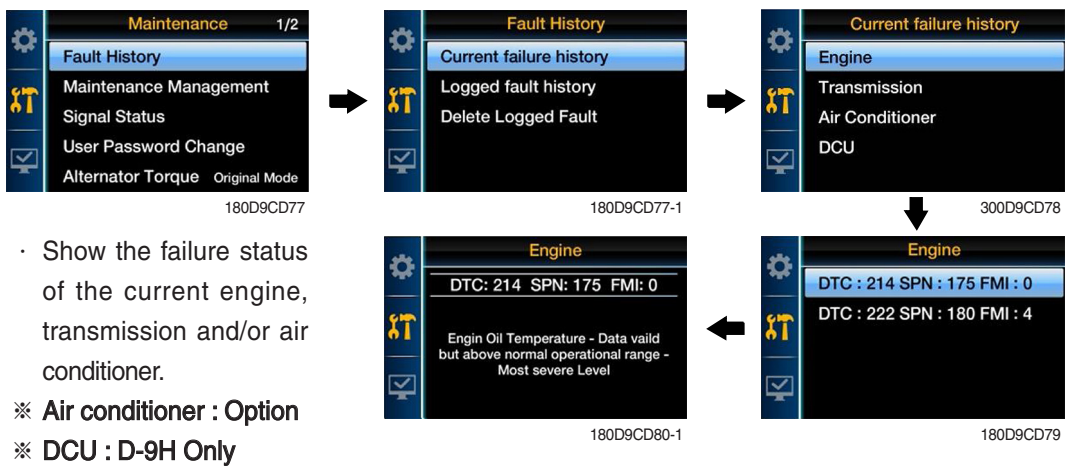
① Choose the maintenance



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

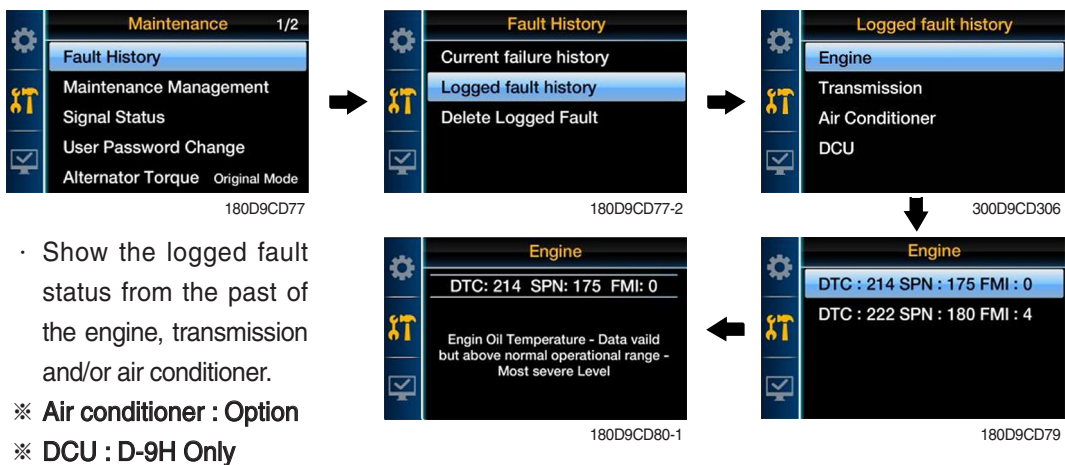
② Failure history

a. Current failure history



- Show the failure status of the current engine, transmission and/or air conditioner.
- ※ Air conditioner : Option
- ※ DCU : D-9H Only

b. Logged fault history

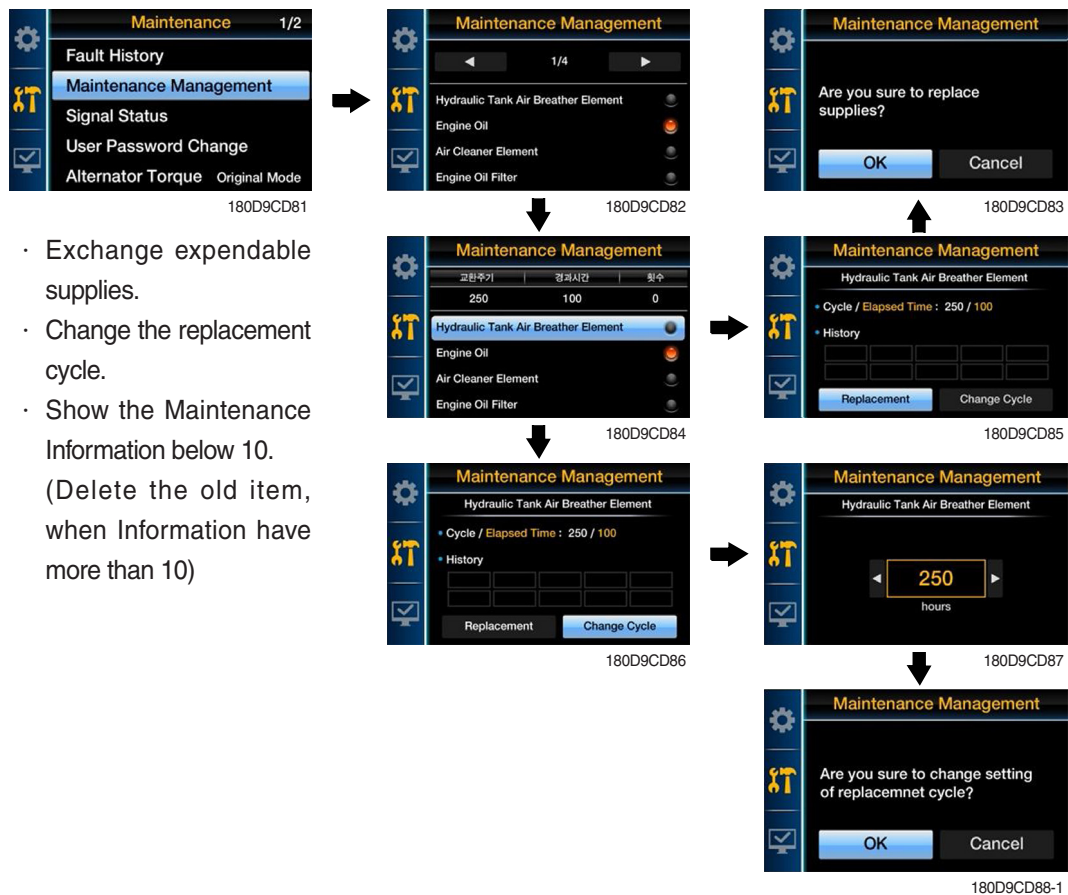


- Show the logged fault status from the past of the engine, transmission and/or air conditioner.
- ※ Air conditioner : Option
- ※ DCU : D-9H Only

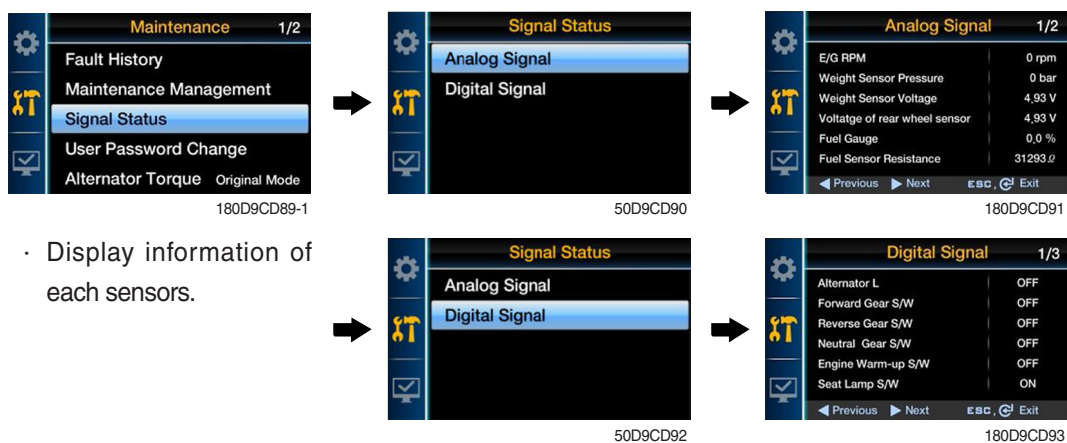
c. Delete logged fault



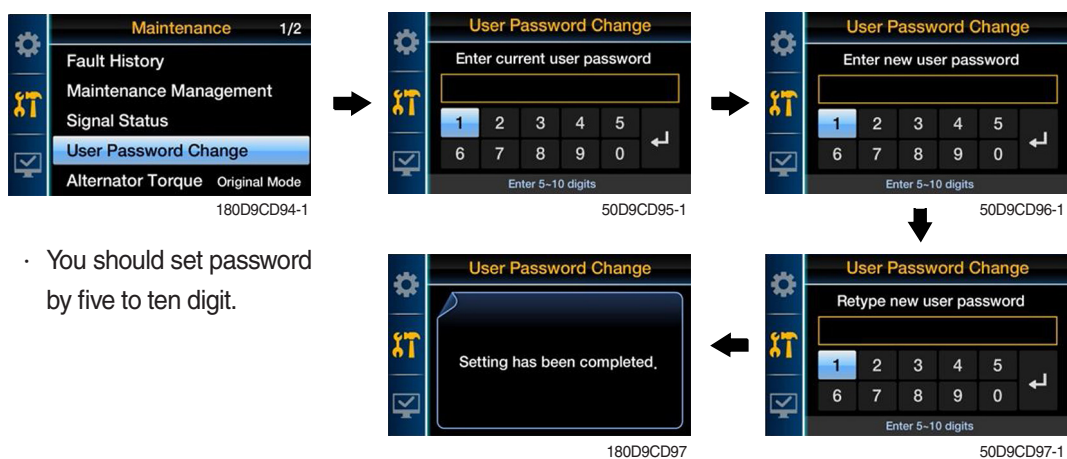
③ Maintenance management



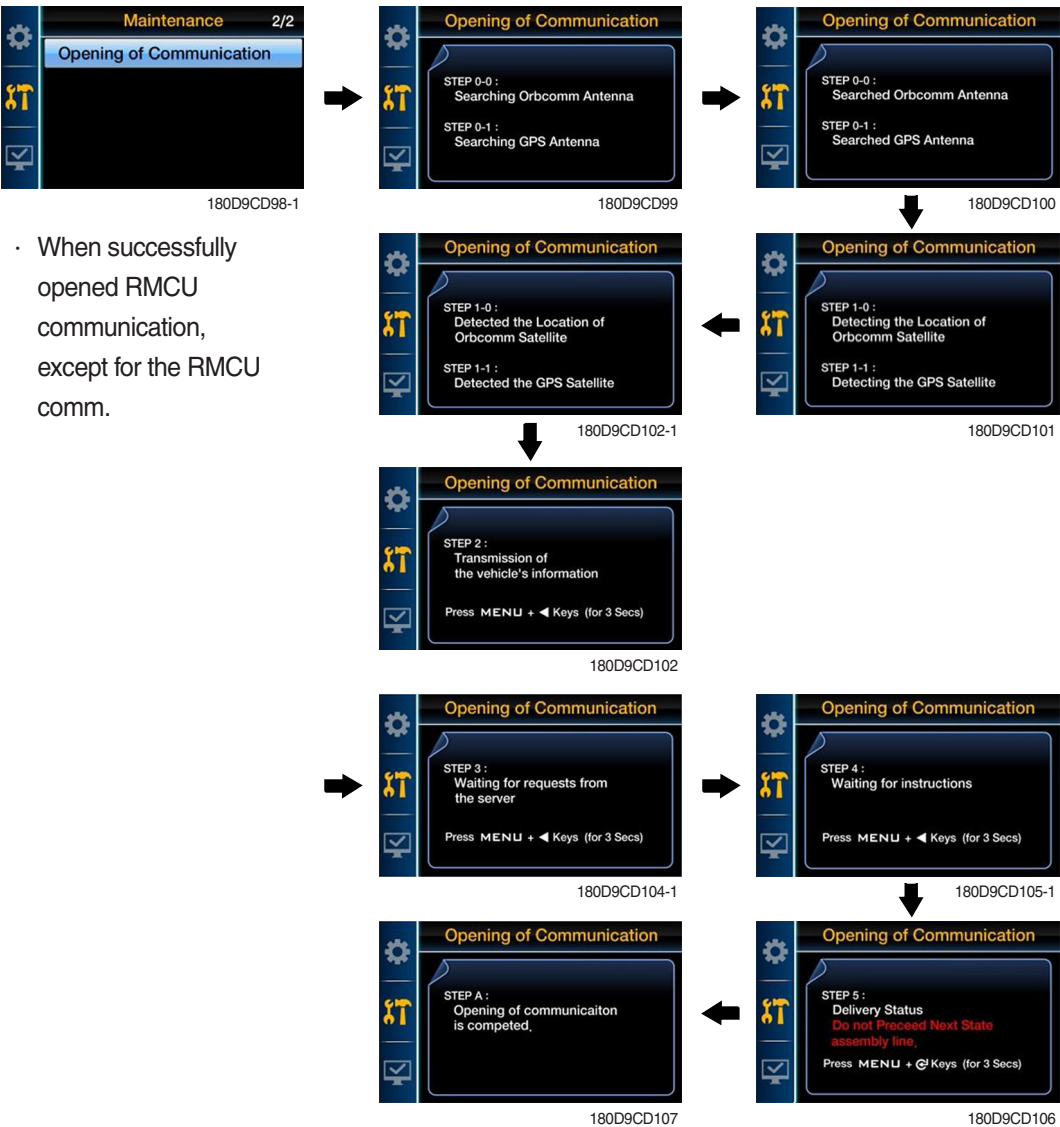
④ Signal status



⑤ User password change

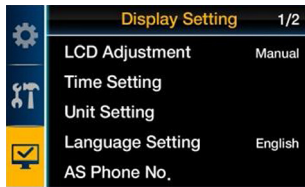


⑥ Opening of communication



(5) Display setting

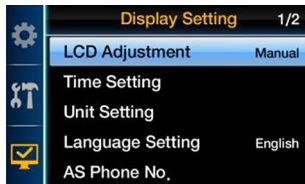
① Choose the display setting



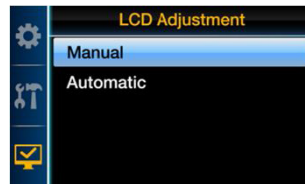
180D9CD108

- No password is required.

