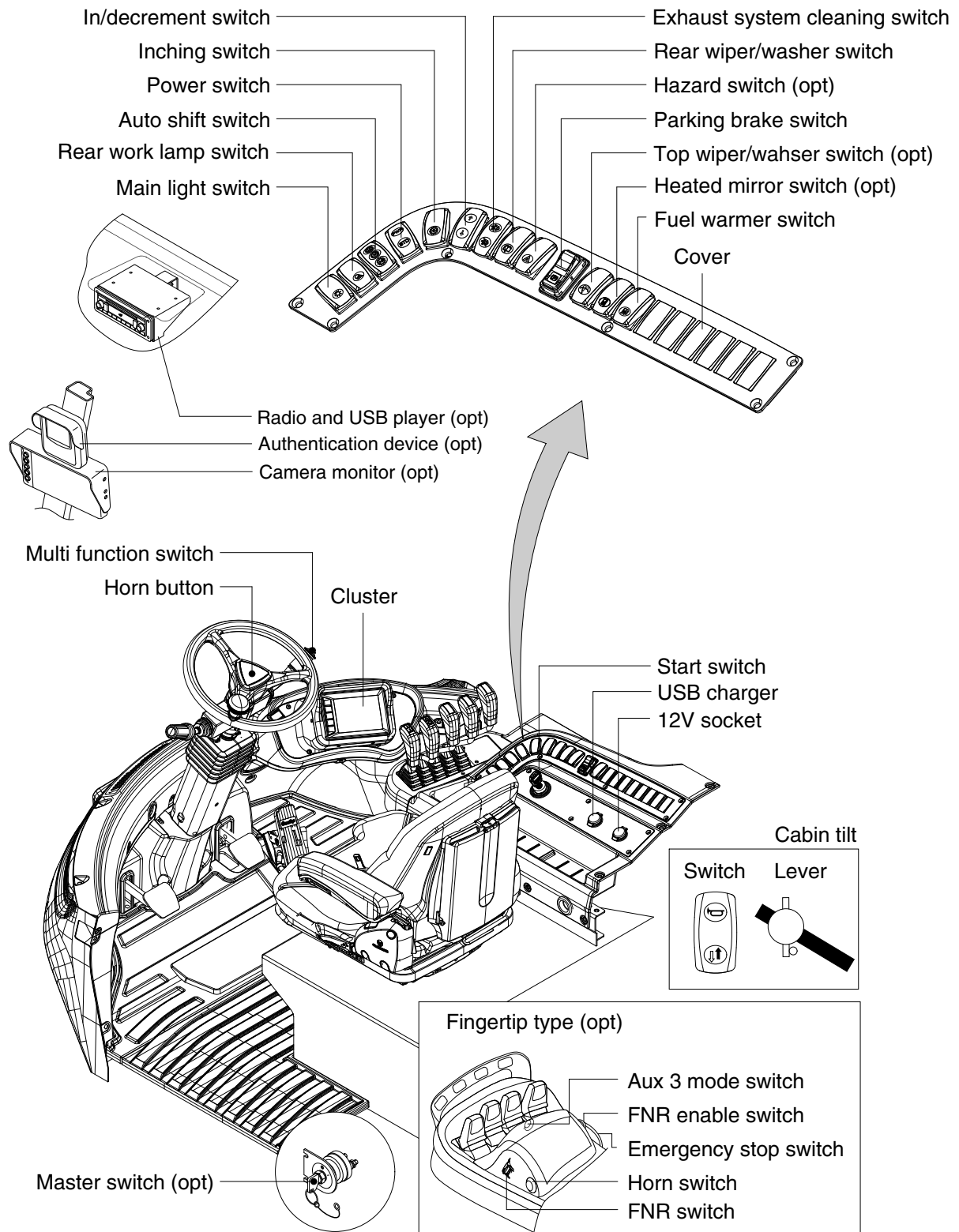


SECTION 7 ELECTRICAL SYSTEM

Group 1	Component location	7-1
Group 2	Electrical circuit	7-3
Group 3	Cluster	7-27
Group 4	Component specification	7-71
Group 5	Connector destination	7-72
Group 6	Troubleshooting	7-77

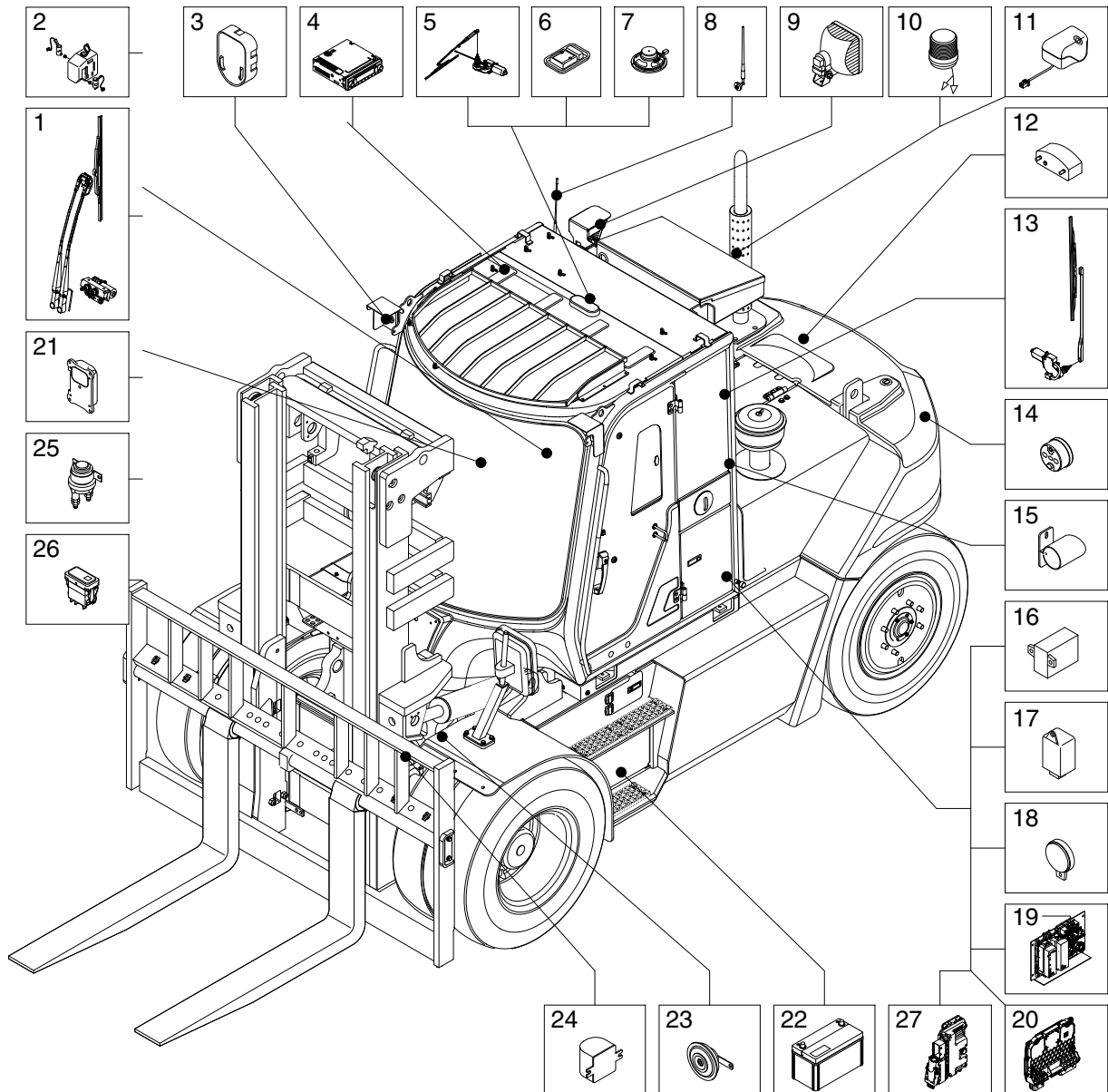
GROUP 1 COMPONENT LOCATION

1. LOCATION 1



100D9V7ES01

2. LOCATION 2

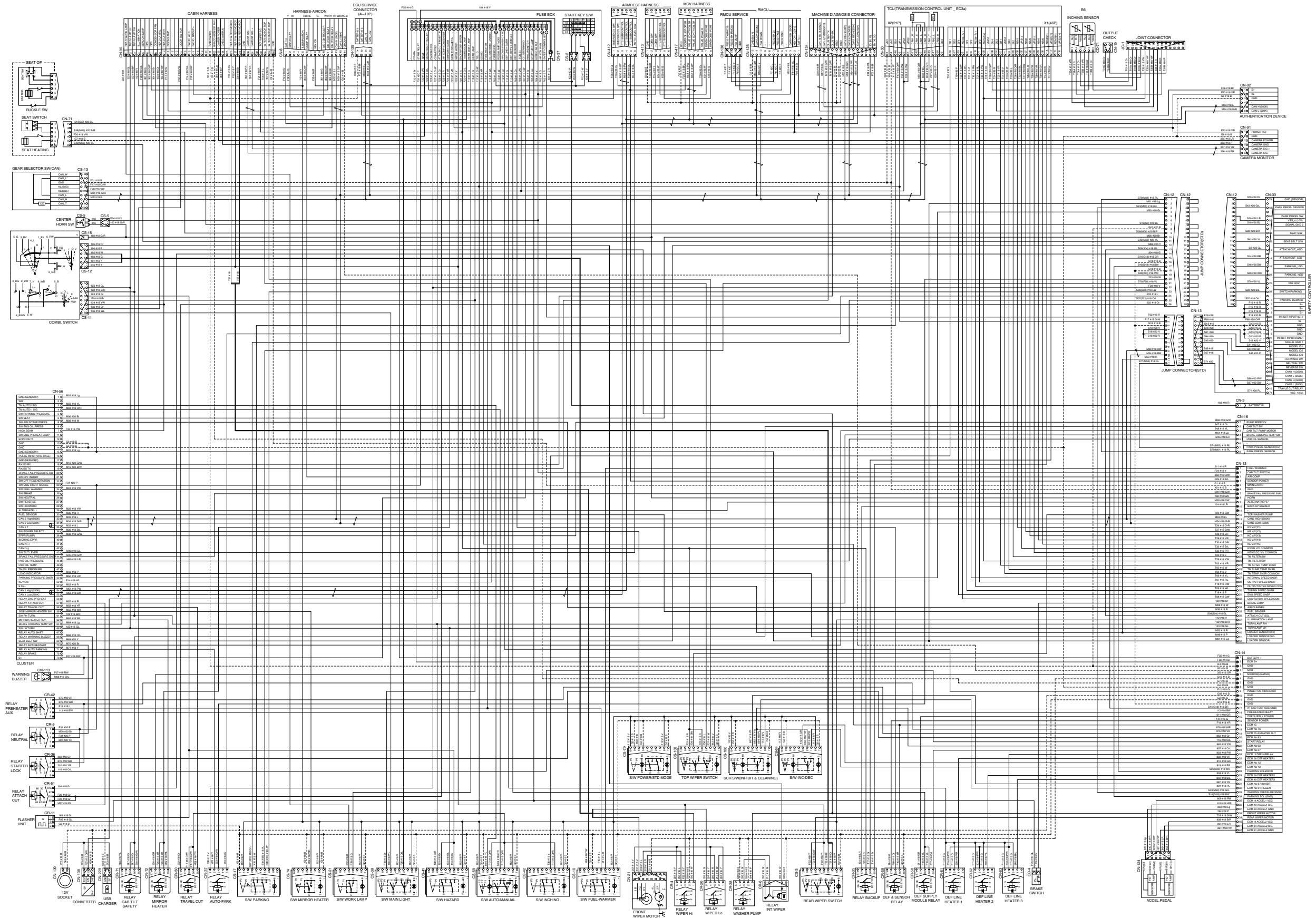


100D9V7ES02

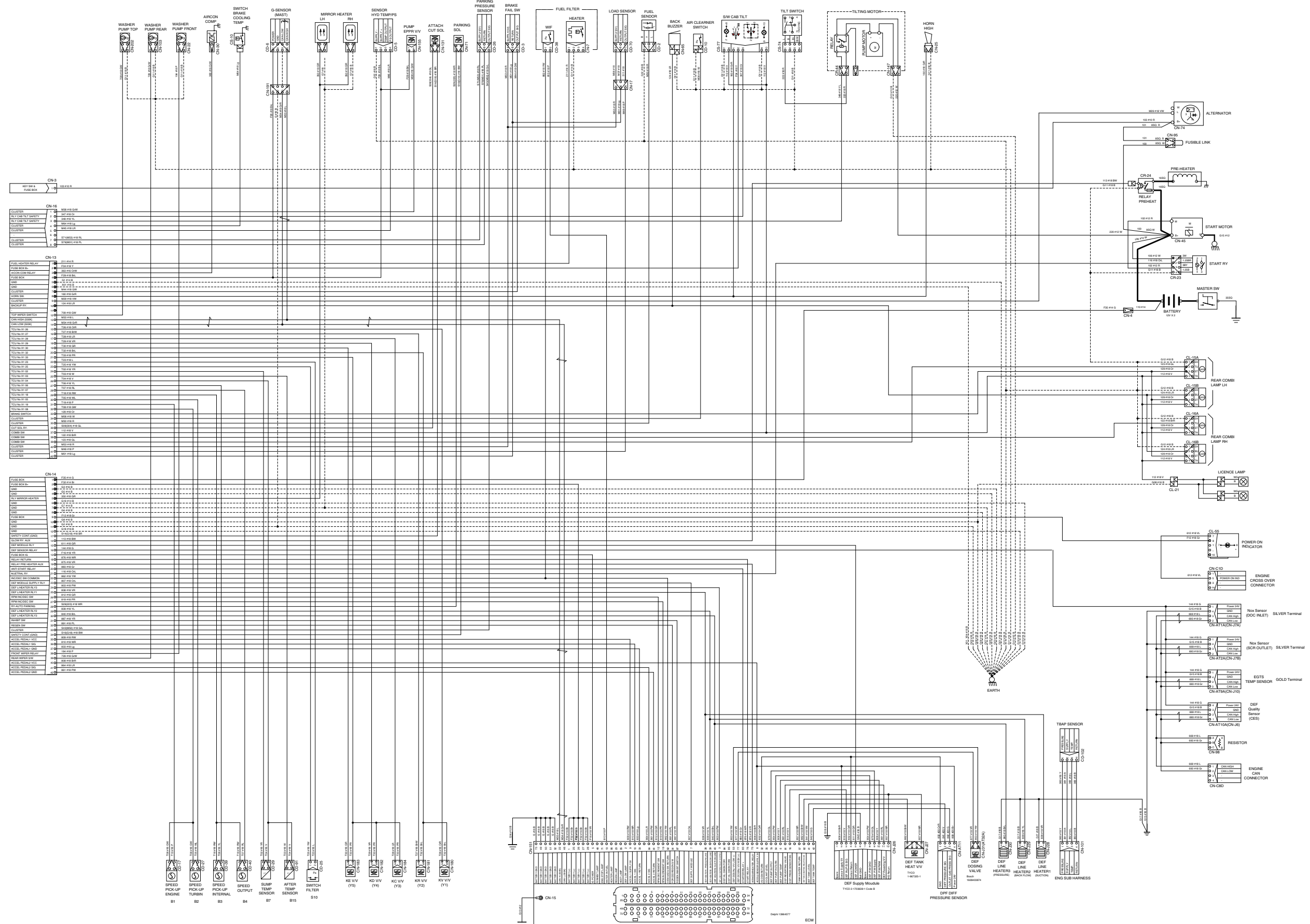
- | | | |
|-----------------------------|--------------------------|-----------------------|
| 1 Wiper assembly | 10 Beacon lamp | 19 ECU |
| 2 Washer reservoir tank | 11 Camera (opt) | 20 TCU |
| 3 Head and turn signal lamp | 12 License lamp (opt) | 21 RMCU (opt) |
| 4 Radio and USB player | 13 Rear wiper assembly | 22 Battery |
| 5 Top wiper assembly (opt) | 14 Rear combination lamp | 23 Horn |
| 6 Room lamp switch | 15 Back buzzer | 24 Angle sensor (opt) |
| 7 Speaker | 16 Wiper relay | 25 Start relay |
| 8 Mobile antenna | 17 Flasher unit | 26 Power ON indicator |
| 9 Work lamp | 18 Warning buzzer | 27 Safety controller |

GROUP 2 ELECTRICAL CIRCUIT

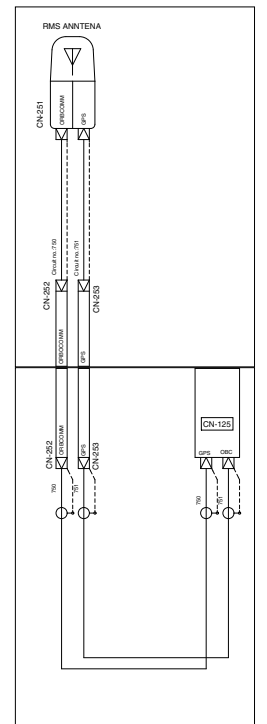
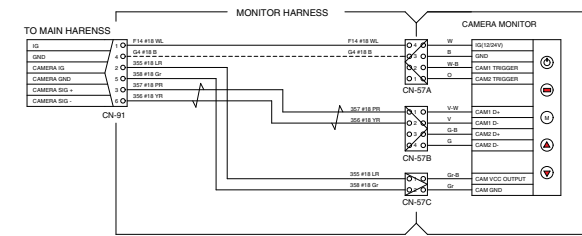
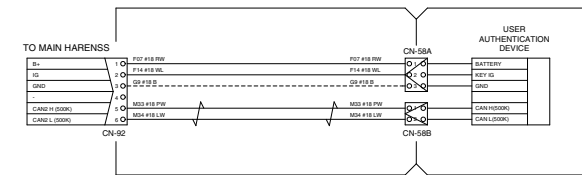
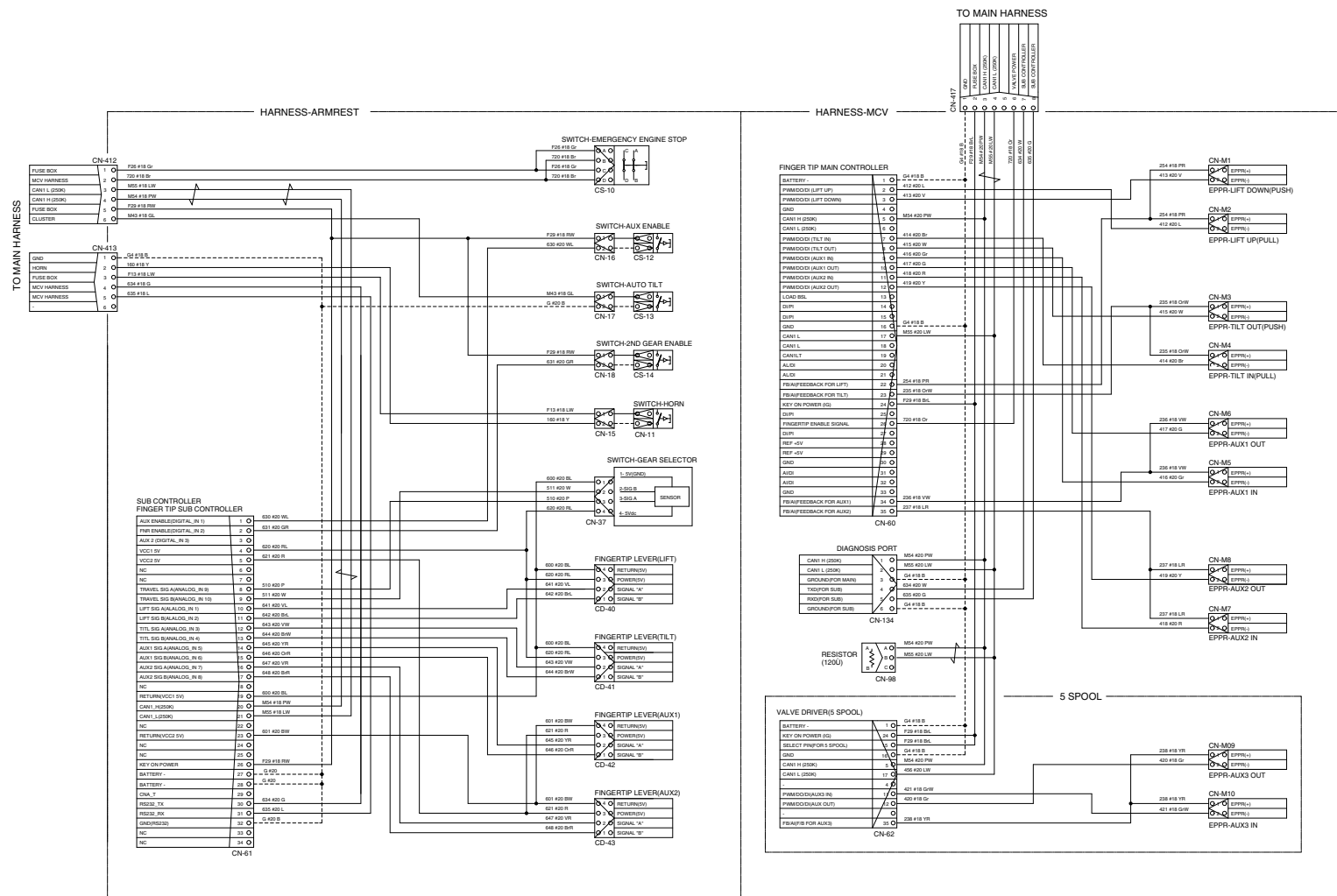
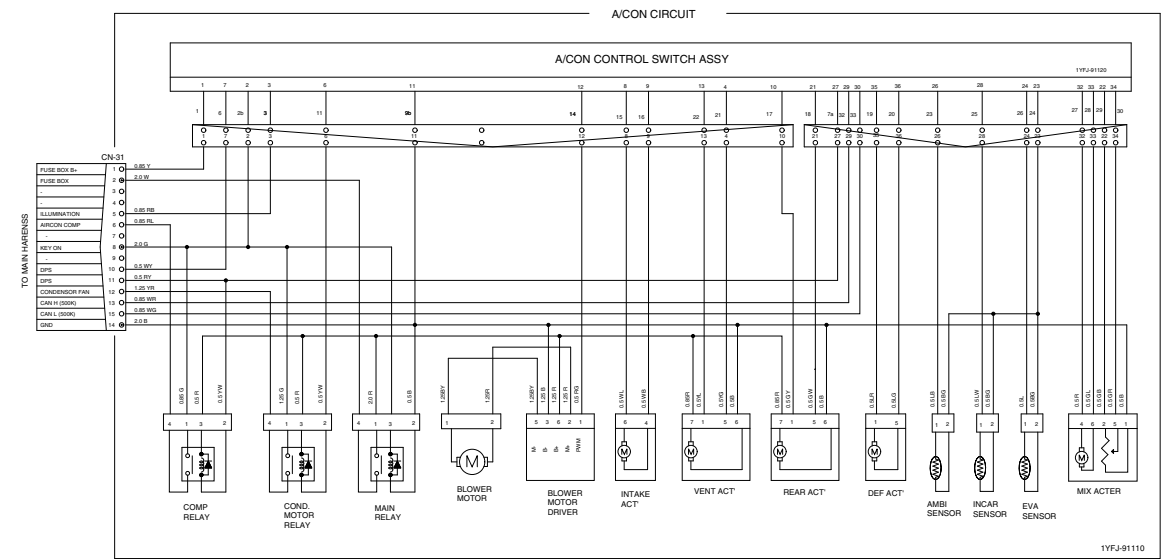
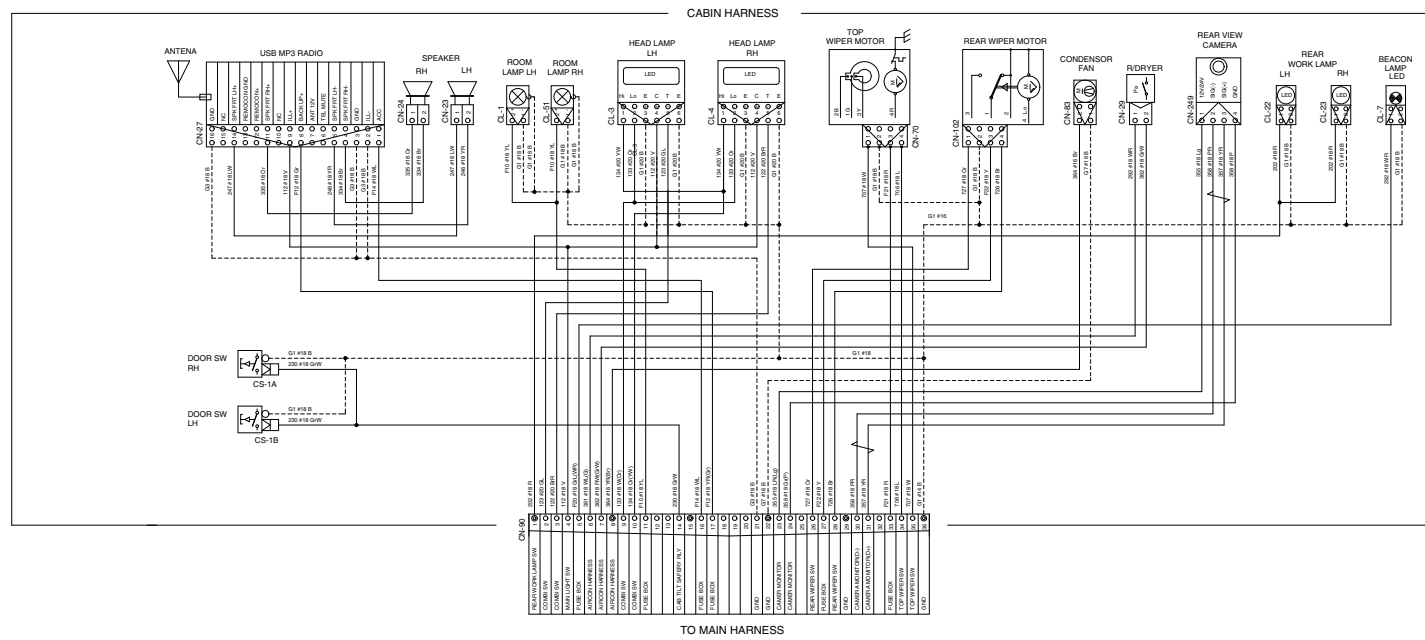
· ELECTRICAL CIRCUIT (1/3, CABIN TYPE, -#0006)



