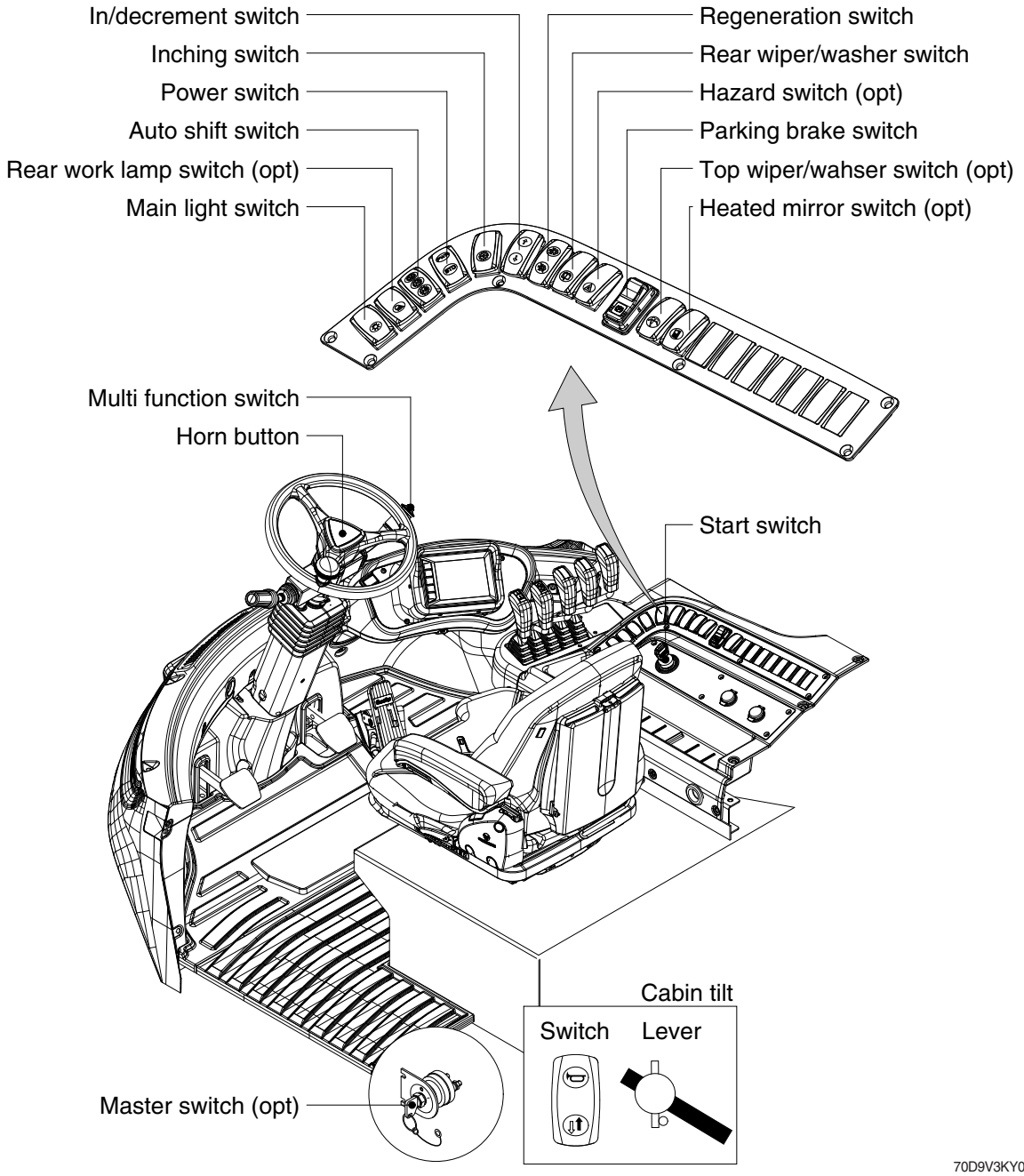
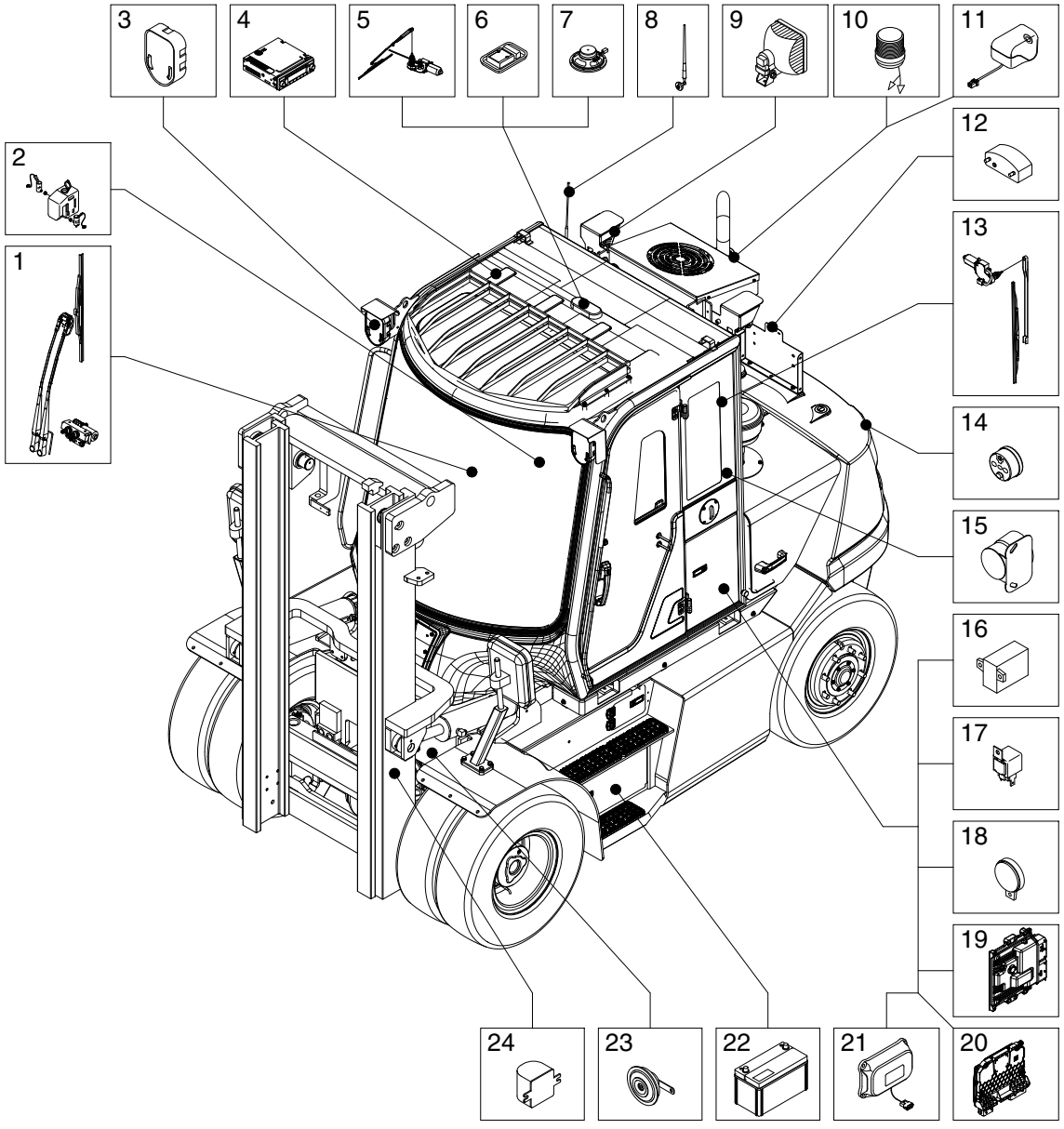
SECTION 7 ELECTRICAL SYSTEM