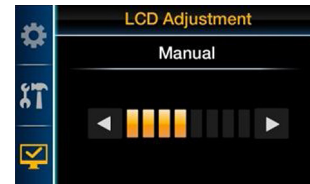
② LCD adjustment



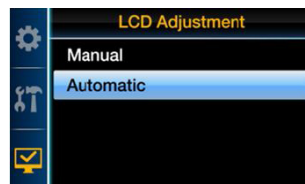
180D9CD109



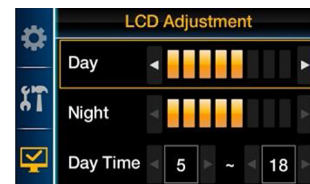
50D9CD110



180D9CD111

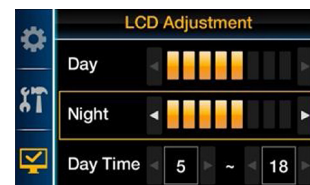


50D9CD112

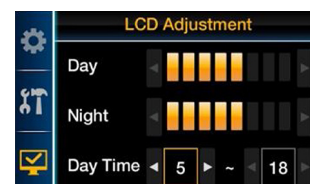


180D9CD113

- 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.)

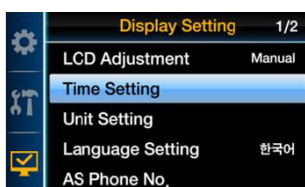


180D9CD114

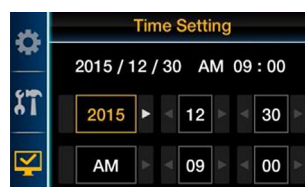


180D9CD115

③ Time setting



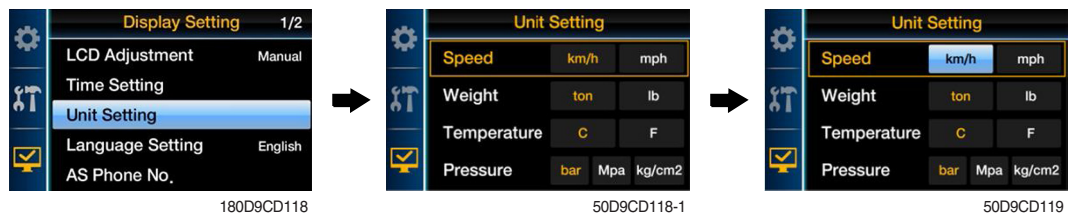
50D9CD116



180D9CD117

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

④ Unit setting



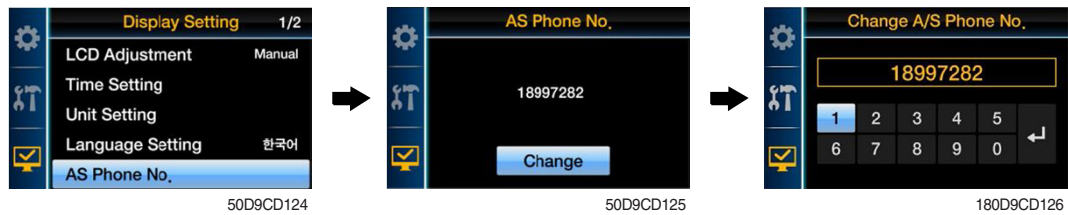
- Change units of temperature / speed / wight / pressure.

⑤ Language setting



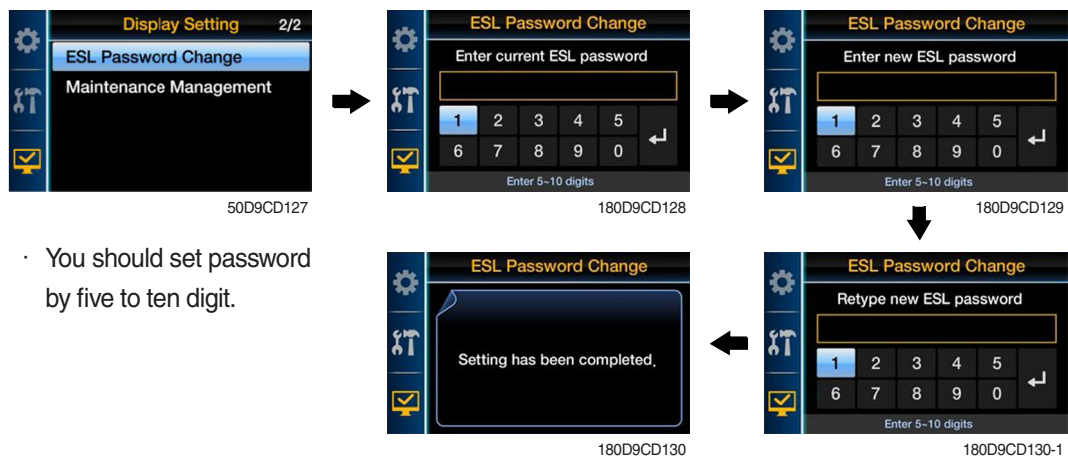
- Set the language used by your device.
(13 Multiple language)

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).

GROUP 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

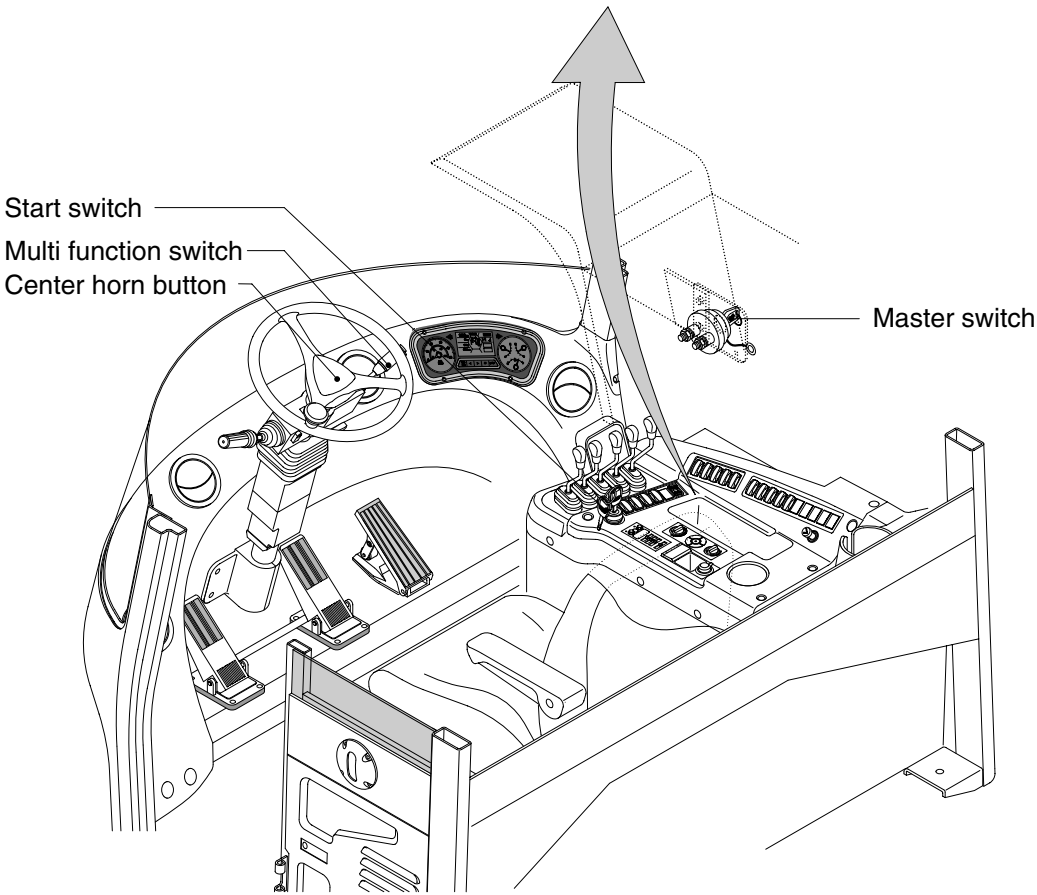
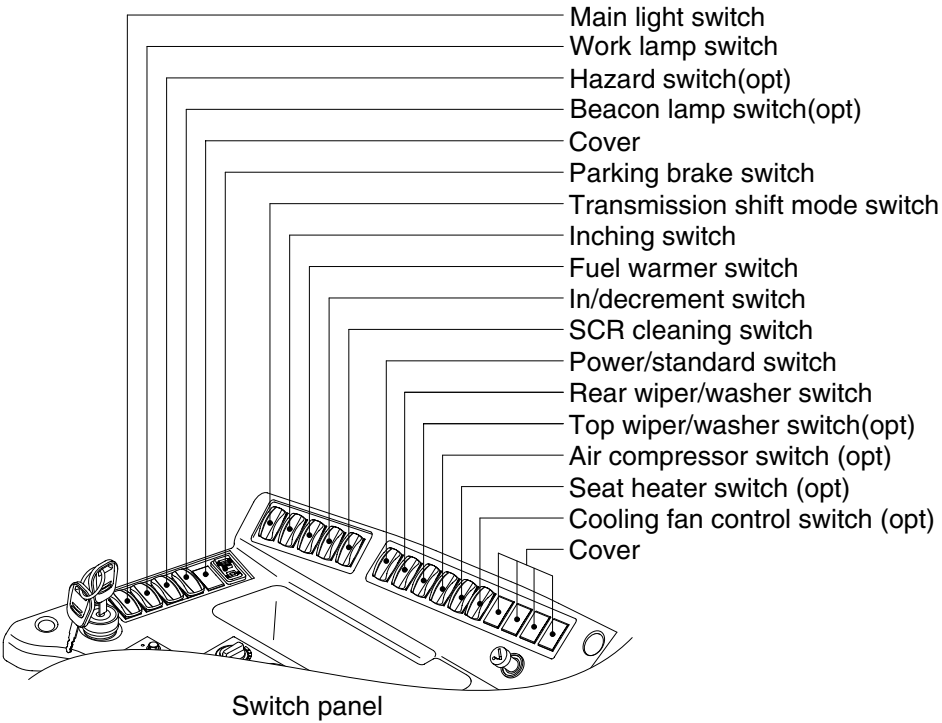
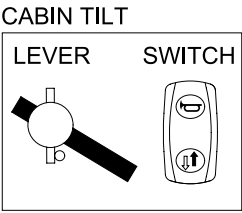
- (1) Start engine after parking the truck on flat floor and blocking wheels.
- (2) Release parking brake and keep neutral gear shift.
- (3) Adjust the inching sensor linkage so that the regular voltage is supplied to inching sensor when operating the pedal.
 ※ Regular voltage ; Before pedal operation ($1 \pm 0.1V$), After pedal operation ($3.5 \pm 0.1V$).
- (4) Stop the engine and then just start switch ON. (Release parking brake, keep neutral gear)
- (5) Connect the AEB STARTER to the T/M controller.
- (6) Push AEB STARTER over 3 seconds.
- (7) If display shows "▼IP", Step on the pedal fully.
- (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