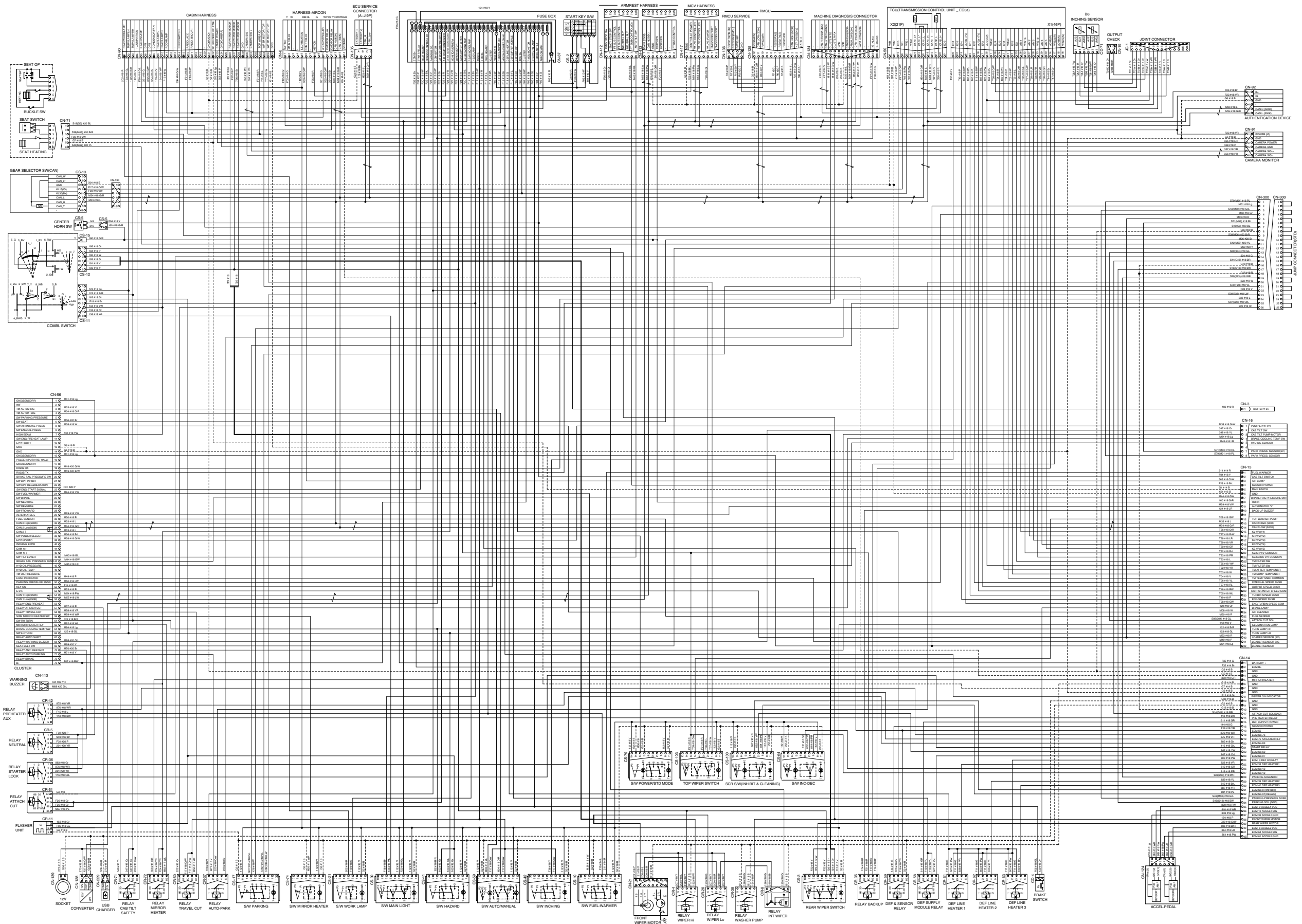
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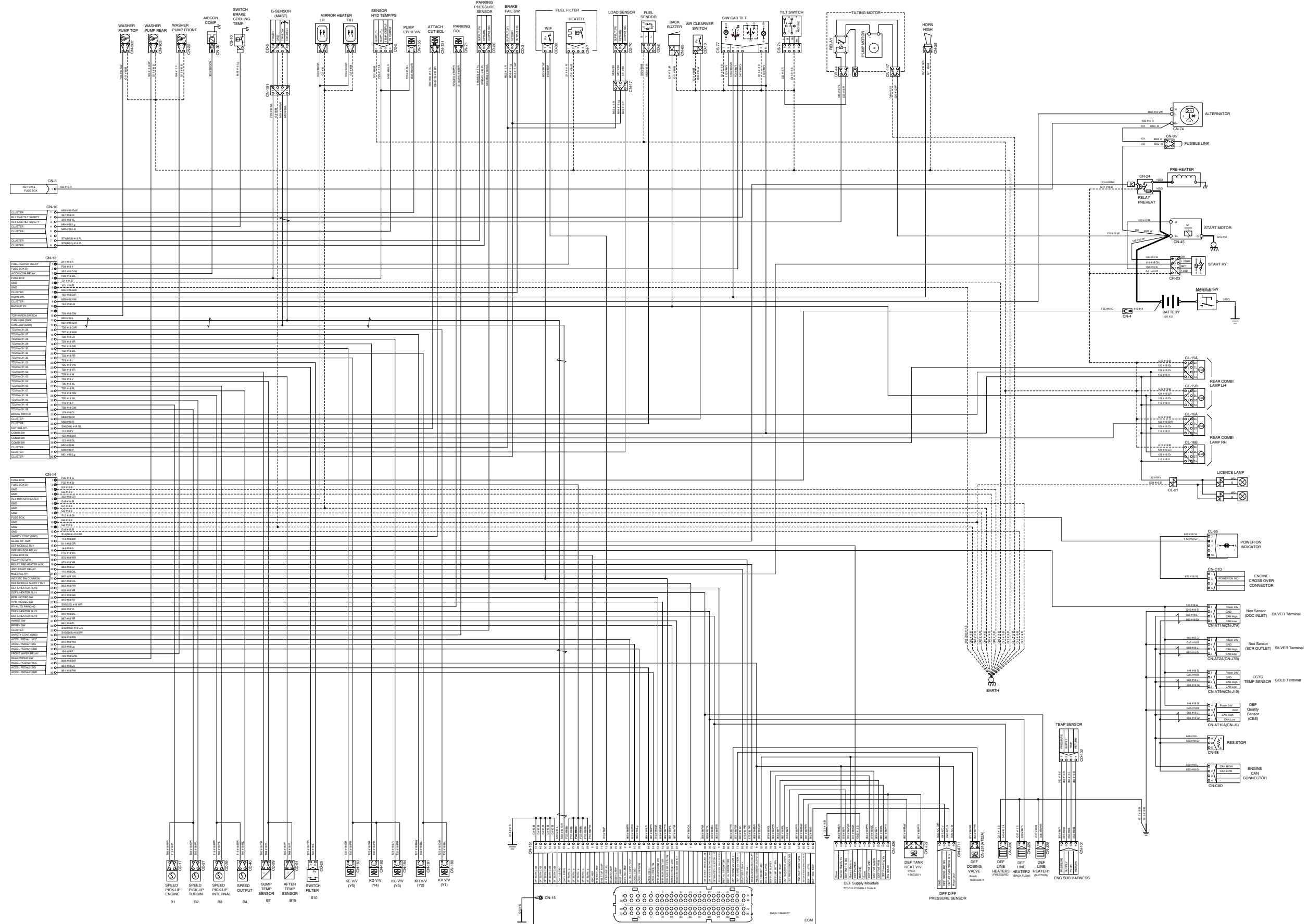
ELECTRICAL CIRCUIT (3/3, -#0006)



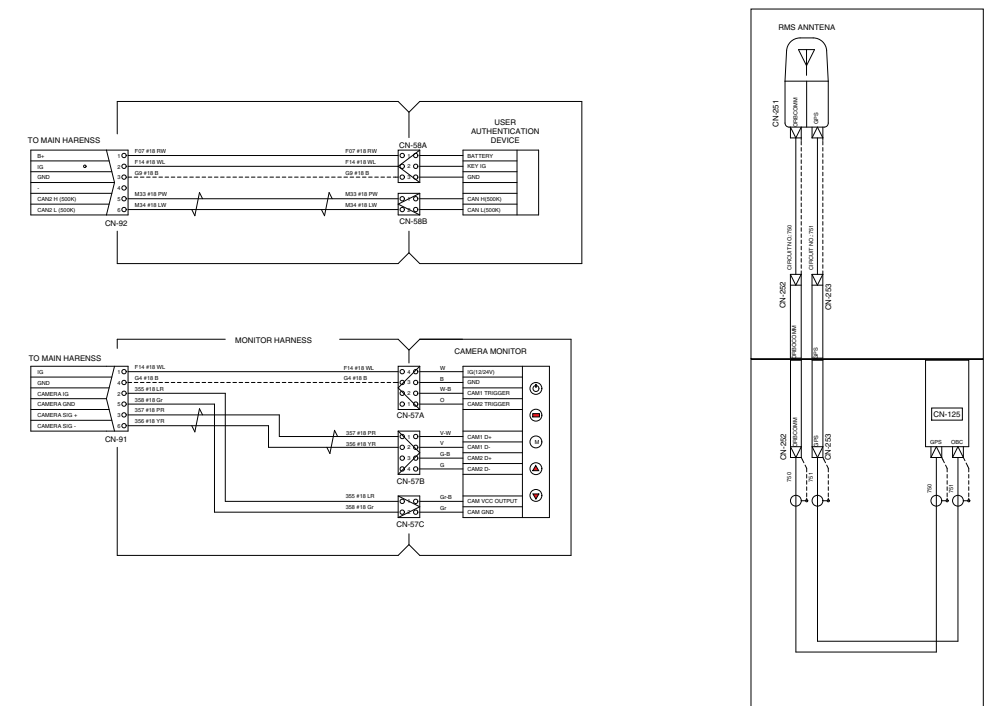
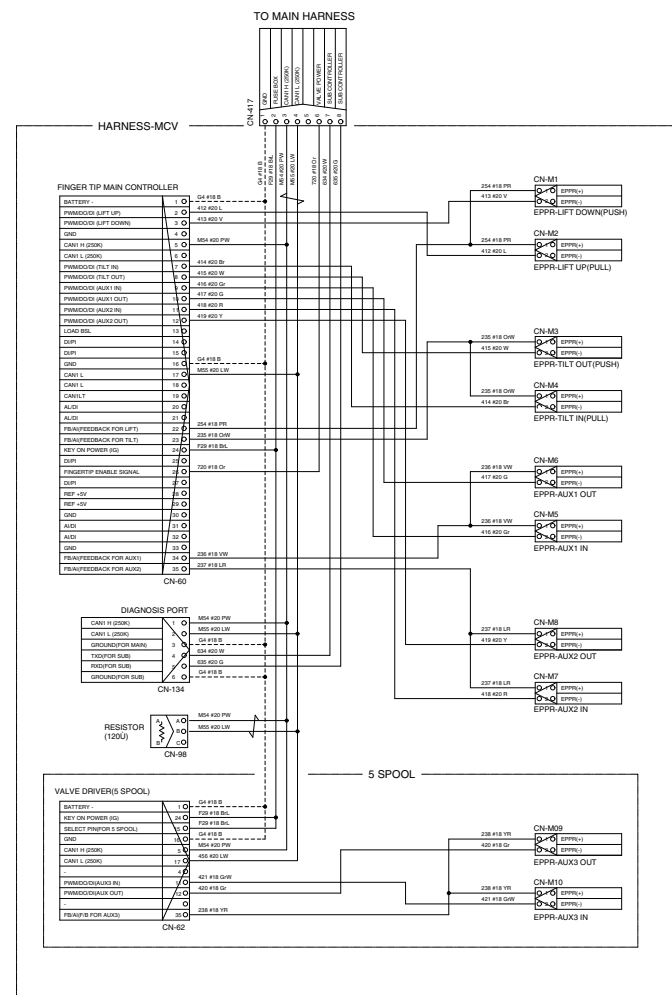
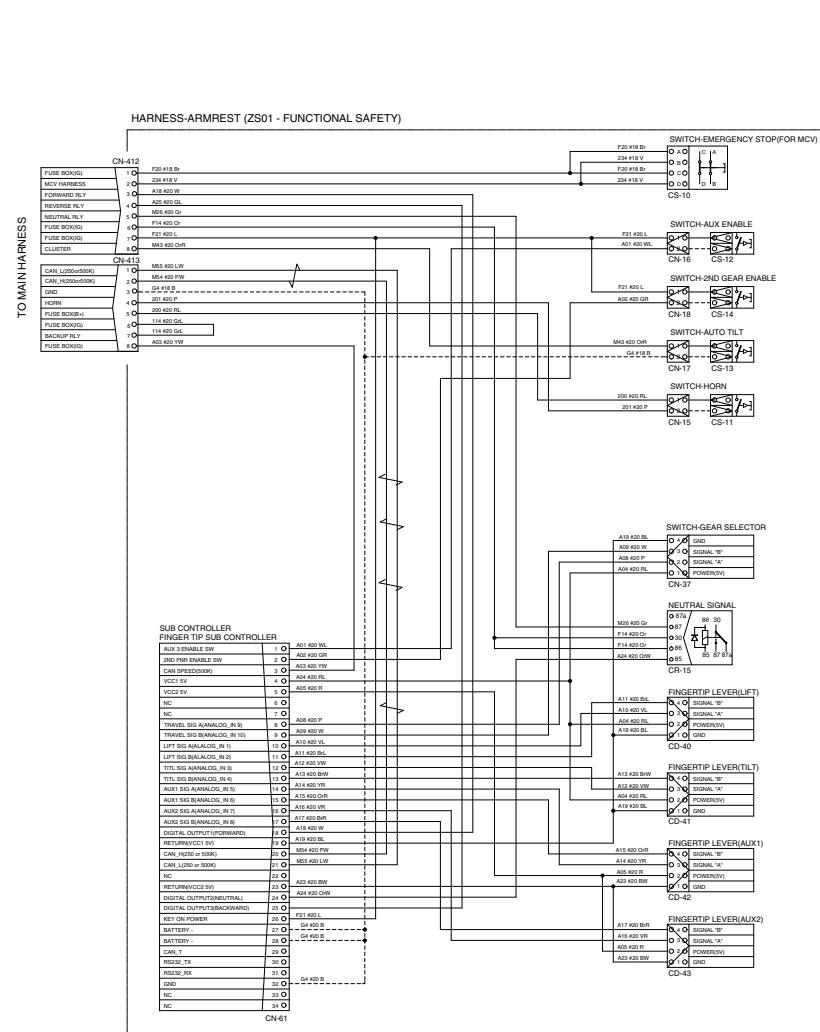
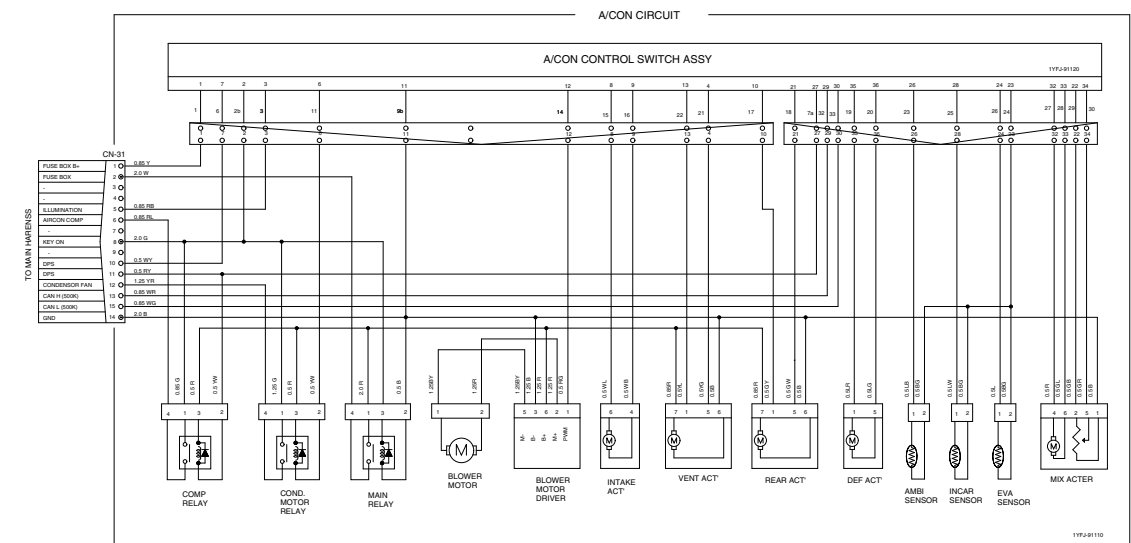
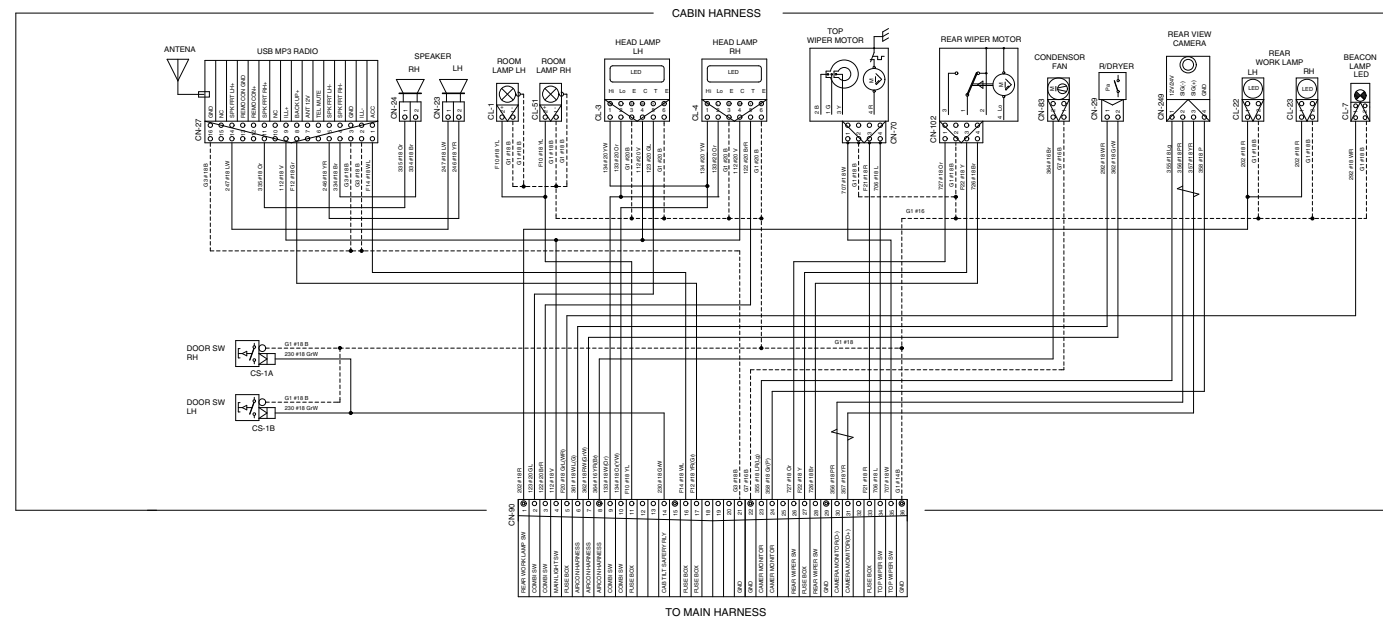
· ELECTRICAL CIRCUIT (1/3, CABIN TYPE, #0007~0036)



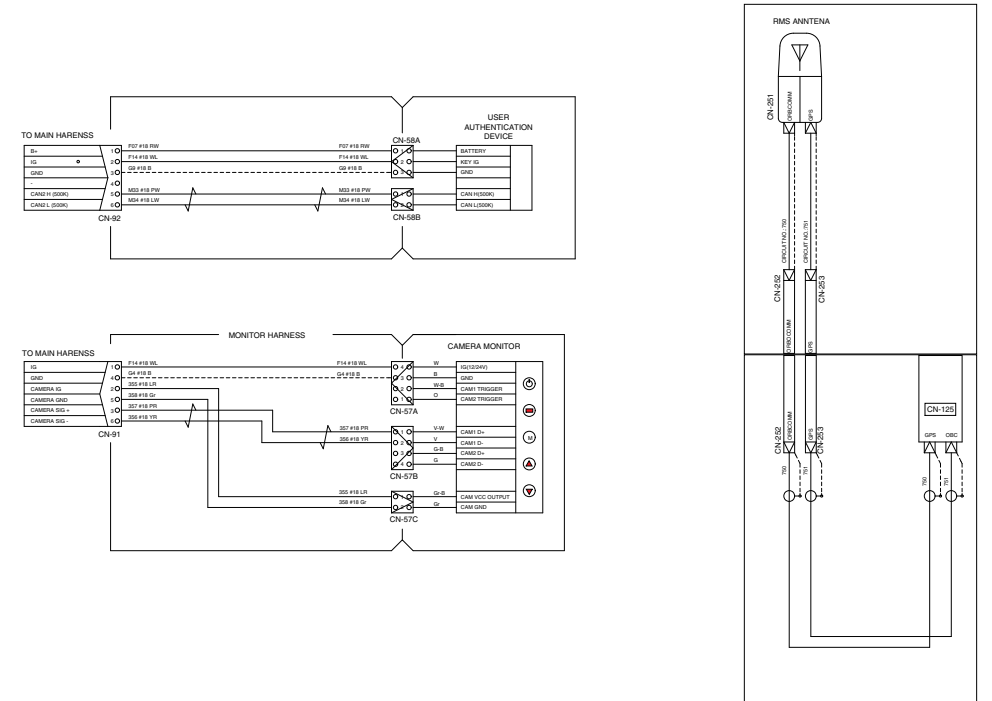
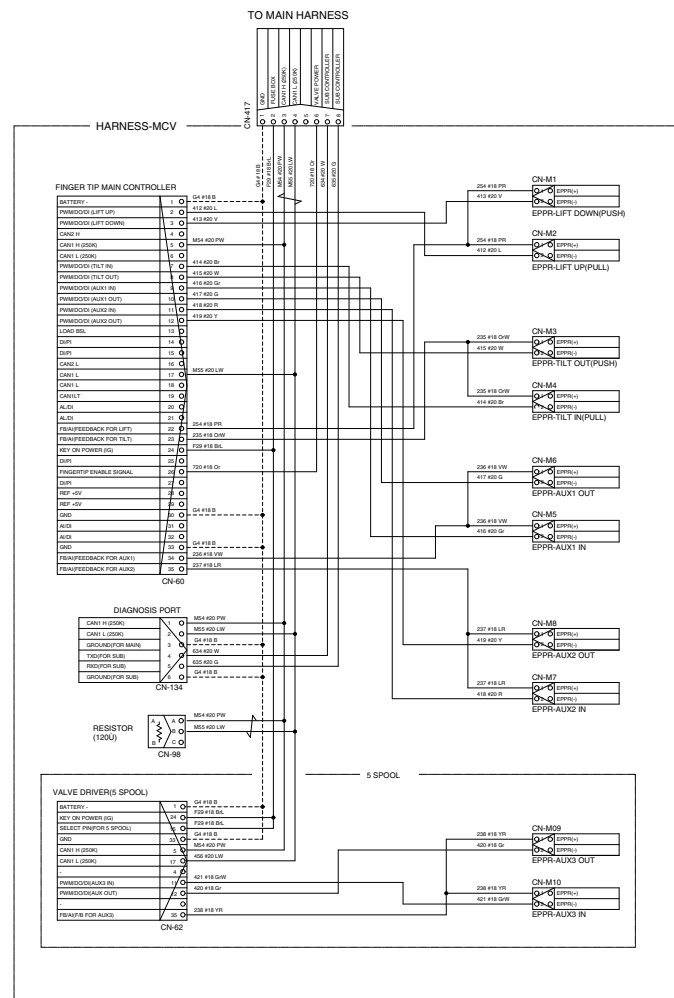
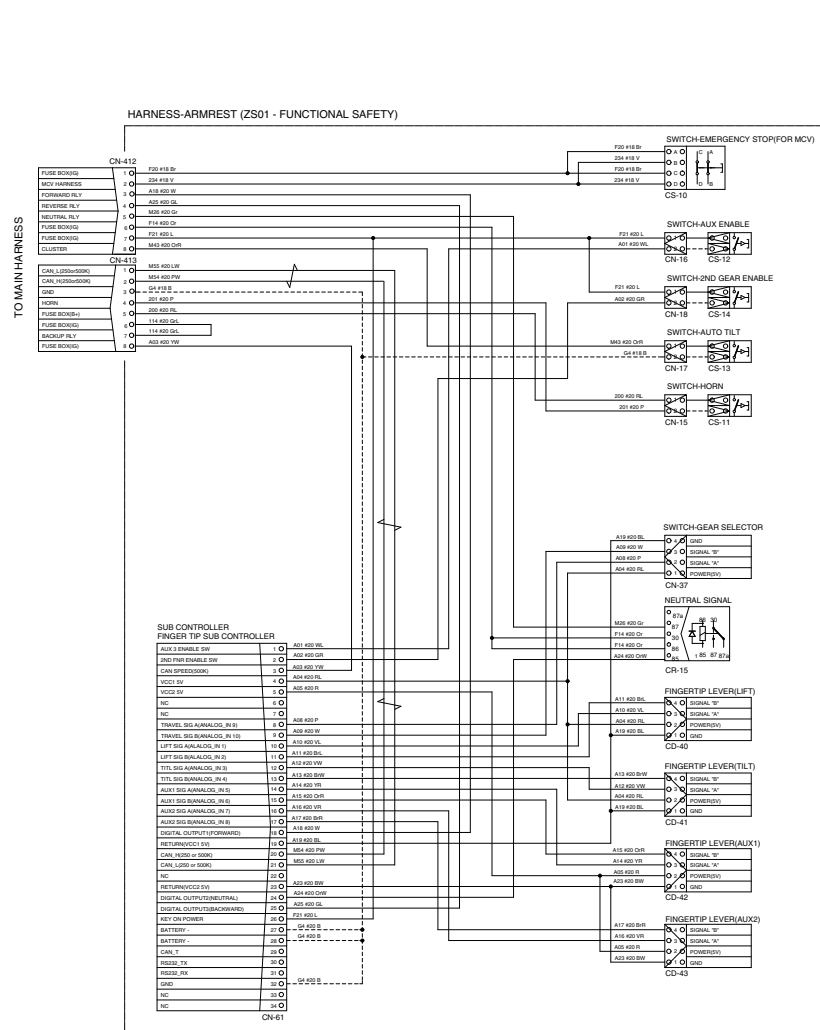
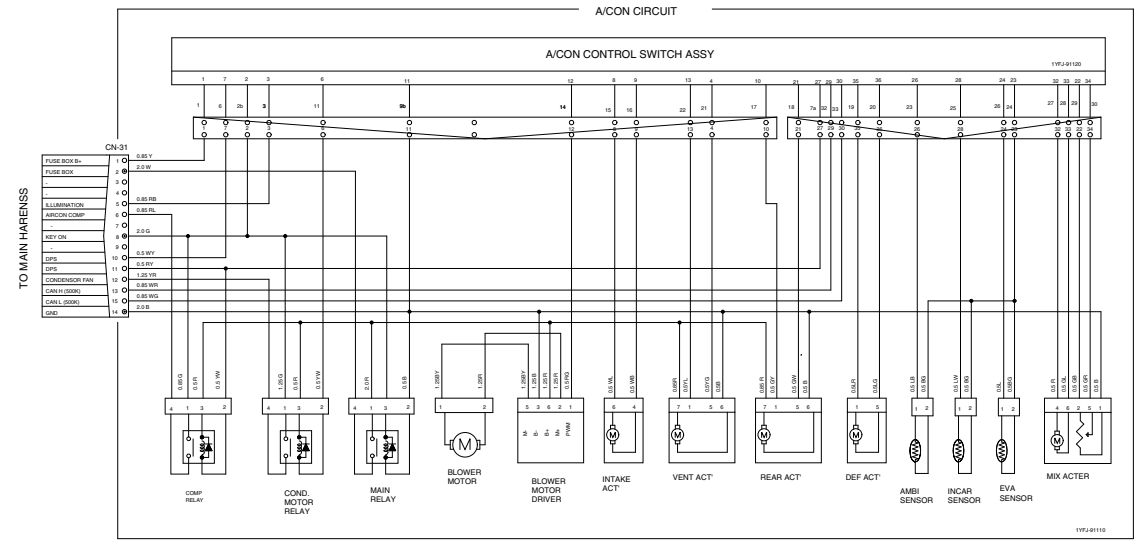
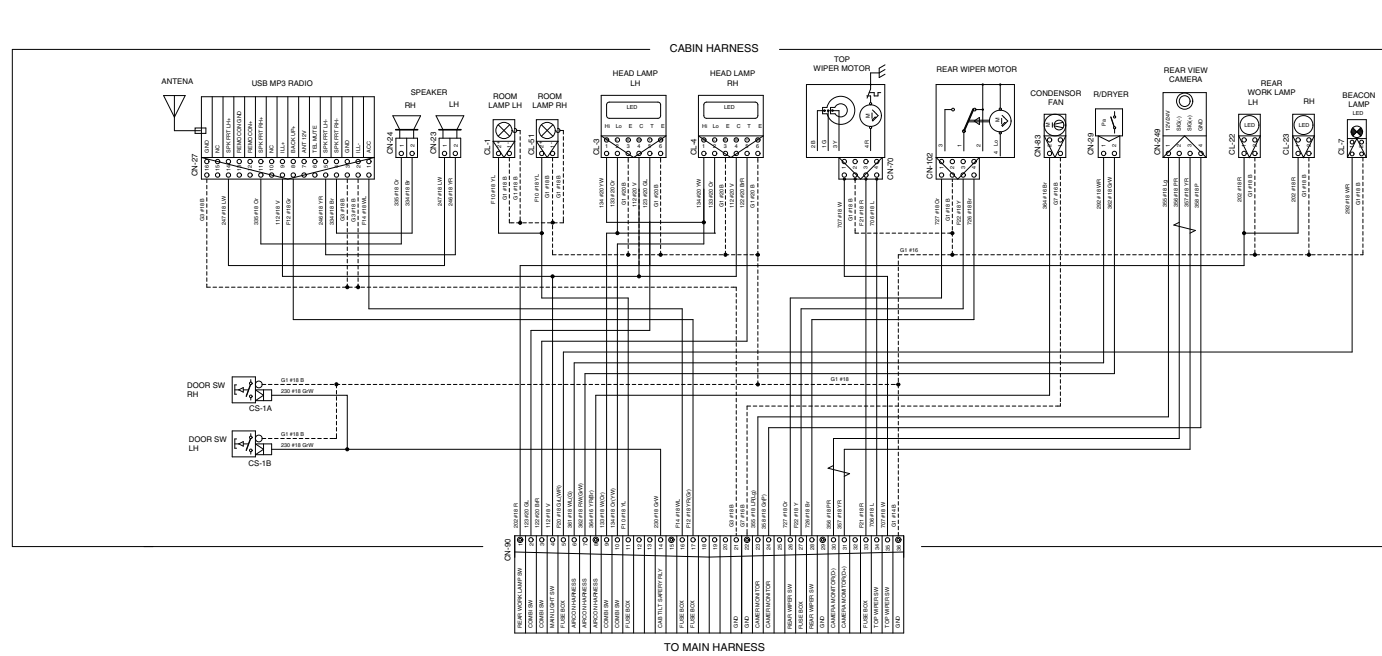
• ELECTRICAL CIRCUIT (2/3, #0007~0036)



