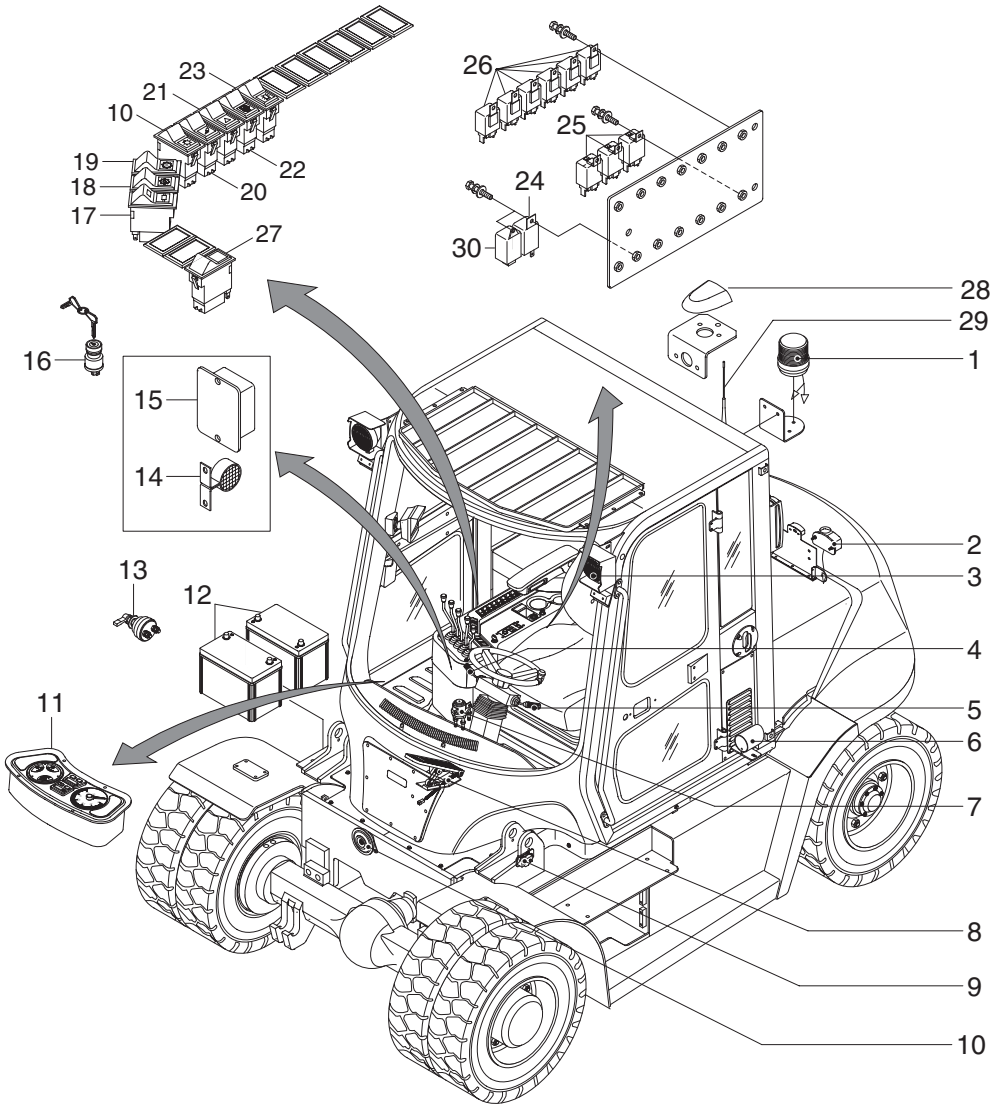
SECTION 7 ELECTRICAL SYSTEM

SECTION 7 ELECTRICAL SYSTEM

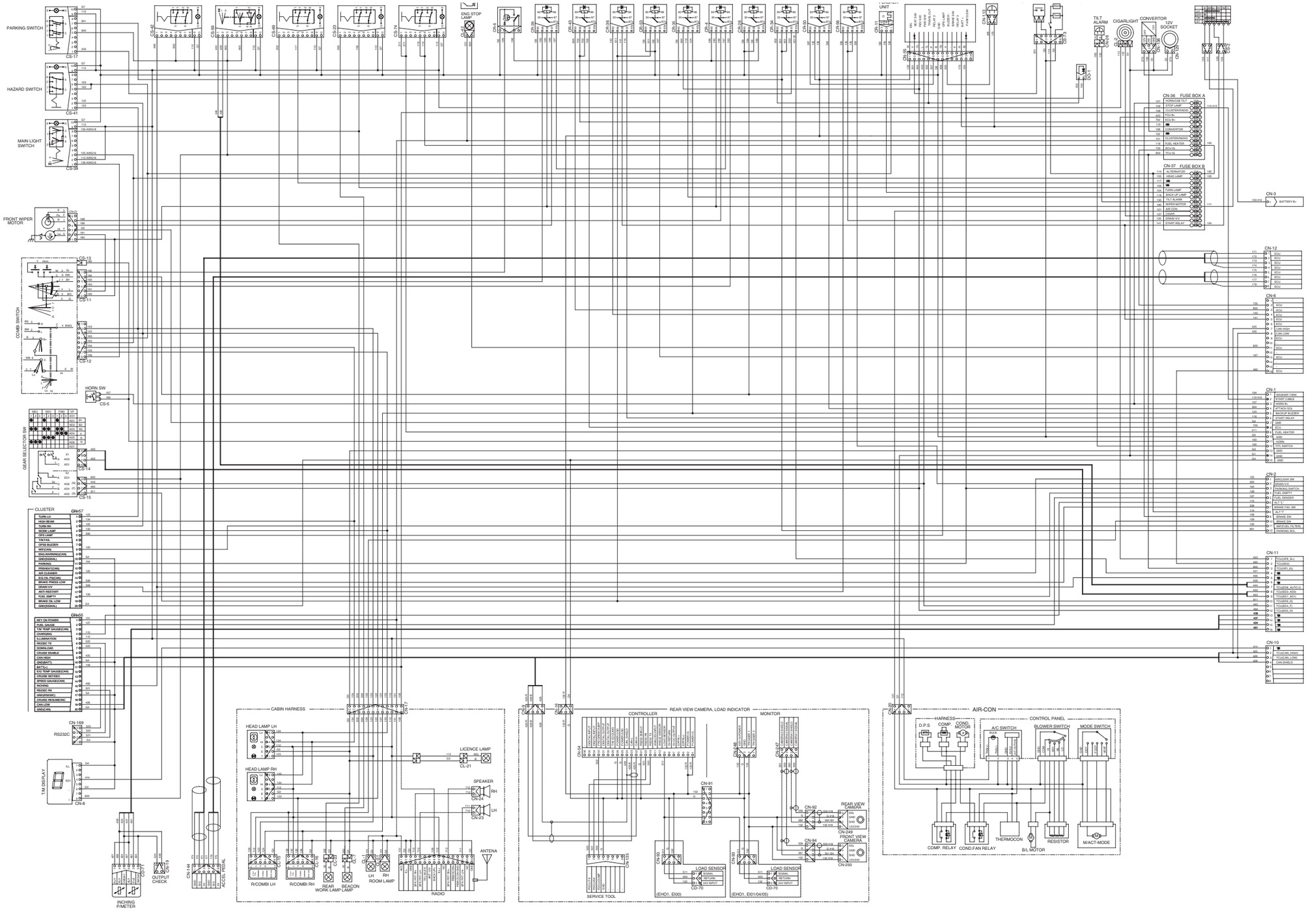
GROUP 1 COMPONENT LOCATION



50D9BEL00

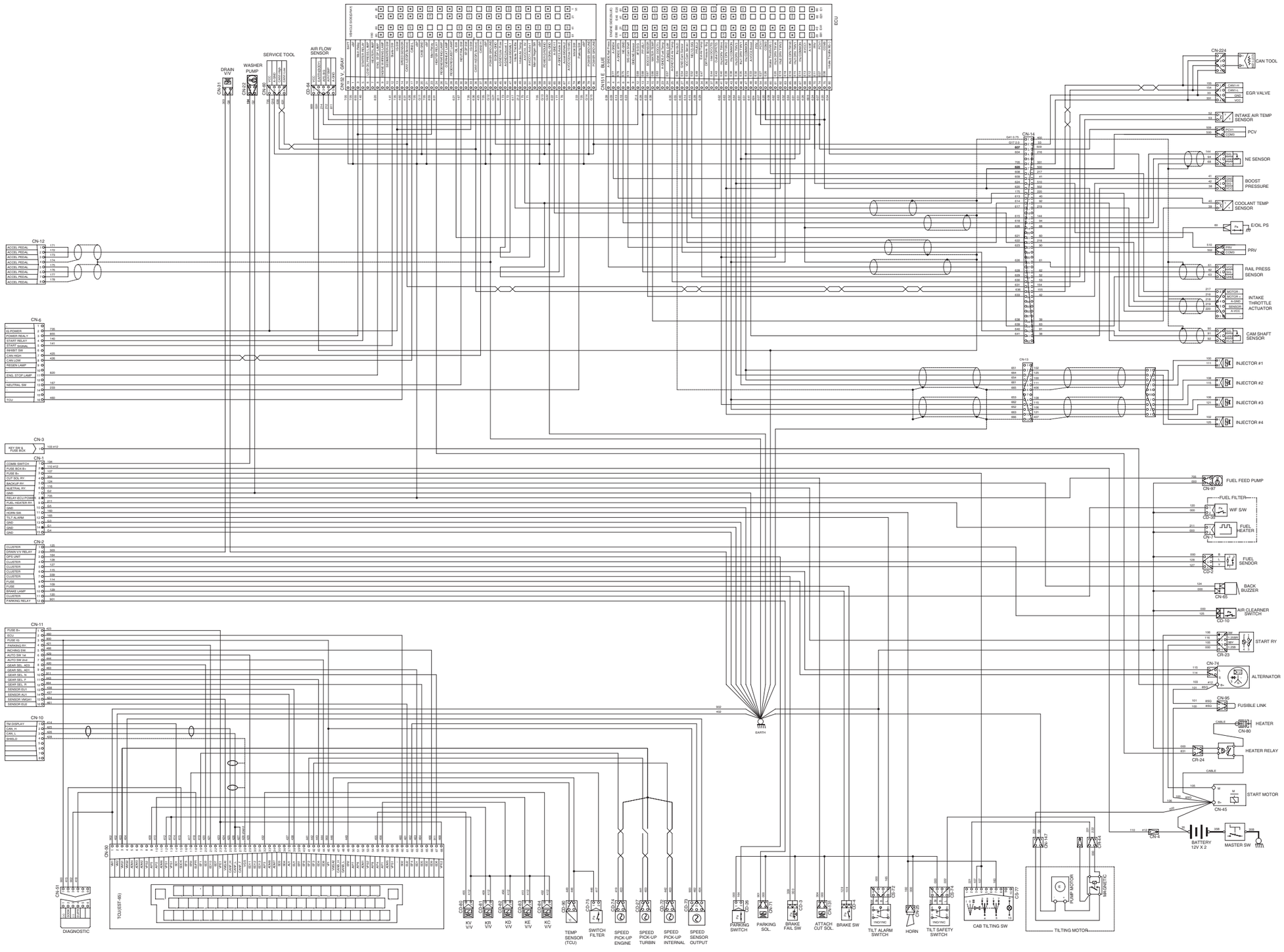
1	Beacon lamp	11	Cluster	21	Hazard switch
2	License lamp	12	Battery	22	Fuel heater switch
3	Work lamp	13	Master switch	23	Beacon lamp switch
4	Combination switch	14	Buzzer	24	Flasher unit relay
5	Gear selector lever	15	OPSS unit	25	Relay 5P
6	Backup alarm	16	Start switch	26	Relay 4P
7	Start relay	17	Parking brake switch	27	Engine stop lamp
8	Accelerator pedal	18	Clutch cut-off switch	28	Rear view camera
9	Micro switch	19	Auto/manual select switch	29	Antenna
10	Main light switch	20	Work lamp switch	30	Intermittent wiper relay