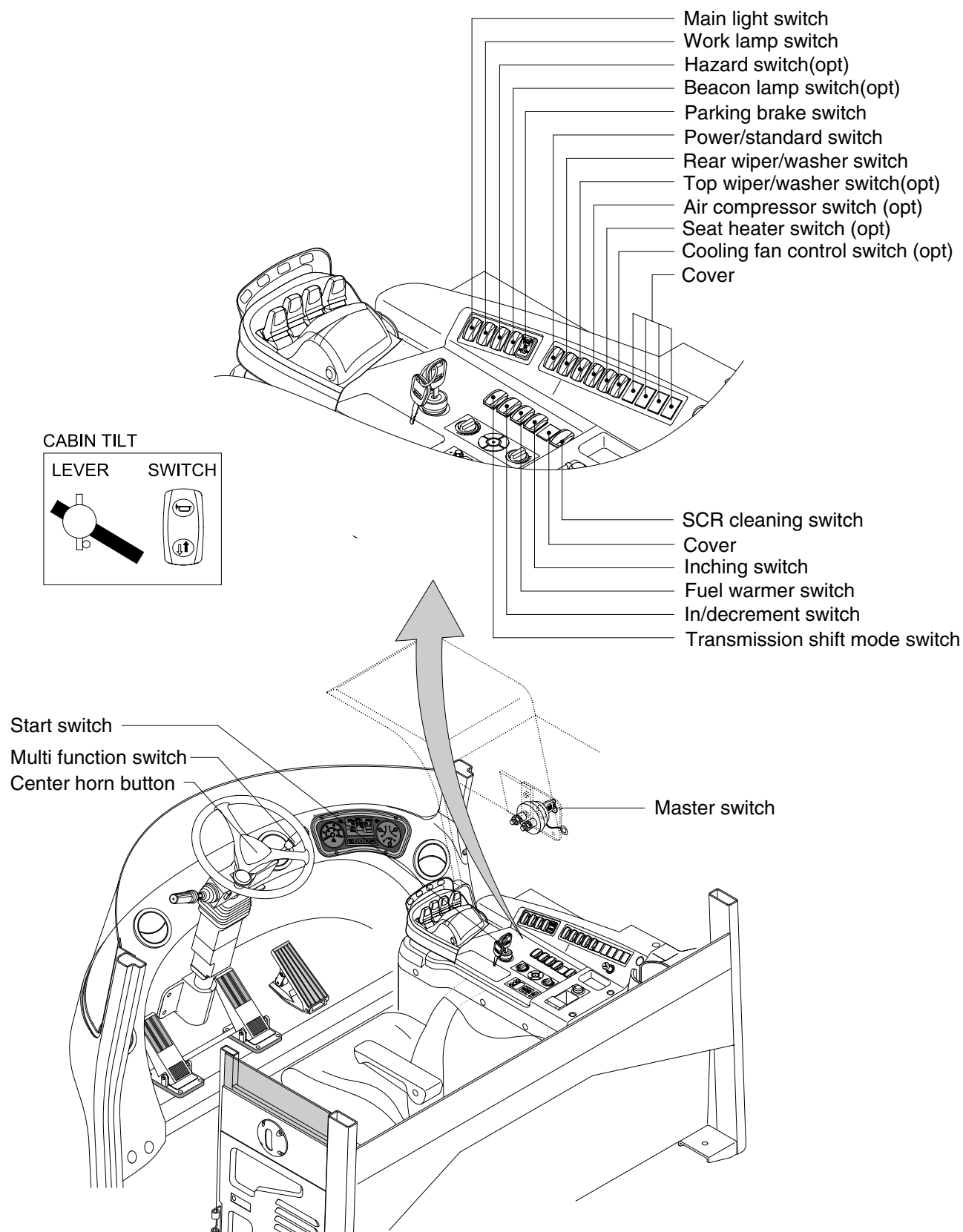
GROUP 5 SWITCHES

· Remote control lever type



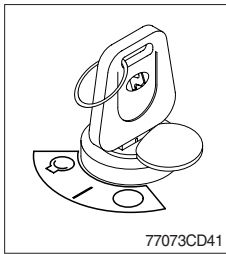
160D9LCD06

· Fingertip type



160D9LCD06-1

1) START SWITCH



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

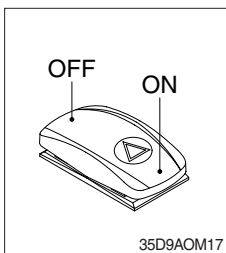
- ○ (OFF) : None of electrical circuits activate.
- | (ON) : All the systems of truck operate.
- ⦿ (START) : Use when starting the engine.

Release key immediately after starting.

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

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

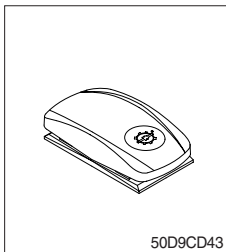
2) HAZARD SWITCH (OPTION)



(1) Use for parking, or loading truck.

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

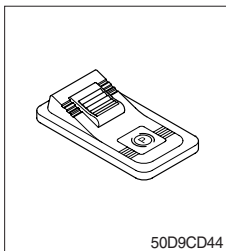
3) INCHING SWITCH



(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

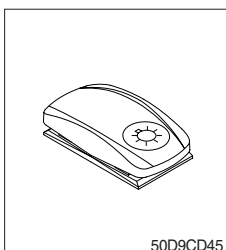


(1) This switch is used to parking brake lock or release.

(2) If this switch is pressed, the parking brake is applied and the warning lamp on the cluster will comes 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 comes ON. Also, all of the pilot lamps of switches come ON.

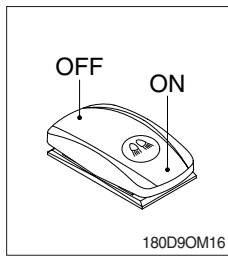
Second step : Head lamp comes ON and head lamp

② pilot lamp comes ON.

Refer to page 7-56 for head lamp.

※

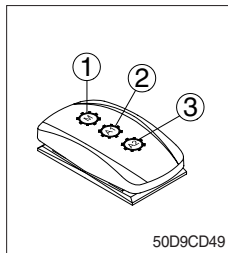
6) WORK LAMP SWITCH



(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) TRANSMISSION SHIFT MODE SWITCH



Three modes are available for operator's preference and job condition.

(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.

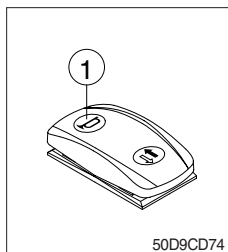
(2) Automatic 1st mode (②)

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.

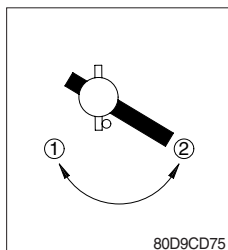
▲ Sound the horn to warn near by personnel, before tilting the cabin.

(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 page 7-18 of the operator's manual for the tilting method of the cabin.

9) HAND PUMP LEVER

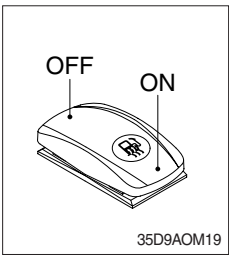


(1) This lever is used when tilting the cabin.

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

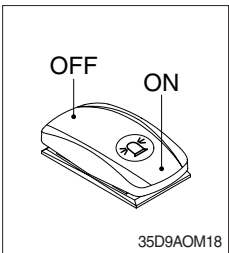
(3) Turn the hand pump lever to counterclockwise direction (②), the cabin shall be returned to original location by the cabin tilt switch.

10) FUEL WARMER SWITCH



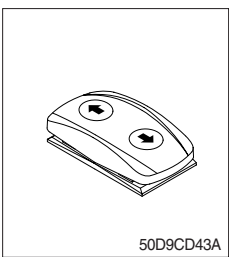
(1) This switch is used to heat the fuel of pre-heater.

11) BEACON LAMP SWITCH (OPTION)



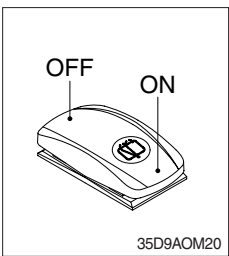
(1) This switch turn ON the strobe light.

12) INC/DECREMENT SWITCH



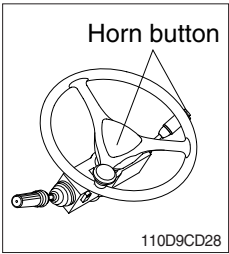
- (1) When engine running, the low idle rpm of engine increase or decrease by 25 rpm by operating this switch.
- (2) Engine low idle rpm returns to normal value when engine restarted.

13) TOP WIPER AND WASHER SWITCH (OPTION)



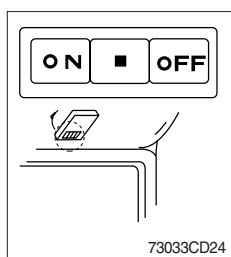
- (1) This switch is used to operate the wiper and washer on the top of the cab.
- (2) The washer liquid is sprayed and the wiper is operated only while pressing this switch.

14) HORN BUTTON



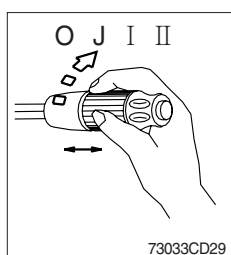
- (1) If you press the button on the top of the multifunction switch and the center of the steering wheel, the horn will sound.

15) CAB LAMP SWITCH



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

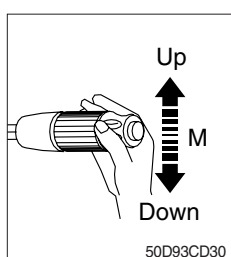
16) MULTI FUNCTION SWITCH



- (1) Front wiper and washer switch

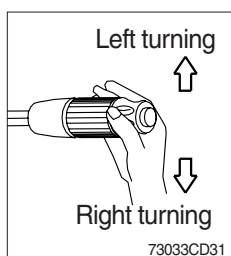
- ① When the switch is in J position, the wiper moves intermittently.
- ② When placed in I or II position, the wiper moves continuously.
- ③ If you push the grip of the lever, washer liquid will be sprayed and the wiper will be activated 2-3 times.

※ **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

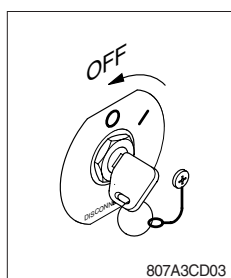
- ① This switch is used to turn the head light direction.
- ② Switch positions
 - Up : To flash for passing
 - Middle : Head light low beam ON
 - Down : Head light high beam ON
- ③ If you release the switch when it's in up position, the switch will return to middle.



- (3) Turning signal switch

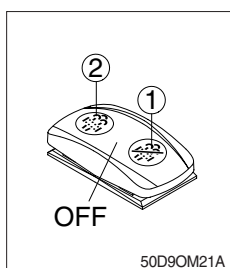
- ① This switch is used to warn or signal the turning direction of the truck to other vehicles or equipment.
- ② Push the lever up for turning left, pull the lever down for turning right.

17) MASTER SWITCH



- (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.**

18) SCR CLEANING SWITCH



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

(2) Inhibit position (①)

- ① The inhibit position disallows any automatic or manual SCR cleaning.
- ② This may be used by operator to prevent SCR 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.

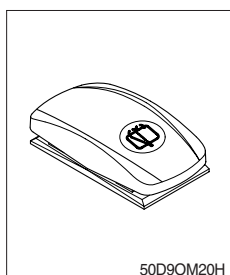
(3) OFF position

This position will initiate a automatic SCR cleaning when needed.

(4) Manual position (②)

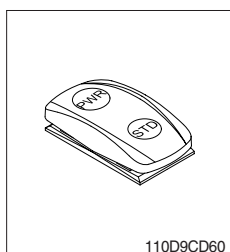
- ① This position will only initiate a manual SCR cleaning and the SCR cleaning lamp is illuminated.
- ② HEST lamp will be illuminated during the entire SCR cleaning.
- ※ **Refer to the page 7-30 for details.**
- ※ **This switch return to the OFF position when released the manual position (②).**
- ※ **SCR : Selective Catalytic Reduction**

19) REAR WIPER/WASHER SWITCH



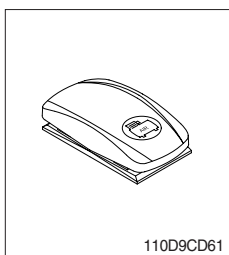
- (1) This switch is used to operate the wiper and washer on the rear of the cab.
- (2) The washer liquid is sprayed and the wiper is operated only while pressing this switch.

20) 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 **STD MODE** : This mode provides maximum fuel efficiency for general loading.
 - ② **PWR MODE** : This mode provides maximum power output for heavy loading or hill climb.

21) AIR COMPRESSOR SWITCH (option)



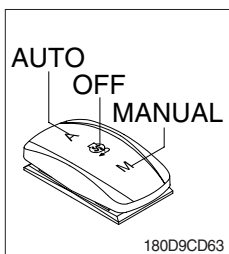
(1) This switch is used to activate the air compressor.

22) SEAT HEAT SWITCH (option)



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

23) 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.