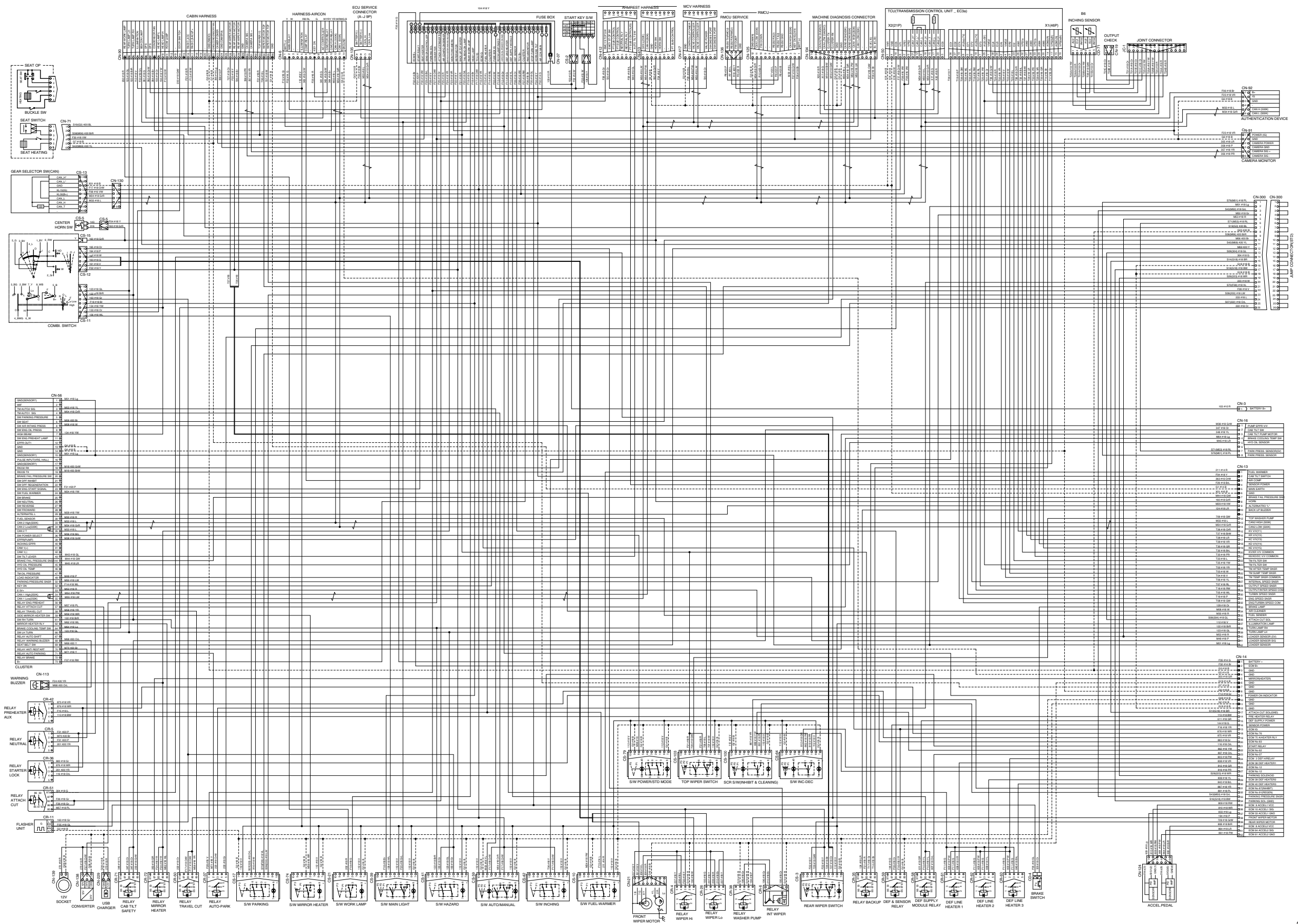
• ELECTRICAL CIRCUIT (3/3, #0007~0036, OLD)



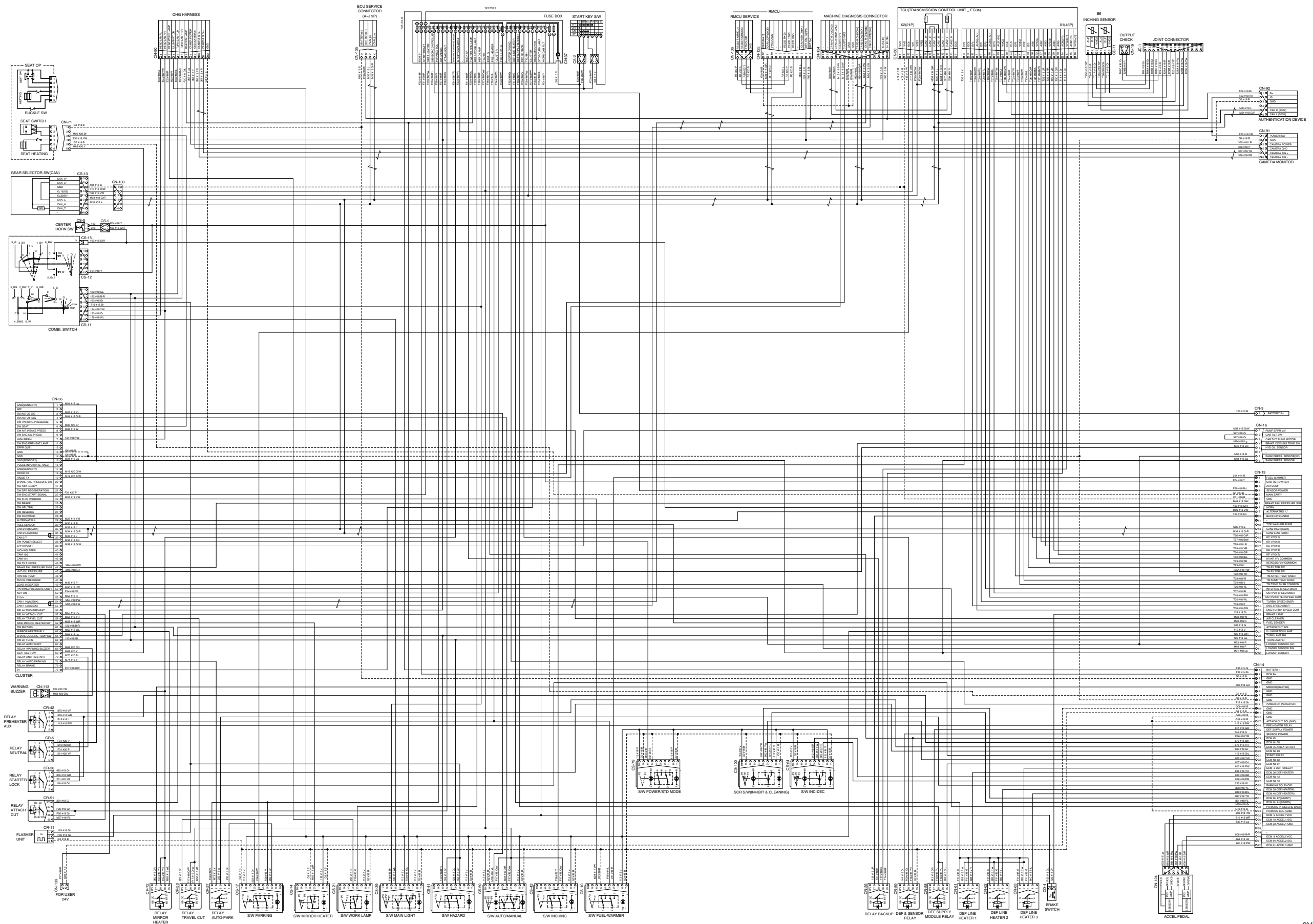
· ELECTRICAL CIRCUIT (3/3, #0007~0036, NEW)



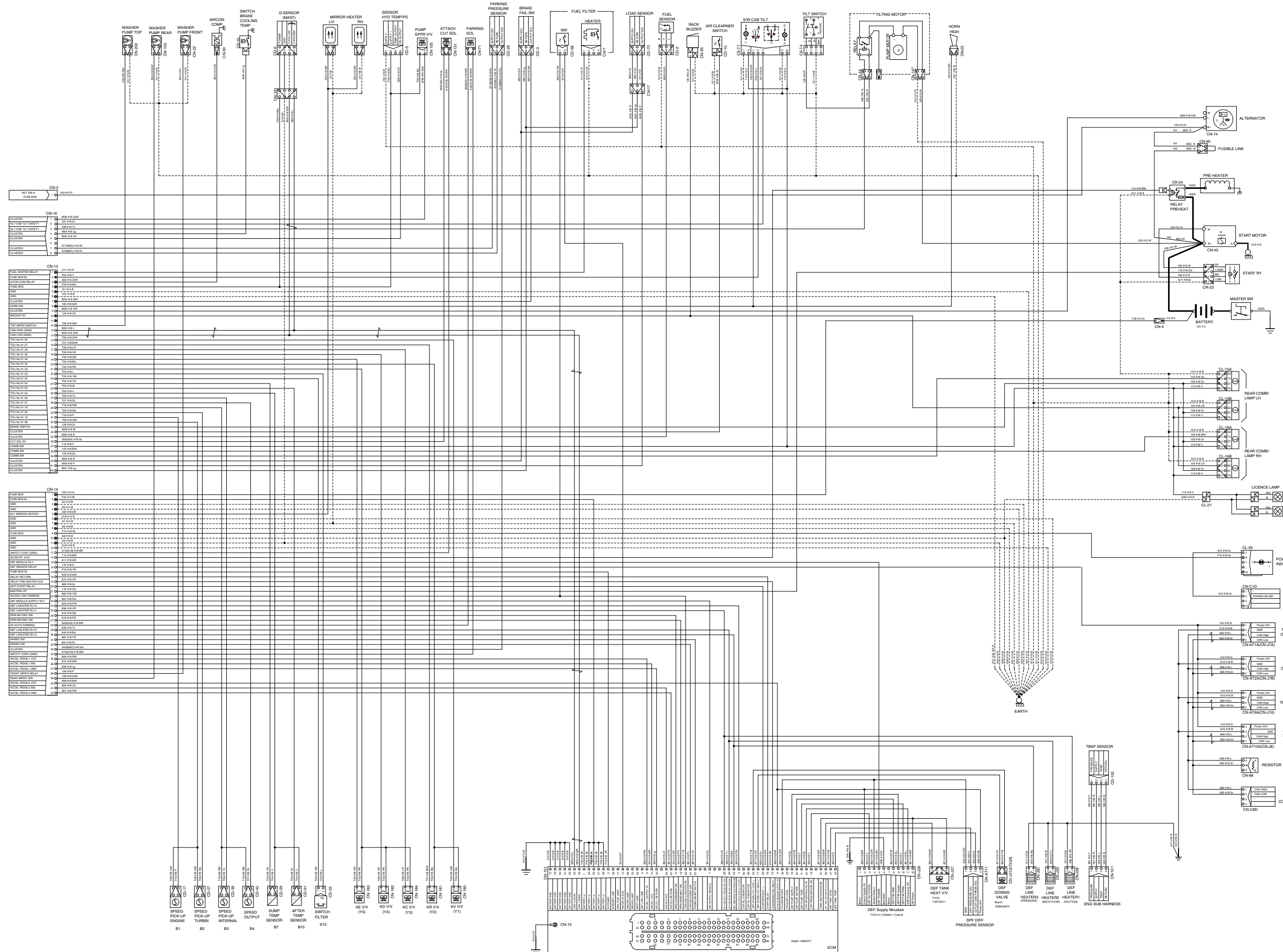
· ELECTRICAL CIRCUIT (1/4, CABIN TYPE, #0037-)



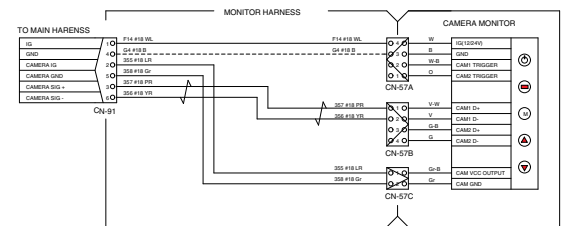
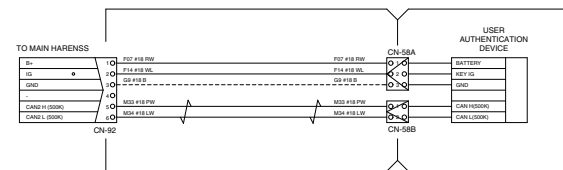
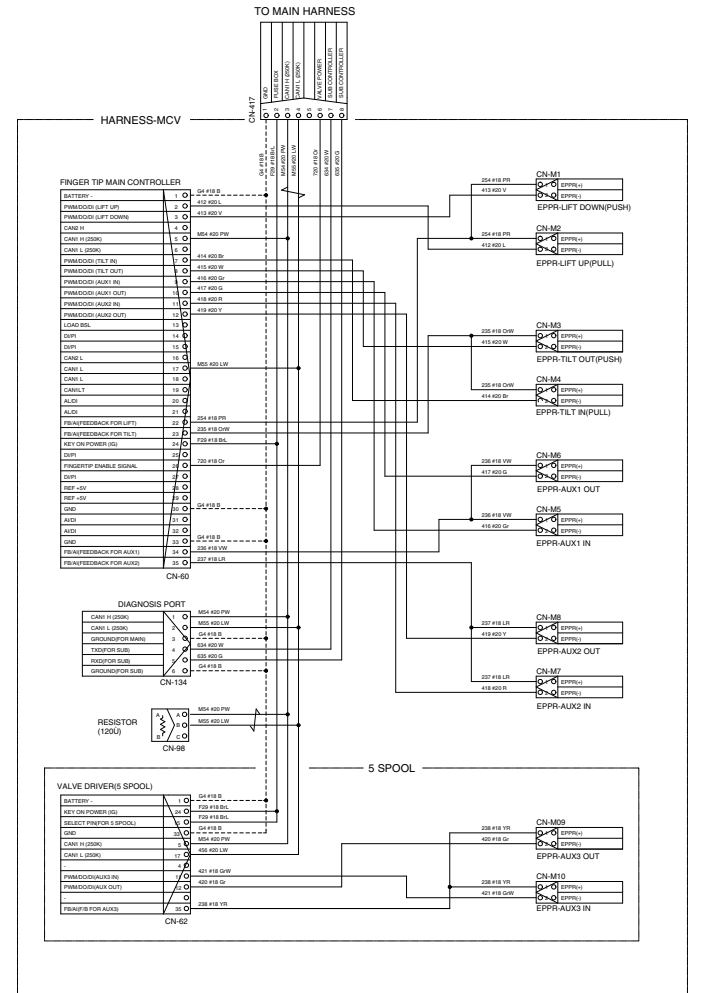
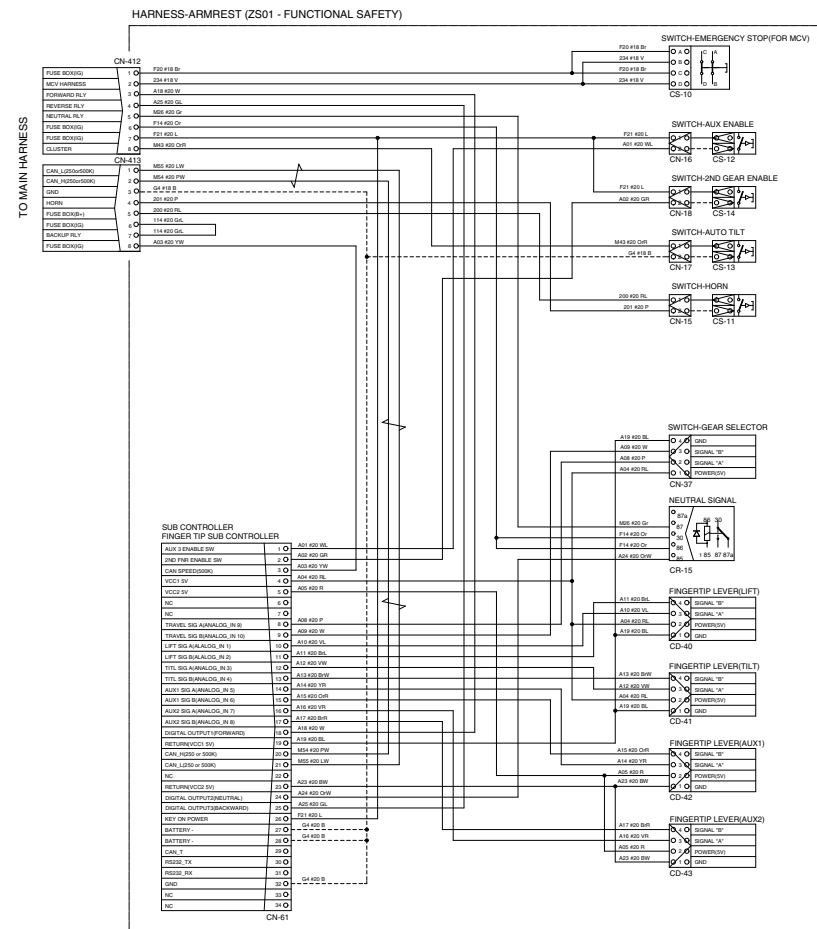
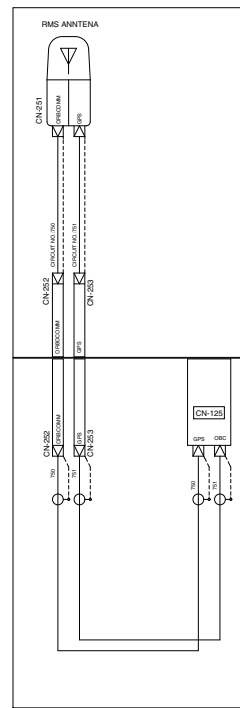
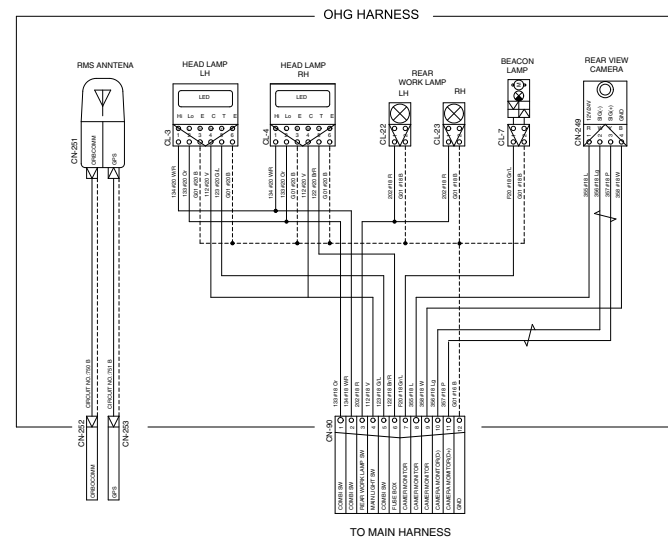
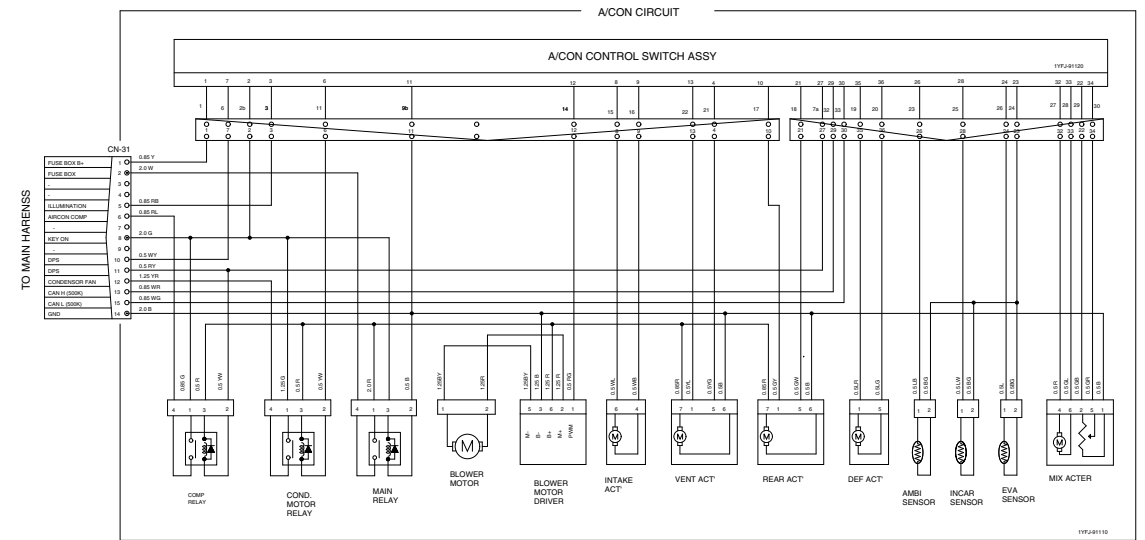
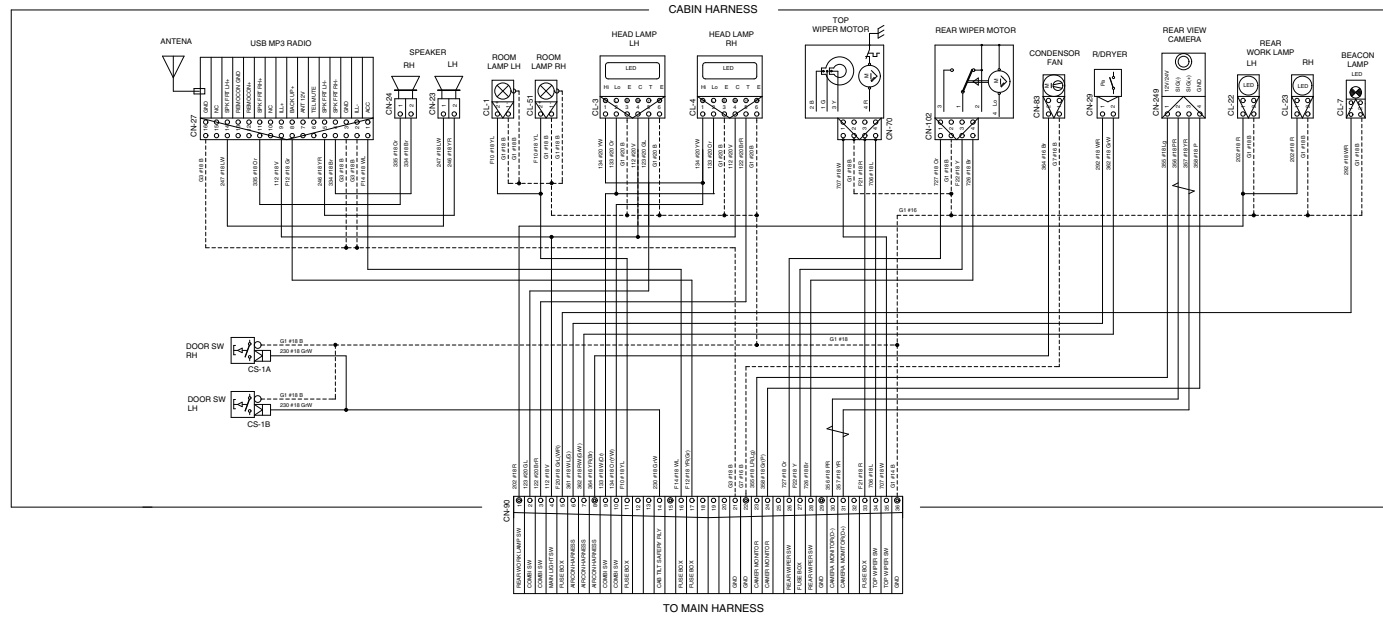
· ELECTRICAL CIRCUIT (2/4, CANOPY TYPE, #0037-)