· ELECTRICAL CIRCUIT (1/2)



21FA-51010-01

· ELECTRICAL CIRCUIT (2/2)



21FA-51010-02

MEMORANDUM

1. POWER CIRCUIT

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

1) OPERATING FLOW

- Battery (+) → Start motor [CN-45 (B+)]
  - → Heater relay [CR-24]
  - → Start relay [CR-23]
  - → Fusible link [CN-95(1)] → Alternator [CN-74 (B+)] → I/conn[CN-3] → Start switch [CS-2 (1)]
  - → Tilting motor [CN-174]
  - → I/conn [CN-4] -> I/conn [CN-1 (2)] -> Fuse box A
    - Fuse [No. 1] → Horn switch [CS-5]
      - → I/conn [CN-1 (3)] -> Cabin tilt switch [CS-77 (3, 4)]
    - Fuse [No. 2] → I/conn [CN-2 (9)] -> Brake switch [CD-4]
    - Fuse [No. 3] → Cluster [CN-56 (11)]
      - → I/conn [CN-17 (1)] -> Radio (8)
    - Fuse [No. 4] → I/conn [CN-11 (1)] -> TCU [CN-50 (23, 68)]
    - Fuse [No. 5] → ECU power relay [CR-43 (30, 86)]
    - Fuse [No. 6] → OPSS unit [CN-55 (12)]
      - → OPSS buzzer [CN-113 (12)]

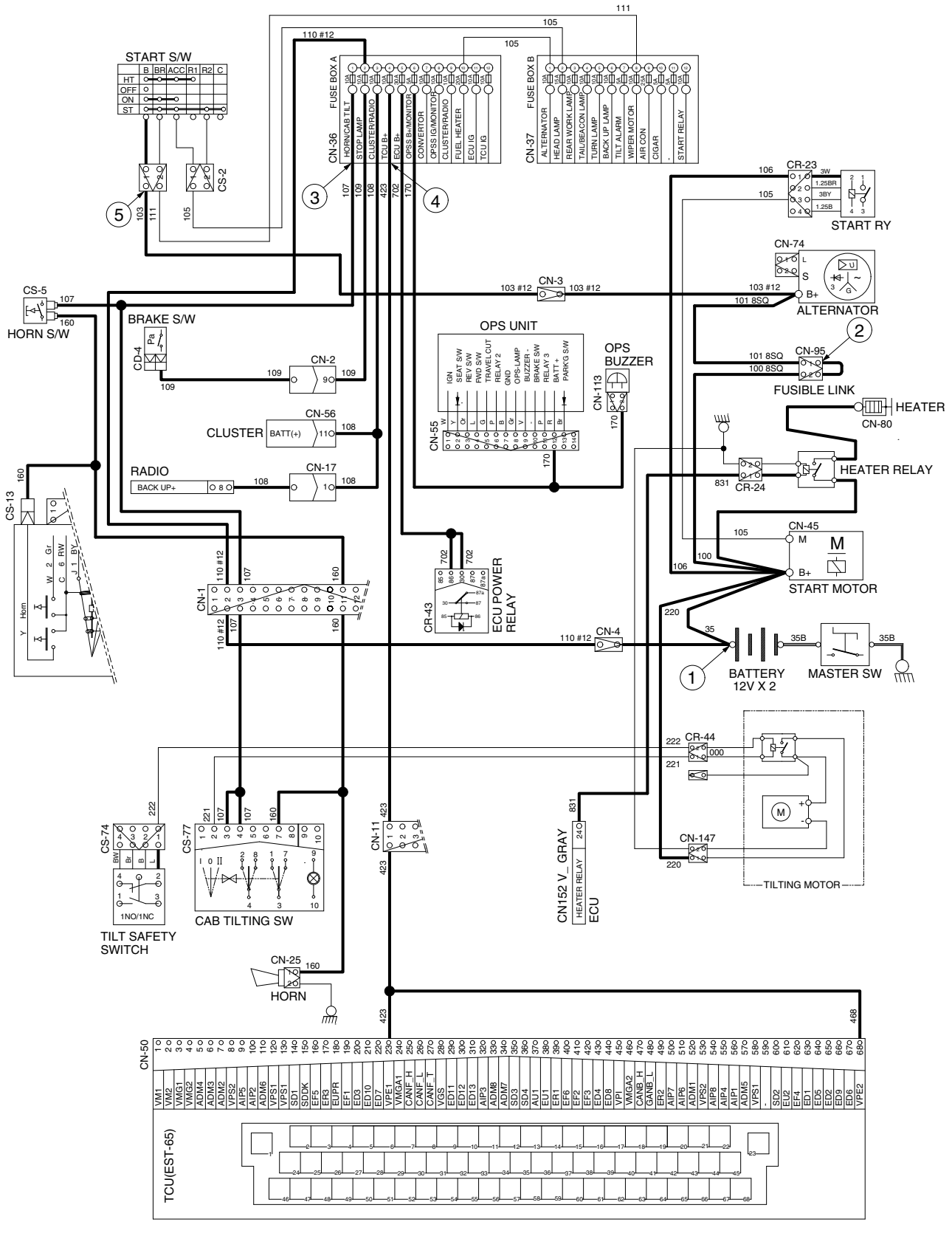
2) CHECK POINT

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

※ GND : Ground

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

POWER CIRCUIT



50D9BEL03

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

2. STARTING CIRCUIT

1) OPERATING FLOW

Battery (+) terminal → Start motor [CN-45 (B+)]
- → Fusible link [CN-95] → Alternator [CN-74 (B+)] → I/conn [CN-3] → Start switch [CS-2 (1)]
- → Start relay [CR-23]
- → Heater relay [CR-24]

※ The engine can be started only when the gear select lever is in neutral position.
The operator should be seated when starting.

(1) When start key switch is in ON position

Start switch ON [CS-2 (1)] → Fuse box B [No.2 →1] → Fuse box A [No.10] → power is supplyed the electric components.

Start switch ON [CS-2 (2)] → Fuse box B [No.8] → power is supplyed the electric components.

(2) When start key switch is START position

Start switch START [CS-2 (2)] → Fuse box B [No. 12] → I/conn [CN-6 (5)] → ECU [CN-152(12→5)]
- → I/conn [CN-6 (4)] → Anti start relay [CR-36 (85)]
- → Anti start relay [CR-36 (30)→(87)]

→ I/conn [CN-1 (6)] → Start relay [CR-23 (2→3)] → Start motor [CN-45 (M)] → Start motor operating.

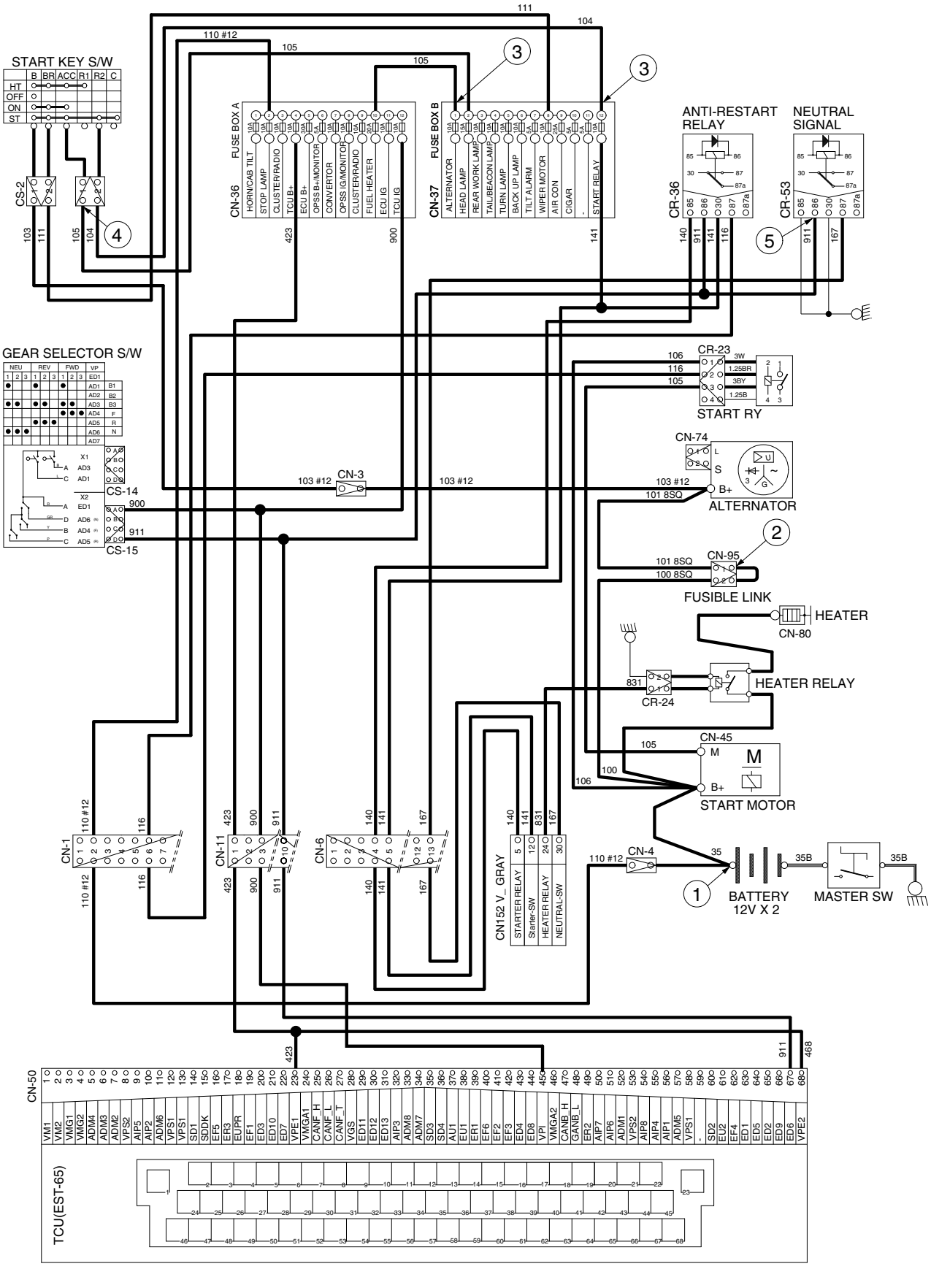
2) CHECK POINT

Engine	Start switch	Check point	Voltage
Running	ON	① - GND (Battery B+) ② - GND (Fusible link) ③ - GND (Fuse box B No.1, 12) ④ - GND (Start swich) ⑤ - GND (Neutral signal relay)	24V

※ GND : Ground

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

STARTING CIRCUIT



50D9BEL04

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

3. CHARGING CIRCUIT

When the start motor is activated and the engine is started, the operator release the start switch to the ON position. Charging current generated by operating alternator flows into the battery.
The current also flows from alternator to each electrical component through the fusible link (CN-95) and the fuse box.