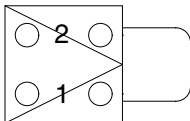
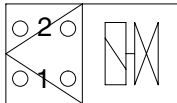
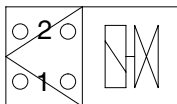
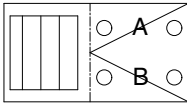
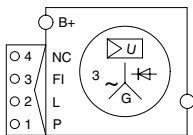
※ **Refer to page 7-40 to set of the cluster.**

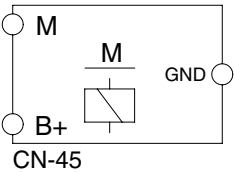
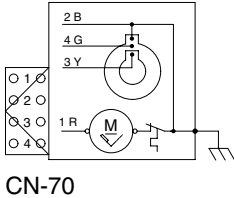
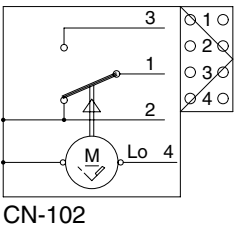
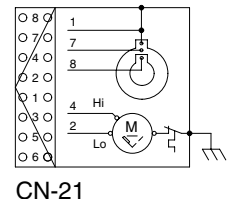
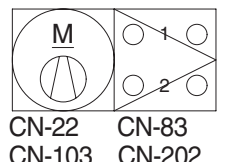
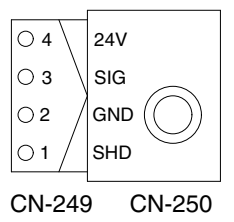
- OFF : Only forward rotation is possible.
- MANUAL : The fan rotates reverse only while pressing this position.

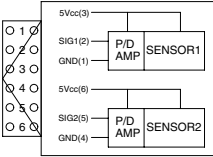
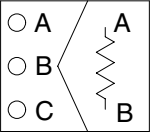
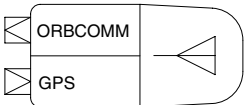
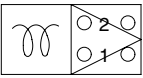
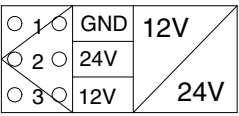
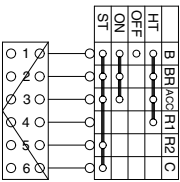
(3) If release the switch, return to the OFF position.

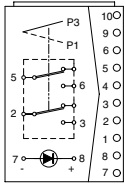
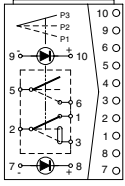
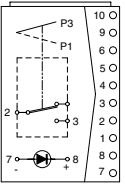
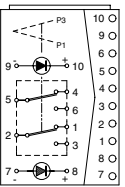
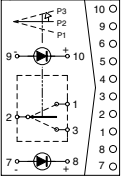
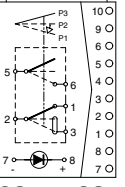
※ **The reverse rotation pilot lamp lights up on the area of the warning and pilot lamp of the LCD when the cooling fan is operated to the reverse rotation.**

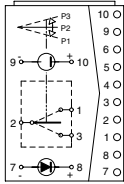
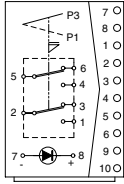
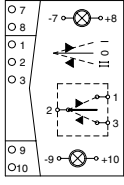
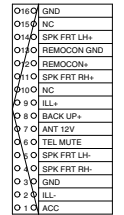
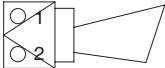
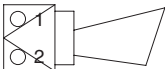
GROUP 6 ELECTRICAL COMPONENT SPECIFICATION

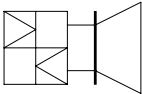
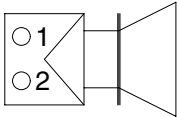
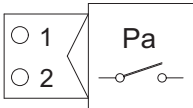
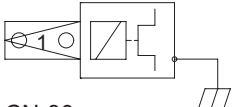
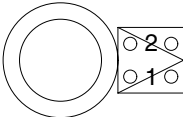
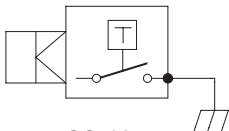
Part name	Symbol	Specifications	Check
Battery		12V × 100Ah (2EA)	※ When checking the battery charging indicator, Green : Normal condition Black : Discharge condition Transparency : Change
Fusible link	 CN-60 CN-95	CN-60 : 24V 27A CN-95 : 24V 45A	※ Check disconnection Normal : 0Ω (Connect ring terminal and check resistance between terminal 1 and 2)
EPPR valve (Pump, Fan)	 CN-154 CN-155 CN-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-131 CN-132 CN-J27 CN-J31	24V 1.2A	※ Check LED lamp. ※ Check resistance About 24Ω
Heater (Seat, DEF line heater 1, 2, 3)	 CN-170 CN-381 CN-382 CN-383	24V	※ Check resistance Normal : About 200Ω (for terminal 1-3) 0 Ω (for terminal 2-4)
Alternator	 CN-74	Delco Remy 24SI 24V 70A	※ Check voltage Normal : 24~28V

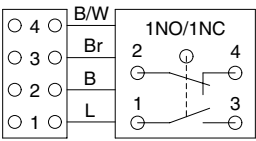
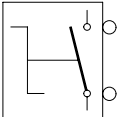
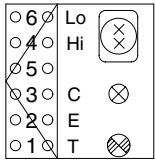
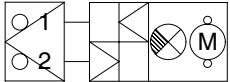
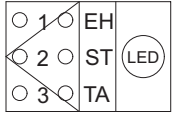
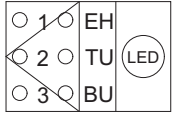
Part name	Symbol	Specifications	Check
Start motor		DENSO 24V 3.7kW	※ Operating or not
Top wiper motor		24V 1.5A 1-speed Auto parking	-
Rear wiper motor		24V 1A 1-speed Auto parking	-
Front wiper motor		24V 1A 2-speed Auto parking	-
Motor		24V 2.5A	※ Check contact Normal : 26.4Ω (For terminal 1-2)
Camera		24V 2.5W Signaling : NTSC Angle of view : 145°	-

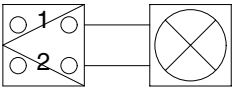
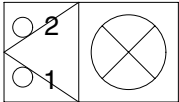
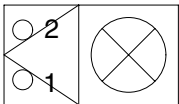
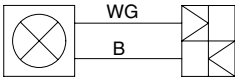
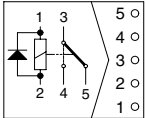
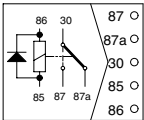
Part name	Symbol	Specifications	Check
Accel pedal	 CN-124	5V, hall sensor	※ Check voltage 0.5~3.9V (2-1)
Resistor	 CN-98	3W 300Ω	※ Check resistance Normal : 300Ω (A-B)
RMS antenna	 CN-251	3.0~5.0V 20mA	-
Fuel warmer	 CN-96	24V 15A	※ Check resistance Abnormal : ∞Ω
DC/DC converter	 CN-138	24V 10A Output 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)

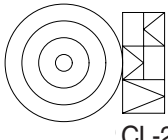
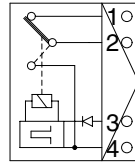
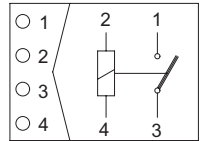
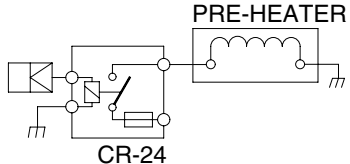
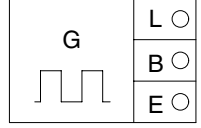
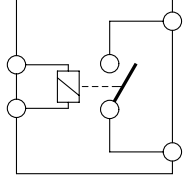
Part name	Symbol	Specifications	Check
Switch (Locking type)	 CS-41 CS-42 CS-82	24V 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-3, 5-6)
Switch (Locking type)	 CS-59	24V 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-3, 5-6)
Switch (Locking type)	 CS-23 CS-74 CS-99	24V 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-3)
Switch (Locking type)	 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 (Locking type)	 CS-100	24V 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-1, 2-3)
Switch (Locking type)	 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)

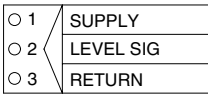
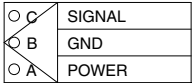
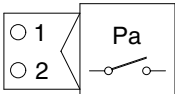
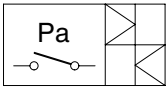
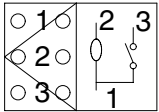
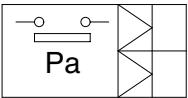
Part name	Symbol	Specifications	Check
Switch (Locking type)	 CS-64	24V 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-1, 2-3)
Switch (Locking type)	 CS-17	24V 8A	※ Check contact Normal ON: 0Ω (For terminal 1-2, 4-5) $\infty \Omega$ (For terminal 2-3, 5-6) OFF: $\infty \Omega$ (For terminal 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	24V 2A	※ Check voltage 20~25V (For terminal 1-3, 3-8)
Horn	 CN-25	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.

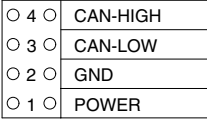
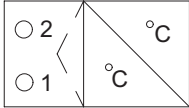
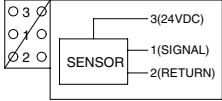
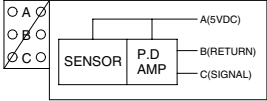
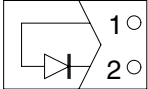
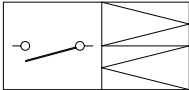
Part name	Symbol	Specifications	Check
Speaker	 CN-23(LH) CN-24(RH)	4Ω 20W	※ Check resistance Normal : 50Ω
Siren speaker	 CN-145	24V	-
Receiver dryer	 CN-29	N.O type	※ Check resistance Normal : Ω
Air conditioner compressor	 CN-30	24V 79W	※ Check contact Normal : 13.4Ω
12V socket	 CN-139	12V 10A Rated ampere	※ Check resistance Normal : A few Ω (1-2)
Brake temp switch	 CS-10	N.O type	※ Check resistance Normal : ∞Ω

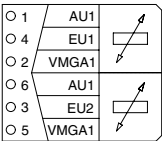
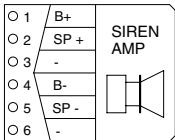
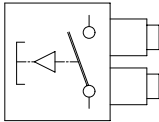
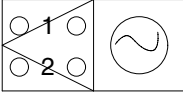
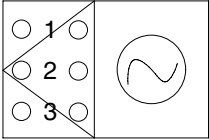
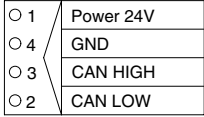
Part name	Symbol	Specifications	Check
Tilt switch	 CS-74	24V 8A	※ Check contact S/W open : $\infty \Omega$ (For terminal NO-COM) : 0Ω (For terminal NC-COM) S/W closed : 0Ω (For terminal NO-COM) : $\infty \Omega$ (For terminal NC-COM)
Master switch		Continuous Capacity : 180Amp Push in capacity : 1000Amp	※ Check contact OFF : $\infty \Omega$
Head lamp	 CL-3 CL-4	24V 75/70W H4 bulb	※ Check disconnection Normal : $\infty \Omega$ (6-2, 4-2, 3-2, 1-2)
Beacon lamp	 CL-7	24V 0.8A (Strobe type)	※ Check disconnection Normal : A few Ω Abnormal : $\infty \Omega$
Rear combination lamp	 CL-15A CL-16A	24V LED (tail) 24V LED (stop)	※ Check disconnection Normal : A few Ω
Rear combination lamp	 CL-15B CL-16B	24V 10W (backup) 24V LED (turn)	※ Check disconnection Normal : A few Ω

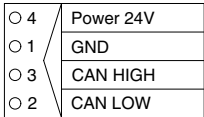
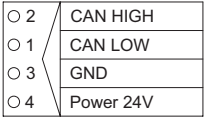
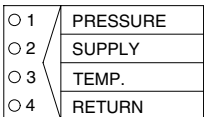
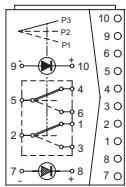
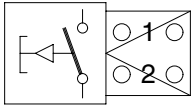
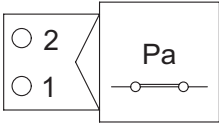
Part name	Symbol	Specifications	Check
Mast work lamp	 CL-5 CL-6 CL-51 CL-61	24V 70W H3 bulb	※ Check disconnection Normal : A few Ω
Room lamp	 CL-1 CL-51	24V 10W	※ Check resistance Normal : A few Ω
Rear work lamp	 CL-22 CL-23	24V 70W	※ Check resistance Normal : A few Ω
License lamp	 CL-21	24V 3W $\times$ 2	※ Check resistance Normal : A few Ω
Relay (5pin)	 CR-4 CR-38 CR-50 CR-57 CR-5 CR-39 CR-52 CR-61 CR-26 CR-42 CR-54 CR-62 CR-36 CR-45 CR-56 CR-63	24V 3-4 : 15A 3-5 : 10A	※ Check resistance Normal : 0 Ω (For terminal 3-5) : $\infty \Omega$ (For terminal 3-4)
Relay (5pin)	 CR-3 CR-58 CR-49 CR-59 CR-55	24V 30-87 : 20A 30-87a : 15A	※ Check resistance Normal : 0 Ω (For terminal 30-87a) : $\infty \Omega$ (For terminal 30-87)