GROUP 1 COMPONENT LOCATION

1. LOCATION 1



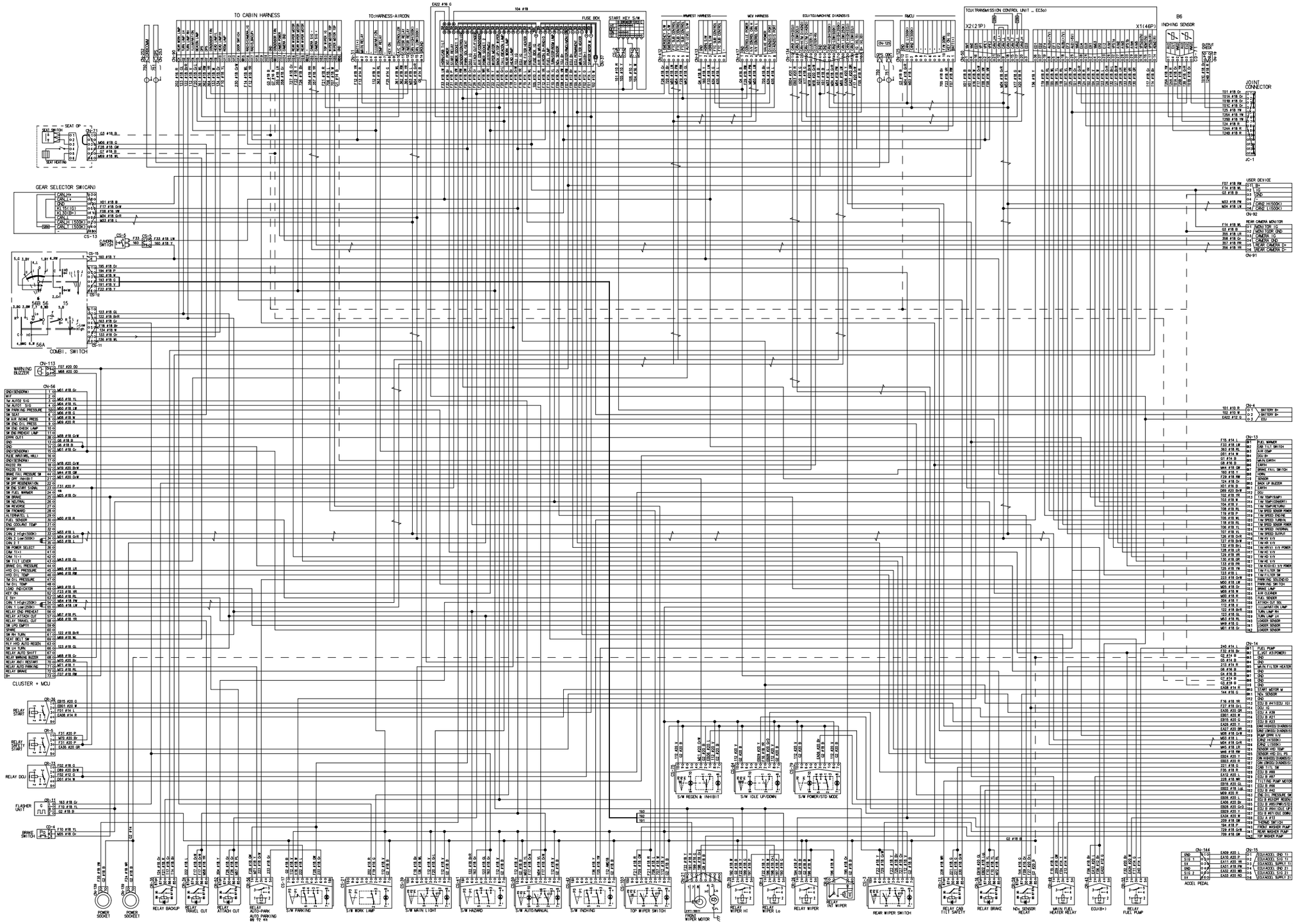
2. LOCATION 2



70D9V7ES01

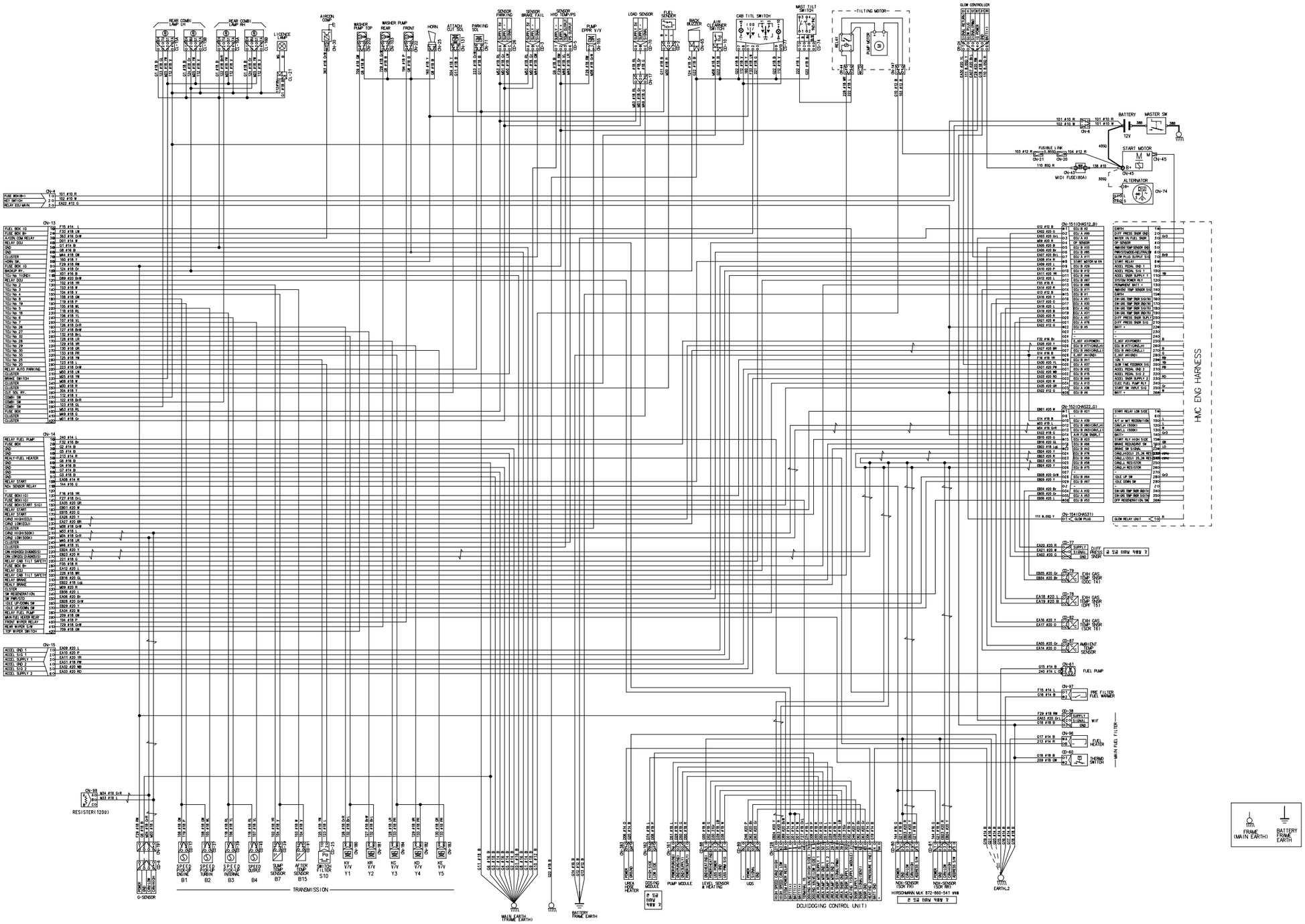
1	Wiper assembly	9	Work lamp	17	Flasher unit
2	Washer reservoir tank	10	Beacon lamp	18	Warning buzzer
3	Head and turn signal lamp	11	Camera (opt)	19	ECU
4	Radio and USB player	12	License lamp (opt)	20	TCU