1) OPERATING FLOW

(1) Warning flow

Alternator [CN-74 (L)] → I/conn [CN-2 (6)] → Cluster charging lamp ON [CN-56 (4)]

(2) Charging flow

Alternator [CN-74 (B+)] → Fusible link [CN-95] → start motor [CN-45 (B+)] → Battery (+) terminal charging

Alternator [CN-74 (B+)] → I/conn [CN-3] → Start switch [CS-2 (1)]

2) CHECK POINT

Engine	Start switch	Check point	Voltage
Running	ON	① - GND (Alternator B+) ② - GND (Start switch) ③ - GND (Cluster)	24V

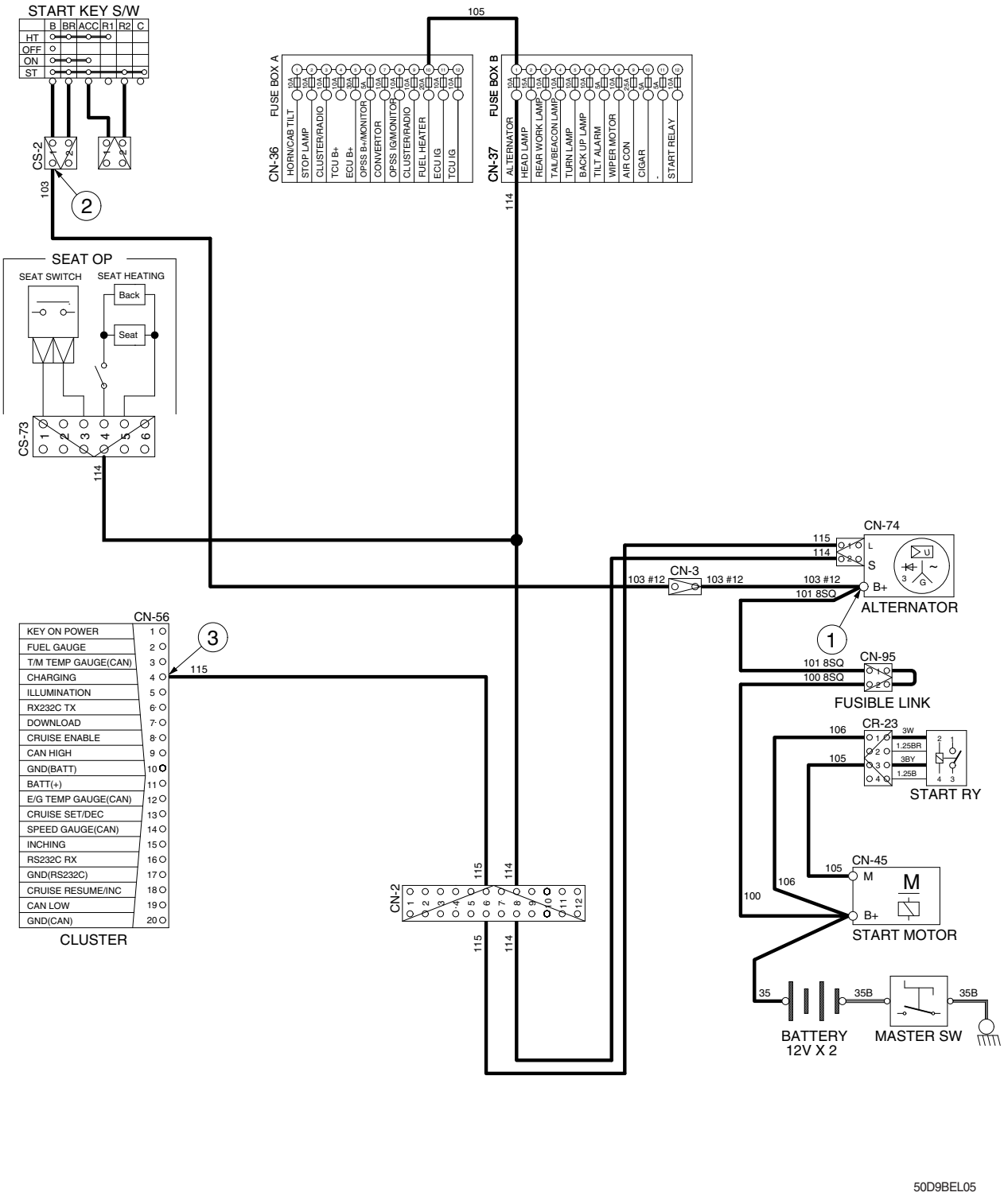
※ GND : Ground

※ Cautions

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

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

CHARGING CIRCUIT



50D9BEL05

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

4. PREHEATER AND FUEL HEATER CIRCUIT

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

1) OPERATING FLOW

(1) Preheater

Battery (+) terminal → Start motor [CN-45 (B+)] → Heater relay [CR-24)]
→ Start swich ON → Fuse box B [No.2→1] → Fuse box A [No.11]
I/conn [CN-6 (2)] → ECU [CN-152 (13→24)
→ Heater relay [CR-24] → Heater [CN-80]

※ 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.

(2) Fuel heater

Fuel heater switch ON [CS-74 (5, 6)→(1, 2)] → I/conn [CN-1 (9)] → Fuel heater [CN-7]

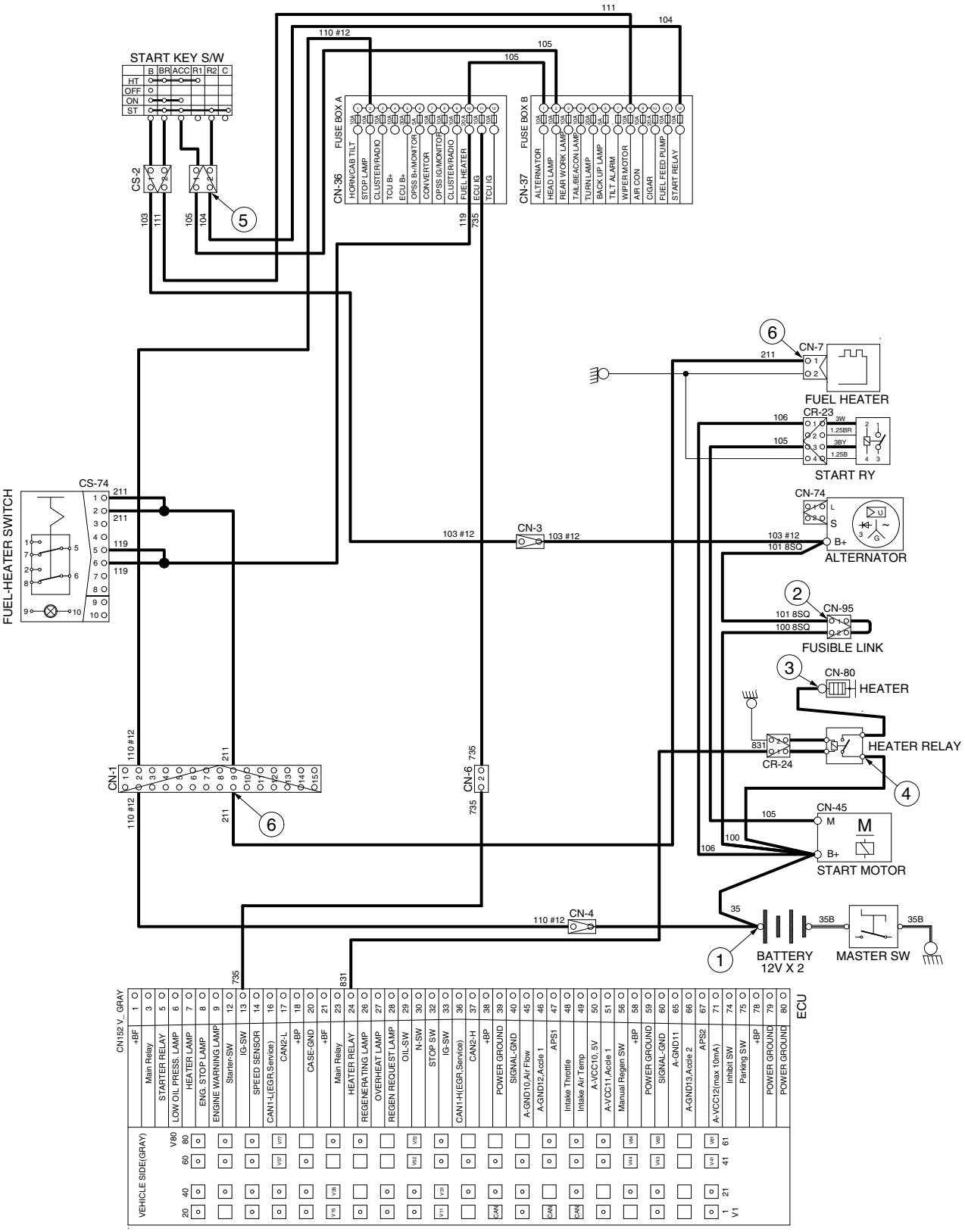
2) CHECK POINT

Engine	Start switch	Check point	Voltage
Stop	ON	① - GND (Battery B+) ② - GND (Fusible link) ③ - GND (Heater) ④ - GND (Heater relay) ⑤ - GND (Start switch) ⑥ - GND (Fuel heater)	24V

※ GND : Ground

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

PREHEATER AND FUEL WARMER CIRCUIT



50D9BEL06

※ 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 B (No.2) → Main light switch [CS-39 (3)] → Switch ON, 2nd step [CS-39 (1)]
→ Multi function switch [CS-12 (8)]
- → Multi function switch MIDDLE [CS-12 (7)]
  - → I/conn [CN-17 (4)]
    - → LH Head light low beam ON [CL-3 (6)]
    - → RH Head light low beam ON [CL-4 (6)]
- → Multi function switch DOWN [CS-12 (6)]
  - → Cluster high beam pilot lamp ON [CN-57 (2)]
  - → I/conn [CN-17 (11)]
    - → LH Head light high beam ON [CL-3 (4)]
    - → RH Head light high beam ON [CL-4 (4)]

※ Illumination lamp

Fuse box B (No.4) → Main light switch [CS-39 (8)] → Switch ON, 1st step [CS-39 (8→2)]
- → Cluster illumination ON [CN-56 (4)]
- → All swich illumination ON

(2) Rear work light

Fuse box B (No.3) → Work light switch [CS-69 (1)] → Switch ON [CS-69 (5)]
→ I/conn [CN-17 (10)] → Rear work light ON [CL-23]