• ELECTRICAL CIRCUIT (3/4, #0037-)



ELECTRICAL CIRCUIT (4/4, #0037-)

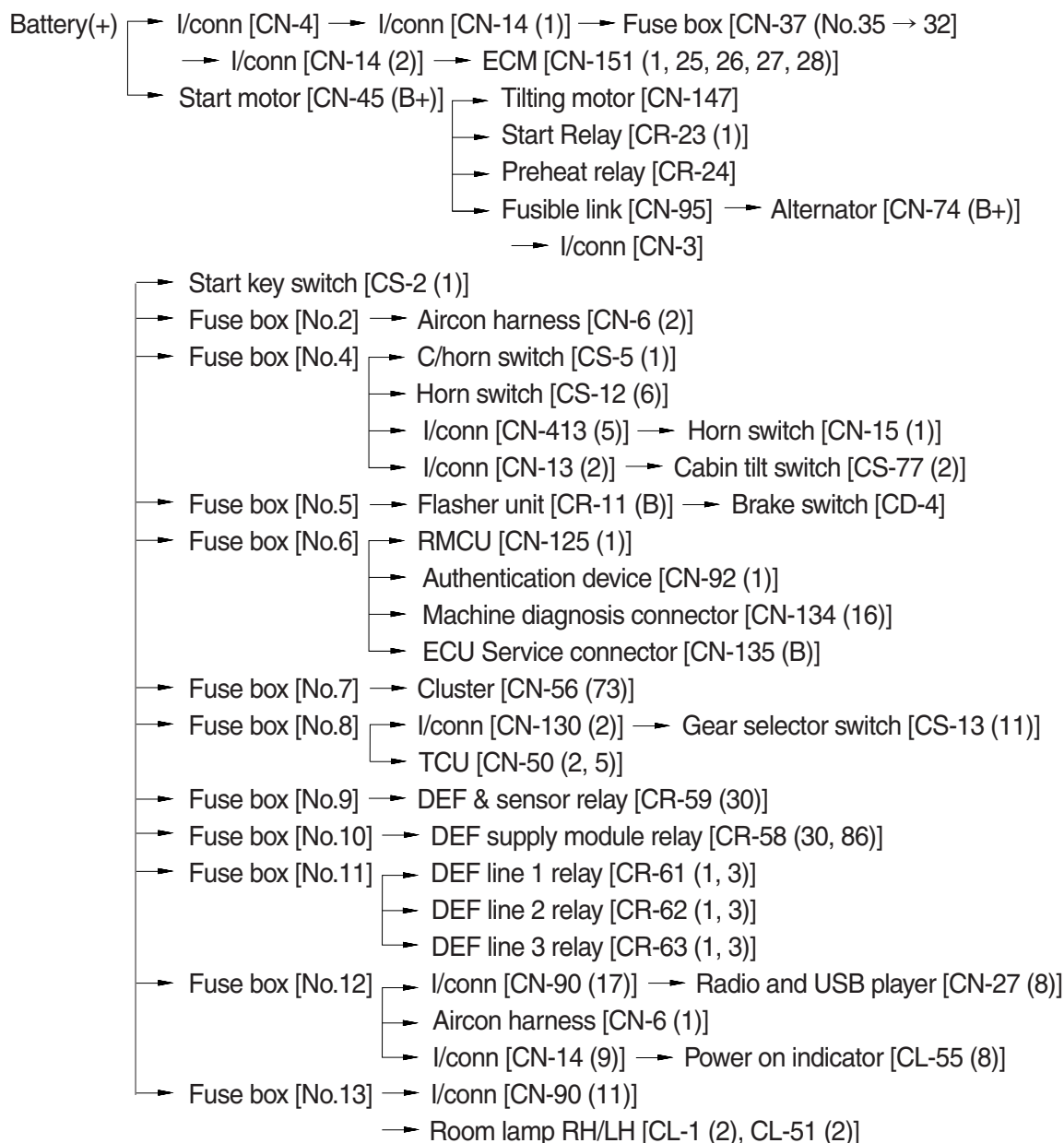


1. POWER CIRCUIT

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

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

1) OPERATING FLOW



※ I/conn : Intermediate connector

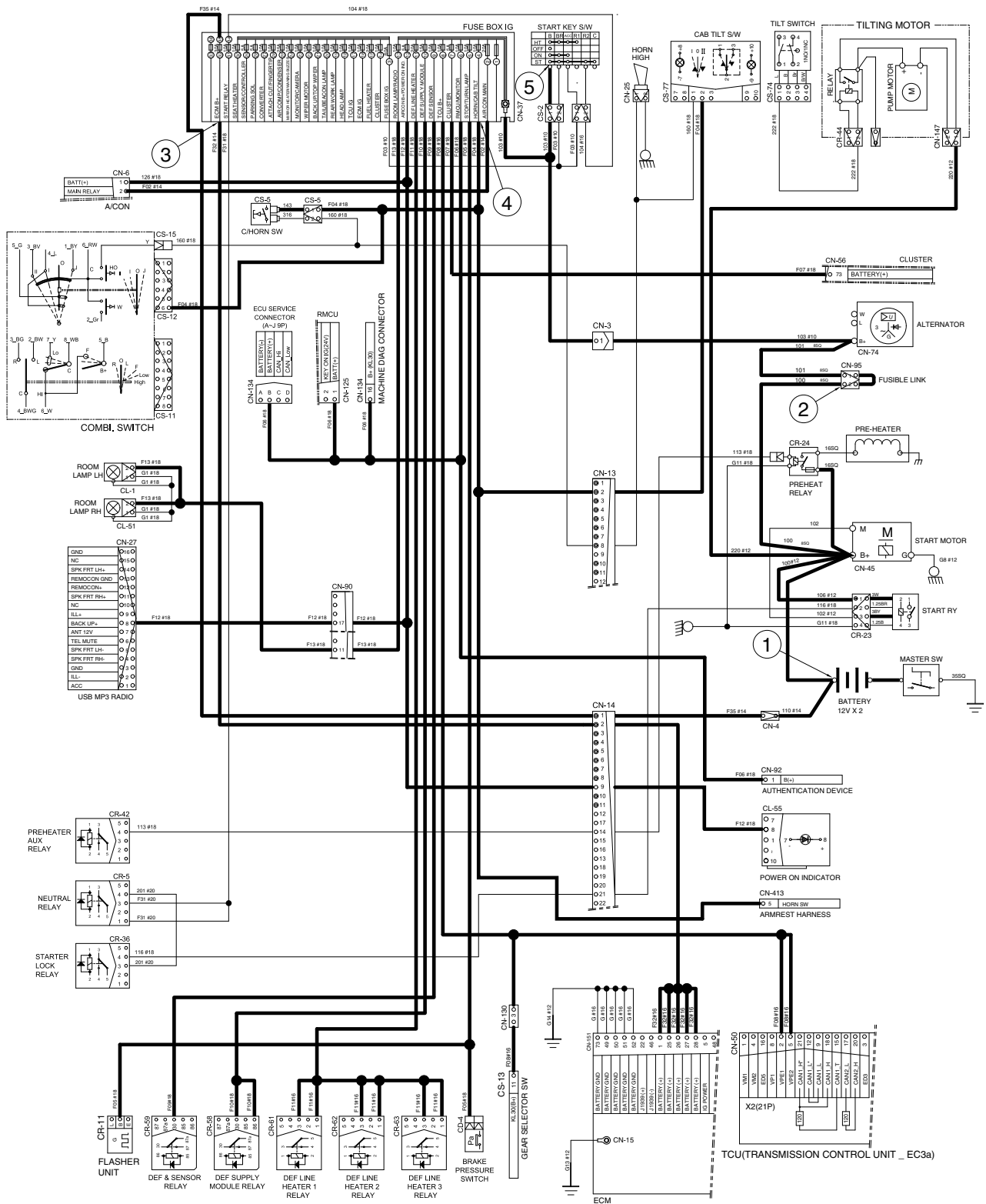
2) CHECK POINT

Engine	Key switch	Check point	Voltage
OFF	OFF	① - GND (Battery (+)) ② - GND (Fusible link) ③ - GND (Fuse No.33) ⑤ - GND (Start key)	24V

※ GND : Ground

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

POWER CIRCUIT



100D9V7EL03

※ 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 (1)] → Start switch [CS-2 (1)]
- Start relay [CR-23 (1)]
- Heater relay [CR-24]

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

The operator should be seated when starting.

(1) When start switch is in ON position

Start switch ON [CS-2 (2, 1)] → Fuse box [CN-37 (3)]

→ Power is supplied with the electric component

(2) When start key switch is START position

Start switch START [CS-2 (2)] → Fuse box [No. 34→31] → Neutral relay [CR-5 (3)→(4)]

→ Start lock relay [CR-36 (3)→(4)] → I/conn [CN-14 (21)] → Start relay [CR-23 (2)→(4)]

→ Start motor [CN-45 (M)] → Start motor operating

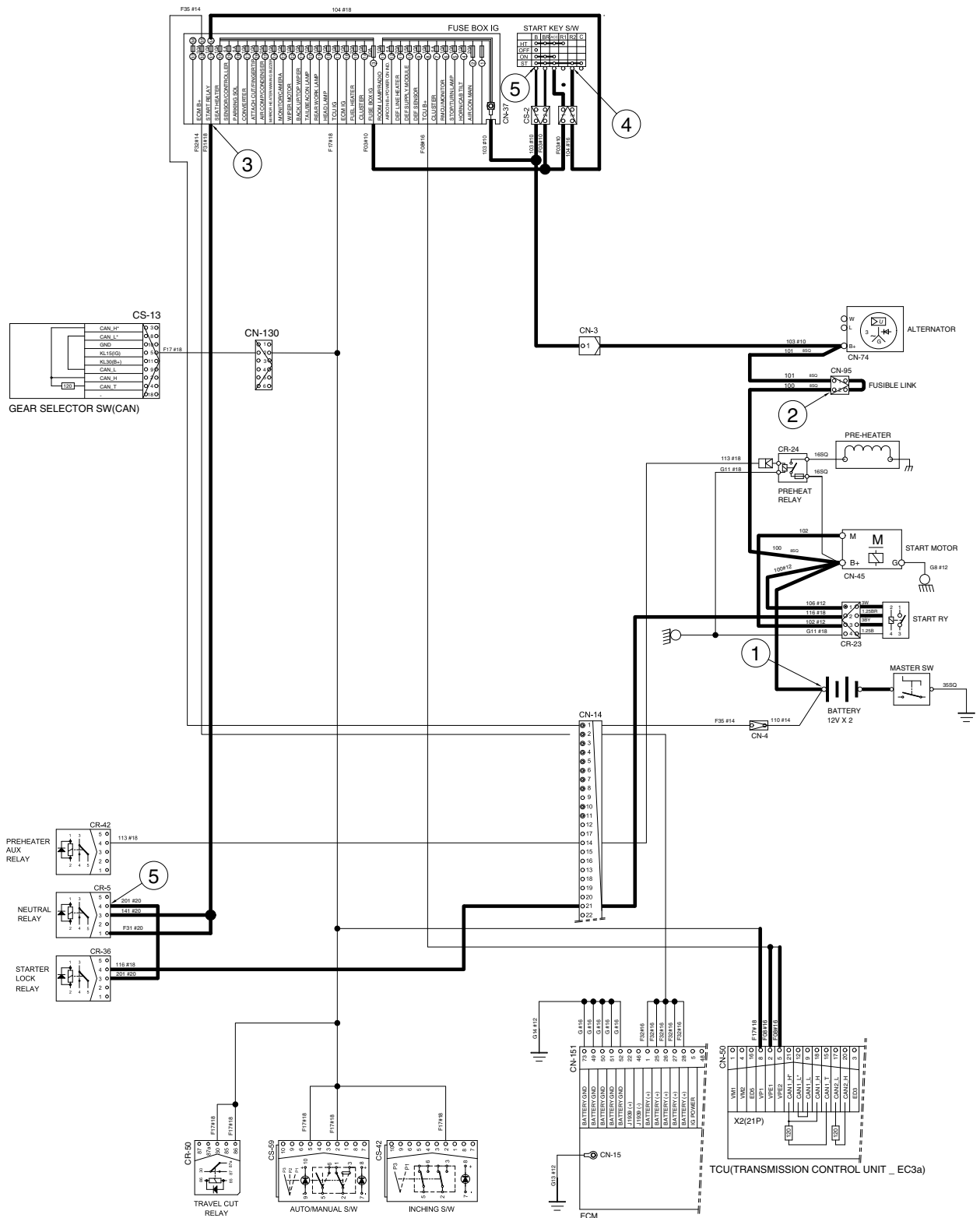
2) CHECK POINT

Engine	Start switch	Check point	Voltage
Running	ON	① - GND (Battery B+) ② - GND (Fusible link) ③ - GND (Fuse box No.31) ④ - GND (Start switch) ⑤ - GND (Neutral relay)	24V

※ GND : Ground

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

STARTING CIRCUIT



100D9V7EL04

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

3. CHARGING CIRCUIT

When the starter is activated and the engine is started, the operator 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-95) and the fuse box.

1) OPERATING FLOW

(1) Warning flow

Alternator [CN-74 (L)] → I/conn [CN-13 (9)] → Cluster alternator level [CN-56 (29)]

(2) Charging flow

Alternator [CN-74 (B+)] → Fusible link [CN-95] → Starter [CN-45 (B+)] → Battery (+) terminal charging
Alternator [CN-74 (B+)] → I/conn [CN-3] → Start switch [CS-2 (1)] → Fuse box [No. 14~30]
I/conn [CN-3] → Fuse box [No. 4~13]

2) CHECK POINT

Engine	Start switch	Check point	Voltage
ON	ON	① - GND (Battery voltage) ② - GND (Alternator B+ terminal) ③ - GND (Alternator L terminal) ④ - GND (Start switch) ⑤ - GND (Cluster)	24V

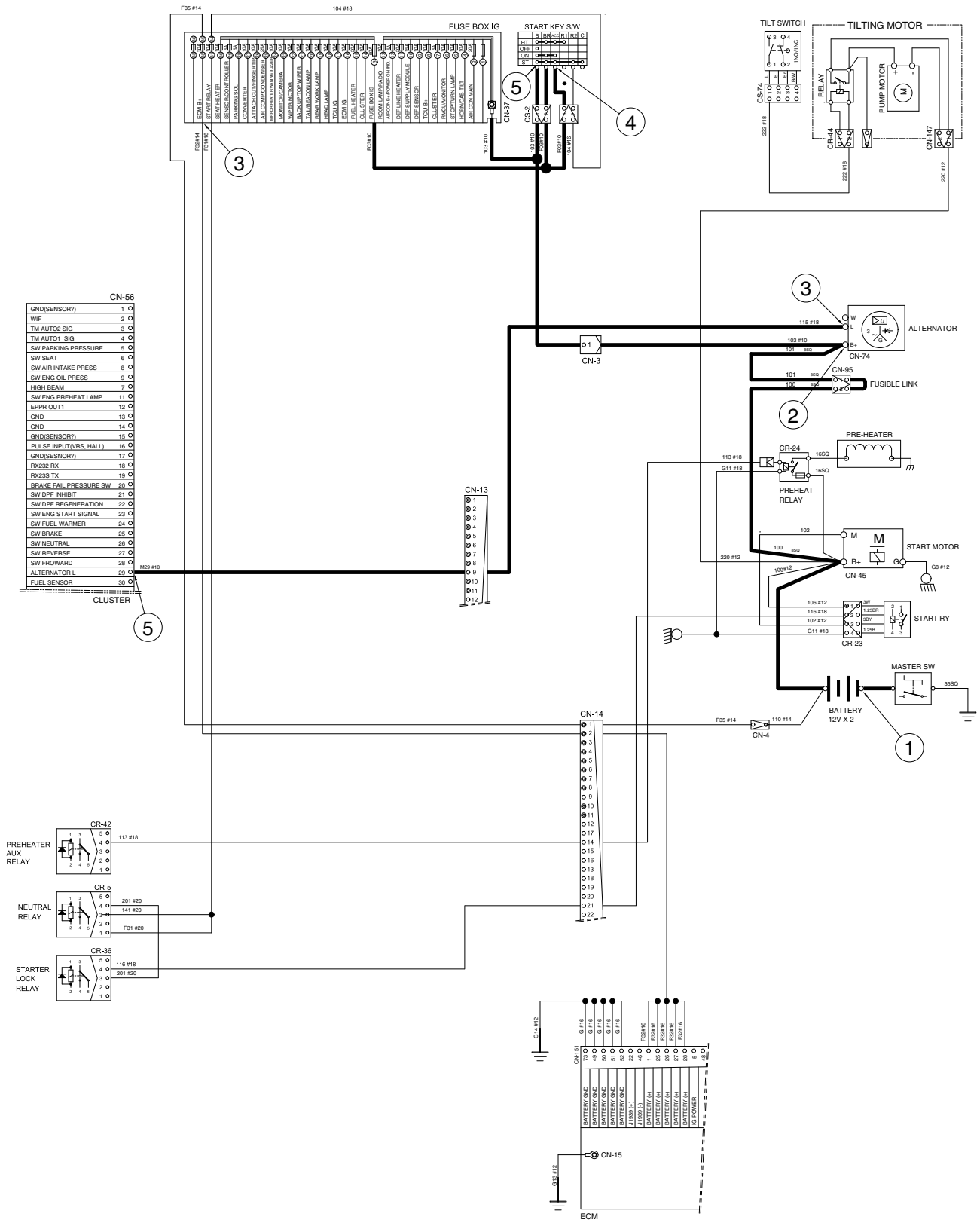
※ GND : Ground

※ 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



100D9V7EL05

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

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

Start switch ON [CS-2 (2)]

→ Fuse box [No.15] → Fuel heater switch [CS-10 (3)→(2)] → I/conn [CN-13 (1)]
→ Fuel heater [CN-7 (1)] → Fuel heater operating
→ ECM [CN-151 (75)] → I/conn [CN-14 (19)] → Preheater aux relay [CR-42 (1)→(4)]
→ I/conn [CN-14 (14)] → Preheater relay [CR-24] → Preheater operating

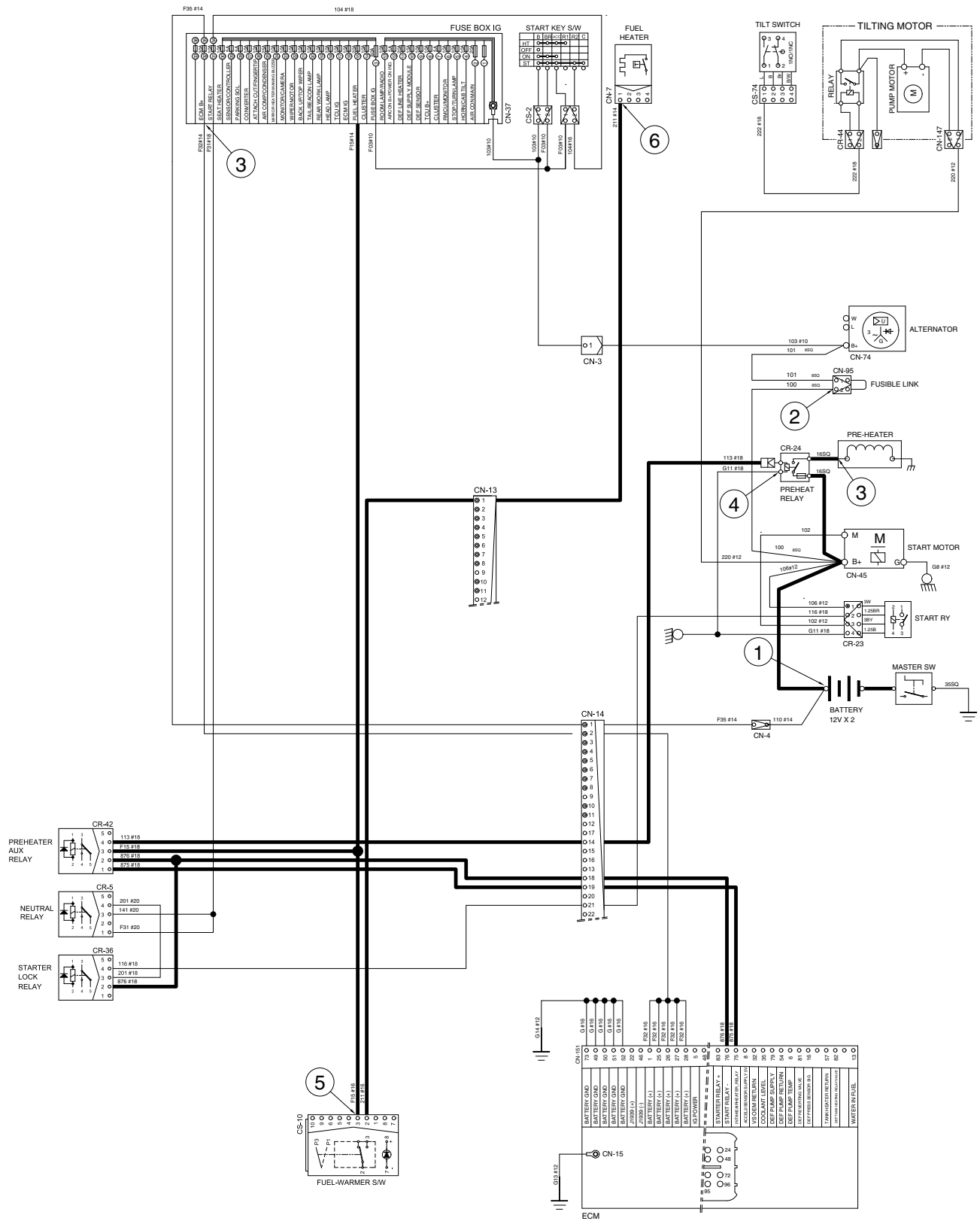
2) CHECK POINT

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

※ GND : Ground

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

PREHEATING CIRCUIT



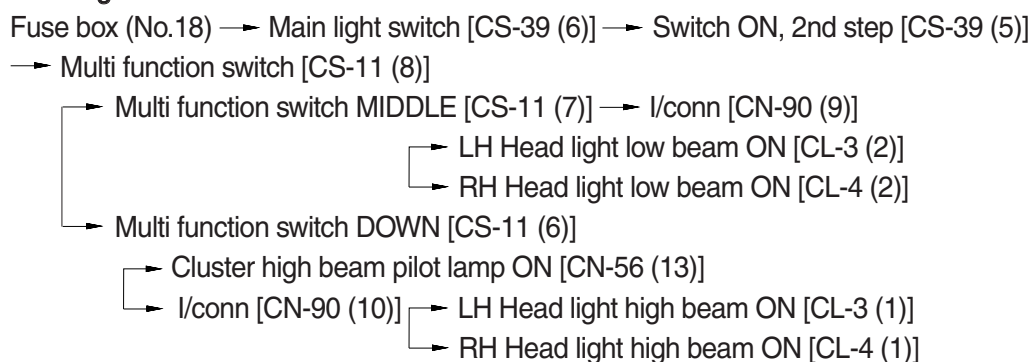
100D9V7EL07

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

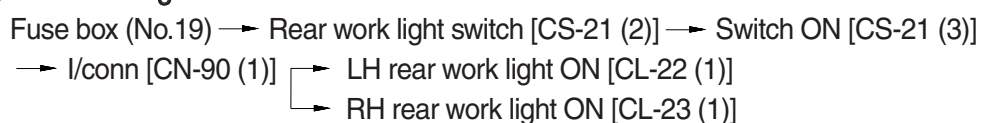
5. HEAD LIGHT AND REAR WORK LIGHT CIRCUIT