5	Top wiper assembly (opt)	13	Rear wiper assembly	21	RMCU (opt)
6	Room lamp switch	14	Rear combination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

· ELECTRICAL CIRCUIT (1/3, DASHBOARD)



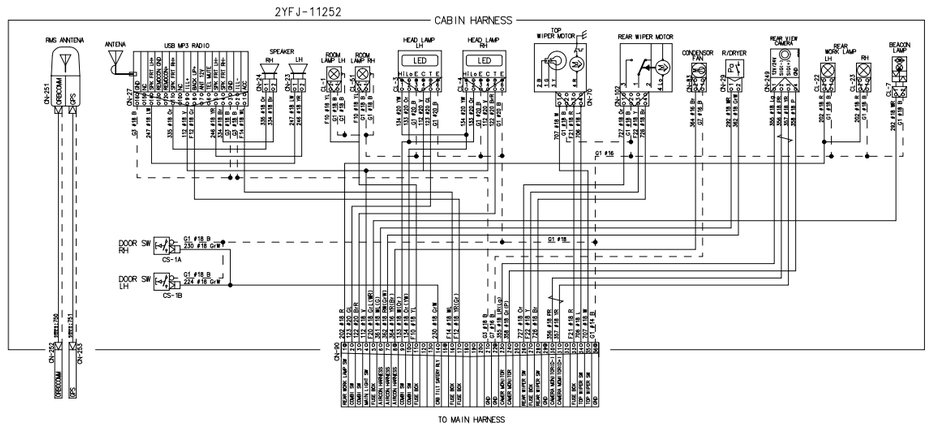
2YFJ-11013-00 1OF3

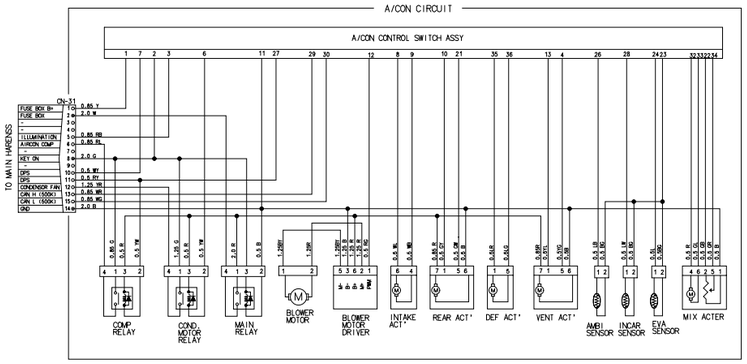
· ELECTRICAL CIRCUIT (2/3, FRAME)