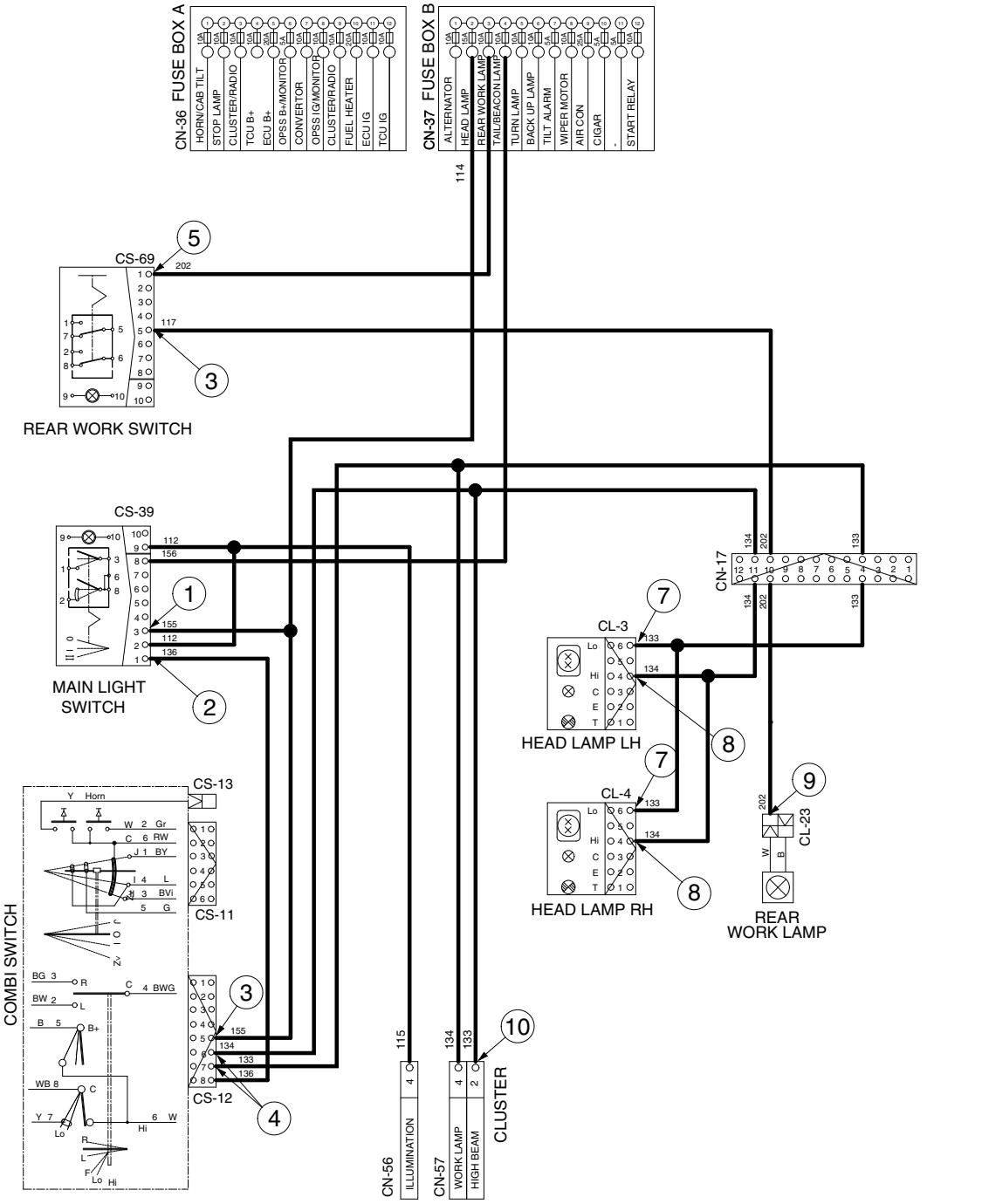
2) CHECK POINT

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 LIGHT AND WORK LIGHT CIRCUIT



50D9BEL07

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

6. WIPER AND WASHER CIRCUIT

1) OPERATING FLOW

Fuse box B [No.9] → Wiper relay Lo [CR-4 (86)]
→ Multi function switch [CS-11 (6)]
→ Wiper relay Hi [CR-39 (30)]
→ Front wiper motor [CN-21 (1)]

(1) Front washer switch ON

① Washer switch ON [CS-11 (6)→(2)]
→ I/conn [CN-1 (1)] → Front washer pump [CN-22 (2)] → Front washer operating
→ Washer pump relay [CR-26 (86)→(87)]
→ Wiper relay Lo [CR-4 (85)→(30)] → Front wiper motor [CN-21 (5)]
→ Wiper motor operating (low)

(2) Front wiper switch ON

① INT position
Wiper switch ON [CS-11 (6)→(1)] → Int wiper relay [CR-6 (3)] → (2)]
→ Wiper relay Lo [CR-4 (85)→(30)] → Front wiper motor [CN-21 (5)]
→ Front wiper motor intermittently operating

② Lo position
Wiper switch ON [CS-11 (6)→(4)] → Wiper relay Lo [CR-4 (87a)→(30)] →
Front wiper motor [CN-21 (5)] → Front wiper motor operating (low)

③ Hi position
Wiper switch ON [CS-11 (6)→(3)] → Wiper relay Hi [CR-39 (86)→(87)] →
Front wiper motor [CN-21 (4)] → Front wiper motor operating (high)

(3) Auto-parking (when switch OFF)

Switch OFF [CS-11 (4)] → Wiper relay Lo [CR-4 (87a)→(30)] → Front wiper motor [CN-21 (5)] →
Wiper motor stop

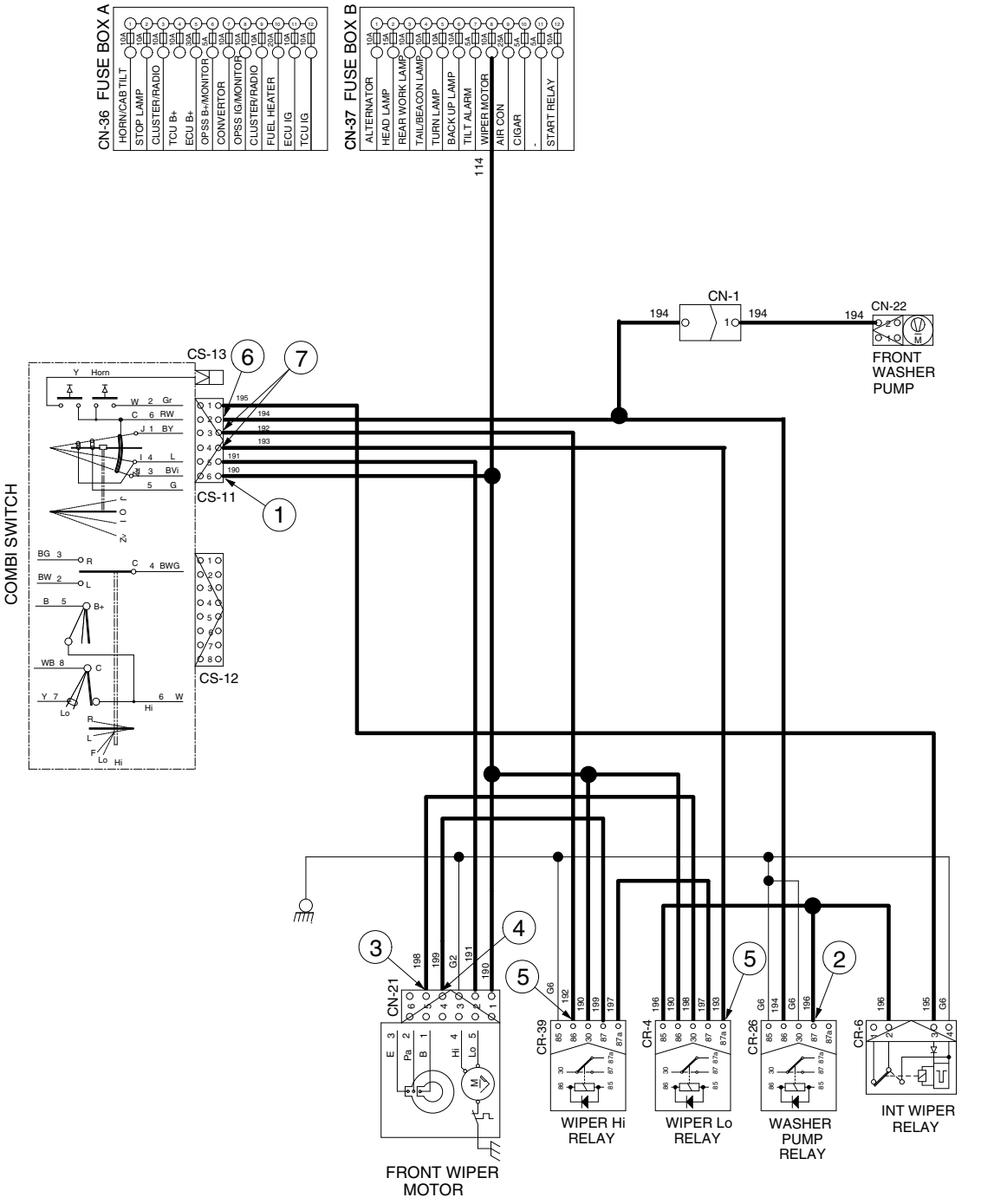
2) CHECK POINT

Engine	Start switch	Check point	Voltage
Stop	ON	① - GND (Front wiper switch power input) ② - GND (Washer pump relay power input) ③ - GND (Front wiper motor Lo power input) ④ - GND (Front wiper motor High power input) ⑤ - GND (Wiper relay power input) ⑥ - GND (Front washer power output) ⑦ - GND (Front 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



50D9BEL08

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

3. CLUSTER

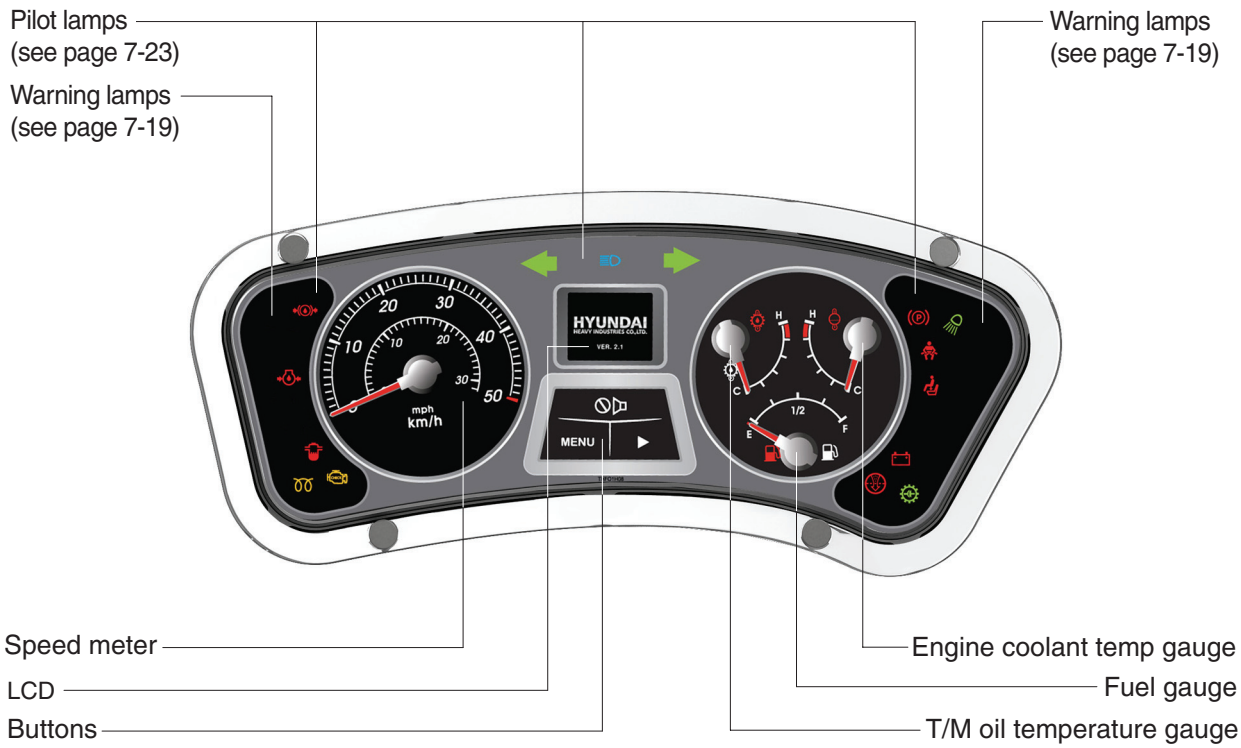
1) STRUCTURE

The gauges panel consists of gauges and monitors 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 lamp : Indicate abnormality of the truck.
- Pilot lamp : Indicate operating status of the truck.
- LCD : Display the truck model, error code and engine speed etc.
- Button : Stop the buzzer sound and select the engine error code and truck model.

※ The monitor 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.

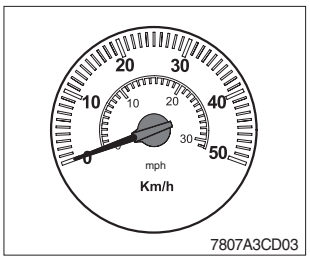
※ When the monitor provides a warning immediately check the problem, and perform the required action.