1) OPERATING FLOW

(1) Head light



(2) Rear work light



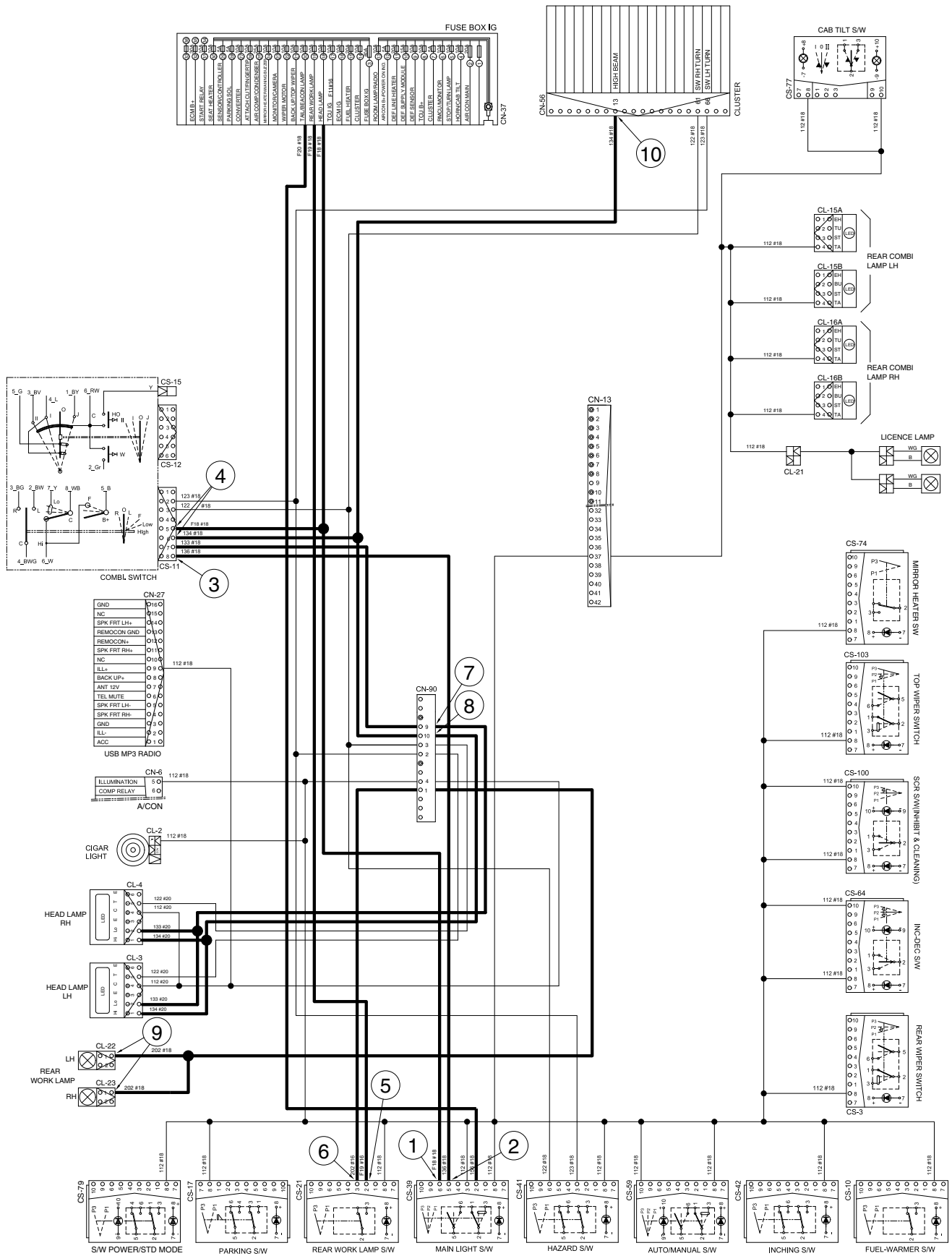
2) CHECK POINT

Engine	Start switch	Check point	Voltage
OFF	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 (Rear work light switch input) ⑥ - GND (Rear work light switch output) ⑦ - GND (Low beam) ⑧ - GND (High beam) ⑨ - GND (Rear 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 REAR WORK LIGHT CIRCUIT

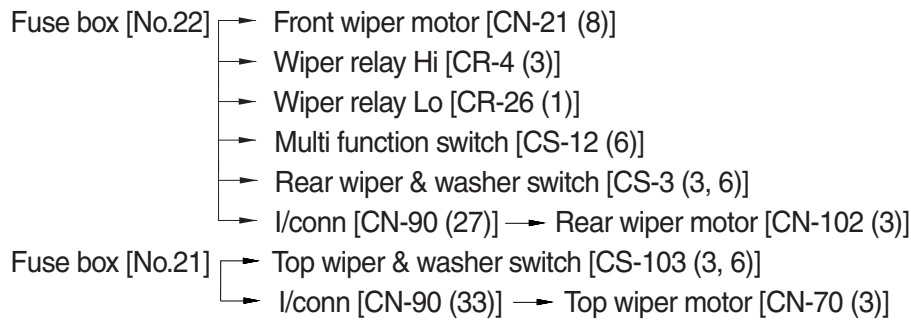


100D9V7EL08

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

6. WIPER AND WASHER CIRCUIT

1) OPERATING FLOW



(1) Front washer switch ON

- ① Washer switch ON [CS-12 (6)→(2)] → I/conn [CN-14 (38)] → Front washer pump [CN-22 (2)]
→ Washer pump relay [CR-38 (1)→(3)] → Int wiper relay [CR-6 (1)→(2)]
→ Wiper Lo relay [CR-26 (2)→(3)] → Front wiper motor [CN-21 (2)]
→ Wiper motor operating (low)

(2) Front wiper switch ON

- ① INT position
Washer switch ON [CS-12 (6)→(1)] → Int wiper relay [CR-6 (3)→(2)] → Wiper Lo relay [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 Lo relay [CR-26 (5)→(2)] →
Front wiper motor [CN-21 (2)] → Front wiper motor operating (low)
- ③ Hi position
Wiper switch ON [CS-12 (6)→(3)] → Wiper Hi relay [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 (3)] → 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)] → I/conn [CN-90 (36)] → 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-14 (39)] → Rear washer tank [CN-103 (2)] →
Washer operating
Wiper switch ON [CS-3 (3)→(2)] → I/conn [CN-90 (36)] → 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-90 (34)] → 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-13 (12)] → Top washer tank [CN-202 (2)] →
Washer operating
Wiper switch ON [CS-103 (3)→(2)] → I/conn [CN-90 (34)] → Top wiper motor [CN-70 (4)] →
Top wiper motor operating

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

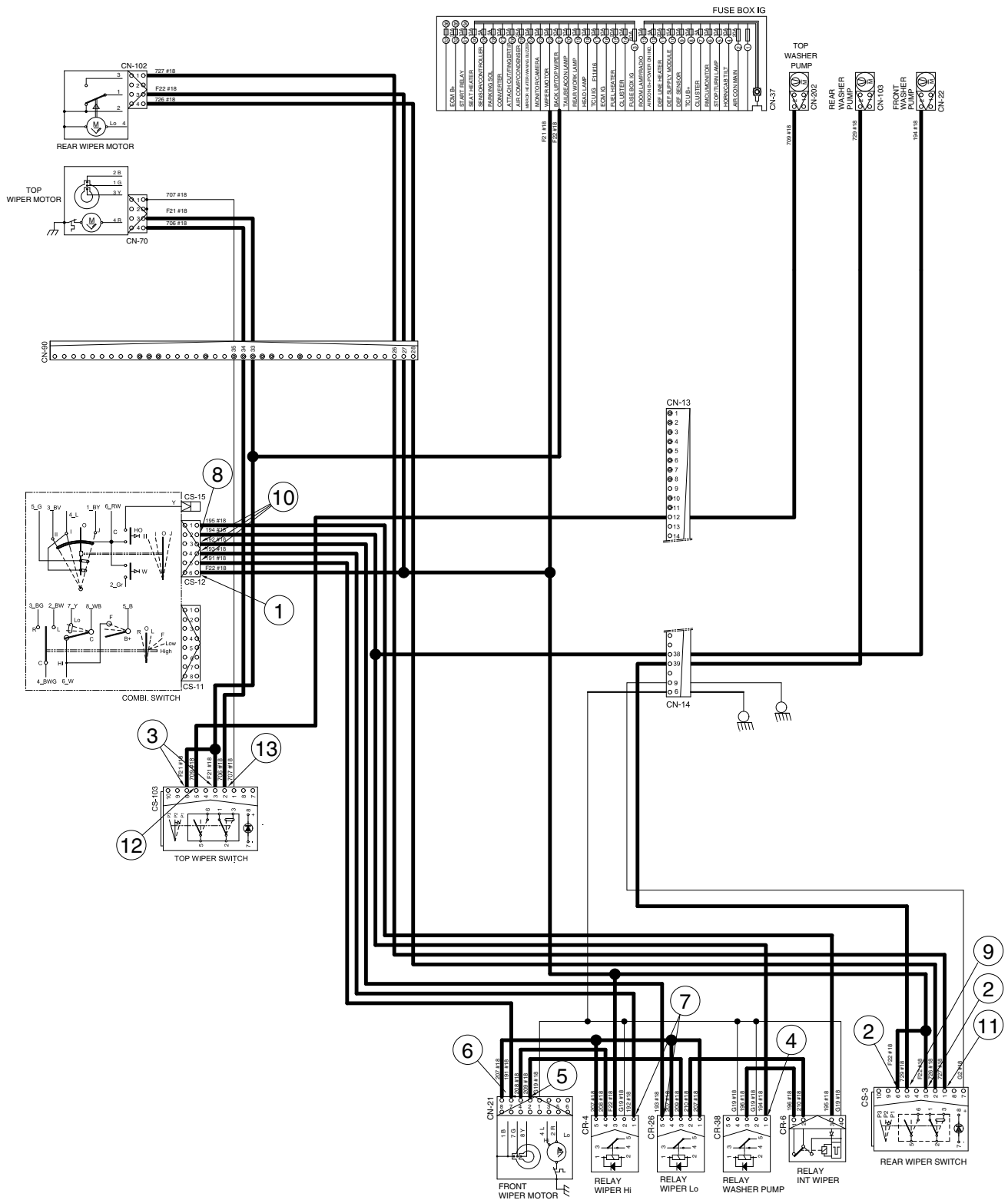
2) CHECK POINT

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



100D9V7EL09

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

GROUP 3 CLUSTER

1) STRUCTURE

Like following figure, cluster is consisted of LCD and buttons. LCD will indicate the operation and abnormal status of truck to the driver in order to use and maintenance. Also, LCD allows to set and indicate the various modes, monitoring, and gadgets.

- ※ The cluster installed on this truck does not entirely guarantee the condition of the truck. Daily inspection should be performed according to the operating manual chapter 7. **PLANNED MAINTENANCE AND LUBRICATION.**
- ※ When the cluster provides a warning immediately check the problem, and perform the required action.



2) GAUGE

(1) Operation screen

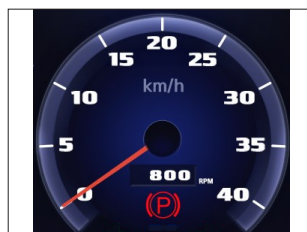
Operating screen will be displayed if turn on the start switch.



70D9V3KY30A

- | | | |
|---------------|-----------------------------|--------------------------------------|
| 1 Speed meter | 3 Coolant temperature gauge | 5 Transmission oil temperature gauge |
| 2 Fuel gauge | 4 DEF gauge | 6 Clock |

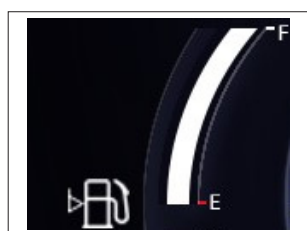
(2) Speed meter



100D9V3KY30

- It indicates the speed of truck and calibrated in miles per hour (mph) or kilometer per hour (km/h).
- ※ Speed unit can be set in the speed unit menu of display set up at page 7-67.

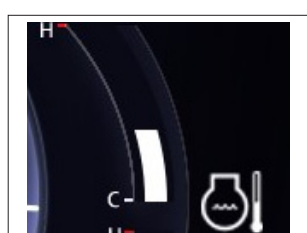
(3) Fuel gauge



70D9V3KY31

- Fuel gauge displays the approximate amount of fuel remaining in the fuel tank.
- It shall be obtained fuel as soon as warning lamp  lights on.

(4) Coolant temperature gauge



70D9V3KY32

- It indicates the temperature of the engine coolant.
 - White zone : 40 ~ 120 °C (104 ~ 248 °F)
 - Red zone : Over 120 °C (248 °F)
 - Warning lamp on : Over 115 °C (239 °F)
- If the gauge display in the red zone, or warning lamp  comes on, please stop the engine and inspect the coolant system.

(5) DEF (Diesel Exhaust Fluid) gauge



70D9V3KY33

- This gauge indicates the level of DEF.
- Fill the DEF when the level is low.

(6) Transmission oil temperature gauge



70D9V3KY34

- This range indicates the temperature of transmission oil.
 - White range : 40 ~ 109 °C (104 ~ 228 °F)
 - Amber range : 110 °C (230 °F) or higher
 - Red range : 120 °C (248 °F) or higher
- Keep idling engine at low speed until the indicator is in the operating range.
- 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.

(7) Clock



35D9VB3KY07

- It displays current time.
- The time can be adjusted at display Set Up > Time Set Up menu.

3) WARNING LAMPS

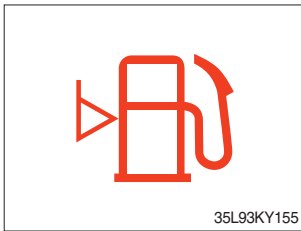


70D9V3KY35

※ Warning and indicator lamp will display only items that were set as ON, and all warning and indicator except fuel level warning and coolant temperature warning will be displayed in order from the left of screen. And directional indicator lamp will display at the center.

No.	Warning lamp		No.	Warning lamp	
1		Fuel Level warning lamp	12		HEST warning lamp
2		Coolant temperature warning lamp	13		Clutch protection warning lamp
3		Engine oil pressure warning lamp	14		Communication error warning lamp
4		Air cleaner warning lamp	15		DEF low warning lamp
5		Water in fuel warning lamp	16		Brake fail warning lamp
6		Engine check warning lamp	17		Seat belt reminder lamp
7		Engine stop warning lamp	18		Fingertip warning lamp
8		Battery charge warning lamp	19		Transmission warning lamp
9		Transmission oil temperature warning lamp	20		FSCU Communication error warning lamp
10		Exhaust system cleaning warning lamp	21		FSCU warning lamp
11		Exhaust system cleaning inhibit warning lamp	-	-	-

(1) Fuel level warning lamp



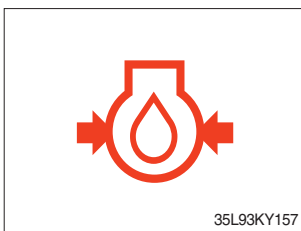
- Warning lamp will be displayed if fuel level is low.
- Please refuel immediately if the lamp is ON.

(2) Coolant temperature warning lamp



- Coolant temperature warning will be lit up when temperature is over 115 °C (239 °F).
- If the warning lamp is on continuously, please inspect the coolant system.

(3) Engine oil pressure warning lamp



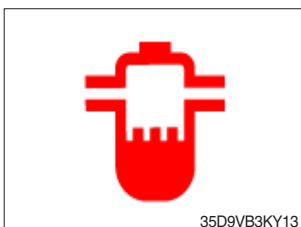
- This warning lamp will be lit up when engine oil pressure is low.
- Stop the engine immediately if the warning lamp is lit up. Please check the engine oil.

(4) Air cleaner warning lamp



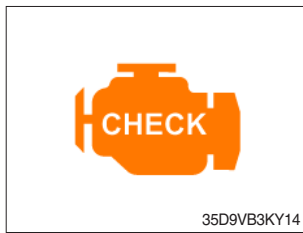
- This warning lamp is lit when air cleaner element is clogged up.
- Please clean up or replace the element.

(5) Water in fuel warning lamp



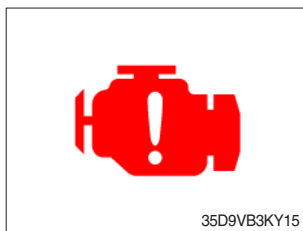
- Light up when water in fuel.
- Stop the engine and please drain the water of the fuel filter.

(6) Engine check warning lamp



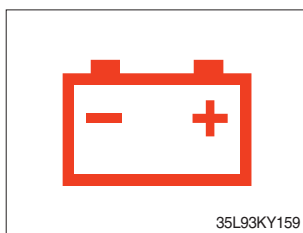
- When the engine is ON, it blinks for about 3 seconds. If the warning light remains on after 3 seconds, there is something wrong with the engine control, fuel supply and so on.
- Check the failure code of cluster.
- ※ **Some engine controls may not start if there is a problem.**
- ※ **Continued operation with the engine warning lamp ON or flashing can damage the exhaust control system, which affects operating performance and fuel consumption. You may also be subject to sanctions related to emission regulations, so be sure to check.**

(7) Engine stop warning lamp



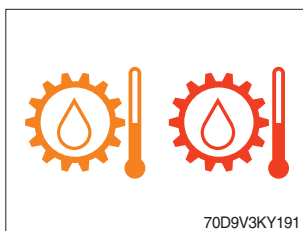
- If the lamp lights on, stop the engine immediately and check the engine.
- ※ **Please contact your Hyundai service center or local dealer.**

(8) Battery charge warning lamp



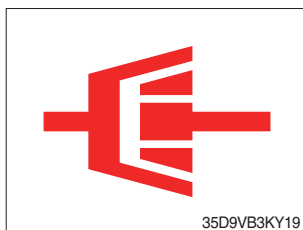
- This warning lamp is lit when battery charging voltage is low.
- Please inspect the battery charging circuit if the warning lamp is lit.

(9) Transmission oil temperature warning lamp



- Transmission oil temperature warning is consisted of two indications.
 - 110 °C (230 °F) or higher : Amber is light up
 - 120 °C (248 °F) or higher : Red is flashing
- When the red lamp lights up during operation, stop the engine and check the truck.

(10) Clutch protection warning lamp



- Warning lamp will be displayed if transmission oil pressure is not enough or while inching operation.
- Please check the transmission when the lamp is displayed without inching operation. If not, the brake performance can be decreased until the problem is resolved.

(11) Communication error warning lamp



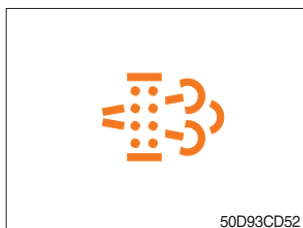
- This warning lamp will be lit up if the communication between cluster-CI and ECU is fail.
- Please check the communication line if the warning lamp is lit up.

(12) FSCU Communication error warning lamp (option)



- This warning lamp will be lit up if the communication between MCU and FSCU is fail.
- Please check the communication line between MCU and FSCU if the warning lamp is lit up.

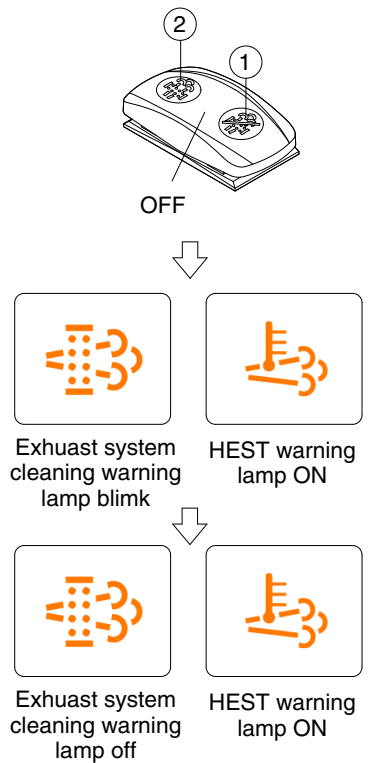
(13) Exhaust system cleaning warning lamp



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

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

※ Manual exhaust system cleaning



160D9VCD143

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

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

- Stop and park the truck.

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

※ Refer to the operator manual page 3-44 for the exhaust system cleaning switch operation.

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

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

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

(14) Exhaust system cleaning inhibit warning lamp



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

※ Refer to the operator manual page 3-44 for the exhaust system cleaning switch.

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

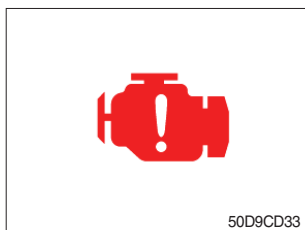


- This warning lamp indicates, when illuminated, that exhaust temperatures are high due to exhaust system cleaning.
- The lamp will also illuminate during a manual exhaust system cleaning.
- When this lamp is illuminated, be sure the exhaust pipe outlet is not directed at any surface or material that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

▲ When this lamp is illuminated, the exhaust gas temperature could reach 800 °C [1500 °F], which is hot enough to ignite or melt common materials, and to burn people.

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

(16) Engine stop warning lamp



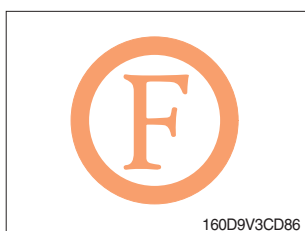
- When this warning lamp lights ON, stop the engine immediately and check the DEF level and related parts of the engine.
- ※ **Please contact your Hyundai service center or local dealer.**

(17) Fingertip red warning lamp



- This lamp lights ON when the forklift truck is in a condition that is serious enough to stop it.
- If the warning light is lit while driving, stop the engine and check the forklift.

(18) Fingertip amber warning lamp



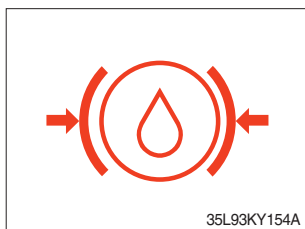
- This lamp lights ON when there is a problem with the forklift truck system, but the vehicle does not need to be stopped immediately.

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



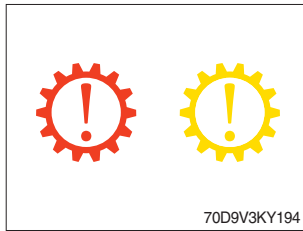
- This warning lamp indicates, when illuminated or flashing, that the diesel exhaust fluid level is low.
- ※ **Add the diesel exhaust fluid into DEF tank.**

(20) Brake fail warning lamp



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

(21) Transmission warning lamp



- If the lamp lights on, check the transmission.
- If the red warning light is lit while driving, stop the engine and check the forklift.

(22) Seat belt reminder lamp



- This lamp will be blinked 5 times, after key on.
- If not wearing a seat belt, this reminder lamp will be displayed (option). (If driving over 4 km/h, it will be activated with buzzer)
- ※ **If reminder lamp still displayed after wearing seat belt, Please check the seat belt wiring.**

(23) FSCU warning lamp (option)



- If this warning light is lighted, check the failure code of FSCU. (with activating buzzer)
- ※ **If the red warning light is lit while driving, stop the engine and check the forklift.**

4) INDICATOR LAMPS



70D9V3KY36

※ Warning and indicator lamps will display only items that were set as ON, and all warning and indicator except turning indicator lamp and driving indicator lamp will be displayed in order from the left of screen.

No.	Indicator lamp		No.	Indicator lamp	
1		Consumables management indicator lamp	8	N	Driving indicator lamp
2		Engine warning up indicator lamp	9	F F1 F2 F3	
3		Fuel warmer indicator lamp	10	R R1 R2 R3	
4		Parking brake indicator lamp	11	SIDE 	Side mirror heated pilot lamp (option)
5	TILT LOCK	Tilt lock indicator lamp (if installed)	12		DrivingHigh beam indicator lamp
6	OP SS	OPSS indicator lamp	13		Shift mode indicator lamp
7		Driving turn lamp	14		Inching switch on indicator lamp

(1) Consumables management indicator lamp



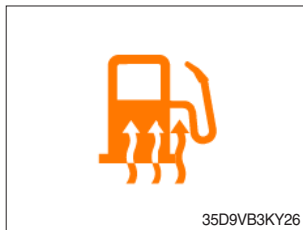
- Light up if consumables which must be replaced are exist.
- The indicator lamp will light up only 3 minutes since start switch ON, and then light OFF.
- Please check the consumables management list in maintenance menu.

(2) Engine warm-up indicator lamp



- The truck senses the engine coolant temperature and warms-up engine when needed.
- When it is happening, the indicator lamp is ON.

(3) Fuel warmer indicator lamp



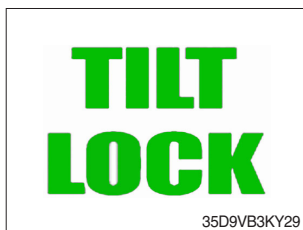
- Light up when fuel warmer is operating. (Controlled by ECU)

(4) Parking brake indicator lamp



- Light up when parking brake is ON.

(5) Tilt lock indicator lamp (if installed)



- The Indicator lamp will be lit up if the tilt lock switch (option) is entered.
- Tilt action will be limited if this Indicator lamp is lit up and the mast is located at 90 degrees.

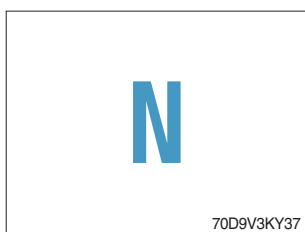
(6) OPSS indicator lamp



- Light up if driver leave seat during operation.
 - Truck driving and/or mast control will be blocked if lamp is lit up.
- ※ Please refer to page the operator manual 0-12 for details.