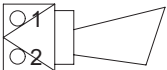
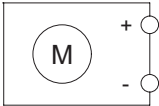
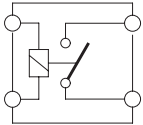
Part name	Symbol	Specifications	Check
Cigar lighter	 CL-2	24V 5A	※ Check coil resistance Normal : About 1M Ω ※ Operating time : 5~15 sec
Int wiper relay	 CR-6	24V 5A Operating time : 2.5 $\pm$ 1 sec	※ Check resistance Normal : 0 Ω (For terminal 1-2) : ∞ Ω (For terminal 1-3)
Start relay	 CR-23	24V 300A	※ Check resistance Normal : 10 Ω (For terminal 2-4) : ∞ Ω (For terminal 1-3)
Preheat relay	 CR-24	24V 200A Exciting current : 2.3A	※ Check resistance Normal : 10 Ω (For terminal coil) : 0 Ω (Between ring term)
Flasher unit	 CR-11	24V 85 $\pm$ 10 C/M 50dB	-
Battery relay	 CR-1	Rated load 24V 100A (continuity) 1000A (30 seconds)	※ Check coil resistance (M4 to M4) Normal : About 50 Ω ※ Check contact Normal : ∞ Ω

Part name	Symbol	Specifications	Check
Coolant level pressure switch	 CD-96	4.75~5.25V 12.5mA	-
Pressure switch	 CD-3 CD-26	N.C TYPE	※ Check contact Normal : 0Ω (CLOSE)
Pressure switch	 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, cac)	 CD-76 CD-87	-	-
Load sensor	 CD-50	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 DO-3 DO-4 DO-5	Diode spec : 1N5406	-
Side shift selector switch	 CS-13	24V	※ Check contact Normal : $\infty \Omega$

Part name	Symbol	Specifications	Check
Inching sensor	 CD-71	-	-
Siren amp	 CN-47	24V	-
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-J7A CN-J7B	-	-

Part name	Symbol	Specifications	Check
Engine sensor (SCR, DOC)	 CN-J10 CN-J17	-	-
DEF quality sensor	 CN-J6	-	-
TBAP sensor	 CD-102	-	-
Switch	 CS-105	24V, 8A	※ Check contact OFF : $\infty \Omega$ (For terminal 2-3, 5-6)
Seat switch	 CS-73	24V 8A	※ Check contact OFF : $\infty \Omega$
Air compressure pressure switch	 CD-150	-	-

Part name	Symbol	Specifications	Check
Air horn	 CN-225	-	-
Cabin tilt motor		24V 30A	-
Air compressure relay		24V 80A	-

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	42	I/conn (Engine harness-Main harness)	936421	936429
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-6	AMP	15	I/conn (Main harness-A/C harness)	2-85262-1	-
CN-7	AMP	16	I/conn (Main harness-Cabin harness)	368047-1	368050-1
CN-8	KET	14	I/conn (Main harness-Monitor harness)	MG610350	MG640352
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-12	DEUTSCH	4	I/conn (Front camera harness-Frame harness)	DT06-4S	DT04-4P
	AMP	3	Rear camera	174357-2	174359-2
	AMP	1	Rear camera	174877-2	174879-2
CN-13	AMP	8	I/conn (Main harness-Cabin harness)	174982-2	174984-2
CN-14	KET	8	Cabin harness	MG610049	MG620048
CN-15	KET	6	Aircon harness	MG610049	-
CN-16	DEUTSCH	2	Mast work lamp harness	DT06-2S	DT04-2P
CN-17	DEUTSCH	2	Mast lamp harness	DT06-2S	-
CN-19	KET	2	Inching check	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	35825-0211	-
CN-27	KUM	16	Radio & USB player	PK145-16017	-
CN-29	KET	2	Receiver dryer	MG640795	-
CN-30	KUM	1	Compressor	PB625-01027	-
CN-31	AMP	2	Aircon harness	-	174354-2
CN-32	AMP	2	Aircon harness	-	176146-2
CN-33	AMP	6	Aircon harness	-	174264-2
CN-36	QPL	1	Fuse box	21HN-55010	-
CN-37	QPL	1	Fuse box	21HN-55010	-
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-50	AMP	68	Transmission control unit	963598-1	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-51	AMP	6	Transmission control unit service tool	480704-0	926682-3
CN-52	KET	4	Handsfree controller	MG610331	21FT-36150
CN-55	KET	14	OPSS unit	MG610350	
CN-56	AMP	20	Cluster	174047-2	-
CN-59M	AMP	34	MCU (Machine control unit)	4-1437290-0	-
CN-59N	AMP	34	MCU (Machine control unit)	4-1437290-1	-
CN-60	QPL/KET	2	Fusible link	21N4-01310	MG620558
CN-65	DEUTSCH	2	Back-up buzzer	DT06-2S	-
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-82	KET	2	Seat harness	MG610043	-
CN-83	KUM	2	Condensor fan	PB625-02027	-
CN-90	AMP	16	I/conn (Engine harness-Frame harness)	368047-1	368050-1
CN-91	KET	14	Monitor	MG610350	MG640352
CN-91	DEUTSCH	3	I/conn (Frame harness-Load sensor harness)	DT06-3S	DT04-3P
CN-93	DELPHI	96	ECM connector (J2)	13964577	-
CN-94	FRAMATOME	24	Alternate droop	F934000	-
CN-94	DEUTSCH	4	Mast camera	DT06-4S	DT04-4P
CN-95	QPL/KET	2	Fusible link	21N4-01310	MG620558
CN-96	TYCO	4	Fuel warmer	2-967325-3	-
CN-100	KET	4	Harness relay	MG610047	-
CN-101	SUMITOMO	4	Engine TBAP harness	-	6098-0144
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
	AMP	2	I/conn (Frame harness-Air horn harness)	174352-2	174354-2
CN-131	DEUTSCH	2	Attachment cut off	DT06-2S	-
CN-132	DEUTSCH	2	Side shift select solenoid	DT06-2S	-
CN-134	DEUTSCH	9	ECM 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
CN-138	KET	3	DC/DC converter	MG610045	-
CN-139	KET	2	12V socket	MG610043	-
CN-144	KET	20	Handsfree controller	MG610240	-
CN-145	AMP	2	Amp speaker	S816-002002	S816-102002
CN-147	KET	2	Cabin tilt (Pump motor)	MG640188-4	-
CN-154	DEUTSCH	2	Fan motor EPPR valve	DT06-2S	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-155	DEUTSCH	2	Pump EPPR valve	DT06-2S	-
CN-156	DEUTSCH	2	Fan EPPR valve	DT06-2S	-
CN-157	AMP	2	Fan reverse ON/OFF valve	85202-5	-
CN-158	AMP	4	I/conn (Engine harness-Cooling fan harness)	174257-2	174259-2
CN-160	DEUTSCH	2	Air compressor	DT06-2S	-
CN-191	AMP	4	I/conn (Frame harness-G sensor)	174257-2	174259-2
CN-202	TYCO	4	Top washer pump	2-967325-3	-
CN-211	AMP	2	I/conn (Cabin harness-Work lamp harness)	-	174354-2
CN-225	AMP	2	Air horn	174352-2	-
CN-245	AMP	12	Remote controller assy	368542	-
CN-246	AMP	12	USB & Socket assy	174045-2	-
CN-249	AMP	3	Rear camera	174357-2	174359-2
		1	Rear camera	174877-2	174879-2
CN-381	DEUTSCH	2	DEF hose heating 1 (Pressure)	DT06-2S W2SB	-
CN-382	DEUTSCH	2	DEF hose heating 2 (Backflow)	DT06-2S W2SB	-
CN-383	DEUTSCH	2	DEF hose heating 3 (Suction line)	DT06-2S W2SB	-
CN412	AMP	6	I/conn (Armrest harness-Main harness)	174262-2	174264-2
CN413	AMP	6	I/conn (Main harness-Armrest harness)	174262-2	174264-2
CN417	AMP	8	I/conn (Main harness-MCV harness)	174982-2	174984-2
CN-C1	KET	2	CAN 1	MG610320	MG610322
CN-C2	KET	2	CAN 2	MG610320	MG610322
CN-J1	FCI	24	Alternate droop breakout connector	F25400	-
CN-J6	DEUTSCH	4	DEF quality sensor	DT06-4S	-
CN-J7A	TYCO	4	DOC NOx sensor	2-1418390-1	-
CN-J7B	TYCO	4	SCR NOx sensor	1-1418390-1	-
CN-J10	TYCO	4	SCR thermistor	3-1418390-1	-
CN-J17	TYCO	4	DOC thermistor	4-1418390-1	-
CN-J26	TYCO	12	DEF supply module	2-1703639-1	-
CN-J27	TYCO	4	Coolant valve	1-967325-1	-
CN-J31	TYCO	2	DEF dosing module inj vlv-LO/HI	936059-1	-
Switch					
CS-2	KET	6	Start switch	MG610335	-
CS-3	CARLING	10	Rear wiper switch	21HN-56300	-
CS-5	KET	2	Center horn	-	MG640322
CS-5A	KET	2	Center horn	MG610320	-
CS-5B	Ring term	1	Center horn	-	S820-105000
CS-10	KET	1	Brake cooling switch	ST730018-3	-
	CARLING	10	Fuel warmer switch	21HN-56300	-
CS-11	KET	8	Multifunction switch	MG610339	-
CS-12	KET	6	Multifunction switch	MG610335	-
CS-13	KET	1	Sideshift selector switch	ST730018-3	ST750036-3
CS-14	PACKARD	4	Gear selector switch	-	12010974

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CS-15	PACKARD	4	Gear selector switch	12015797	-
	KET	1	Gear selector switch	ST730018-3	-
CS-17	CARLING	10	Parking switch	21HN-56300	-
CS-21	CARLING	10	Work lamp switch	21HN-56300	-
CS-23	CARLING	10	Beacon switch	21HN-56300	-
CS-39	CARLING	10	Main switch	21HN-56300	-
CS-41	CARLING	10	Hazard switch	21HN-56300	-
CS-42	CARLING	10	Inching switch	21HN-56300	-
CS-54	CARLING	10	Aircon switch	21HN-56300	-
CS-59	CARLING	10	Auto/manual switch	21HN-56300	-
CS-64	CARLING	10	Inc/dec switch	21HN-56300	-
CS-74	DEUTSCH	4	Cabin tilt switch	-	DT04-4P
CS-77	CARLING	10	Cabin tilt operation switch	21HN-56300	-
		10	Air compressor switch	21HN-56300	-
CS-79	CARLING	10	Engine mode switch	21HN-56300	-
CS-82	CARLING	10	Seat heat switch	21HN-56300	-
CS-100	CARLING	10	SCR cleaning switch	21HN-56300	-
CS-103	CARLING	10	Top wiper switch	21HN-56300	-
CS-105	CARLING	10	Reverse fan switch	21HN-56300	-
Lamp					
CL-1	KET	2	Room lamp LH	MG610392	-
CL-2	KET	1	Cigar lighter	ST730018-3	ST750036-3
	AMP	1	Cigar lighter	172128-1	-
CL-3	DEUTSCH	6	Head lamp	DT06-6S	-
CL-5	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	3	Rear combi lamp (Illum/stop, LH)	282087-1	-
CL-15B	AMP	3	Rear combi lamp (Turn/back up, LH)	282087-2	-
CL-16A	AMP	3	Rear combi lamp (Illum/stop, RH)	282087-1	-
CL-16B	AMP	3	Rear combi lamp (Turn/back up, RH)	282087-2	-
CL-21	KET	1	License lamp	ST730018-3	ST750036-3
CL-23	DEUTSCH	2	R/work lamp LH	DT06-2S	-
CL-23	DEUTSCH	2	R/work lamp RH	DT06-2S	-
CL-51	KET	2	Room lamp RH	MG610392	-
Relay					
CR-1	KET	1	Battery relay coil	S820-308000	-
	KET	1	Battery relay coil	S820-104000	-
CR-3	HELLA/OMRON	5	Front work lamp relay	8JA003526-001	24L1-05100
CR-4	AMP	5	Wiper high speed relay	VCFM-1002	-
CR-5	AMP	5	Netural relay	VCFM-1002	-
CR-6	KET	4	Intermittent wiper relay	MG610047	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
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	-	S820-106000
	KET	1	Preheat relay	ST730018-3	-
CR-26	AMP	5	Wiper low speed relay	VCFM-1002	-
CR-36	AMP	5	Anti restart 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-45	HELLA	5	Engine control module relay	8JA003536-001	-
CR-46	HELLA	5	Engine preheat relay	8JA003536-001	-
CR-49	HELLA/OMRON	5	Fuel warmer relay	8JA003526-001	24L1-05100
CR-50	AMP	5	Travel cut relay	VCFM-1002	-
CR-51	AMP	5	Start lock relay	VCFM-1002	-
CR-52	AMP	5	Attach cut-off relay	VCFM-1002	-
CR-54	AMP	5	Reverse fan relay	VCFM-1002	-
CR-55	HELLA/OMRON	5	Rear work lamp relay	8JA003526-001	24L1-05100
CR-56	-	5	Auto park 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 heater 1 relay	VCFM-1002	-
CR-62	AMP	5	DEF heater 2 relay	VCFM-1002	-
CR-63	AMP	5	DEF heater 3 relay	VCFM-1002	-
Sensor and pressure switch					
CD-2	KET	3	Fuel sender	MG610045	-
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	DT04-3P
CD-26	DEUTSCH	3	Parking pressure switch	DT06-3S	-
CD-27	AMP	2	Turbine speed pick-up	963040-2	-
CD-35	DEUTSCH	2	Water in fuel switch	DT06-2S	-
CD-50	DEUTSCH	3	Load sensor	DT06-3S	DT04-3P
CD-71	AMP	6	Inching sensor	1-967616-1	-
CD-72	AMP	2	Internal speed pick-up	963040-3	-
CD-73	AMP	3	Output speed sensor	282087-1	-
CD-74	AMP	2	Engine speed pick-up	963040-3	-
CD-75	AMP	2	Filter switch	282080-1	-
CD-76	AMP	2	Air temp sensor	963040-3	-
CD-87	KET	2	Ambient temp sensor	MG610320	-