50D9BCD02

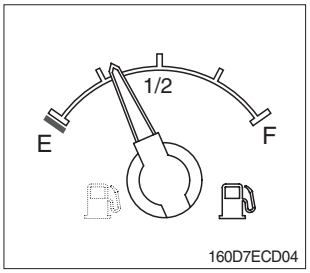
2) GAUGE

(1) Speed meter



① The speedmeter displays the speed of truck in mph and km/h.

(2) Fuel gauge

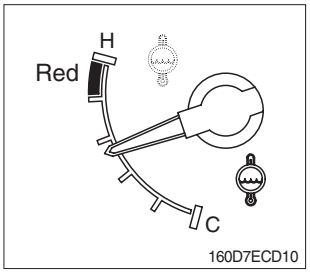


① This gauge indicates the amount of fuel in the fuel tank.

② Fill the fuel when 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

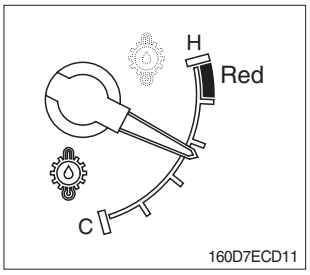


① This indicates the temperature of coolant.
· Red range : Above 104˚C (219˚F)

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, check the radiator and engine.

(4) Transmission oil temperature gauge

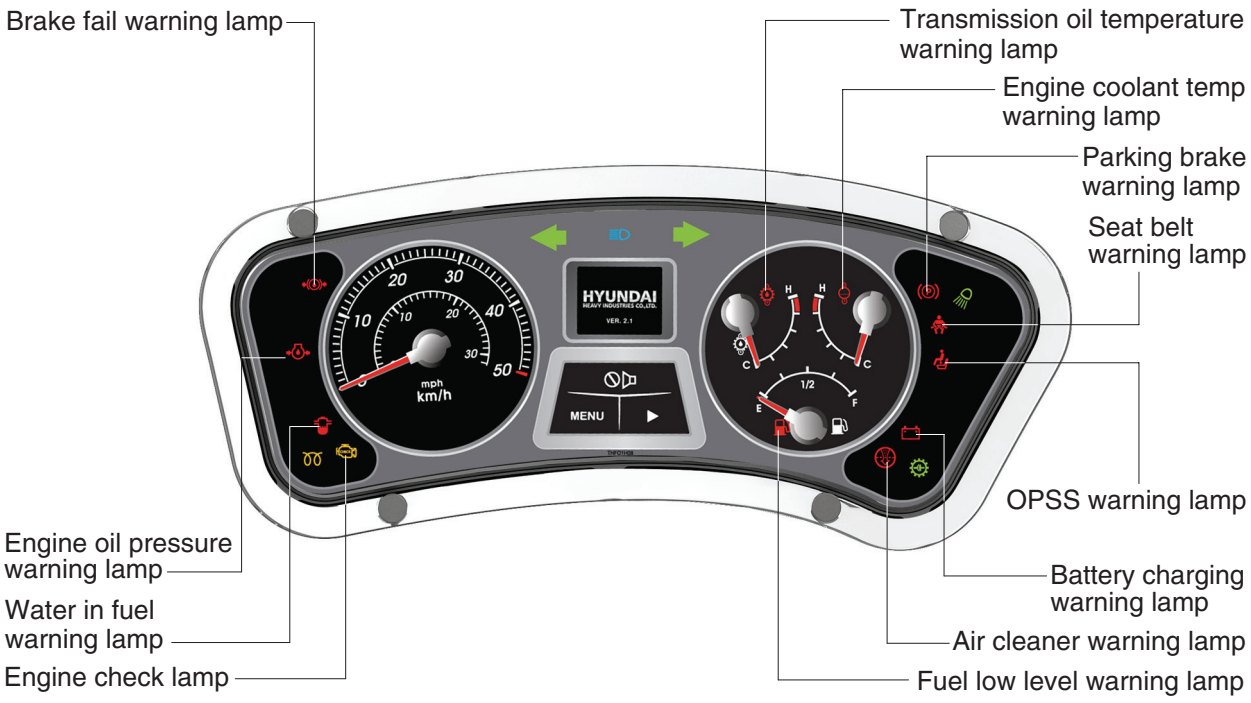


① This range indicates the temperature of transmission oil.
· Red range : Above 107˚C (225˚F)

② Keep idling engine at low speed until the indicator is in the operating range.

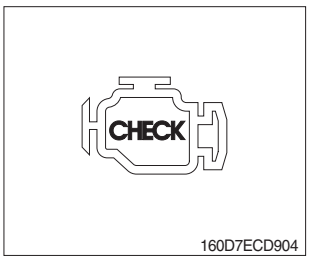
③ If the indicator is in the red range, it means the transmission is overheated. Be careful that the indicator does not move into the red range.

3) WARNING LAMPS



50D9CD02-1

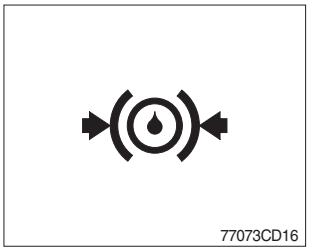
(1) Engine check lamp



160D7ECD904

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

(2) Brake fail warning lamp



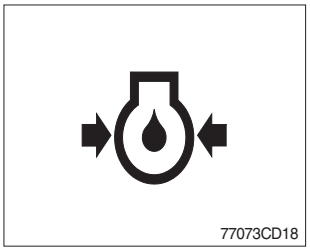
77073CD16

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

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

※ Do not operate until the problems are corrected.

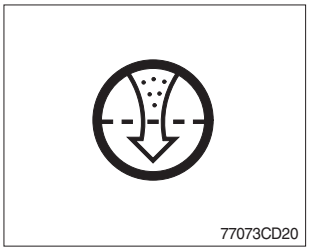
(3) Engine oil pressure warning lamp



① This lamp comes ON for a while after starting the engine because of the low oil pressure.

② If the lamp comes ON during engine operation, shut OFF engine immediately. Check oil level.

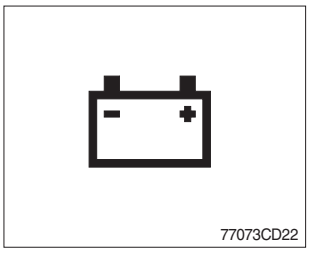
(4) Air cleaner warning lamp



① This lamp operates by the vacuum caused inside when the filter of air cleaner is clogged.

② Check the filter and clean or replace it when the lamp is ON.

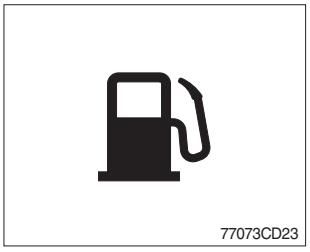
(5) Battery charging warning lamp



① This lamp is ON after key switch is turned ON.

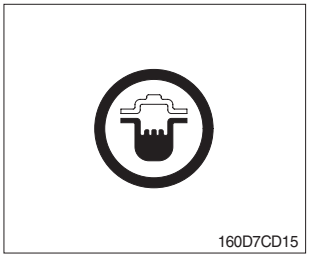
② Check the battery charging circuit when this lamp comes ON during engine operation.

(6) Fuel low level warning lamp



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

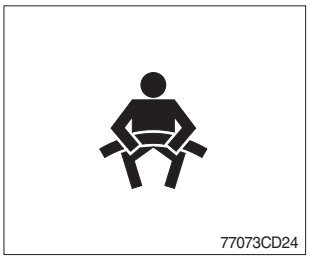
(7) Water in fuel warning lamp



① This lamp lights up when the water separators full of water or malfunctioning.

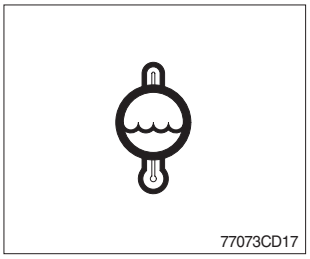
※ When this lamp lights up, stop the truck and spill water out of the separator.

(8) Seat belt warning lamp



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

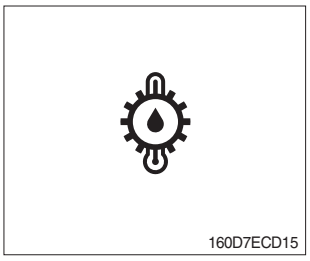
(9) Engine coolant temperature warning lamp



① This lamp is turned ON when the temperature of cooling water is over the normal temperature(104°C, 219°F).

② Check the cooling system when the lamp is ON.

(10) Transmission oil temperature warning lamp



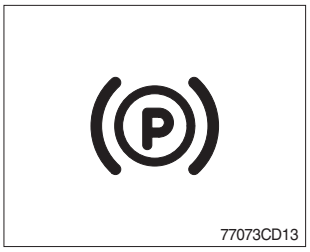
① This lamp informs the operator that transmission oil is above the specified temperature.

· Lamp ON : Abnormal

· Lamp OFF : Normal

※ When this lamp lights up during operation, stop the engine and check the machine.

(11) Parking brake warning lamp



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

※ Check the lamp is OFF before driving.

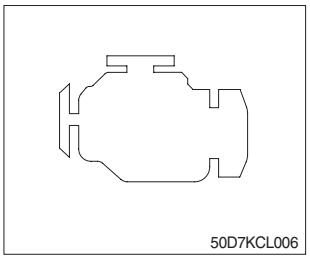
(12) OPSS warning lamp (option)

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 forward/reverse lever must be cycled through neutral with the operator in the normal operating position to regain powered direction control.

(13) Engine stop warning lamp

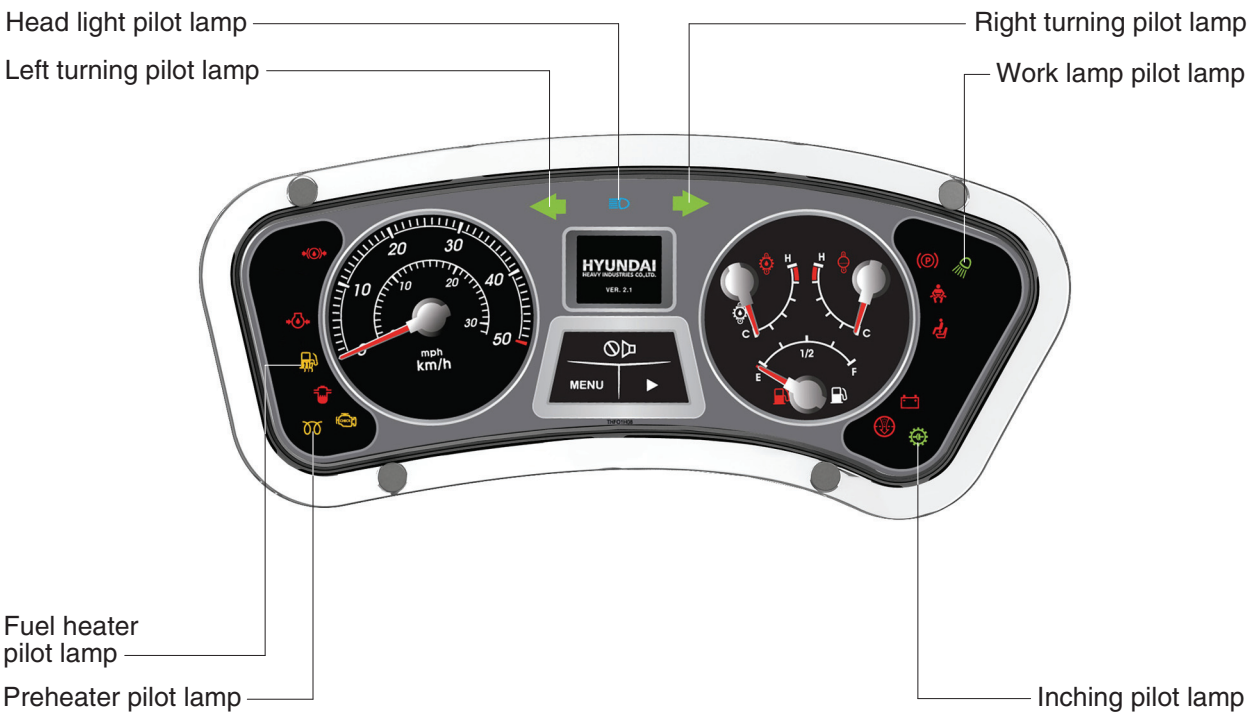


① f the lamp lights ON, stop the engine immediately and check the engine.