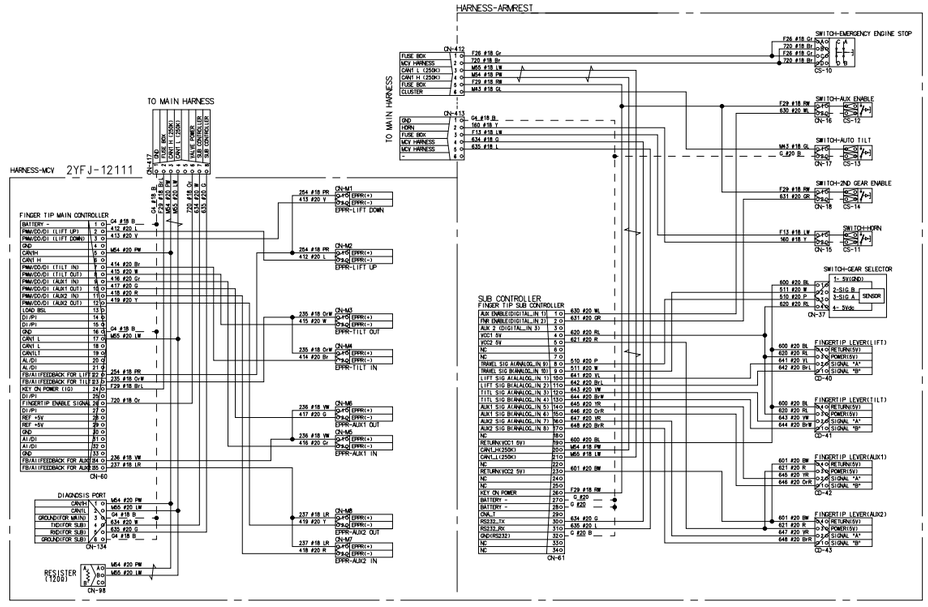


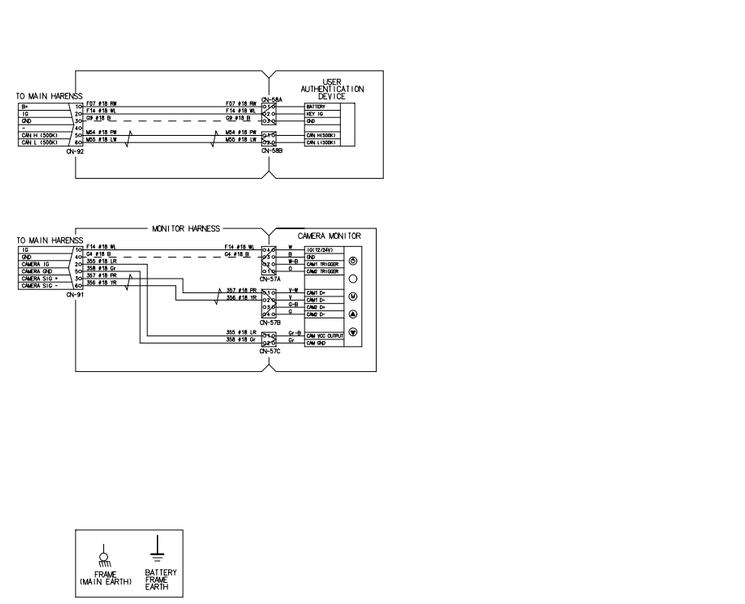
2YFJ-11013-00 2OF3

· ELECTRICAL CIRCUIT (3/3, CABIN WITH AIRCON)









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

Battery(+) → Start motor [CN-45 (B+)] → Fusible link [CN-20, CN-21] → Tilting motor [CN-147]
→ Midi fuse [CN-43] → Glow controller [CR-24 (6)]
→ Alternator [CN-74 (B+)]

Battery(+) → I/conn [CN-6 (1)] → I/conn [CN-4 (1)] → Start key switch [CS-2 (1)]
→ I/conn [CN-6 (2)] → I/conn [CN-4 (2)] → Fuse box [CN-37]
→ [No. 1] → [No. 36 → 33] → C/horn switch [CS-5 (1)]
→ I/conn [CN-413 (3)] → Horn switch [CN-15 (1)]
→ I/conn [CN-13 (2)] → Cabin tilt switch [CS-77 (2)]
→ [No. 2] → DCU relay [CR-73 (1, 3)]
→ [No. 4] → Main fuel heater relay [CR-49 (3)]
→ [No. 5] → Diagnosis port [CN-134 (16)]
→ I/conn [CN-14 (28)] → I/conn [CN-151 (13)] → Engine harness
→ [No. 7] → RMCU [CN-125 (1)]
→ Warning buzzer [CN-113 (2)]
→ Cluster [CN-56 (73)]
→ User device [CN-92 (1)]
→ [No. 8] → Gear selector switch [CS-13 (11)]
→ TCU [CN-50 (2, 5)]
→ [No. 9] → NOx sensor relay [CR-59 (30)]
→ [No. 10] → I/conn [CN-90 (11)] → Room lamp RH/H [CL-51 (2), CL-1 (2)]
→ Flasher unit [CR-11 (B)]
→ Brake switch [CD-4]
→ Brake relay [CR-16 (30, 86)]
→ [No. 11] → Fuel pump relay [CR-55 (3)]
→ [No. 12] → I/conn [CN-90 (17)] → Radio and USB player [CN-27 (8)]
→ Aircon harness [CN-31 (1)]
→ [No. 13] → Aircon harness [CN-31 (2)]