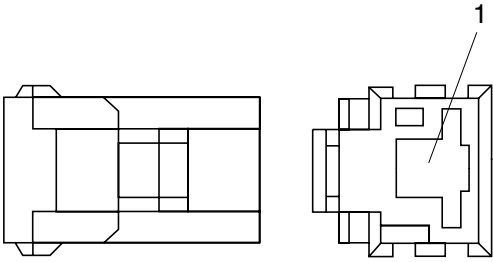
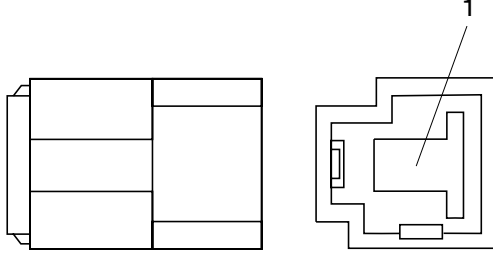
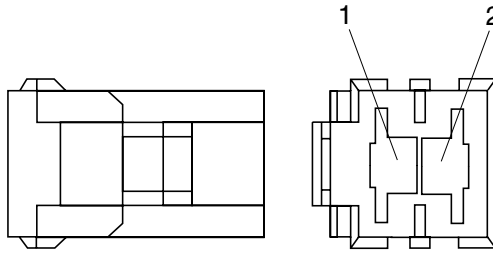
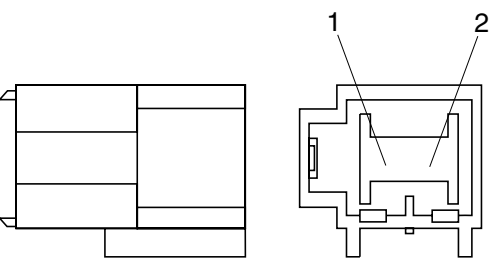
Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CD-96	PACKARD	3	Coolant level sensor	12110293	-
CD-101	SUMITOMO	4	TBAP sensor	-	54200415
CD-102	FRAMTOME	4	Engine TBAP sensor (Temp. Barometric Absolute Pressure)	54200415	-
Diode					
DO-1	AMP/QPL	2	Diode	174352-2	21EA-50550
DO-2	AMP/QPL	2	Diode	174352-2	21EA-50550
DO-3	AMP/QPL	2	Diode	174352-2	21EA-50550
DO-4	AMP/QPL	2	Diode	174352-2	21EA-50550
DO-5	AMP/QPL	2	Diode	174352-2	21EA-50550
Resistor					
RS-1	KET/QPL	2	Resistor (300 Ω)	MG610043	21FT-10810
RS-2	KET/QPL	2	Resistor (120 Ω)	MG610043	21FH-15030

FINGERTIP (OPTION)

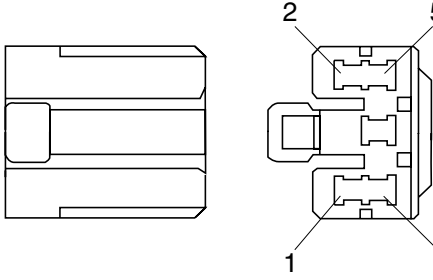
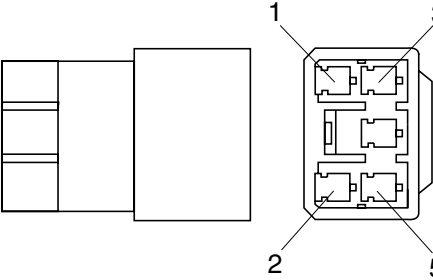
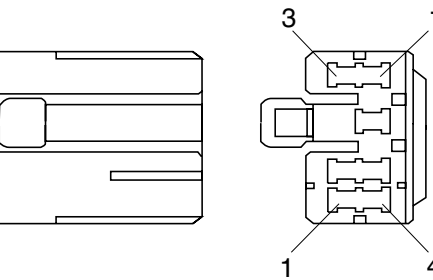
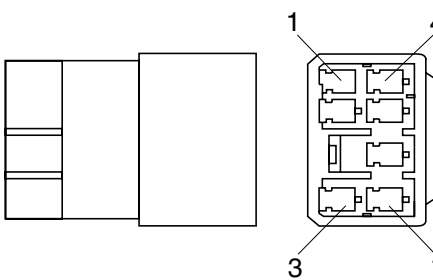
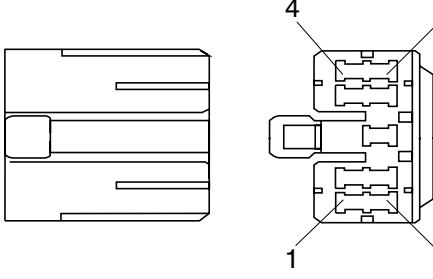
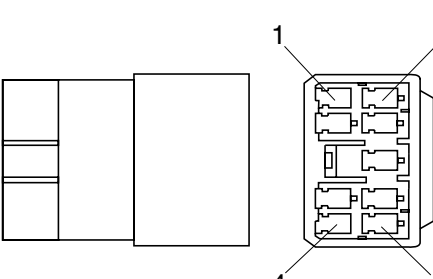
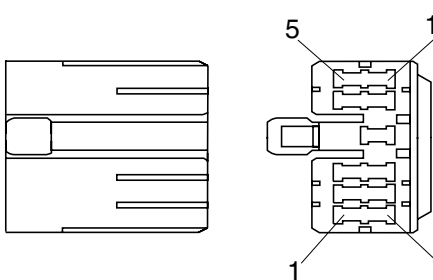
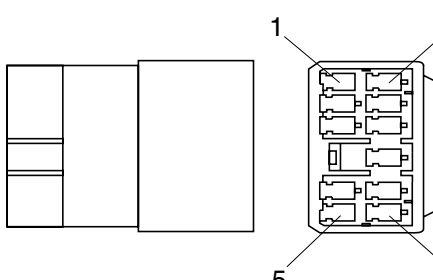
Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-1A	DEUTSCH	2	Lift 1 up	DT06-2S	-
CN-1B	DEUTSCH	2	Lift 1 down	DT06-2S	-
CN-2A	DEUTSCH	2	Lift 2 up	DT06-2S	-
CN-2B	DEUTSCH	2	Lift 2 down	DT06-2S	-
CN-3A	DEUTSCH	2	Tilt out	DT06-2S	-
CN-3B	DEUTSCH	2	Tilt in	DT06-2S	-
CN-4A	DEUTSCH	2	Aux 1 out	DT06-2S	-
CN-4B	DEUTSCH	2	Aux 1 in	DT06-2S	-
CN-5A	DEUTSCH	2	Aux 2 out	DT06-2S	-
CN-5B	DEUTSCH	2	Aux 2 in	DT06-2S	-
CN-6A	DEUTSCH	2	Aux 3 out	DT06-2S	-
CN-6B	DEUTSCH	2	Aux 3 in	DT06-2S	-
CN-7	DEUTSCH	2	Solenoid valve	DT06-2S	-
CN-15	MOLEX	2	Horn switch	52213-0211	-
CN-16	MOLEX	2	Auxiliary enable switch	52213-0211	-
	MOLEX	2	2nd gear enable switch	52213-0211	-
CN-17	MOLEX	2	Auto tilt switch	52213-0211	-
CN-37	MOLEX	2	Auxiliary enable switch	52213-0211	-
CN-61	AMP	34	Fingertip sub controller	4-1437290-1	-
CN-134	KET	6	Diagnosis port	MG610335	-
CN-J1	MOLEX	32	Valve controller unit J1	64319-3211	-
CN-J2	MOLEX	48	Valve controller unit J2	64320-3319	-
CN-J3	MOLEX	32	Valve controller unit J3	64319-3218	-
Switch					
CS-10	Ring term	-	Emergency switch contact A & B	-	S820-204000
CS-10	Ring term	-	Emergency switch contact C & D	-	S820-204000
Sensor and pressure switch					
CD-40	MOLEX	4	Lift lever	-	52266-0417
CD-41	MOLEX	4	Tilt lever	-	52266-0417
CD-42	MOLEX	4	Aux 1 lever	-	52266-0417
CD-43	MOLEX	4	Aux 2 lever	-	52266-0417

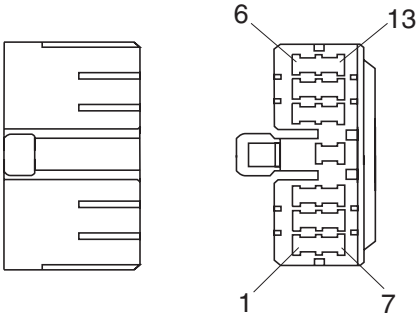
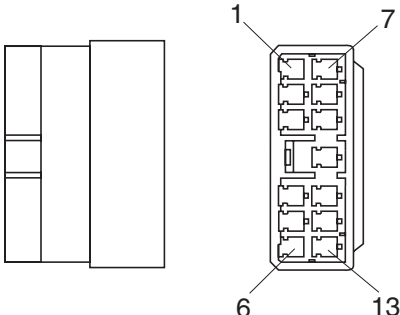
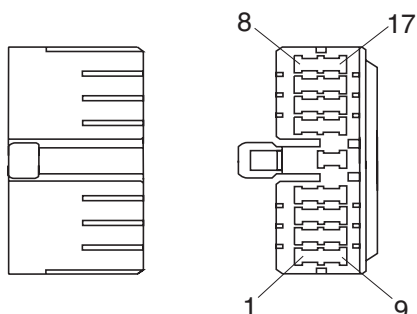
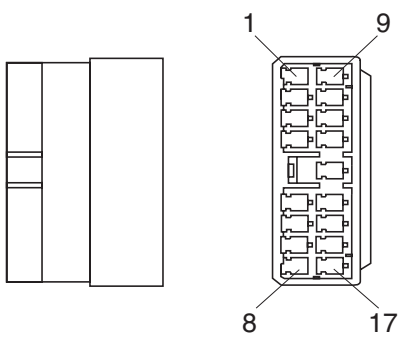
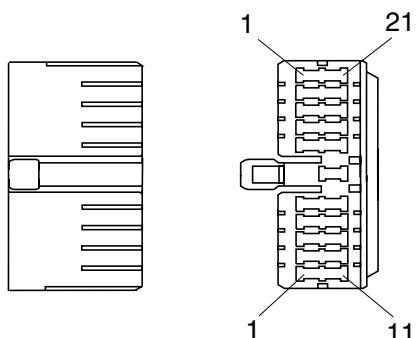
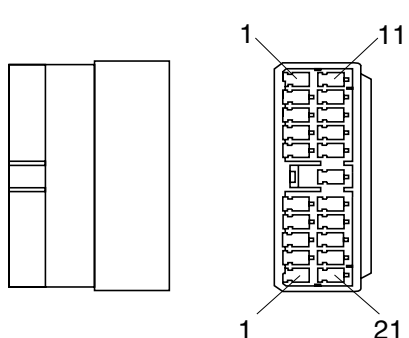
2. CONNECTION TABLE FOR CONNECTORS