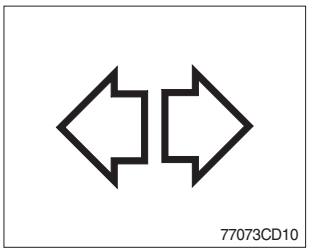
※ Please contact your Hyundai service center or local dealer.

※ Refer to page 7-33 for the location of the warning lamp.

4) PILOT LAMPS

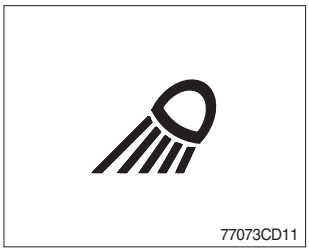


(1) Direction pilot lamp



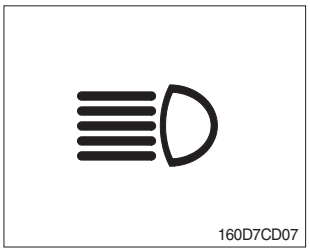
① This lamp flashes when the signal indicator lever is moved.

(2) Work lamp pilot lamp (rear)



① This lamp lights ON when rear work lamp switch is pressed.

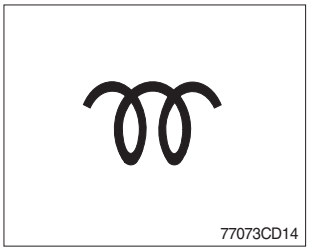
(3) Head light pilot lamp



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

※ Refer to page 7-34.

(4) Preheater pilot lamp

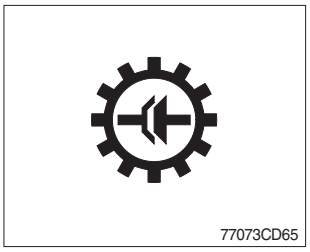


① This lamp lights ON when start switch is turned clockwise to the ON position. Light will turn off after approximately 15~45 seconds, depending on engine temperature, indicating that preheating is completed.

② When the lamp goes out the operator should start cranking the engine.

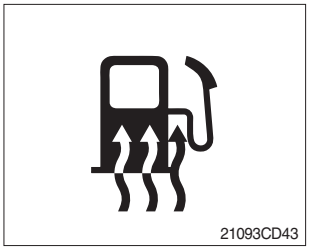
※ Refer to page 5-12 of the operator's manual.

(5) Inching pilot lamp



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

(6) Fuel heater pilot lamp

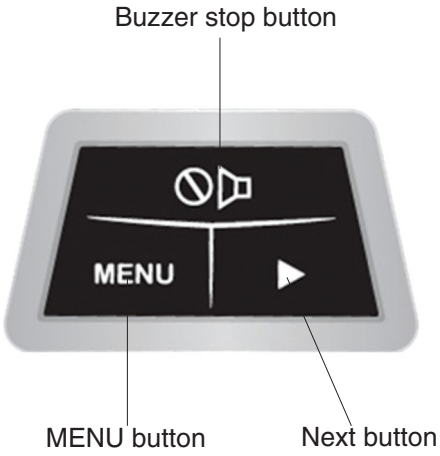


① This lamp is turned ON when the coolant temperature is below 10 °C (50 °F) or the hydraulic oil temperature 20 °C (68 °F).

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

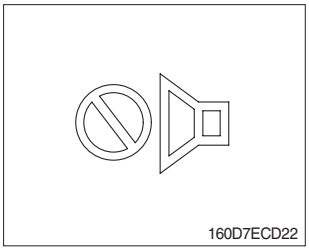
5) CLUSTER BUTTON

Each button has the following function.



160D7ECD121E

(1) Buzzer stop button



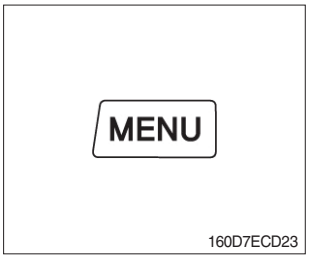
160D7ECD22

① This button is used to stop the buzzer sound.

② Stop the buzzer when the button is pressed.

※ If another alarm condition occurs after this button has been pressed, the alarm buzzer will re-sound.

(2) Menu button



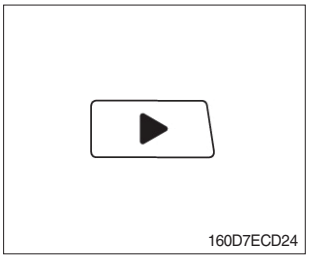
160D7ECD23

① To select engine error display mode when the the engine check warning lamp lights ON, press this button.

② To return to standby mode, press this button.

③ To set model on the model select mode, press this button.

(3) Next button

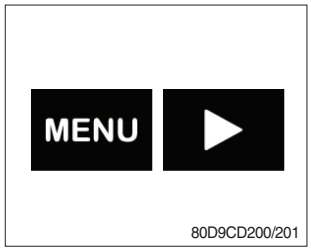


160D7ECD24

① To display next page on the engine error display mode where engine error of 4 or more are occurred, press this button

② To change another model on model select mode, press this button.

(4) Menu and next buttons



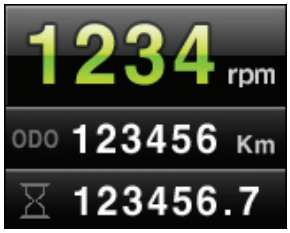
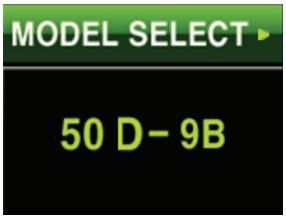
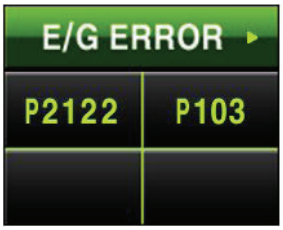
① These buttons are used to select the model select mode.

② The model is displayed on the LCD when the menu button and next button are pressed simultaneously for some longer seconds.

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

5) LCD

LCD has the functions to display start mode, standby mode, model select and engine error code.

NO	Display	Name	Description
1		Start mode	– Display initialization state with HYUNDAI logo and program version.
2		Standby mode	– Displays on the idle state. – Displays rpm, odometer and hourmeter
3			– Odometer is on, ODO is activated.
4			– Hourmeter is on, is activated.
5		Model select	– On model select mode, displays like this image. ※ Refer to the page 7-26.
6		Engine error	– Engine check lamp is activated. – Key in MENU button. 

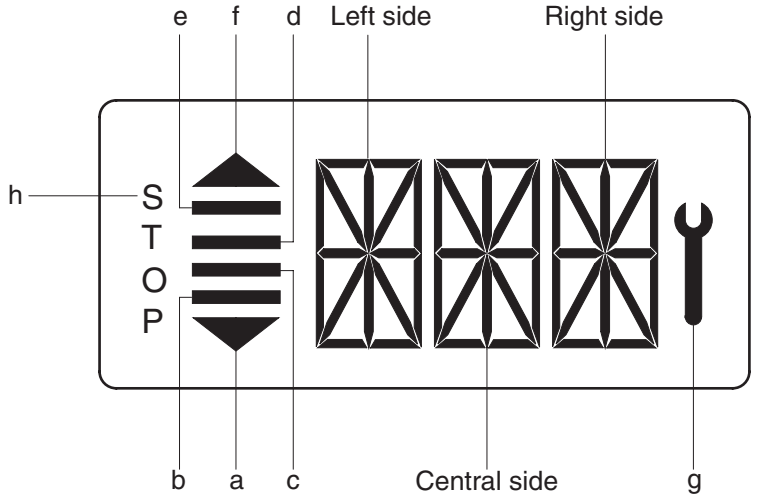
4.TRANSMISSION MESSAGE DISPLAY

1) TRANSMISSION MESSAGE DISPLAY (ZF Transmission)

(1) Function

The display can be used with the gear selector (DW-3). It indicates speed and driving direction as well as the activated kickdown.

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.



7803A3CD33

1	Bars	a, f	Driving direction (a : reverse, f : forward)
		b, c, d	Preselected gear
		e	Automatic mode
2	Left side		For the moment still without function
3	Central and Right side		On the two alphanumeric 16-segment display, the electric control unit issues the actual state of gear and driving direction. Besides, a two digit error code will be indicated via these two segment
4	Spanner	g	Electronic control unit recognized an error, is flashing
5	Letters STOP	h	Immediate stop is required

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

(2) Display during operation

Symbol	Meaning	Remarks
F, N, R 1, 2, 3	Actual gear and direction Central side shows actual gear Right side shows actual direction	
NN (Central and right side)	Not neutral, waiting for neutral after power up or a severe fault	To engage a gear, first move shift selector to neutral position and again to F to R position
1 bar	Manual mode lst gear	
2 bar	Manual mode 2nd gear	
3 bar	Manual mode 3nd gear	
4 bars and 2 arrows	Automatic mode	e, a, f
Arrows (a, f) flashing	Kick down mode active	
✳ ✳	Transmission neutral	Cold start phase
Bars flashing	Downshift mode active	
Spanner flashing	At least on fault active	Select neutral to get fault code displayed
WT	Warning torque converter temperature	Changes between actual gear/direction while driving, in neutral only displayed if no fault is detected (spanner)
WS	Warning sump temperature	Changes between actual gear/direction while driving, in neutral only displayed if no fault is detected (spanner)
WE	Warning high engine speed	Changes between actual gear/direction while driving, in neutral only displayed if no fault is detected (spanner)
PN	Direction F or R selected while parking brake engaged	Transmission in neutral until parking brake is released. ※ Truck starts to move after release of parking brake.
F or R flashing	Direction F or R selected while turbine speed is to high	※ Gear will engage when turbine speed drops
EE flashing (central and right side)	No communication with display	

(3) Definition of the error codes

① Introduction

The error codes consists of two hexadecimal numbers.

The first number shows the type of signal, the second number shows signal and the type of the error.