(7) Driving indicator lamp

① Neutral



- This indicator lamp will be lit up when gear selector lever is located in neutral.

② Forward



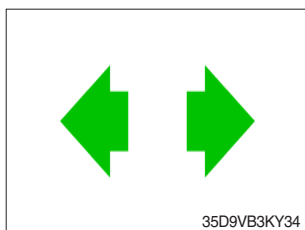
- This indicator lamp will be lit up if the forward gear is selected.

③ Reverse



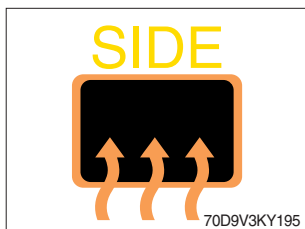
- This indicator lamp will be lit up if the reverse gear is selected.

(8) Driving turn lamp



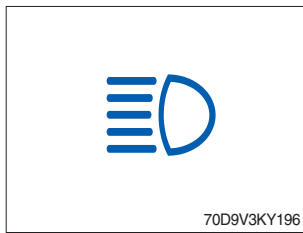
- This indicator lamp will flash if turns on the right or left turn signal.

(9) Side mirror heated indicator lamp (option)



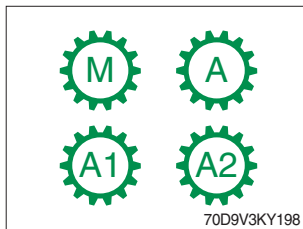
- ① When the heated mirror is operating, the lamp lights ON.

(10) High beam indicator lamp



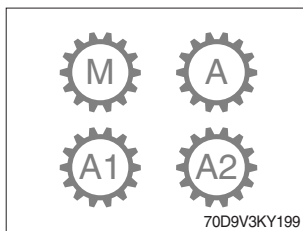
- This indicator is displayed when the vehicle's high beam is on.

(11) Shift mode indicator lamp 1



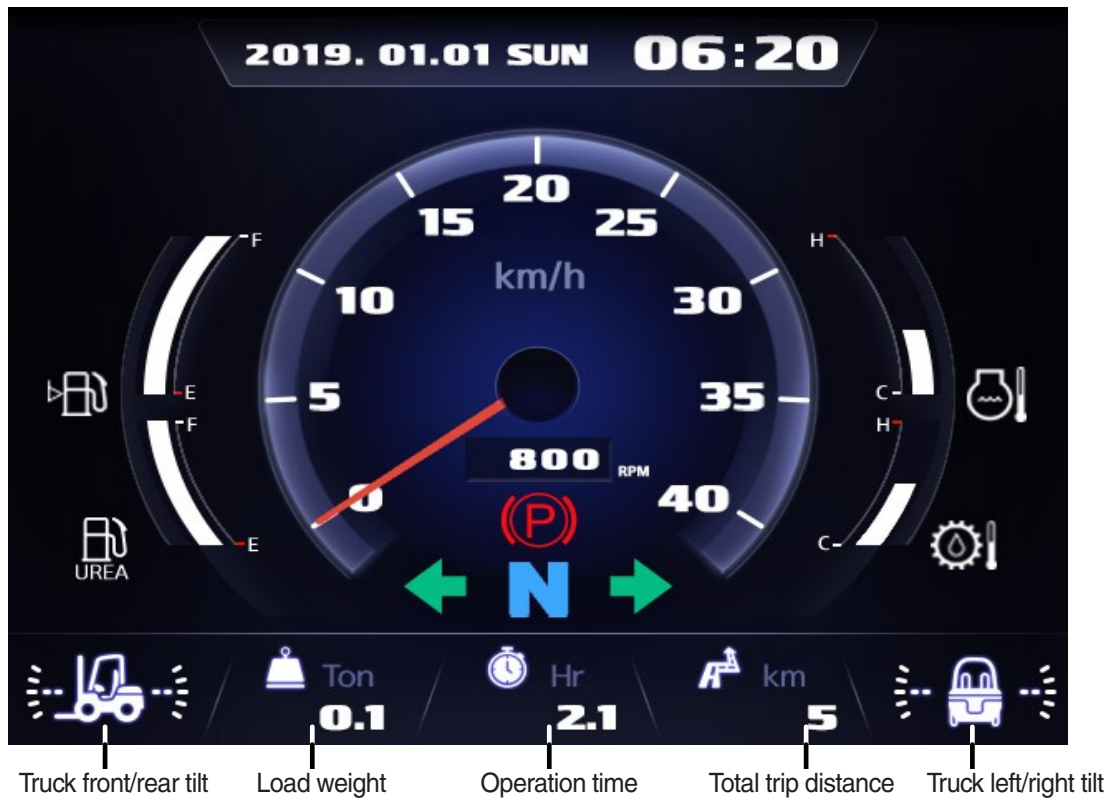
- This indicator shows the current vehicle's shift mode, A1 and A2 are indicated on vehicles with 2nd gear or higher.

(12) Shift mode indicator lamp 2



- This indicator shows the shift mode when activating the 2nd FNR, A1 and A2 are indicated on vehicles with 2nd gear or higher.

5) INFORMATION DISPLAY



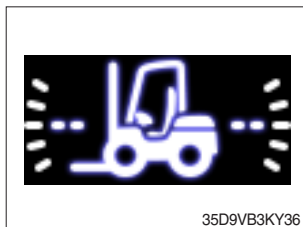
70D9V3KY40

(1) Mast front/rear tilt



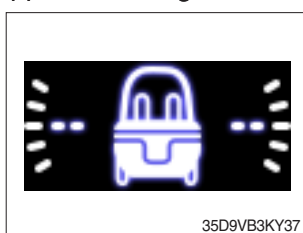
- Display the real time tilt of mast.

(2) Truck front/rear tilt



- Display the front and rear tilt of truck in real time.
- The red warning symbol turned on condition.
 - Stop : Tilt angle is higher than 2.3°
 - Driving : Tilt angle is higher than 10.2°

(3) Truck left/right tilt



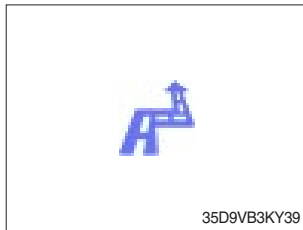
- Display the left and right tilt of truck in real time.
- The red warning symbol turned on condition.
 - Stop : Tilt angle is higher than 3.4°
 - Driving : Tilt angle is higher than 28.0°

(4) Load weight (option)



- Display the load weight.
- Screen will display blurry if the weight sensor has not been mounted.

(5) Total trip distance



- Display total trip distance of the truck.
- Unit of distance is kilometer.

(6) Operation time



- Display the used time of the truck.

(7) Explanation of warning lamp and indicator lamp



- When warning lamp or indicator lamp comes on, please press the enter button to check detailed explanation.
- During pressing the enter button, it keeps the screen to be shown explanation for warning lamp or indicator.

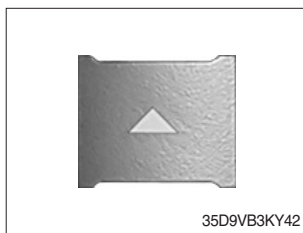
6) BUTTONS

(1) Camera



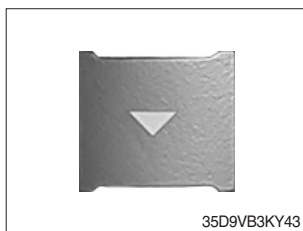
- This switch displays rear camera images. (if the camera is mounted)

(2) UP/Left



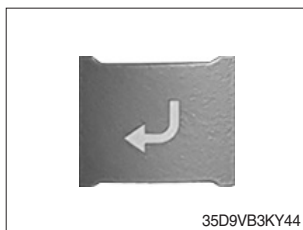
- This switch is used to move upward or leftward in menu or increase the value.

(3) Down/Right



- This switch is used to move downward or rightward in menu or decrease the value.

(4) Enter (select)



- This switch is used to enter into the menu or to select.

(5) Cancel (ESC)



- This switch is used to cancel or move to upper menu.

7) MAIN MENU

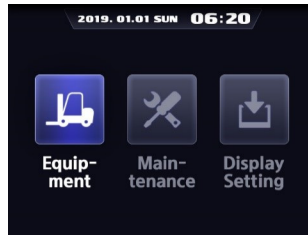
(1) Structure

Menus consist of main menu and sub-menu.

Operation Screen



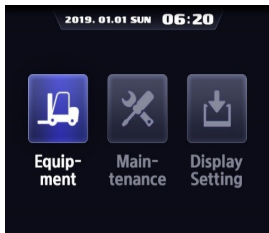
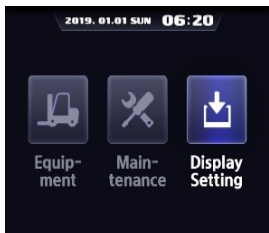
Main Menu Screen



Sub-Menu Screen



70D9V3KY42

No.	Main menu screen	Sub menu	Explanation
1	 35D9VB3KY47	- Model select - Tilt setting - ESL setting - Weight sensor setting (option) - Camera setting (if installed) - Fingertips setting (option) - CSC setting (if installed) - Auto shift setting (if installed) - DCSR setting (if installed) - HAC setting (if installed) - Vehicle Max speed limit - Zero start setting (if installed) - Clutch protection beep (if installed) - ZF TCU calibration - Seat belt interlock (option) - Cluster-CI info	- Diesel, LPG - Truck tilt initialize - ESL setting, Engine start limit, Delay time - Enter the cylinder cross section area, Adjust load weight, Weight display setup - Reverse gear interworking - DCSR on, Cut-off driving speed, Restore driving speed - Maximum speed limitation - Cluster-CI information
2	 35D9VB3KY48	- Failure history - Consumables management - I/O information	- Engine, Transmission failure history - Change oil and filter replacement cycle - Analog, Digital signal
3	 35D9VB3KY49	- LCD brightness adjustment - User setting - A/S phone No. - Password change - Consumables management	- Automatic, Manual - Time, Unit, Language - Change A/S contact - Engine starting password connect - Maintenance parts management

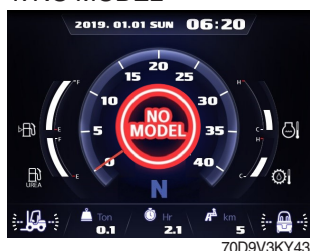
(2) Equipment menu

① Model Select (a required setting)

Check under the start switch ON status. Selection will be canceled if press the cancel button.

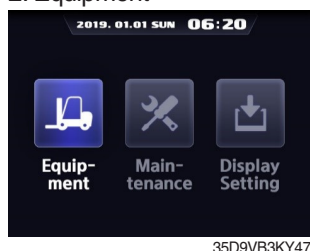
- ※ This is a required setting. Some functions may not be worked properly if you do not select the model.
- ※ If you want to move back to previous page, please enter ESC button in any stage.
- ※ It shall be selected right model to prevent malfunction of truck.

1. NO MODEL



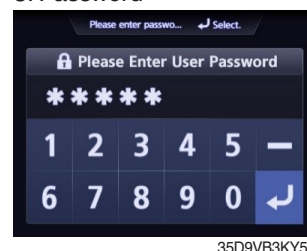
Select the your model.

2. Equipment



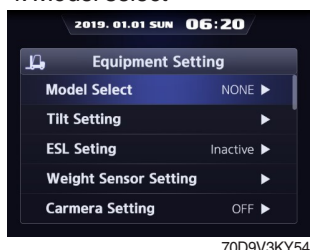
Enter to Equipment.

3. Password



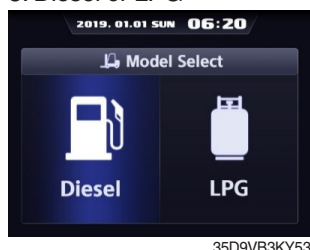
Enter the password.
Default password is "00000".
Password length must be 5~10 digits.

4. Model select



Choose Model Select and enter.

5. Diesel or LPG



Please select the fuel type.

6. Truck weight



Please select the truck weight level.

7. Truck model



Please select the exact model name.

8. Confirm



Confirm the model which you select.

9. Completion



Model selection is completed.

10. Check



Check the status which is not shown 'NO MODEL' in main display.

② Tilt Setting

a. Setting (Check under the start switch ON status.)

※ The tilt sensor has already been initialized when deliver the truck from factory.

※ Tilt reset if the tilt sensor figure or truck tilt is not horizontal in the flatland.

⚠ You must set tilt in the flatland since this is a horizontal set up.

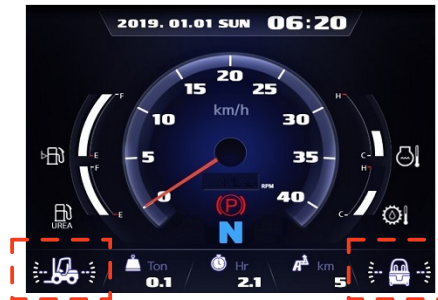
※ If tilt sensor for mast is mounted (option), locates the mast vertically.

※ Mast maximum angle depends on the truck.

· Truck that has not applied the mast angle sensor

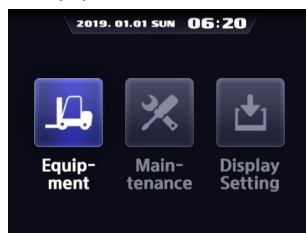


· Truck that has applied the mast angle sensor (option)



70D9V3KY49

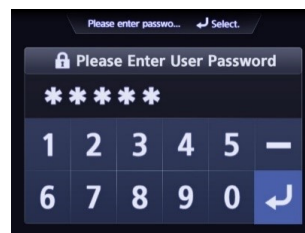
1. Equipment



35D9VB3KY47

Enter to Equipment.

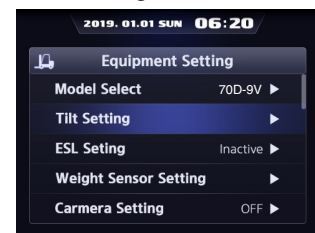
2. Password



35D9VB3KY51

Enter the password.

3. Tilt setting



70D9V3KY50

Choose Tilt Setting and enter.

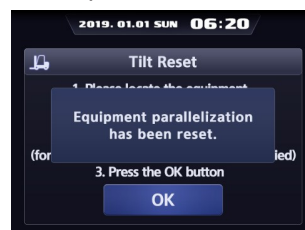
4. Instruction



70D9V3KY51

Follow the instruction showing in the screen.

5. Completion



70D9V3KY52

Setting has been completed.

b. Check functions

a) Check the real time operation by changing angles of truck tilt and mast tilt.

b) Auto-leveling (if installed)

(a) Tilt mast forward or backward.

(b) Start tilting mast toward its vertical position, pushing the auto tilt leveling switch.

(c) Check if the mast stops traveling when it becomes vertical to ground.

c) Forward or backward truck tilt warning (red)

· Stop : $\pm 2.3^\circ$ (1.5 ~ 5 tons)

· Driving : $\pm 10.2^\circ$ (1.5 ~ 5 tons)

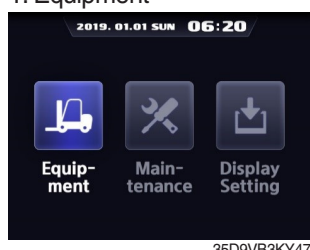
d) Left or right truck tilt warning (red)

- Stop : $\pm 3.4^{\circ}$ (1.5 ~ 5.0 tons)
- Driving

Truck weight	Warning angles (red)
1.5 ~ 2.0 tons	$\pm 20.3^{\circ}$
2.2 ~ 3.3 tons	$\pm 20.8^{\circ}$
3.5 ~ 4.5 tons	$\pm 24.2^{\circ}$
5.0 tons ~	$\pm 28.0^{\circ}$

③ ESL (Engine Start Limit) Setting : Default is 'Inactive'

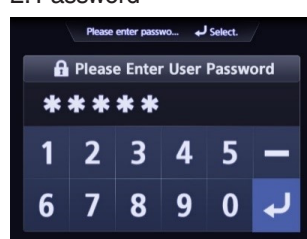
1. Equipment



35D9VB3KY47

Enter to Equipment.

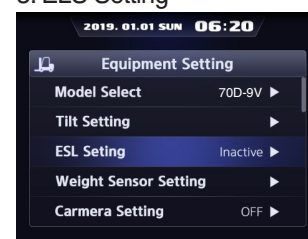
2. Password



35D9VB3KY51

Enter the password.

3. ELS Setting

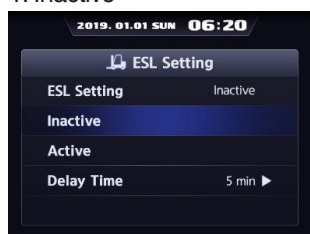


70D9V3KY55

Choose ESL setting and enter.

a. Setting

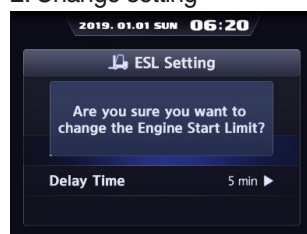
1. Inactive



35D9VB3KY85

Choose Inactive.

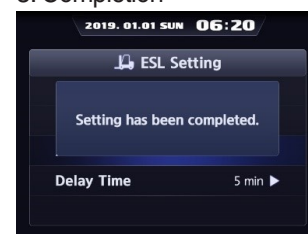
2. Change setting



35D9VB3KY86

If you want to change setting, press enter button.

3. Completion

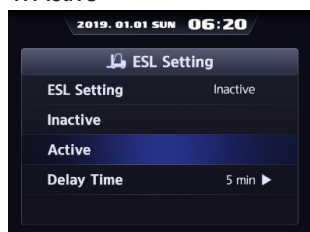


35D9VB3KY87

Setting has been completed.

b. Active

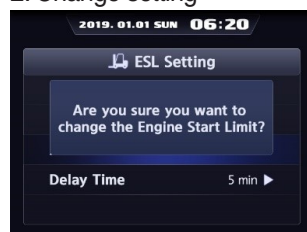
1. Active



35D9VB3KY88

Choose Active.

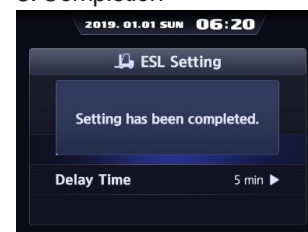
2. Change setting



35D9VB3KY89

If you want to change setting, press enter button.

3. Completion



35D9VB3KY87

Setting has been completed.

b. Check functions

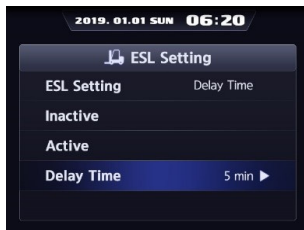
- (a) Set the mode as active and start switch OFF.
 - (b) Upon start switch ON, the password screen pops up and starting is prohibited until the right password has been offered. (But, driver still can start the vehicle if starts within 10 seconds from start switch OFF)
 - (c) Set the mode as 5 min of delay time and start switch OFF.
 - (d) check if vehicle can start within 5 min and start switch OFF.
 - (e) check if vehicle requests password after 5 min.
- ※ **Start switch ON screen (When startup control mode is ON)**



35D9VB3KY90

c. Delay time

1. Delay time



35D9VB3KY91

Choose delay time.

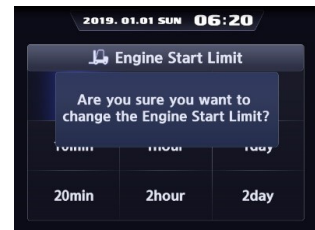
2. Select value



35D9VB3KY92

Select value you want to apply.

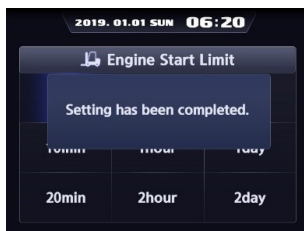
3. Change setting



35D9VB3KY93

If you are sure to change ESL, press enter.

4. Completion



35D9VB3KY94

Setting has been completed.

④ Weight Sensor Setting (option)

Check under the start switch ON status. There are three settings (unload, load, reset) for weight sensor.

※ The weight sensor has already been set when deliver the truck from factory.

a. Setting Cylinder Cross-Section

※ Cylinder cross-section value

unit : cm^2

Model	Mast type	V-mast	TS-mast
100D-9V	V300~500	113.49	141.76
	TS450~500		
	V550~600	141.76	190.07
	TS550~750		

· Truck that has not applied the weight sensor

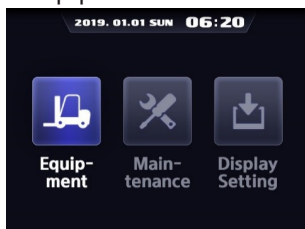


· Truck that has applied the weight sensor (option)



70D9V3KY53

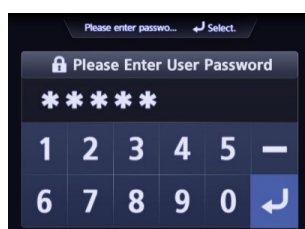
1. Equipment



35D9VB3KY47

Enter to Equipment.

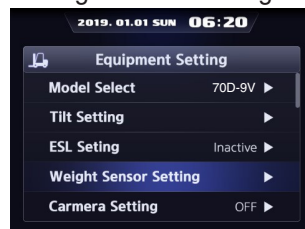
2. Password



35D9VB3KY51

Enter the password.

3. Weight Sensor Setting



70D9V3KY56

Choose Weight Sensor Setting and enter.

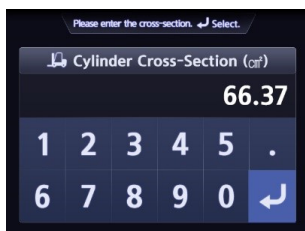
4. Cylinder Cross-Section



70D9V3KY57

Choose Cylinder Cross-Section. If cylinder cross-section is already set up, setting value is shown in initial screen.

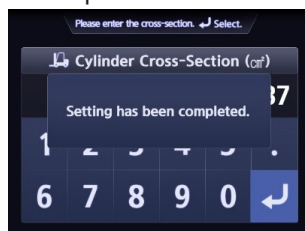
5. Value



35D9VB3KY66

Enter cylinder cross-section value using up or down buttons.

6. Completion



35D9VB3KY67

Setting has been completed.

7. Check

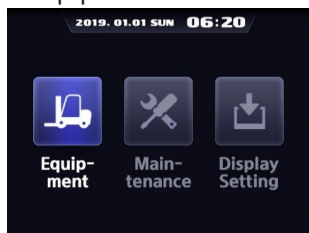


70D9V3KY58

Check the value whether it is right.

b. Unloaded status adjustment

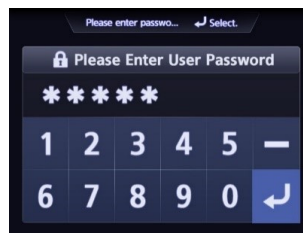
1. Equipment



35D9VB3KY47

Enter to Equipment menu

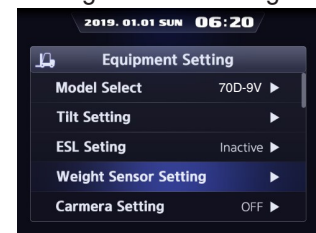
2. Password



35D9VB3KY51

Enter the password

3. Weight Sensor Setting



70D9V3KY56

Choose Weight Sensor Setting

4. Load Weight Adjustment



70D9V3KY59

Choose Load Weight Adjustment and enter.

5. Unloaded Status Adjustment



70D9V3KY60

Choose Unloaded Status Adjustment and enter.

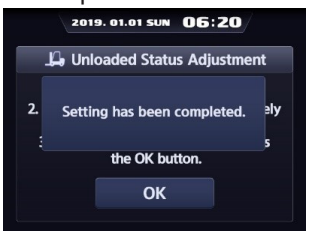
6. Instruction



35D9VB3KY71

Follow the instruction showing in the screen. After finish setting and press enter button

7. Completion



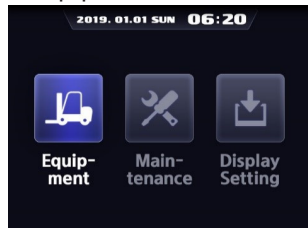
35D9VB3KY72

Setting has been completed.

c. Loaded status adjustment

- ※ Must be prepared to lift up by locating the load on the fork before enter the weight.
- ※ MCU (Main Control Unit) recognizes the weight automatically by detecting the pressure change.
- ※ Must be performed within 30 seconds of the lift task. If it is not completed within 30 seconds, this process will be canceled automatically.
- ※ Accurate weight value is not recognized if other pressure changes that are occurred besides salvage work.
- ※ Perform again, if the measurement malfunction is occurred.

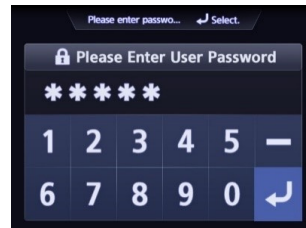
1. Equipment



35D9VB3KY47

Enter to Equipment menu

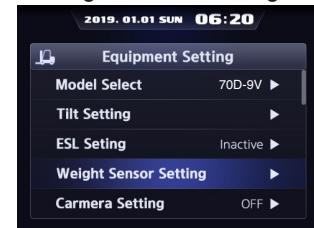
2. Password



35D9VB3KY51

Enter the password

3. Weight Sensor Setting



70D9V3KY56

Choose Weight Sensor Setting

4. Load Weight Adjustment



70D9V3KY59

Choose Load Weight Adjustment and enter.

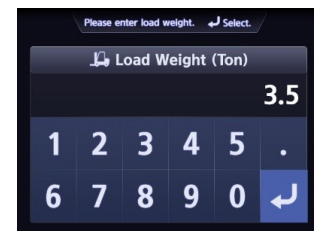
5. Loaded Status Adjustment



70D9V3KY61

Choose Load Weight Adjustment and enter.

6. Value



35D9VB3KY74

Enter load weight using up or down buttons.