1) 58-L TYPE CONNECTOR

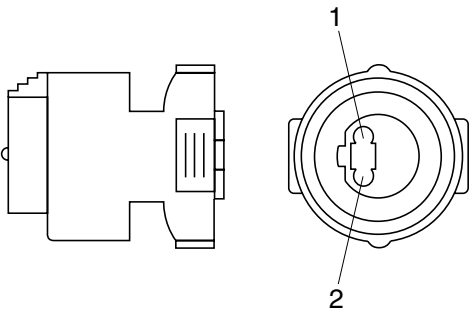
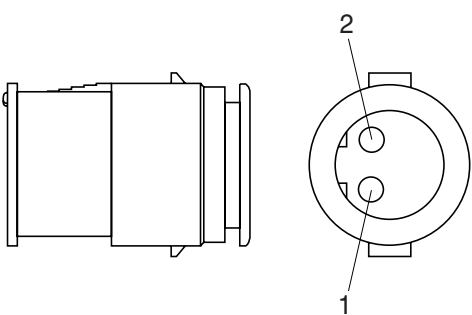
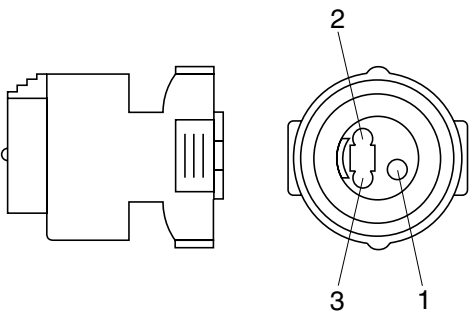
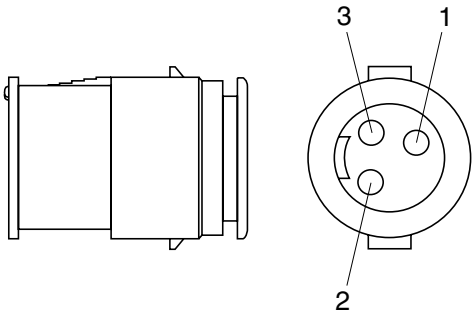
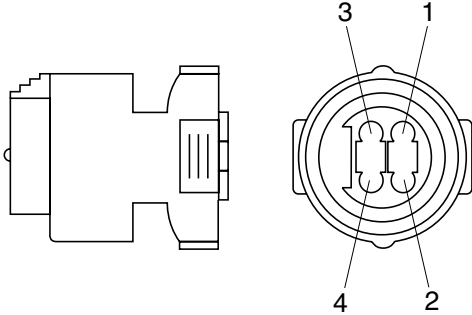
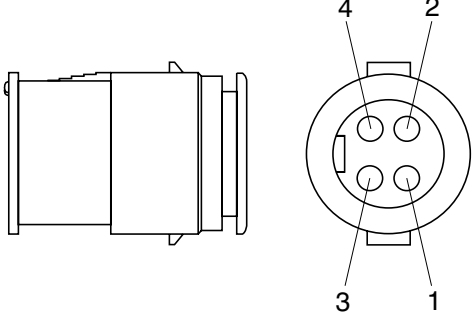
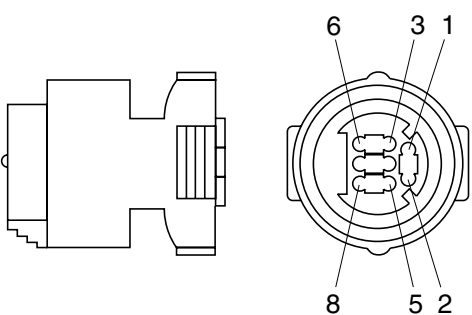
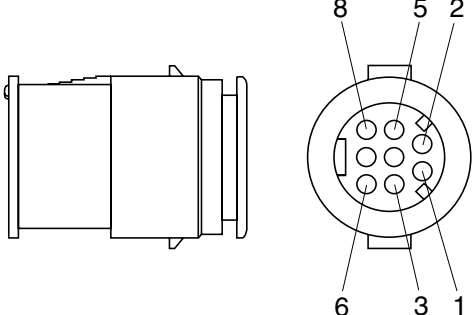
No. of pin	Receptacle connector (Female)	Plug connector (Male)
1	 S813-030100	 S813-130100
2	 S813-030200	 S813-130200

2) PA TYPE CONNECTOR

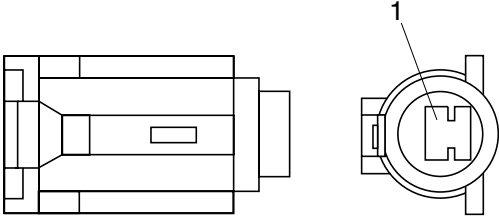
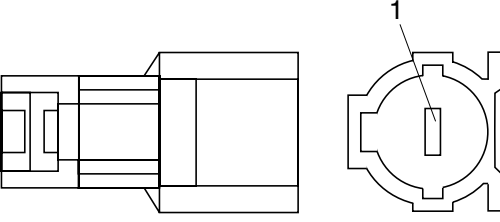
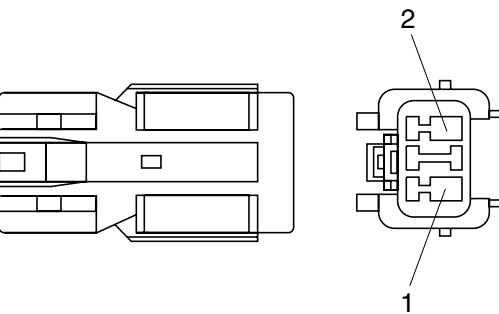
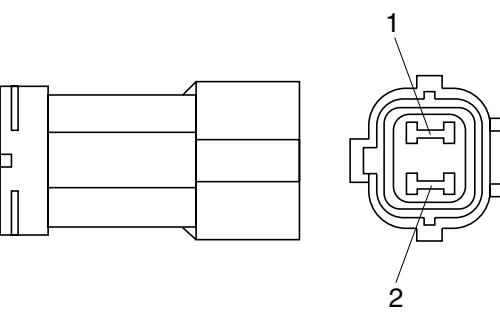
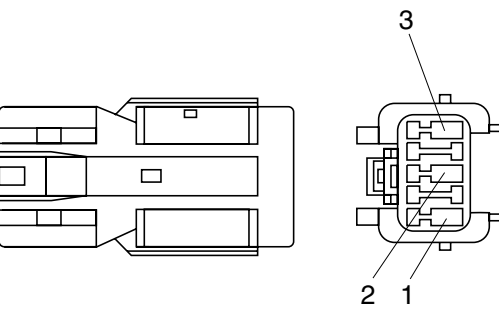
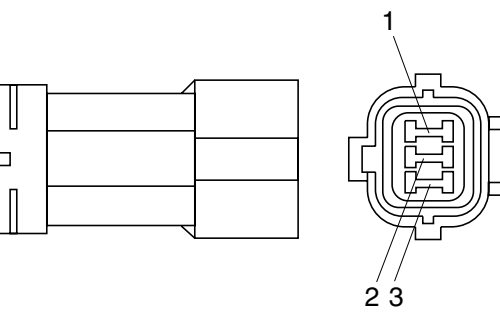
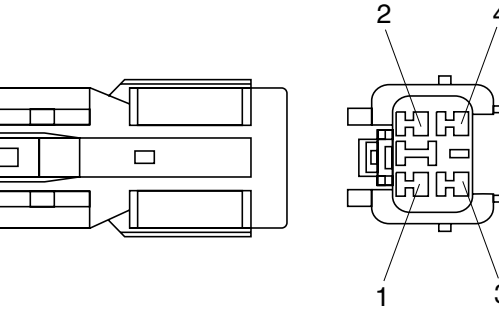
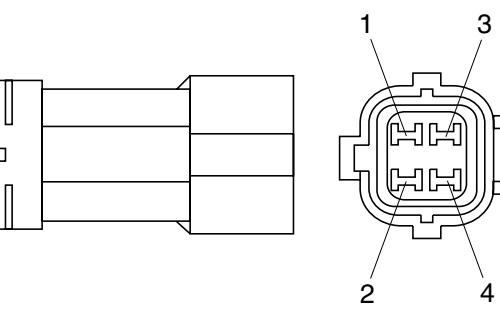
No. of pin	Receptacle connector (Female)	Plug connector (Male)
5	 S811-005002	 S811-105002
7	 S811-007002	 S811-107002
9	 S811-009002	 S811-109002
11	 S811-011002	 S811-111002

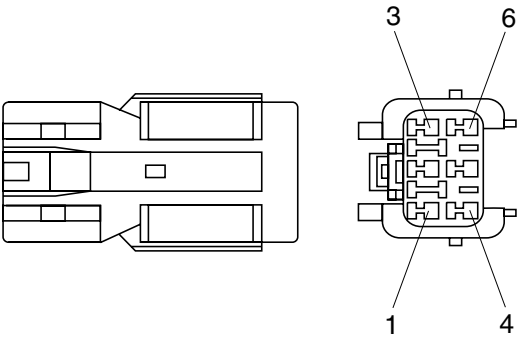
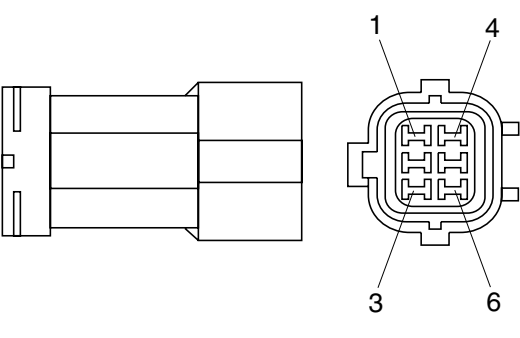
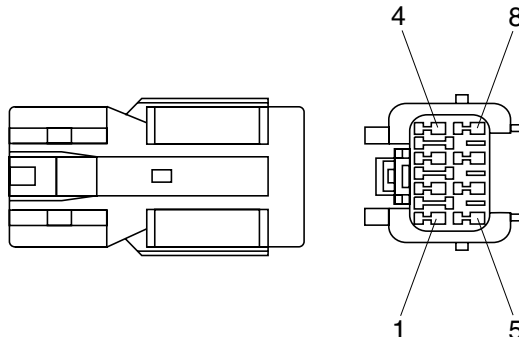
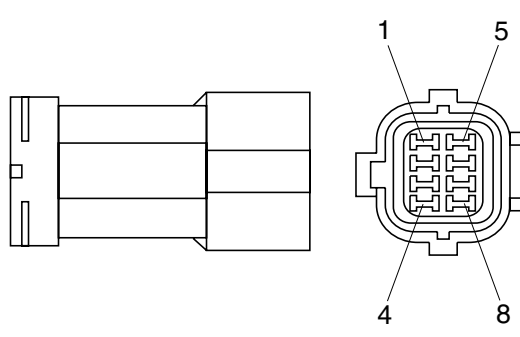
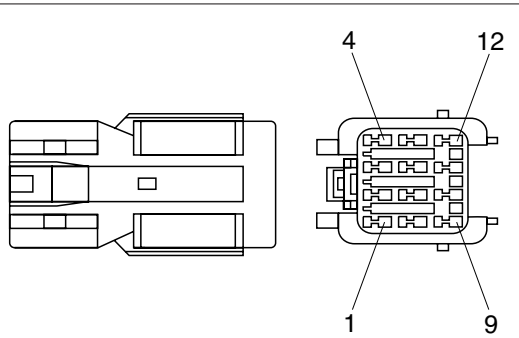
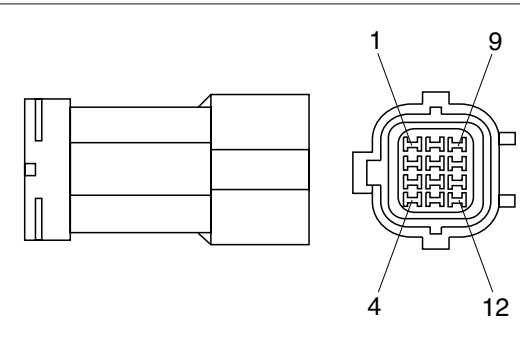
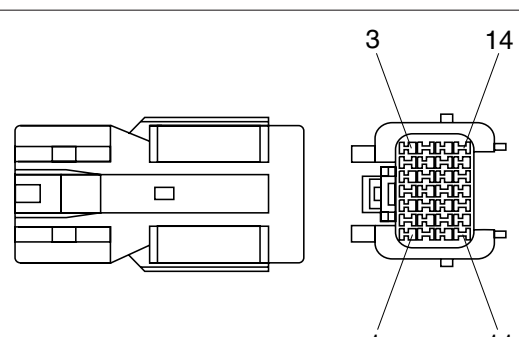
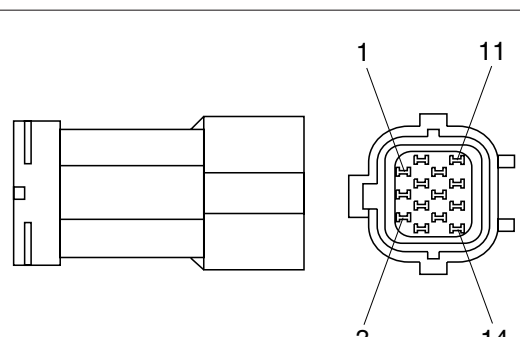
No. of pin	Receptacle connector (Female)	Plug connector (Male)
13	 S811-013002	 S811-113002
17	 S811-017002	 S811-117002
21	 S811-021002	 S811-121002