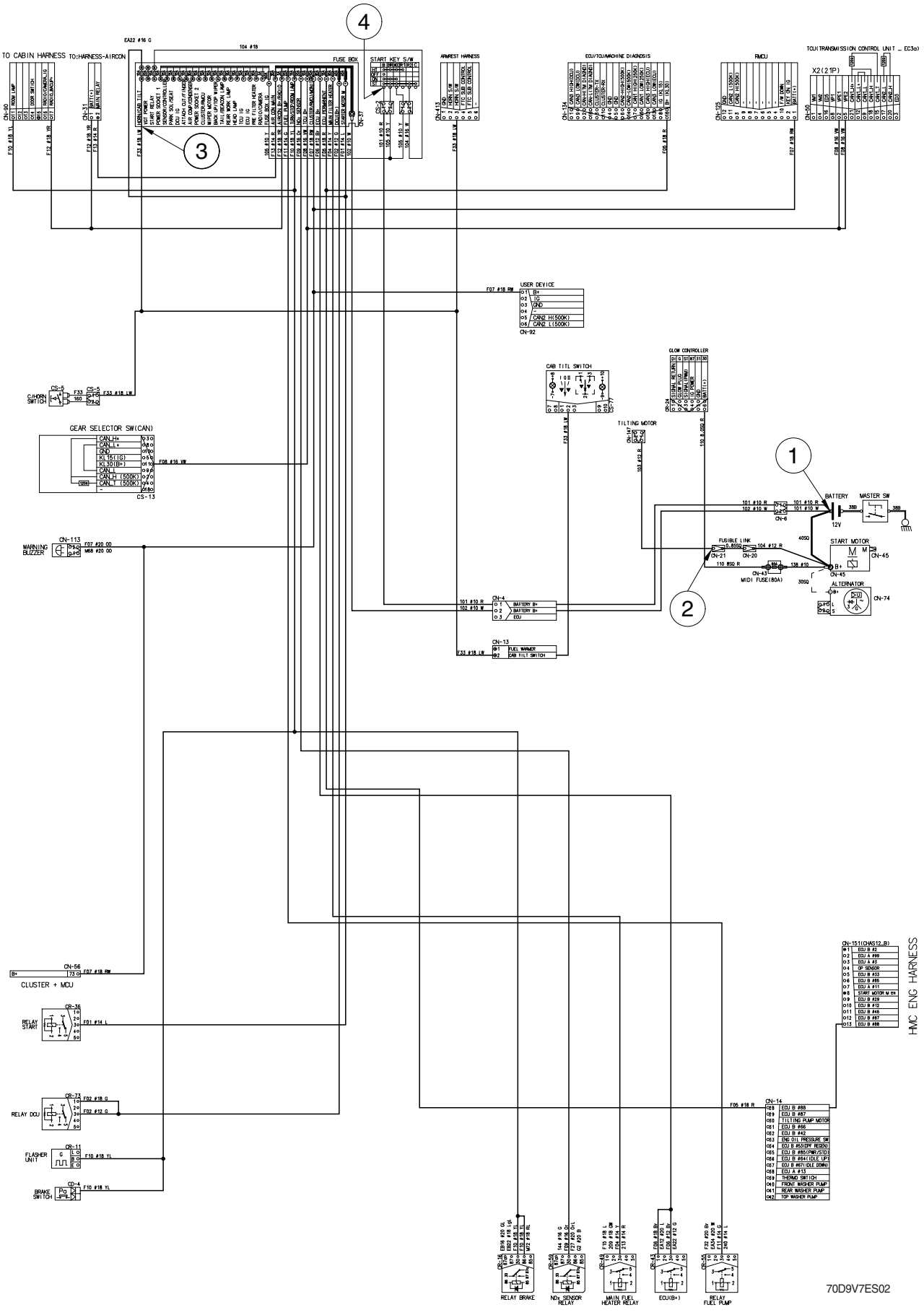
2) CHECK POINT

Engine	Key switch	Check point	Voltage
OFF	OFF	① - GND (Battery (+)) ② - GND (Fusible link) ③ - GND (Fuse No. 33) ④ - GND (Start key)	14V

※ GND : Ground

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

POWER CIRCUIT



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

2. STARTING CIRCUIT

1) OPERATING FLOW

Battery(+) → I/conn [CN-6 (1)] → I/conn [CN-4 (1)] → Start key switch [CS-2 (1)] → Start motor [CN-45 (B+ → M)] → I/conn [CN-151 (8)] → I/conn [CN-14 (10)] → Start relay [CR-36(4)]

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

(1) When start key switch is in ON position

Start switch ON [CS-2 (2)] → 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] → Safety start relay [CR-5 (3) → (4)] → I/conn [CN-14 (5)] → ECU harness [CN-151 (35)], ECU start signal → ECU Harness [CN-152 (1,15)] → I/conn[CN-14 (16,17)] → Start relay [CR-36 (1 → 2)]

Then, Fuse box [No. 1] → Start realy [CR-36 (3 → 4)] →I/conn [CN-14 (10)] → ECU Harness [CN-151 (8)] → Start motor [CN-45 (M)]