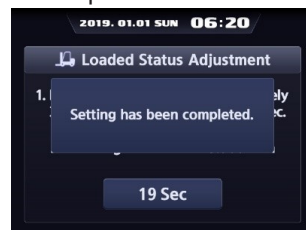
7. Instruction



35D9VB3KY75

Follow the instruction showing in the screen. After finish setting and press enter button. Please proceed the operation within 30 seconds.

8. Completion



35D9VB3KY76

Setting has been completed.

d. Reset

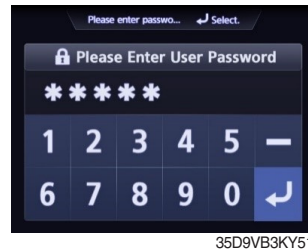
Initialize the all values of 'Unloaded and Loaded Status Adjustment' that were entered previously. (Cylinder cross-sectional area is not initialized.)

1. Equipment



Enter to Equipment menu

2. Password



Enter the password

3. Weight Sensor Setting



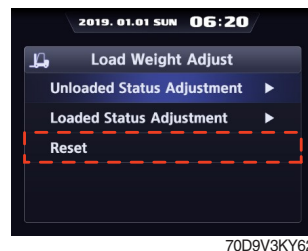
Choose Weight Sensor Setting

4. Load Weight Adjustment



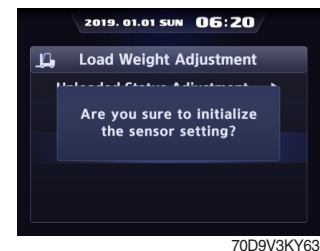
Choose Load Weight Adjustment and enter.

5. Reset



Enter to Reset.

6. Check



Press the enter button.

7. Completion

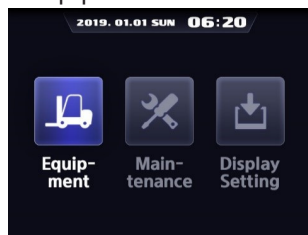


Reset has been completed.

e. Weight Display Setting

Enable to adjust the digit-number fo weight of main screen.

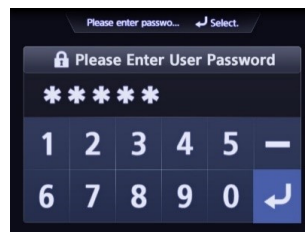
1. Equipment



35D9VB3KY47

Enter to Equipment menu

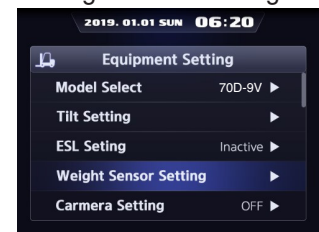
2. Password



35D9VB3KY51

Enter the password

3. Weight Sensor Setting



70D9V3KY56

Choose Weight Sensor Setting

4. Weight Display Setting



70D9V3KY65

Choose weight sensor setting and enter.

5. Unit



35D9VB3KY81

Choose unit what you want to use.

6. Completion



35D9VB3KY80

Setting has been completed.

· 100 kg unit



70D9V3KY66

· 10 kg unit



70D9V3KY67

f. Overload Alarm

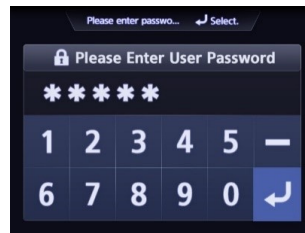
1. Equipment



35D9VB3KY47

Enter to Equipment menu

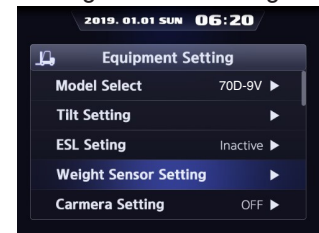
2. Password



35D9VB3KY51

Enter the password

3. Weight Sensor Setting



70D9V3KY56

Choose Weight Sensor Setting

4. Overload alarm



70D9V3KY68

Enter to Overload alarm.

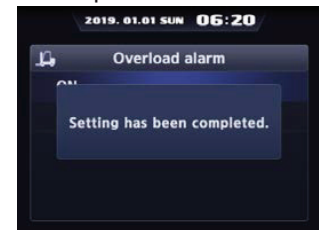
5. Select



35D9VB3KY81

Select ON or OFF.

6. Completion



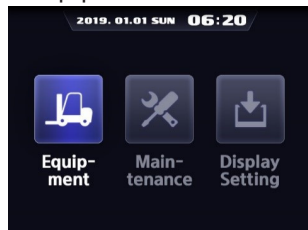
100D9VB3KY80

Setting has been completed.

⑤ Camera Setting (if installed)

- Device setup → Camera setup
- After set the reverse gear interoperation as ON, the screen will be changed from main screen to camera mode if put gear into reverse, and if the gear is changed, screen will be back to the main screen.

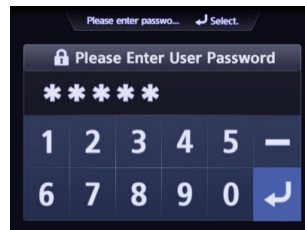
1. Equipment



35D9VB3KY47

Enter to Equipment.

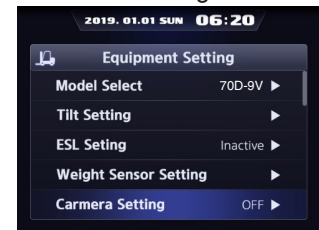
2. Password



35D9VB3KY51

Enter the password

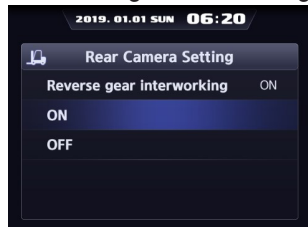
2. Camera Setting



70D9V3KY69

Choose Camera Setting and enter.

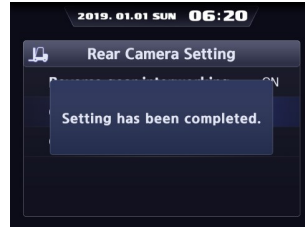
3. Reverse gear interworking



70D9V3KY70

Select ON or OFF.

4. Completion



70D9V3KY71

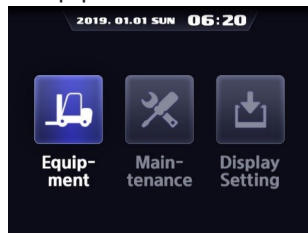
Setting has been completed.



35D9VB3KY98

⑥ FingerTips Setting (option)

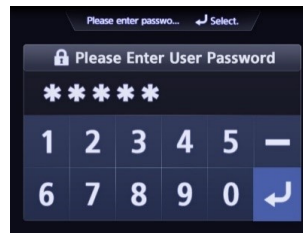
1. Equipment



35D9VB3KY47

Enter to Equipment.

2. Password



35D9VB3KY51

Enter the password

3. FingerTips Setting



70D9V3KY72

Choose FingerTips Setting and enter.

a. Lever Position Setting

1. Lever Position Setting



70D9V3KY73

Choose Lever Position Setting and Enter

2. Setting



70D9V3KY74

Set minimum and maximum value.

b. Lever Dead Zone Setting

1. Lever Dead Zone Setting



70D9V3KY75

Choose Lever Dead Zone Setting and enter.

2. Setting

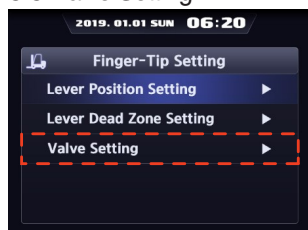


70D9V3KY76

Set lever dead zone range.

c. Valve setting

3-3. Valve Setting



70D9V3KY77

Choose Valve Setting and enter.

4. Lift Section Valve



70D9V3KY78

In the Valve Setting, you can set the lift, tilt, AUX1, or AUX2 section valves

5. Setting.

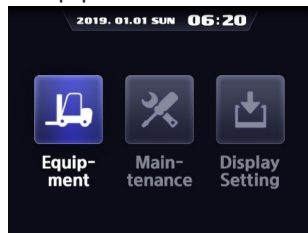


70D9V3KY79

For each valve value, you can adjust the current value and time on the above screen

⑦ CSC (Curve Speed Control) Setting (if installed)

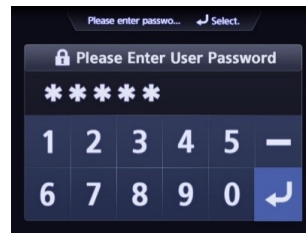
1. Equipment



35D9VB3KY47

Enter to Equipment.

2. Password



35D9VB3KY51

Enter the password

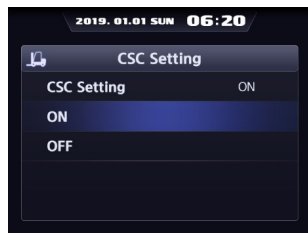
3. CSC Setting



70D9V3KY80

Choose CSC setting and enter.

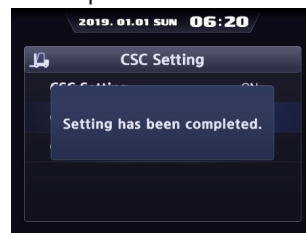
4. Select



70D9V3KY81

Select ON or OFF.

5. Completion



70D9V3KY82

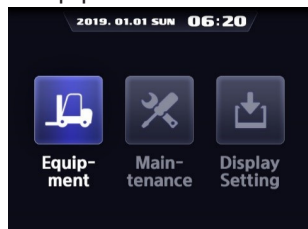
Setting has been completed.

⑧ Auto Shift Setting (if installed)

Enable to turn the function ON or OFF or change the shift speed.

a. Mode Select

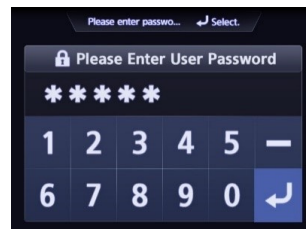
1. Equipment



35D9VB3KY47

Enter to Equipment.

2. Password



35D9VB3KY51

Enter the password

3. Auto Shift Setting



70D9V3KY83

Choose Auto Shift setting and enter.

4. Mode Select



70D9V3KY84

Choose Mode Select.

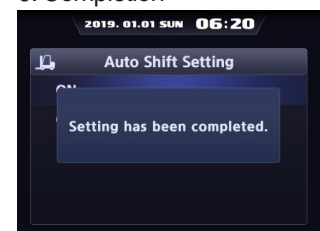
5. Select



70D9V3KY85

Select ON or OFF.

6. Completion



70D9V3KY86

Setting has been completed.

b. Speed Setting

- In case of 1st gear → 2nd gear, it is possible to set up to 7 ~ 10 km/h.
- In case of 2nd gear → 1st gear, it is possible to set up to 4 ~ 5 km/h.

※ Depending on the model, the function can be turned on/off only by an external switch.

3-2. Speed Setting



70D9V3KY87

Choose Speed Setting and enter.

4. Adjustment



70D9V3KY88

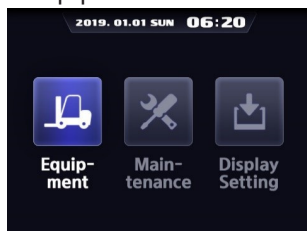
Change the speed value after selecting the shift point that needs to be changed

⑨ DCSR (Direction Change Shock Relief) setting (if installed)

- Set the mode ON. Below is how this feature functions.
- If you are driving at over the block drive speed and then change gear from forward to reverse (or reverse to forward), the gear stays as neutral until the truck reaches the restore drive speed.
- The truck changes direction and starts to travel.

※ Restore drive speed can not be set over the block drive speed.

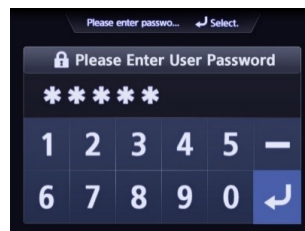
1. Equipment



35D9VB3KY47

Enter to Equipment.

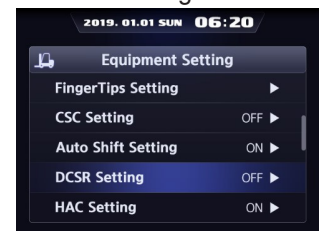
2. Password



35D9VB3KY51

Enter the password

3. DCSR Setting



70D9V3KY89

Choose DCSR setting and enter.

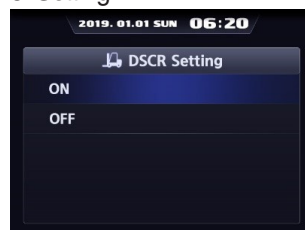
4. Mode Select



35D9VB3KY108

Select Mode Select.

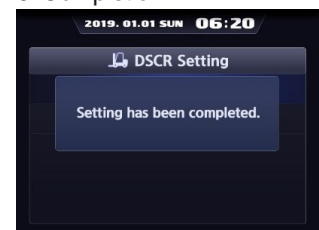
5. Setting



35D9VB3KY109

Select ON or OFF.

6. Completion



35D9VB3KY110

Setting has been completed.

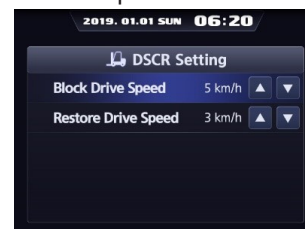
7. Speed Setting



35D9VB3KY111

If you want to change speed setting, enter Speed Setting.

8. Drive Speed



35D9VB3KY112

Change speed.

⑩ HAC (Hill Assist Control) Setting (if installed)

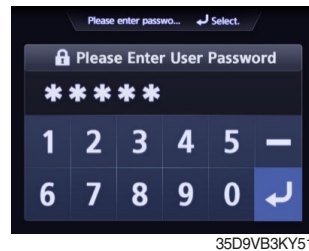
If you are trying to drive in stop status on the hill, the truck does not move backward when the HAC setting is ON.

1. Equipment



Enter to Equipment.

2. Password



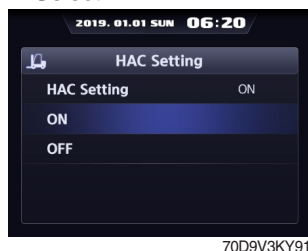
Enter the password

3. HAC Setting



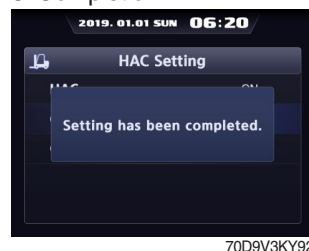
Choose DCSR setting and enter.

4. Select



Select ON or OFF.

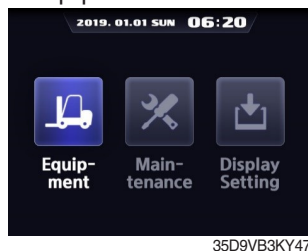
5. Completion



Setting has been completed.

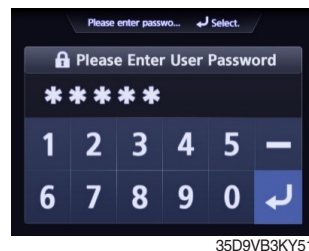
⑪ Vehicle Max Speed Limit

1. Equipment



Enter to Equipment.

2. Password



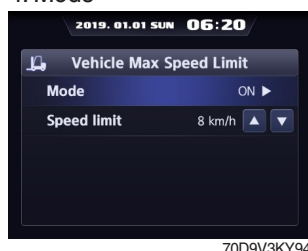
Enter the password

3. Vehicle Max Speed Limit



Choose Vehicle Max Speed Limit and enter.

4. Mode



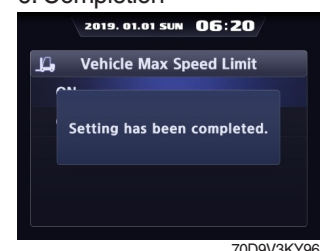
Enter to Mode.

5. Select



Select ON or OFF.

6. Completion



Setting has been completed.

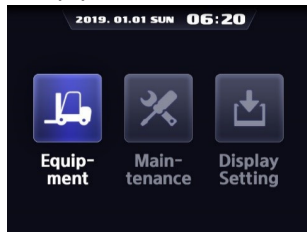
· Limit speed : 10 km/h



The truck does not exceed the limit speed.

⑫ Zero Start Setting (if installed)

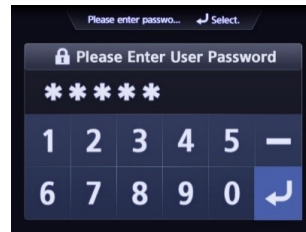
1. Equipment



35D9VB3KY47

Enter to Equipment.

2. Password



35D9VB3KY51

Enter the password

3. Zero Start Setting



70D9V3KY98

Choose Zero Start Setting and enter.

4. Select Sensitivity



100D9V3KY99

Select Sensitivity and press the enter.

5. Setting Sensitivity



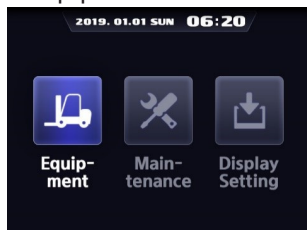
100D9V3KY10

Change value using up/down button and press the enter

※ Default Sensitivity is 0.4% and it can be changed to maximum 4.8%

⑬ Clutch Protection Beep (if installed)

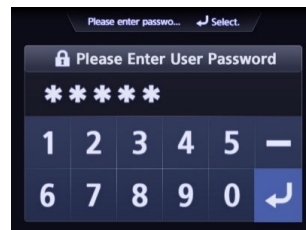
1. Equipment



35D9VB3KY47

Enter to Equipment.

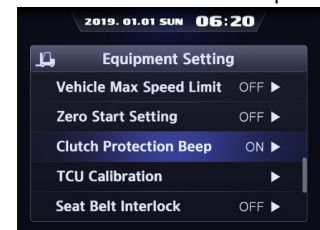
2. Password



35D9VB3KY51

Enter the password

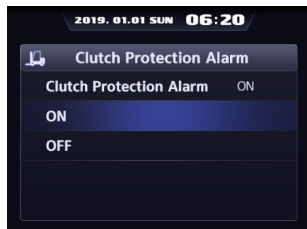
3. Clutch Protection Beep



70D9V3KY101

Choose Clutch Protection Beep and enter.

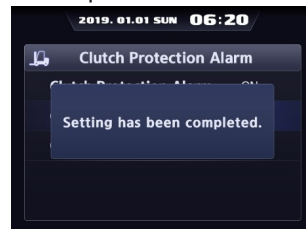
4. Select



70D9V3KY102

Select ON or OFF.

5. Completion



70D9V3KY103

Setting has been completed.

⑭ ZF TCU Calibration

Enable to calibrate the inching and clutch of the transmission.

※ Depending on the model, the initial conditions for calibration may be different or the procedure may be automatically skipped.

a. Inching Calibration

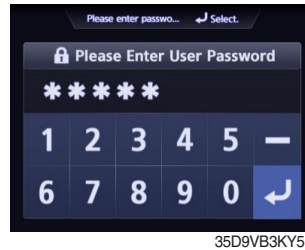
1. Equipment



35D9VB3KY47

Enter to Equipment.

2. Password



35D9VB3KY51

Enter the password

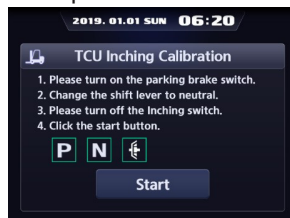
3. ZF TCU Calibration



70D9V3KY127

Choose ZF TCU Calibration and enter.

4. Prepare for Calibration



70D9V3KY128

Before starting calibration, turn on the parking switch, the gear neutral, and the inching switch off.

5. Calibration 1



70D9V3KY129

Fully press the inching pedal.

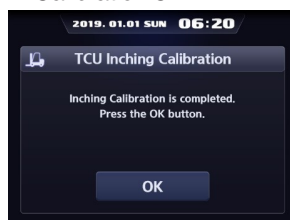
6. Calibration 2



70D9V3KY130

Take your foot off the inching pedal.

7. Calibration 3



70D9V3KY131

Confirm the completion of calibration and press the ESC button or OK button to exit to the menu

b. Clutch Calibration

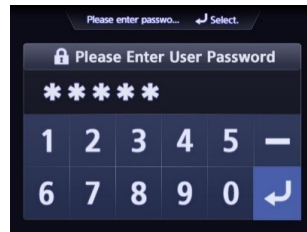
2-1. ZF TCU Calibration



70D9V3KY127

Choose ZF TCU Calibration and enter.

2. Password



35D9VB3KY51

Enter the password

3. ZF TCU Calibration



70D9V3KY127

Choose ZF TCU Calibration and enter.

4. Prepare for Calibration



70D9V3KY185A

Before starting calibration, must be satisfied with 5 conditions.

※ Conditions

- 1) Engine RPM 800 to 1100
- 2) T/M temperature 60°C to 90°C
- 3) Truck speed 0 km/h (stop)
- 4) Gear neutral
- 5) Parking switch ON

5. Calibration 1



70D9V3KY186

Wait until the next button is ON.

6. Calibration 1



70D9V3KY187

Enter the next button.

7. Calibration 2



70D9V3KY188

Confirm the completion of calibration and press the ESC button or OK button to exit to the menu

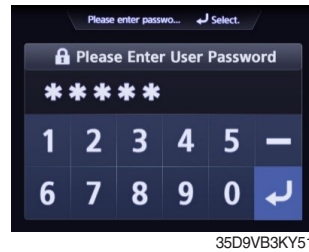
⑮ Seat Belt Interlock (option)

1. Equipment



Enter to Equipment.

2. Password



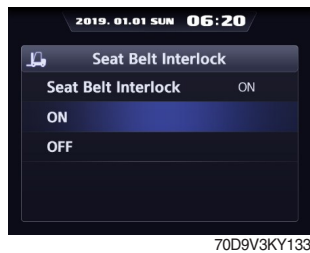
Enter the password (applied master password)

3. Seat Belt Interlock



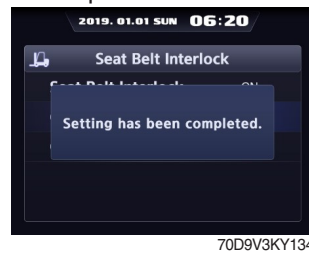
Choose Seat Belt Interlock and enter.

4. Select



Select ON or OFF.

5. Completion



Setting has been completed.

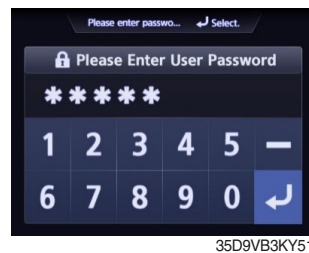
⑯ Cluster-CI

1. Equipment



Enter to Equipment.

2. Password



Enter the password

3. Version



Choose Version and enter.

4. Cluster-CI



Choose Cluster-CI and enter.

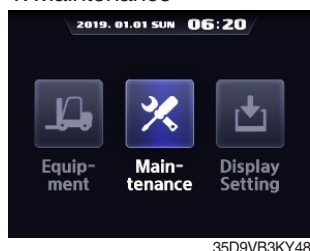
5. Check Version



(2) Maintenance

① Failure History

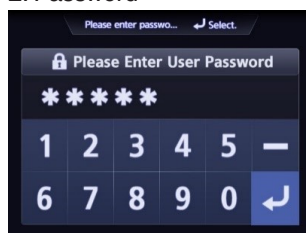
1. Maintenance



35D9VB3KY48

Enter to Maintenance.

2. Password



35D9VB3KY51

Enter the password

3. Failure History



70D9V3KY138

Choose Failure History and enter.

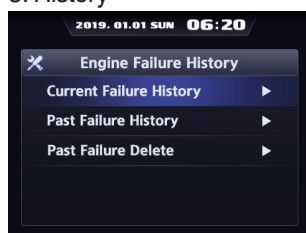
4. Engine or Transmission



70D9V3KY139

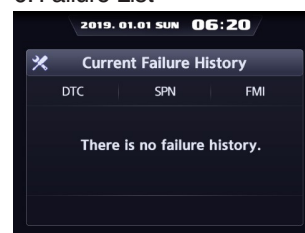
Choose what needs to check.

5. History



70D9V3KY140

6. Failure List



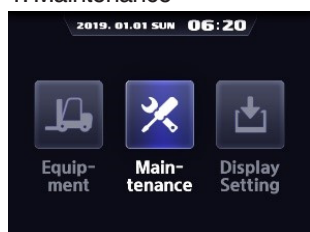
70D9V3KY141

② Consumables Management

- If the consumables replacement cycle has been passed, alarm will be displayed as ON.
- Press the 'Consumables replacement' if replaced the consumables.
- Information about recent replacement (maximum 9) will be displayed.
- If you want to change the cycle, please press the 'Change' button.

※ Refer to the operating manual page 7-12 about periodic replacement parts.

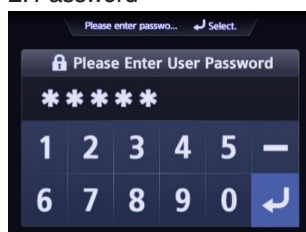
1. Maintenance



35D9VB3KY48

Enter to Maintenance.

2. Password



35D9VB3KY51

Enter the password

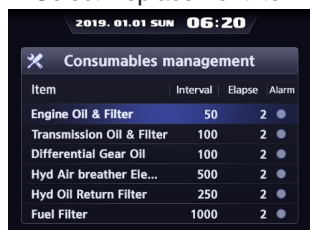
3. Consumables Management



70D9V3KY142

Choose Consumables Management and enter.

4. Select Replacement Item



70D9V3KY143

Select the replaced item.

5. Replacement History



70D9V3KY144

Select Replacement History.

6. Check.



70D9V3KY145

Check history.

7. Replacement



70D9V3KY146

Select Replacement.

8. Confirm



70D9V3KY147

Press enter button.

9. Change



70D9V3KY148

Select Change.

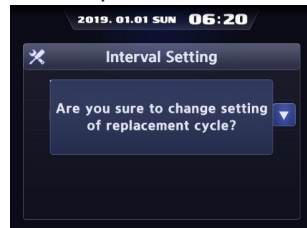
10. Setting Cycle



70D9V3KY149

Change properly the interval.

11. Completion

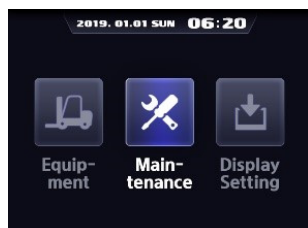


70D9V3KY150

Setting has been completed.