3) J TYPE CONNECTOR

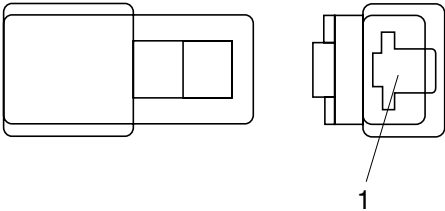
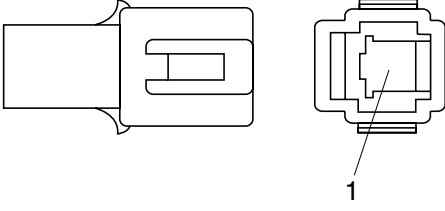
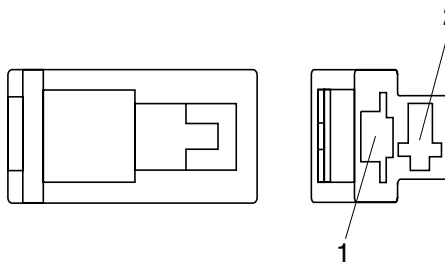
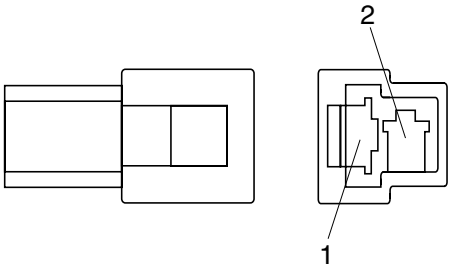
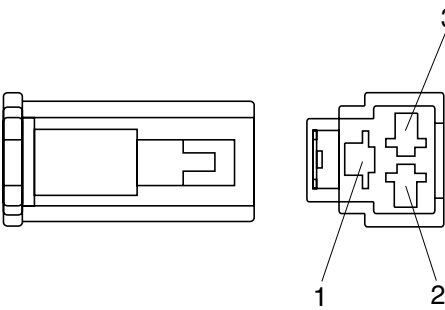
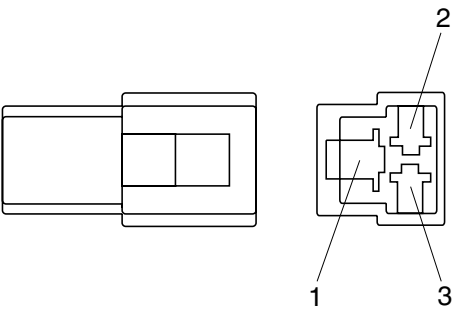
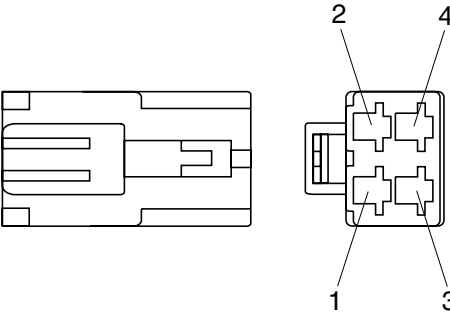
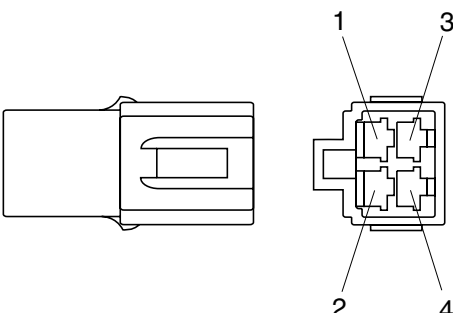
No. of pin	Receptacle connector (Female)	Plug connector (Male)
2	 S816-002001	 S816-102001
3	 S816-003001	 S816-103001
4	 S816-004001	 S816-104001
8	 S816-008001	 S816-108001

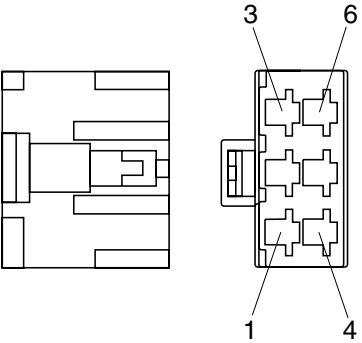
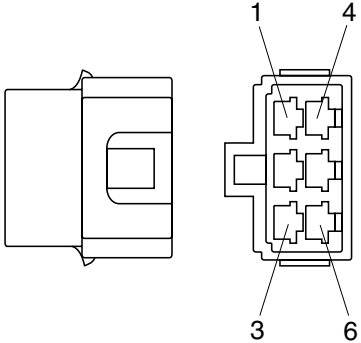
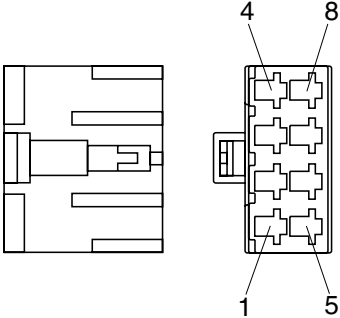
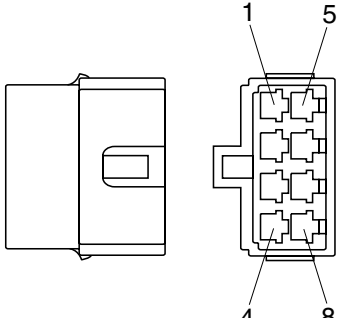
4) SWP TYPE CONNECTOR

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

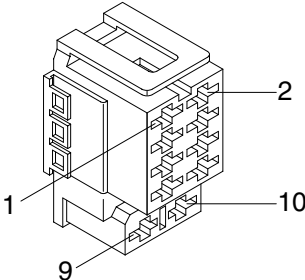
No. of pin	Receptacle connector (Female)	Plug connector (Male)
6	 S814-006000	 S814-106000
8	 S814-008000	 S814-108000
12	 S814-012000	 S814-112000
14	 S814-014000	 S814-114000

5) CN TYPE CONNECTOR

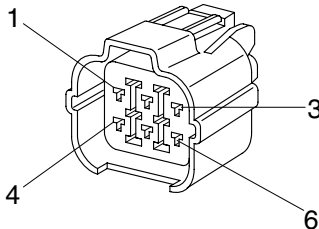
No. of pin	Receptacle connector (Female)	Plug connector (Male)
1	 S810-001202	 S810-101202
2	 S810-002202	 S810-102202
3	 S810-003202	 S810-103202
4	 S810-004202	 S810-104202

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

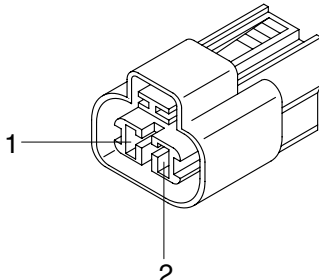
6) ITT SWF CONNECTOR

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

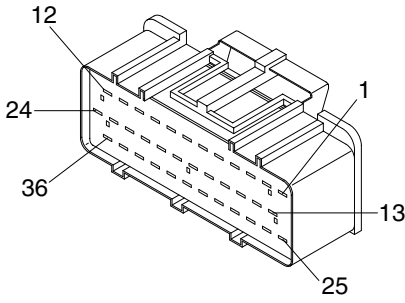
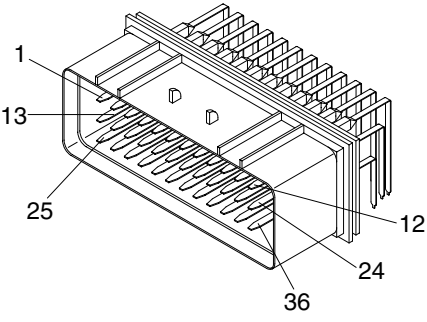
7) HW090 SEALED CONNECTOR

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

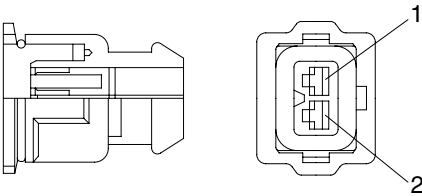
8) MWP02F-B CONNECTOR

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

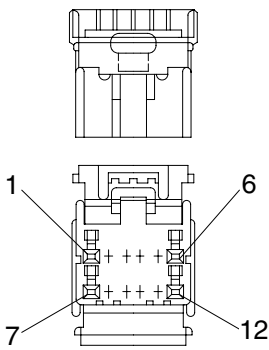
9) AMP ECONOSEAL CONNECTOR

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

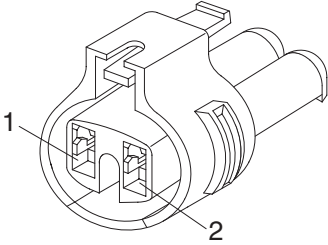
10)AMP TIMER CONNECTOR

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

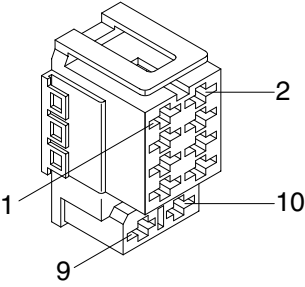
11)AMP 040 MULTILOCK CONNECTOR

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

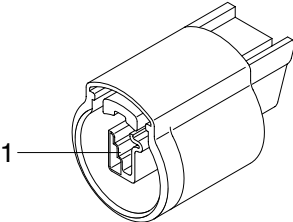
12)KET 090 WP CONNECTORS

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

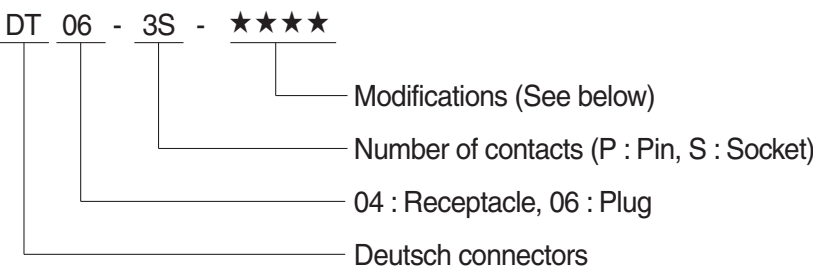
13)ITT SWF CONNECTOR

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

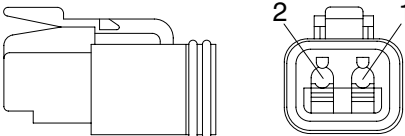
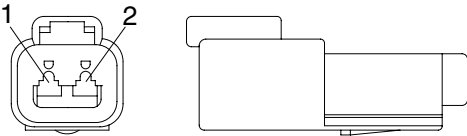
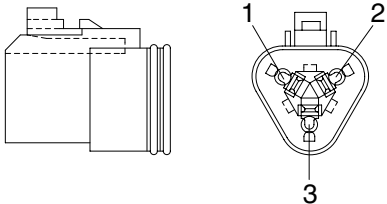
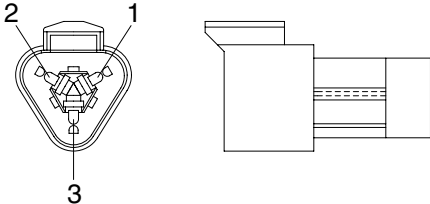
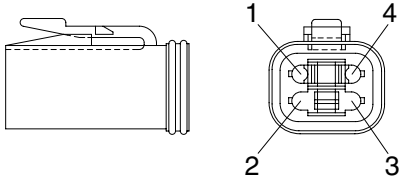
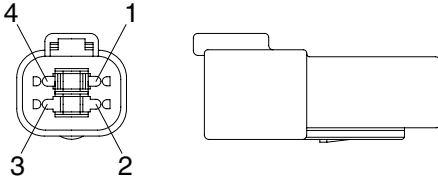
14)MWP NMWP CONNECTOR

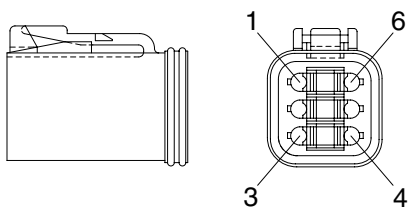
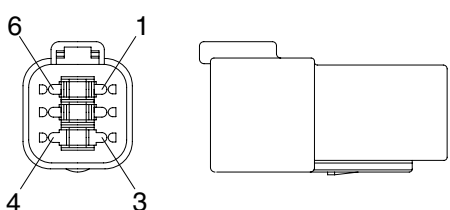
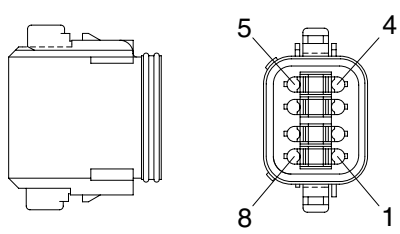
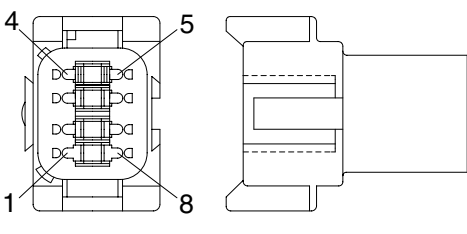
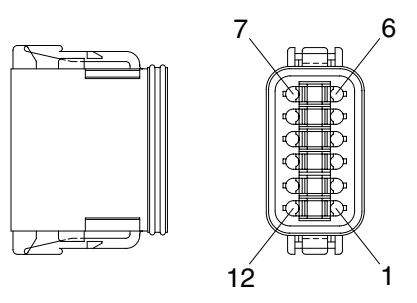
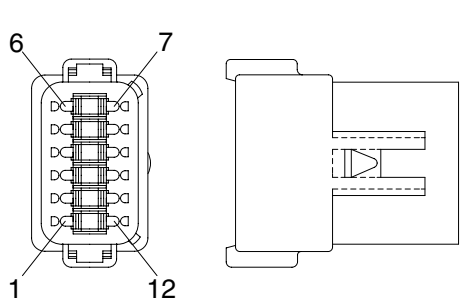
No. of pin	Receptacle connector (Female)	Plug connector (Male)
1	 NMWP01F-B	

15)DEUTSCH DT CONNECTORS



- ※ 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