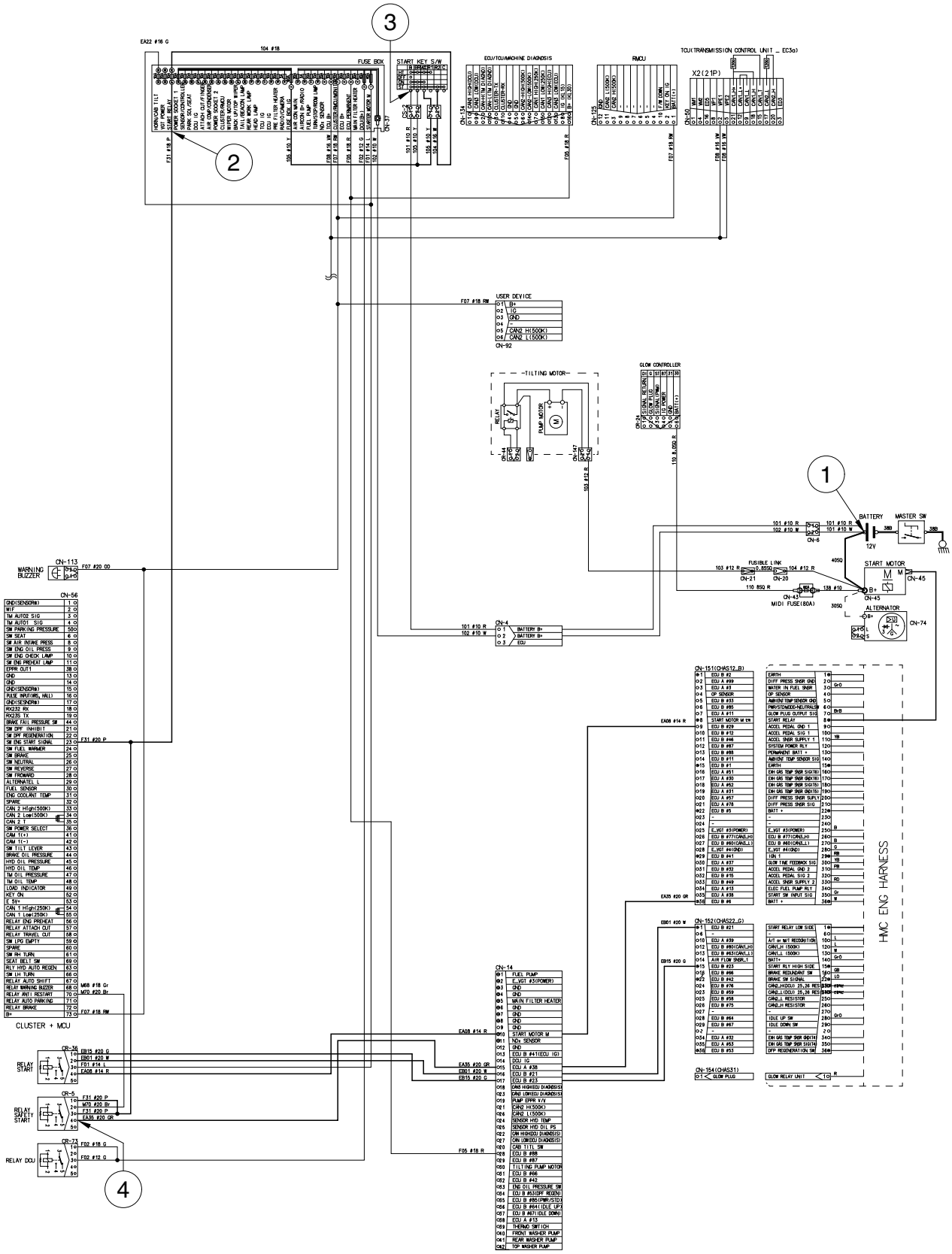
2) CHECK POINT

Engine	Key switch	Check point	Voltage
Running	ON	① - GND (Battery B+) ② - GND (Fuse box No.31) ③ - GND (Start key) ④ - GND (Safety start relay)	12V

※ GND : Ground

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

STARTING CIRCUIT



70D9V7ES03

※ 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 alternator flows into the battery.
The current also flows from alternator to each electrical component through the fusible link (CN-95) and the fuse box.

1) OPERATING FLOW

(1) Warning flow
Cluster charging warning lamp (Via CAN interface)

(2) Charging flow
Alternator [CN-74 (B+)] → Start motor [CN-45 (B+)] → Battery (+) charging

2) CHECK POINT

Engine	Key switch	Check point	Voltage
ON	ON	① - GND (Battery voltage) ② - GND (Alternator B+ terminal) ③ - GND (Start motor B+ terminal)	12V