③ I/O Information

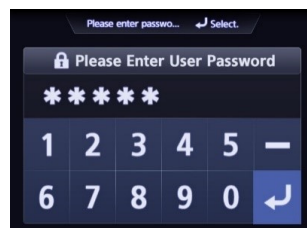
1. Maintenance



35D9VB3KY48

Enter to Maintenance.

2. Password



35D9VB3KY51

Enter the password

3. I/O Information



70D9V3KY151

Choose I/O Information and enter.

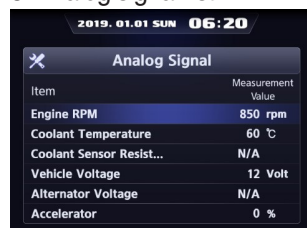
4. Analog signal



35D9VB3KY139

Enter to Analog Signal.

5. Analog signal list



70D9V3KY152

Check the analog signal list.

6. Digital signal



35D9VB3KY141

Enter to Digital Signal

7. Digital signal list



70D9V3KY153

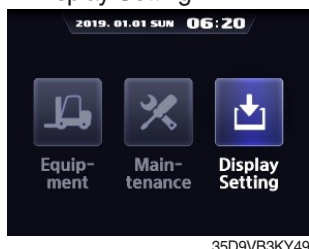
Check the digital signal list.

(3) Display setting

① LCD Brightness Adjustment

- LCD brightness has two options. (Automatic and Manual modes)
- Manual mode always keeps the selected brightness.
- Brightness : Daytime 100%, Nighttime 50%
- Daytime/Nighttime time zone : 06 ~ 18

1. Display Setting



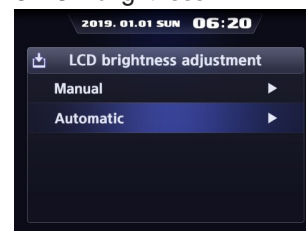
Enter to Display Setting.

2. LCD Brightness Adjustment



Choose LCD Brightness Adjustment and enter.

3. LCD brightness



Select Manual or Automatic.

4. LCD Brightness (Day/Night)



Set day and night brightness in the manual mode.

5. LCD Brightness

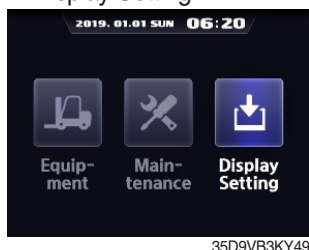


Set LCD brightness in the manual mode.

② User Setting

Enable to set time, unit, and language.

1. Display Setting

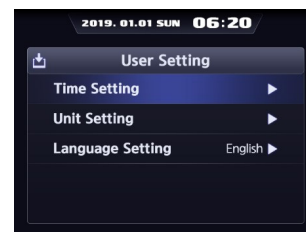


Enter to Display Setting.

2. User Setting



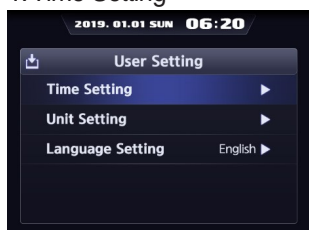
Choose User Setting and enter.



Select Time Setting.

a. Time Setting

1. Time Setting



Select Time Setting.

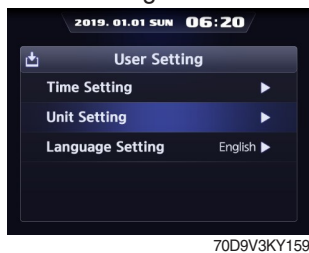
2. Setting



Set time.

b. Unit Setting

1. Unit Setting



70D9V3KY159

Select Unit Setting.

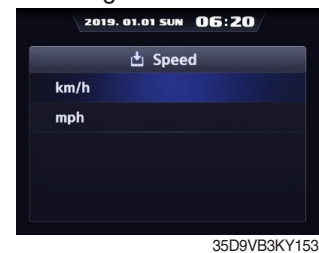
2. Unit Setting List



35D9VB3KY152

Enable to set the unit of speed, weight, temperature and pressure.

3. Setting

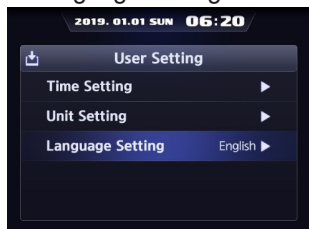


35D9VB3KY153

Set unit.

c. Language Setting

1. Language Setting



70D9V3KY160

Select Language Setting.

2. Setting

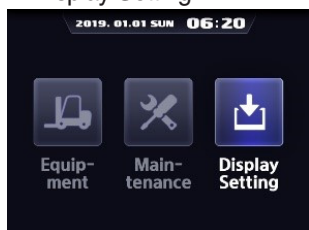


70D9V3KY161

Choose a language.

③ A/S Phone No.

1. Display Setting



35D9VB3KY49

Enter to Display Setting.

2. A/S Phone No.



70D9V3KY162

Choose A/S Phone No. and enter.

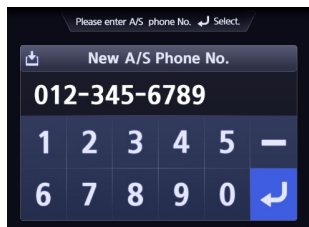
3. Change



70D9V3KY163

Select phone number if you want to change.

4. New A/S Phone No.



70D9V3KY164

Enter new phone number using up or down buttons and press the enter button.

5. Finish



70D9V3KY165

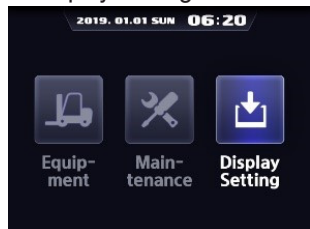
Contact will be displayed as the modified number.

④ Password Change.

- This function is to allow to change password from default password to user defined password.
- Password length must be 5~10 digits.

※ Since, if you forget the password, you must request the A/S, do not forget the password.

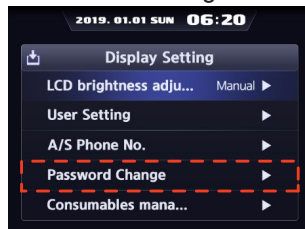
1. Display Setting



35D9VB3KY49

Enter to Display Setting.

2. Password Change



70D9V3KY166

Choose Password Change and enter.

3. User Password Change

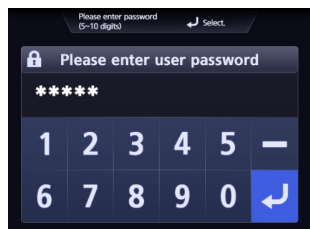


70D9V3KY167

Select User Password Change.

a. User Password Change

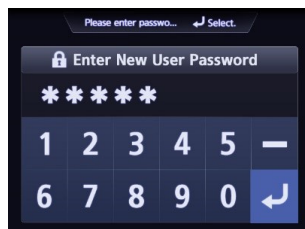
1. Current User Password



70D9V3KY168

Enter the current user passwr.

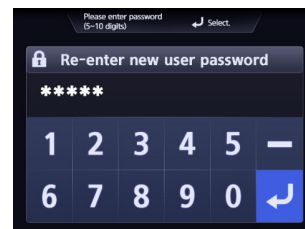
2. New User Password



35D9VB3KY144

Enter a new user password.

3. Re-enter

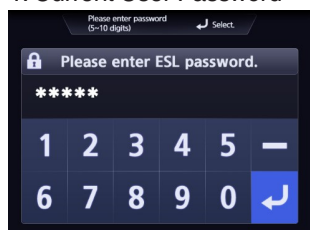


70D9V3KY169

Enter a new user password again.

b. ESL Password Change

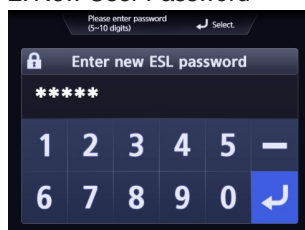
1. Current User Password



70D9V3KY166

Enter the current user password.

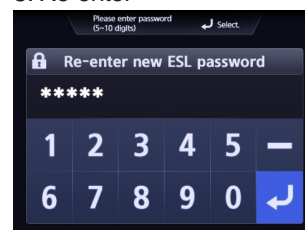
2. New User Password



70D9V3KY167

Enter a new user password.

3. Re-enter



70D9V3KY168

Enter a new user password again.

⑤ Consumables Management

1. Display Setting



35D9VB3KY49

Enter to Display Setting.

2. Conusmables Management



70D9V3KY174

Choose Consumables Management and enter.

3. List



70D9V3KY143

8) CAUSES AND CORRECTION OF CLUSTER WARNING LAMP

No.	Warning lamp types	Symbol	Warning and indicator lamp	Causes and correction
1	Engine oil pressure warning		Engine oil pressure warning lamp	Engine oil pressure is low. Please fill the engine oil
2	Engine warm-up indicator		Engine warm-up indicator lamp	Warm-up will be started.
3	Air cleaner warning		Air cleaner warning lamp	Replace the air cleaner filter.
4	Water in fuel warning		Water in fuel warning lamp	Please drain the water of the fuel filter.
5	Engine check warning		Engine check warning lamp	Check the failure code of cluster.
6	Engine stop warning		Engine stop warning lamp	Check the failure code of cluster.
7	Exhaust system cleaning warning		Exhaust system cleaning warning lamp	Exhaust system cleaning is required
8	Exhaust system cleaning inhibit warning		Exhaust system cleaning inhibit warning lamp	Exhaust system cleaning is inhibited
9	HEST warning		HEST warning lamp	High exhaust system temperature will be started.
10	Fuel warmer indicator		Fuel warmer indicator lamp	Warming up the fuel.
11	Transmission oil temperature warning		Transmission oil temperature warning lamp	T/M oil is over temperature condition. 110 °C (230 °F) or higher : Amber 120 °C (248 °F) or higher : Red
12	Parking brake indicator		Parking brake indicator lamp	Parking brake is the operational status.

No.	Warning lamp types	Symbol	Warning and indicator lamp	Causes and correction
13	Battery charging warning		Battery charging warning lamp	Battery is not being charged. Please check alternator and wiring.
14	Tilt lock indicator (if installed)		Tilt lock indicator lamp	Auto-leveling is the operational status.
15	OPSS indicator		OPSS indicator lamp	OPSS is working : Driving, lifting, and tilting is locked or the truck is parked status.
16	Fuel level warning		Fuel level warning lamp	Fuel level is low. Please fill the fuel.
17	Coolant temperature warning		Engine coolant temperature warning lamp	Engine coolant is over temperature condition.
18	Clutch protection warning		Clutch protection warning lamp	Clutch protection warning operation
19	Consumables replacement indicator		Consumables replacement indicator lamp	Consumables replacement cycle has been passed.
20	LH Turn indicator		LH Turning indicator lamp	-
21	RH Turn indicator		RH Turning indicator lamp	-
22	Forward gear		Forward gear, 1 gear, 2 gear, and 3 gear indicator lamp	-
23	Reverse gear		Reverse gear, 1 gear, 2 gear, and 3 gear indicator lamp	-
24	Communication error warning (ECU)		Communication error warning lamp	Communication between cluster-CI and ECU has been failed. Check communication line.
25	Communication error warning (FSCU)		Communication error warning lamp	Communication between cluster-CI and FSCU has been failed. Check communication line.
26	DEF low warning		DEF low warning lamp	DEF level is low. Please fill the DEF.
27	Brake fail warning		Brake fail warning lamp	Stop the engine and check for its cause.
28	Side mirror heated indicator		Side mirror heated pilot lamp	Side mirror heated operation
29	Seat belt reminder		Seat belt reminder lamp	Please wear seat belt

GROUP 4 COMPONENT SPECIFICATION

No	Part name	Qty	Specification												
1	Battery	2	24 V × 80 AH RC : 190 min CCA : 850 A												
2	LED work lamp	2	12~24 V, 20~27 W												
3	License lamp (opt)	1	24 V, 5 W												
4	LED rear combination lamp	2	24 V, LED (turn signal, tail, stop)												
5	LED head and turn lamp	2	24 V, 26 W (high and low), 18 W (low) 24 V, 2.4 W (turn)												
6	Room lamp	1	24 V, 10 W												
7	LED beacon lamp (opt)	1	12~24 V, Max. 0.96 A												
8	Radio and USB player	1	12~32 V, 20 W × 2												
9	Cluster	1	12 V / 24 V												
10	Rear view camera	1	6~32 V, 1.4 W												
11	12V socket	1	12 V, 10 A												
12	Relay (5P)	7	24 V, 20 A												
13	Flasher unit	1	24 V, 85 ± 10 C/M, (23 W + 23 W) × 2 + 3 W × 2												
14	Back buzzer	1	24 V, 90 ± 5 dB, 60 ± 10 C/M, 300 mA												
15	Warning buzzer	1	24 V, 85 ± 5 dB, 120 ± 20 C/M, 50 mA												
16	Horn	1	24 V, 100~115 dB, 3.5A												
17	Intermittent wiper relay	1	9~16 V, 2.5 A (rated), operating time : 4.5 ± 1 sec												
18	Fuel level sender	1	<table border="1"> <tr> <td>Float indicator</td><td>Empty</td><td>7/14</td><td>Full</td></tr> <tr> <td>Resistance (Ω)</td><td>EC</td><td>350</td><td>50</td></tr> <tr> <td>Tolerance (Ω)</td><td colspan="3">$\pm (R \times 1.5 \% + 1 \Omega)$</td></tr> </table>	Float indicator	Empty	7/14	Full	Resistance (Ω)	EC	350	50	Tolerance (Ω)	$\pm (R \times 1.5 \% + 1 \Omega)$		
Float indicator	Empty	7/14	Full												
Resistance (Ω)	EC	350	50												
Tolerance (Ω)	$\pm (R \times 1.5 \% + 1 \Omega)$														
19	Start switch	1	24 V, 60 A												
20	Parking brake switch	1	24 V, 20 A												
21	Main light switch	1	24 V, 15 A												
22	Auto shift switch	1	24 V, 20 A												
23	Power switch	1	24 V, 20 A												
24	Inhching switch	1	24 V, 20 A												
25	In/decrement switch	1	24 V, 20 A												
26	Rear wiper and washer switch	1	24 V, 20 A												
27	Exhaust system cleaning switch	1	24 V, 20 A												
28	Rear work lamp switch (opt)	1	24 V, 20 A												
29	Hazard switch (opt)	1	24 V, 20 A												
30	Top wiper/washer switch (opt)	1	24 V, 20 A												
31	Multi function switch	1	24 V, 2 A												
32	Gear selector switch	1	24 V, 3.5 A												
33	Master switch (opt)	1	6~36 V, 180 A												
34	Cabin tilt switch	1	24 V, 20 A												

GROUP 5 CONNECTOR DESTINATION

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-3	KET	1	I/conn (frame-main harness)	-	MG650943-5
CN-4	AMP/KET	3	I/conn (frame-main harness)	MG642292	MG652290
CN-6	AMP	15	Aircon harness	2-85262-1	-
CN-7	-	4	Fuel heater	-	-
CN-12	AMP	26	I/conn (main-safety harness)	1897009-2	1897013-2
CN-13	AMP	42	I/conn (main-frame harness)	936421	936429
CN-13	KET	12	I/conn (main-safety harness)	MG610346	MG640348
CN-14	AMP	42	I/conn (frame-main harness)	936421	936429
CN-15	RINGTERM	-	ECM earth	-	-
CN-16	KET	8	I/conn (frame-main harness)	MG610339	-
CN-17	AMP	3	I/conn (frame harness-load sensor)	174357-2	174359-2
CN-19	KET	2	Outpu check	MG610320	MG642552
CN-21	DEUTSCH	8	Front wiper	DT06-8S	-
CN-23	-	2	Speaker (LH)	MG610070	-
CN-24	-	2	Speaker (RH)	MG610070	-
CN-25	MOLEX	2	Horn	35825-0211	-
CN-27	-	16	Radio and USB player	PK145-16017	-
CN-29	-	2	Receiver dryer	MG640795	-
CN-30	KUM	1	Aircon compressor	PB625-01027	-
CN-31	AMP	15	I/conn (main-aircon harness)	2-85262-1	-
CN-37	QPL	-	Fuse box main assy	21HN-55010	-
CN-37	-	4	Fingertip-gear selector	-	-
CN-45	HCE	1	Start motor (B+)	S820-308000	-
CN-50A	AMP	46	TCU	1-2112231-1	-
CN-50B	AMP	21	TCU	1-1534127-1	-
CN-56	MOLEX	73	Cluster CI	34566-0103	-
CN-57A	MOLEX	4	Monitor power	-	52213-0417
CN-57B	MOLEX	4	Monitor sig	-	52266-0417
CN-57C	MOLEX	2	Monitor trigger	-	52266-0211
CN-58A	DAEDONG	3	User authentication power	110-3PR	-
CN-58B	DAEDONG	2	User authentication CAN	110-2PR	-
CN-65	KET	1	Backup buzzer	ST730018-3	ST750036-2
CN-70	-	4	Top wiper motor	180900	-
CN-71	KET	2	Pakring solenoid	MG610320	-
CN-71	DEUTSCH	6	Seat switch	DT06-6S	21HN-52080
CN-83	-	2	Condenser fan	PB625-02027	-
CN-90	AMP	36	I/conn (main-cabin harness)	1743059-2	1743062-2
CN-91	AMP	6	I/conn (main-monitor harness)	174262-2	174264-2

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-92	AMP	6	I/conn (monitor-main harness)	174262-2	174264-2
CN-98	DEUTSCH	3	Resistor	DT06-3S-EP06	DT04-3S-EP10
CN-102	-	4	Rear wiper motor	180900	-
CN-113	KET	2	Warning buzzer	MG610320	-
CN-125	-	1	ORBCOMM	-	TNC-C-58
CN-125	DEUTSCH/-	12/1	I/conn (cabin harness-RMCU)	DT06-12S	TNJ-C-58
CN-125	-	1	I/conn (cabin harness-GPS)	-	SMA-C-316R/V
CN-130	AMP	6	I/conn (Main-gear selector harness)	174262-2	174264-2
CN-131	KET	2	Attach cut solenoid	MG610320	-
CN-134	MOLEX	16	Diagnosis	51115-1601	-
CN-135	DEUTSCH	9	ECU service	HD10-9-1939P	-
CN-136	AMP	4	RMCU service	174257-2	-
CN-138	KET	3	Converter	MG610045	-
CN-139	KET	2	Socket (12 V)	MG610043	-
CN-144	AMP	6	Accel pedal	174262-2	-
CN-147	KET	2	Cabin tilt relay switch	MG640188-4	-
CN-151	AMP	96	Engine	-	-
CN-155	DEUTSCH	2	Pump EPPR valve	DT06-2S	DT04-2P
CN-180	AMP	2	KV solenoid	12162198	-
CN-181	AMP	2	KR solenoid	12162198	-
CN-182	AMP	2	KD solenoid	12162198	-
CN-183	AMP	2	KE solenoid	12162198	-
CN-184	AMP	2	KC solenoid	12162198	-
CN-191	AMP	4	I/conn (frame harness-G sensor)	174257-2	174259-2
CN-202	KET	2	Washer pump-top	MG640605	-
CN-202	KET	2	Washer pump-rear	MG640605	-
CN-229	AMP	2	USB charger	172684-2	-
CN-249	-	4	Rear view camera	174257-2	174259-2
CN-251	-	1	RMS antenna (ORBCOMM)	FME J1505-58	-
CN-251	-	1	RMS antenna (GPS)	-	FME P1505-316
CN-252	-	1	RMS antenna (ORBCOMM)	TNJ-C-58	TNC-C-58
CN-253	-	1	RMS antenna (GPS)	SMJ-C-316R/V	SMA-C-316R/V
CN-412	AMP	6	I/conn (armrest-main harness)	174262-2	174264-2
CN-413	AMP	6	I/conn (main-armrest harness)	174262-2	174264-2
CN-417	AMP	8	I/conn (main-MCV finger tip harness)	174982-2	174984-2
CN-930	KET	20	HVAC ext harness	MG614119	-
CN-935	KET	16	HVAC ext harness	MG614120	-
CN-940	AMP	13	HVAC ext harness	-	172508-1
CN-945	AMP	17	HVAC ext harness	-	172509-1

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
· Switch					
CS-2	KET	2	Start switch	MG610281	MG620282
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	KET	1	Center horn	-	S820-105000
CS-10	CARLING	10	Fuel warmer switch	21HN-56300	-
CS-11	KET	8	Multi function switch	MG610339	-
CS-12	KET	6	Multi function switch	MG610335	-
CS-13	DEUTSCH	18	Gear selector switch	DT16-18SA-K004	-
CS-15	KET	1	Multi function switch	ST730018-3	-
CS-17	CARLING	10	Parking brake switch	21HN-56300	-
CS-21	CARLING	10	Work lamp switch	21HN-56300	-
CS-39	CARLING	10	Main light switch	21HN-56300	-
CS-41	CARLING	10	Hazard switch	21HN-56300	-
CS-42	CARLING	10	Inching switch	21HN-56300	-
CS-59	CARLING	10	Auto shift switch	21HN-56300	-
CS-64	CARLING	10	In/decrement switch	21HN-56300	-
CS-74	DEUTSCH	4	Tilt switch	-	DT04-4P
CS-74	CARLING	10	Mirror heater switch	21HN-56300	-
CS-77	CARLING	10	Cabin tilt switch	21HN-56300	-
CS-79	CARLING	10	Power/standard switch	21HN-56300	-
CS-100	CARLING	10	Regen & inhibit switch	21HN-56300	-
CS-103	CARLING	10	Top wiper/washer switch	21HN-56300	-
· Lamp					
CL-1	-	2	Room lamp (LH)	MG610392	-
CL-3	-	6	Head lamp (LH)	HP285-06021	-
CL-4	-	6	Head lamp (RH)	HP285-06021	-
CL-7	-	2	Beacon lamp	DT06-2S	DT04-2P
CL-15A	AMP	4	Turn/Stop/Tail lamp (black)	184050-1	-
CL-15B	AMP	4	Backup/Stop/Tail lamp (gray)	184050-2	-
CL-16A	AMP	4	Turn/Stop/Tail lamp (black)	184050-1	-
CL-16B	AMP	4	Backup/Stop/Tail lamp (gray)	184050-2	-
CL-21	KET	1	License lamp	ST730018-3	ST750036-2
CL-22	-	2	Rear work lamp (LH)	DT06-2S	-
CL-23	-	2	Rear work lamp (RH)	DT06-2S	-
CL-51	-	2	Room lamp (RH)	MG610392	-
· Relay					
CR-6	KET	4	INT wiper relay	MG610047	-
CR-11	TYCO	3	Flsru unit relay	21LM-01600	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CR-15	-	5	Neutral signal relay	-	-
CR-24	FCI	6	Glow controller relay	F162210	-
CR-34	HELLA	5	Travel cut relay	8JA003526-001	-
CR-35	HELLA	5	Back up relay	8JA003526-001	-
CR-44	AMP	2	Cabin tilt relay coil relay	174352-2	-
CR-51	HELLA	5	Attach cut relay	8JA003526-001	-
CR-58	HELLA	5	DPF supply module relay	8JA003526-001	-
CR-59	HELLA	5	DPF sensor relay	8JA003526-001	-
CR-71	HELLA	5	Cab tilt safety relay	8JA003526-001	-
CR-72	HELLA	5	Mirror heater relay	8JA003526-001	-
· Sensor and pressure switch					
CD-2	KET	3	Fuel sender	MG610045	-
CD-3	DEUTSCH	3	Brake fail pressure switch	DT06-3S	-
CD-4	AMP	1	Brake switch	171809-2	-
CD-5	DEUTSCH	4	Hydraulic pressure and temperature sensor	DT06-4S	-
CD-6	DEUTSCH	4	G-sensor	DT06-4S	-
CD-10	KET	1	Air cleaner switch	ST730057-2	-
CD-17	AMP	2	Speed pickup-engine	1-1418483-1	-
CD-25	AMP	2	Filter switch	282080-1	-
CD-26	DEUTSCH	3	Parking switch (PS1)	DT06-3S	-
CD-27	AMP	2	Speed pickup-turbine	1-1418483-1	-
CD-29	AMP	2	Sump temperature sensor	963040-3	-
CD-38	AMP	3	Water in fuel sensor	-	936292-2
CD-39	AMP	2	Speed pickup-internal	1-1418483-1	-
CD-40	AMP	2	Speed output	1-1418483-1	-
CD-40	DEUTSCH	4	Fingertip-Lift	-	-
CD-41	DEUTSCH	4	Fingertip-Tilt	-	-
CD-42	DEUTSCH	4	Fingertip-Aux 1	-	-
CD-43	DEUTSCH	4	Fingertip-Aux 2	-	-
CD-60	AMP	2	Thermo switch	282080-1	-
CD-70	DEUTSCH	3	Load sensor	DT06-3S	-
CD-71	DELPHI	6	Inching sensor	12110293	-
CD-91	AMP	2	After temperature sensor	963040-3	-
CD-102	DEUTSCH	4	TBAP sensor	-	-
JC-1	KET	14	Joint connector	MG610754	-
JC-1	AMP	36	Joint connector	-	1743062-2
· MCV (fingertip, option)					
CN-60	AMP	35	Valve controller unit	776164-1	-
CN-61	-	35	Sub controller	-	-
CN-98	DEUTSCH/QPL	3	Resistor	DT06-3S-EP06	DT04-3P

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-155	KET	6	Diagnosis connector	MG610335	MG642554
CN-M1	DEUTSCH	2	Lift down	963040-3	-
CN-M2	DEUTSCH	2	Lift up	963040-3	-
CN-M3	DEUTSCH	2	Tilt out	963040-3	-
CN-M4	DEUTSCH	2	Tilt in	963040-3	-
CN-M5	DEUTSCH	2	Aux 1 in	963040-3	-
CN-M6	DEUTSCH	2	Aux 1 out	963040-3	-
CN-M7	DEUTSCH	2	Aux 2 in	963040-3	-
CN-M8	DEUTSCH	2	Aux 2 out	963040-3	-

GROUP 6 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 engine is stopped (with starting switch left in "ON" position).	· Caution lamp defective. · Caution lamp switch defective.	· Replace · Replace