② Description of error codes

First No.	Meaning of number
1 hex	Digital input signals
2 hex	Analog input signals
3 hex	Speed signals
4 hex	Speed signals
7 hex	Analog current output signals
8 hex	Analog current output signals
9 hex	Digital output signals
A hex	Digital output signals
B hex	Clutch errors
D hex	Power supply
E hex	High speed signals
F hex	General errors

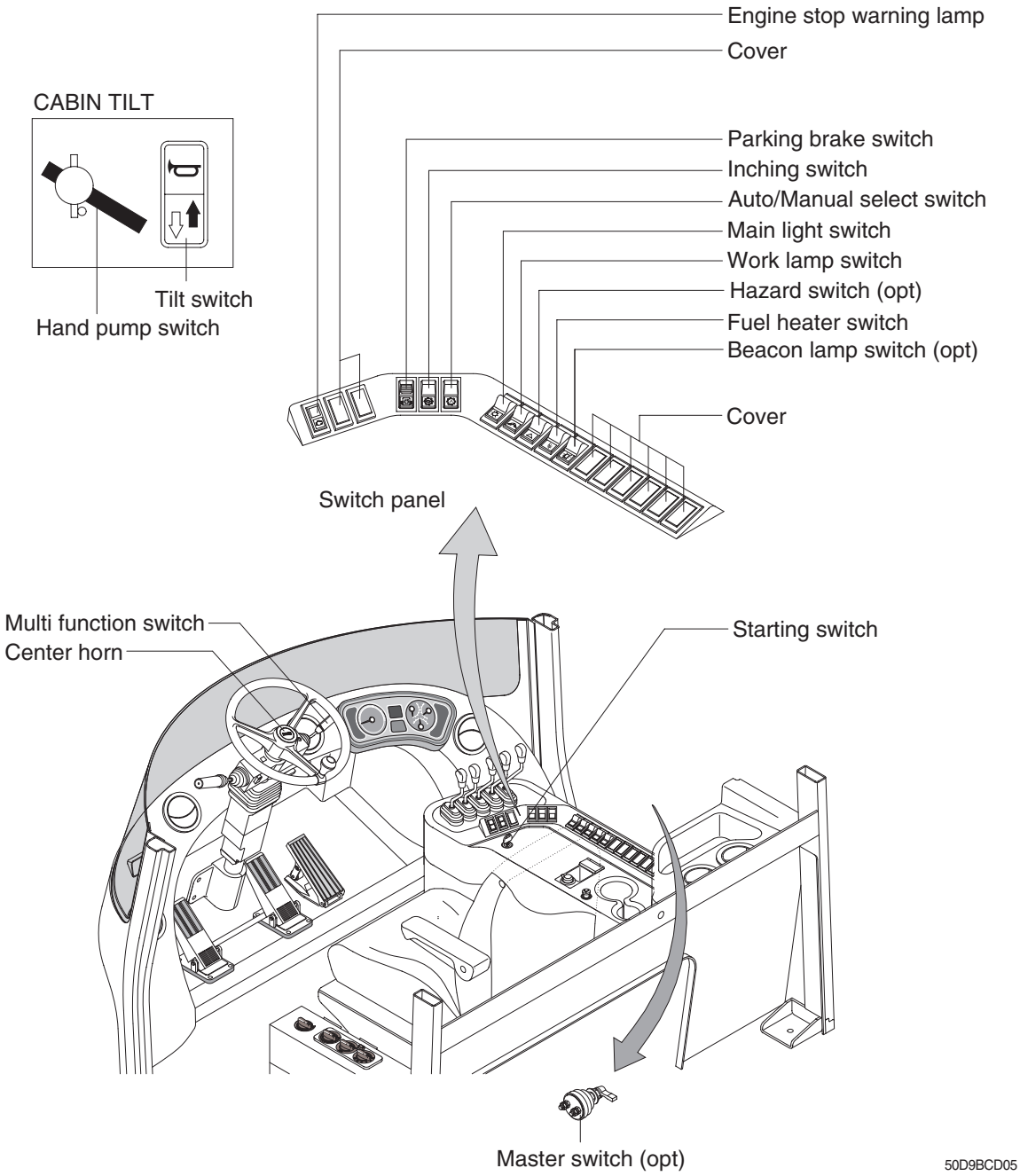
③ List of error codes

Error code	Meaning of error code
11 hex	Logical error at gear range signal
12 hex	Logical error at direction select signal
21 hex	Short circuit to battery voltage at clutch cutoff input
22 hex	Short circuit to ground or open circuit at clutch cutoff input
25 hex	Short circuit to battery voltage or open circuit at temperature sensor input
26 hex	Short circuit to ground at temperature sensor input
31 hex	Short circuit to battery voltage at engine speed input
32 hex	Short circuit to ground or open circuit at engine speed input
33 hex	Logical error at engine speed input
34 hex	Short circuit to battery voltage at turbine speed input
35 hex	Short circuit to ground or open circuit at turbine speed input
36 hex	Logical error at turbine speed input
37 hex	Short circuit to battery voltage at internal speed input
38 hex	Short circuit to ground or open circuit at internal speed input
39 hex	Logical error at internal speed input

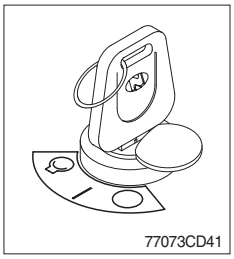
Error code	Meaning of error code
3A hex	Short circuit to battery voltage or open circuit at output speed input
3B hex	Short circuit to ground or open circuit at output speed input
3C hex	Logical error at output speed input
71 hex	Short circuit to battery voltage at clutch KC
72 hex	Short circuit to ground at clutch KC
73 hex	Open circuit at clutch KC
74 hex	Short circuit to battery voltage at clutch KD
75 hex	Short circuit to ground at clutch KD
76 hex	Open circuit at clutch KD
77 hex	Short circuit to battery voltage at clutch KE
78 hex	Short circuit to ground at clutch KE
79 hex	Open circuit at clutch KE
84 hex	Short circuit to battery voltage at clutch KV
85 hex	Short circuit to ground at clutch KV
86 hex	Open circuit at clutch KV
87 hex	Short circuit to battery voltage at clutch KR
88 hex	Short circuit to ground at clutch KR
89 hex	Open circuit at clutch KR
91 hex	Short circuit to ground at relay reverse warning alarm
92 hex	Short circuit to battery voltage at relay reverse warning alarm
93 hex	Open circuit at relay reverse warning alarm
94 hex	Short circuit to ground at relay starter interlock
95 hex	Short circuit to battery voltage at relay starter interlock
96 hex	Open circuit at relay starter interlock
97 hex	Short circuit to ground at park brake solenoid
98 hex	Short circuit to battery voltage at park brake solenoid
99 hex	Open circuit at park brake solenoid
B1 hex	Slippage at clutch KC
B2 hex	Slippage at clutch KD
B3 hex	Slippage at clutch KE
B5 hex	Slippage at clutch KV
B6 hex	Slippage at clutch KR

Error code	Meaning of error code
D1 hex	Short circuit to battery voltage at power supply for sensors
D2 hex	Short circuit to ground at power supply for sensors
D3 hex	Low voltage at battery
D4 hex	High voltage at battery
D5 hex	Error at valve power supply 1
D6 hex	Error at valve power supply 2
E5 hex	Communication failure on devicenet
F1 hex	General EEPROM fault
F2 hex	Configuration lost
F3 hex	Application error

5. SWITCHES



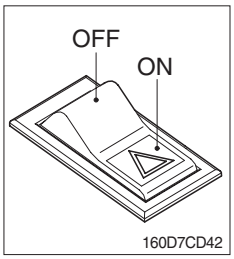
1) STARTING SWITCH



(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.

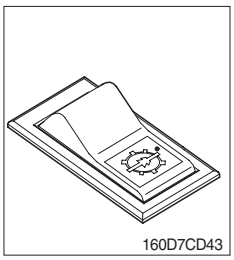
2) HAZARD SWITCH (OPTION)



(1) Use for parking, or loading truck.

※ If the switch is left ON for a long time while the engine does not run, the battery may be discharged.

3) INCHING SWITCH

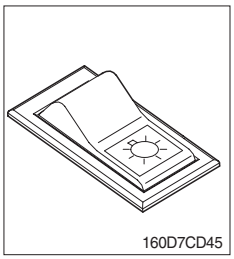


(1) If this switch is pressed, inching operation is applied to inching pedal.

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

⚠ Be careful not to use this switch when driving on a slope.
Place the switch to OFF position before driving on a slope.

4) MAIN LIGHT SWITCH

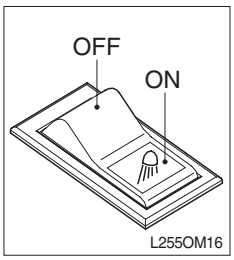


(1) This switch is used to operate the clearance lamp, illumination lamp and head light by two steps.

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

② Second step : Head lamp comes ON.

5) REAR WORK LAMP SWITCH



(1) This switch is used to operate the rear work lamps.
Press this switch to turn on rear work lamps.

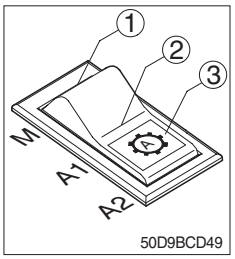
6) PARKING BRAKE SWITCH

(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.

7) AUTO/MANUAL CHANGEOVER SWITCH



50D9BCD49

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 gearshift function. The operator selects the desired speed and the desired direction in the manual mode with the gear selector lever.

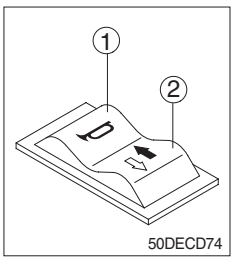
(2) Automatic 1st mode (②)

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



50DECD74

(1) Horn ( )

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

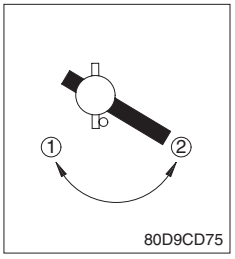
⚠ Sound the horn to warn near by personnel, before tilting the cabin.

(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 SWITCH



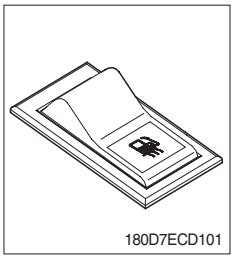
80D9CD75

(1) This switch 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.

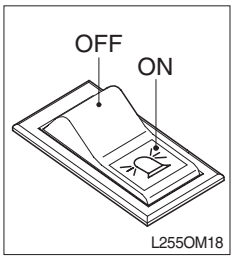
(3) Turn the hand pump lever to counterclockwise direction (②), the cabin shall be returned to original location by the cabin tilt switch.

10) FUEL HEATER SWITCH


180D7ECD101

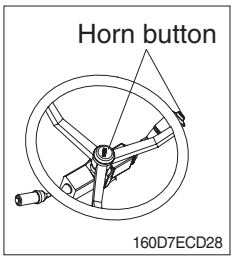
(1) This switch is used to heat the fuel of pre-heater.

11) BEACON SWITCH (OPTION)



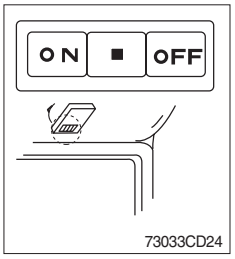
(1) This switch turn ON the beacon lamp.

12) HORN BUTTON



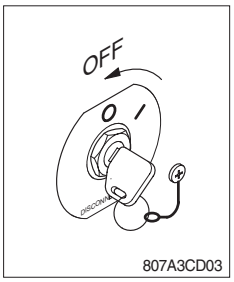
(1) If you press the button on the top of the multifunction switch and the center of the steering handle, the horn will sound.

13) CAB LAMP SWITCH



(1) This switch turns ON the cab room lamp.
(2) The room lamp can be turned ON or OFF by pressing the switch.

14) MASTER SWITCH (OPTION)

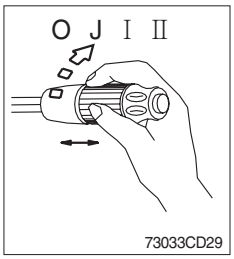


(1) This switch is used to shut off the entire electrical system.
When the truck is not operated for a long time, turn OFF the master switch for the safety purpose.

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

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

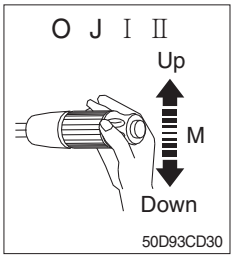
15) MULTI FUNCTION SWITCH



(1) Front wiper and washer switch

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

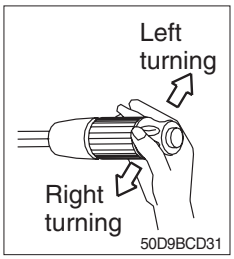
※ Check the quantity of washer liquid in the tank. If the level of the washer liquid is LOW, add the washer liquid (In cold, winter days) or water. The capacity of the tank is 1 liter.