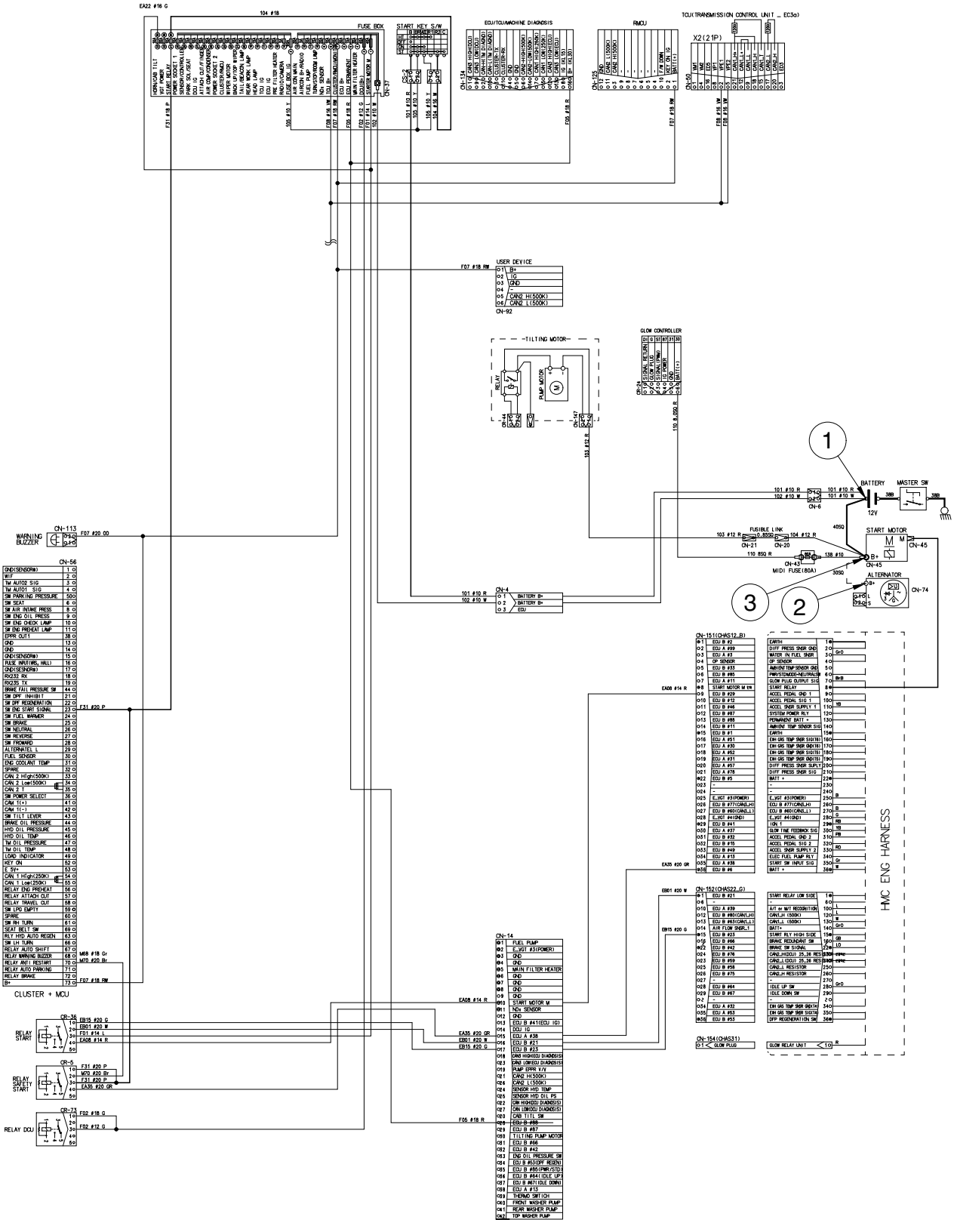
※ GND : Ground

※ 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



70D9V7ES04

※ 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 (+) → Start motor [CN-45 (B+)] → Midi fuse [CN-43] → Glow controller [CR-24 (6)] → Fuse box [No. 4] → Main fuel heater relay [CR-49 (3) → (4)] → I/conn [CN-14 (5)] → Fuel heater [CN-96 (B)]

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

Start switch ON [CS-2 (2)] → I/conn [CN-13 (1)] → Prefilter fuel warmer [CN-97 (1)] → Fuse box [No. 15] → Main fuel heater relay [CR-49 (1) → (2)] → I/conn [CN-14 (39)] → Thermo switch [CD-60 (2)]

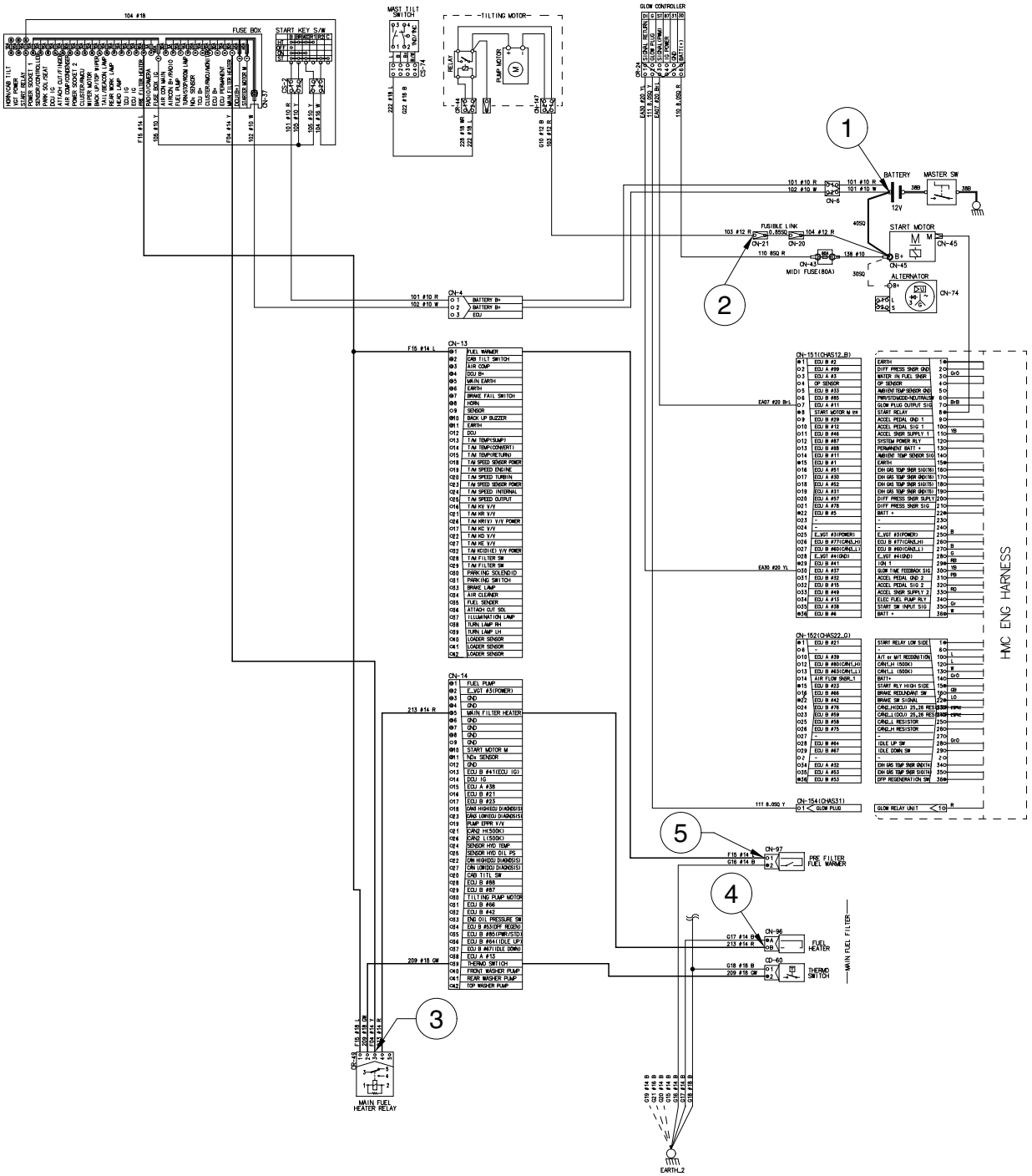
2) CHECK POINT

Engine	Key switch	Check point	Voltage
Stop	HEAT	① - GND (Battery B+) ② - GND (Fusible link) ③ - GND (Main fuel heater relay) ④ - GND (Fuel heater) ⑤ - GND (Prefilter fuel warmer)	12V