(2) Dimmer switch

① This switch is used to turn the head light direction.
② Switch positions
- Up : To flash for passing
- Middle : Head light low beam ON
- Down : Head light high beam ON

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



(3) Turning 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.

GROUP 6 COMPONENT SPECIFICATION

No	Part name	Qty	Specification
1	Battery	2	12V×80 AH RC : 130 min CCA : 640A
2	Working lamp	1	24V, 70W
3	License lamp	1	24V, 3W×2
4	Rear Combination lamp	2	24V, 21/5W (Turn signal) 24V, 10W (Tail) 24V, 10W (Stop)
5	Head lamp	2	24V, 70W
6	Flasher lamp	2	24V, 25/10W
7	Room lamp	1	24V, 10W
8	Cluster	1	24V, 10W
9	Rear view camera	1	24V, 2.5W
10	12V socket	1	12V, 10A
11	Cigar lighter	1	24V, 5A
12	Parking brake switch	1	24V, 8A
13	Relay (5P)	7	24V, 8A
14	Flasher Unit	1	24V, 85±10 CM, (21W + 21W) × 2 + 3W ×2
15	Back buzzer	1	24V, 90±5 dB, 60±10 C/M
16	Horn	1	24V, 1.5 A, 100 ~ 115 dB
17	Fuel level sender	1	Float indicator: E / 4/8 / F Resistance (Ω): - / 350 / 50 Tolerance (Ω): +5% / -0 / 5% / +0 / -5%
18	Master switch	1	24V, 180A
19	Working lamp switch	1	24V, 8A
20	Hazard switch	1	24V, 8A
21	Beacon switch	1	24V, 8A
22	Start switch	1	24V, 60A
23	Start relay	1	24V, 300A
24	Tilt switch (cabin)	1	24V, 8A
25	Warning buzzer	1	24V, 200 mA, 90±5 dB (ℓ m)
26	Auto switch	1	24V, 8A
27	Clutch cut-off switch	1	24V, 8A
28	Main light switch	1	24V, 8A
29	Fuel heater switch	1	24V, 8A
30	Intermittent wiper relay	1	24V, 5A
31	OPSS unit	1	24V

GROUP 7 CONNECTOR DESTINATION

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-1	TYCO	15	I/conn (Frame harness-console harness)	2-85262-1	368301-1
CN-2	TYCO	12	I/conn (Console harness-frame harness)	S816-012002	174663-2
CN-3	KET	1	I/conn (Frame harness-console harness)	MG640944-5	MG650943-5
CN-4	KET	1	Start cable	-	MG650943-5
CN-6	TYCO	16	I/conn (Frame harness-console harness)	368047-1	368050-1
CN-7	TYCO	4	Fuel warmer	2-967325-3	-
CN-8	AMP	8	Transmission display	929504-3	S816-108002
CN-9	AMP	4	To CAN connector	-	S816-104002
	TYCO	4	Service tool	-	174259-2
	AMP	3	TCU service tool	174257-2	174259-2
CN-10	AMP	8	I/conn (Console harness-T/M harness)	S816-008002	S816-108002
CN-11	AMP	16	I/conn (Console harness-T/M harness)	368047-1	S816-116002
CN-12	TYCO	8	I/conn (Frame harness-console harness)	174982-2	S816-108002
CN-13	MOLEX	12	I/conn (Injector harness-frame harness)	33472-1206	-
CN-14	TYCO	42	I/conn (Engine harness-frame harness)	936421-1	-
CN-15	SMITOMO	2	Alternator (B+)	6189-0172	-
CN-16	AMP	3	Power connector	-	S816-103002
		3	Monitor power	174357-2	174359-2
CN-17	AMP	12	I/conn (Console harness-cabin harness)	S816-012002	174663-2
CN-19	KET	2	Output check	S814-002100	S814-102100
CN-20	KET	4	Aircon harness	MG641744-5	MG651747-5
	AMP	6	Diagnostic	480704-0	-
CN-21	AMP	6	Wiper motor	936257-2	-
CN-22	KET	2	Washer tank	MG640605	-
CN-23	KET	2	LH speaker	MG610070	-
CN-24	KET	2	RH speaker	MG610070	-
CN-25	MOLEX	2	Horn	35825-0211	-
CN-26	KET	1	Tilt alarm	S822-014000	-
		1	Tilt alarm	-	S822-114000
CN-27	KUM	16	CD/MP3 player	PK145-16017	-
CN-31	DEUTSCH	2	Drain valve	DT06-2S	-
CN-36	-	-	Fuse box	21HF-10500	-
CN-37	-	-	Fuse box	21HF-10500	-
CN-45	TYCO	1	Start motor	171809-2	-
CN-50	AMP	68	Transmission control unit	963598-1	-
CN-51	AMP	6	Diagnostic	-	926682-3
CN-54	AMP	36	Load indicator control unit	344111-1	-
CN-55	KET	14	OPS unit	S814-014100	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-56	AMP	20	Cluster	174047-2	-
CN-57	AMP	20	Cluster	175967-2	-
CN-65	KET	1	Back buzzer	S822-014000	S822-114000
CN-71	AMP	1	Seat	174877-2	174879-2
	DEUTSCH	2	Parking brake solenoid	DT06-2S	-
CN-74	KET	2	Alternator	MG640188-4	-
CN-91	KET	8	I/conn (Camera harness-monitor harness)	MG610339	MG640341
CN-92	AMP	4	Monitor	-	174259-2
		4	Rear view camera	S816-004002	-
CN-93	AMP	4	Load sensor	S816-004002	174259-2
CN-94	AMP	4	Front view camera	S816-004002	-
CN-95	KET	2	Fusible link	21N4-01311	S813-130201
CN-97	YAZAKI	2	Fuel feed pump	7123-8520-40	-
CN-113	KET	2	OPSS buzzer	S814-002100	-
CN-129	KET	2	12V socket	S810-002201	-
CN-131	DEUTSCH	2	Attach cut solenoid	DT06-2S	-
CN-135	AMP	8	Service tool	S816-008002	174984-2
	AMP/KET	8	Service tool	S816-008002	MG610330
CN-138	KET	3	Converter	S810-003201	-
CN-144	AMP	6	Accelerator pedal	S816-006002	-
CN-147	KET	2	Cabin tilting pump motor	MG640188-4	-
CN-151	MOLEX	80	ECU (Blue)	34566-1903	-
CN-152	MOLEX	80	ECU (Gray)	34566-1803	-
CN-169	DEUTSCH	4	RS232C	DT06-4S-EP06	DT04-4P-E005
CN-248	AMP	20	Monitor	174047-2	-
CN-249	AMP	4	Rear view camera	174057-2	-
Switch					
CS-2	KET	2	Start switch	MG620181	-
		2	Start switch	-	MG620282
CS-5	KET	2	Horn switch	-	S814-102100
CS-11	KET	6	Combination switch	MG610335	-
CS-12	KET	8	Combination switch	MG610339	-
CS-13	KET	1	Combination switch	S822-014000	-
CS-14	PACKARD	4	Gear selector switch	-	12010974
CS-15	PACKARD	4	Gear selector switch	12015797	-
CS-17	SWF	10	Parking brake switch	SWF593757	-
CS-23	SWF	10	Beacon lamp switch	SWF593757	-
CS-39	SWF	10	Main light switch	SWF593757	-
CS-41	SWF	10	Hazard switch	SWF593757	-
CS-42	SWF	10	Clutch cut-off switch	SWF593757	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CS-59	SWF	10	Auto / manual switch	SWF593757	-
CS-69	SWF	10	Rear work switch	SWF593757	-
CS-72	DEUTSCH	4	Tilt alarm switch	DT06-4S	DT04-4P
CS-73	KET	2	Seat switch	S810-002201	-
CS-74	DEUTSCH	4	Cabin tilting safety switch	DT06-4S	DT04-4P
	SWF	10	Fuel heater switch	SWF593757	-
CS-77	SWF	10	Cabin tilting switch	SWF593757	
Lamp					
CL-1	KET	2	Room lamp	MG610392	-
CL-2	KET	1	Cigar light	S822-014000	S822-114000
	AMP	1	Cigar light	S810-001202	-
CL-3	KET	1	Flasher lamp-LH	S822-014000	S822-114000
CL-4	KET	1	Flasher lamp-RH	S822-014000	S822-114000
CL-7	KET	1	Beacon lamp	S822-014000	S822-114000
CL-15	DAEDONG	6	Combination lamp-LH	110-6PR	-
CL-16	DAEDONG	6	Combination lamp-RH	110-6PR	-
CL-21	KET	1	License lamp	S822-014000	S822-114000
CL-23	KET	1	Rear work lamp	S822-014000	S822-114000
CL-24	DEUTSCH	6	Work lamp-LH	DT06-6S	-
CL-25	DEUTSCH	6	Work lamp-RH	DT06-6S	-
CL-42	SWF	2	Engine stop warning lamp	SWF913328	-
CL-51	KET	2	Room lamp	MG610392	-
Relay					
CR-4	KET	5	Wiper relay L	MG640927	-
CR-6	KET	4	Intermittent wiper relay	S810-004201	-
CR-11	-	3	Flasher unit relay	S810-003702	-
CR-23	TYCO	4	Start relay	172134-1	-
CR-24	KET	2	Air heater relay	S810-002201	-
CR-26	KET	5	Wiper pump relay (Cabin)	MG640927	-
CR-34	KET	5	Parking brake relay	MG640927	-
CR-35	KET	5	Back up relay	MG640927	-
CR-36	KET	5	Anti restart relay	MG640927	-
CR-39	KET	5	Wiper relay H	MG640927	-
CR-43	KET	5	ECU power relay	MG640927	-
CR-44	TYCO	2	Cabin tilting relay	174352-2	-
CR-50	KET	5	Tilt / lift cut-off relay	MG640927	-
CR-53	KET	5	Neutral signal relay	MG640927	-
Sensor and pressure switch					
CD-2	KET	3	Fuel sendor	S810-003201	-
CD-3	DEUTSCH	2	Brake oil pressure switch	-	DT04-2P
CD-4	TYCO	1	Stop lamp switch	171809-2	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CD-10	KET	1	Air cleaner switch	ST730057-2	-
CD-26	DEUTSCH	2	Parking brake pressure switch	-	DT04-2P
CD-27	AMP	2	Turbine speed input	963040-3	-
CD-35	DEUTSCH	2	Water in fuel switch	DT06-2S	-
CD-64	SUMITOMO	5	Air flow sensor	6189-1046	-
CD-70	DEUTSCH	3	Load sensor	DTM06-3S	-
CD-71	AMP	6	Inching sensor	1-967616-1	-
CD-72	AMP	2	Gear train speed sensor	963040-3	-
CD-73	AMP	3	Output speed sensor	282087	-
CD-74	AMP	2	Engine speed sensor	963040-3	-
CD-75	AMP	2	Oil filter	282080	-
CD-80	PACKARD	2	KV Solenoid	12162197	-
CD-81	PACKARD	2	KR Solenoid	12162197	-
CD-82	PACKARD	2	KD Solenoid	12162197	-
CD-83	PACKARD	2	KE Solenoid	12162197	-
CD-84	PACKARD	2	KC Solenoid	12162197	-
CD-90	AMP	2	Temp sensor	963040-3	-
DO-01	AMP/QPL	2	Diode	S816-002002	21EA-50550
DO-02	AMP/QPL	2	Diode	S816-002002	21EA-50550

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 operation	· 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	· Recharge battery · Replace
Heater signal does not become red	· Faulty wiring · Glow plug damaged	· Check and repair · Replace
Engine oil pressure caution lamp does not light when enigne is stopped (with starting switch left in "ON" position)	· Caution lamp defective · Caution lamp switch defective	· Replace · Replace