※ GND : Ground

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

PREHEATING CIRCUIT



70D9V7ES05

※ 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

Fuse box (No. 18) → Main light switch [CS-39 (6)] → Switch ON, 2nd step [CS-39 (5)] → Multi function switch [CS-11 (8)] → Multi function switch MIDDLE [CS-11(7)] → I/conn [CN-90 (9)]
→ LH Head light low beam ON [CL-3 (2)]
→ RH Head light low beam ON [CL-4 (2)]
→ Multi function switch DOWN [CS-11 (6)] → I/conn [CN-90 (13)]
→ LH Head light high beam ON [CL-3 (1)]
→ RH Head light high beam ON [CL-4 (1)]

(2) Rear work light

Fuse box (No. 19) → Rear work lamp switch [CS-21 (2)] → Switch ON [CS-21 (3)] → I/conn [CN-90 (1)] → LH, RH rear work lamp [CL-22 (2), CL-23 (2)]

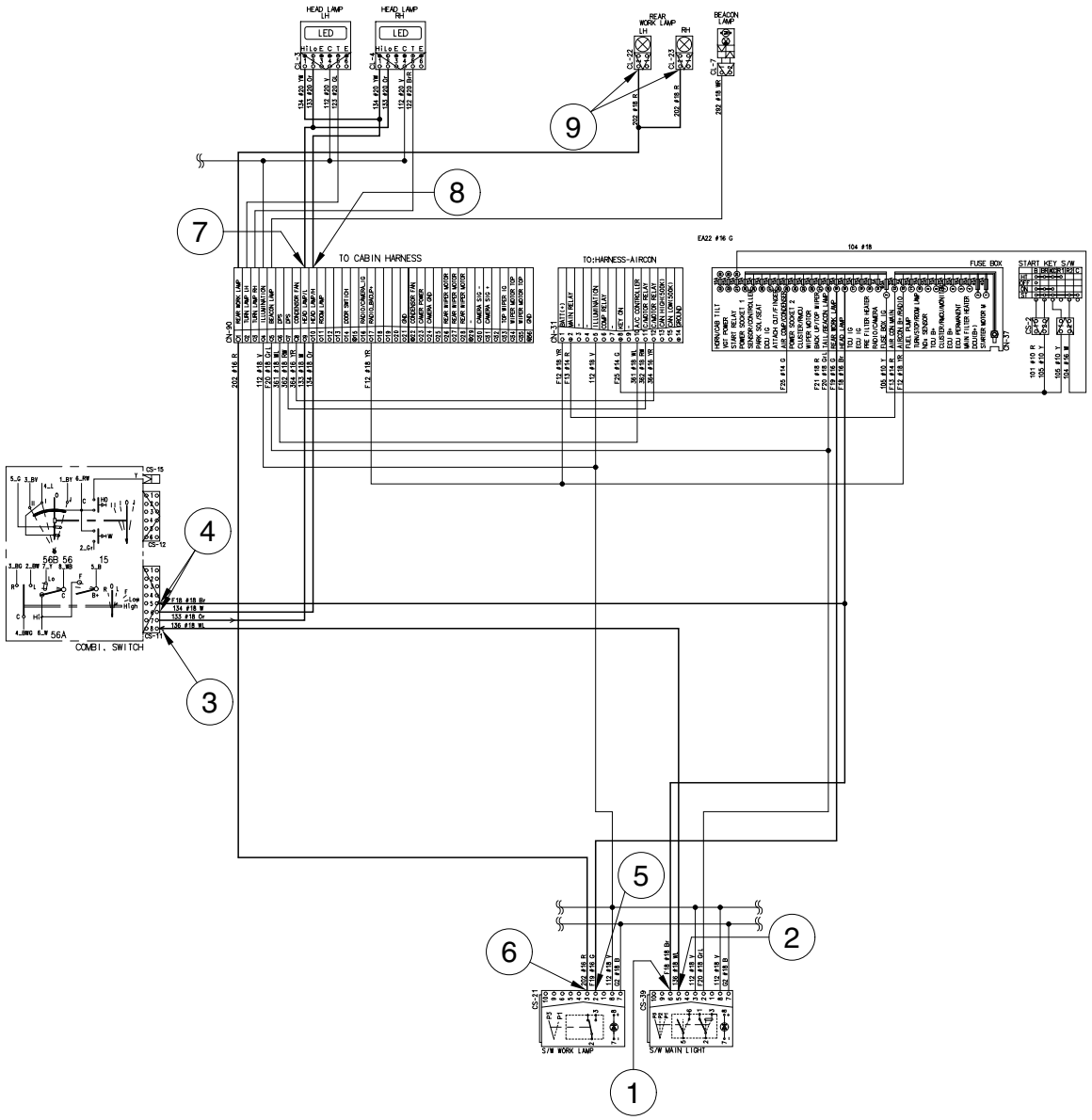
2) CHECK POINT

Engine	Key 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)	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



70D9V7ES06

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

6. WIPER AND WASHER CIRCUIT

1) OPERATING FLOW

Fuse box [No. 22] → Front wiper motor [CN-21 (8)]
→ Wiper relay Hi [CR-39 (3)]
→ Wiper relay Lo [CR-4 (1)]
→ Multi function switch [CS-12 (6)]
→ Rear wiper and washer switch [CS-3 (3, 6)]
→ I/conn [CN-90 (27)] → Rear wiper motor [CN-102 (3)]

Fuse box [No. 21] → Top wiper and washer switch [CS-103 (3, 6)]
→ I/conn [CN-90 (3)] → Top wiper motor [CN-70 (3)]

(1) Front washer switch ON

① Washer switch ON [CS-12 (6) → (2)] → I/conn [CN-14 (40)] → Front washer pump [CN-22 (2)] → Wiper relay [CR-26 (1) → (4)] → Wiper relay Lo [CR-4 (2) → (3)] → Front wiper motor [CN-21 (2)]

(2) Front wiper switch ON

① **INT position**

Wiper switch ON [CS-12 (6) → (1)] → Int wiper relay [CR-6 (3) → (2)] → Wiper relay Lo [CR-4 (2) → (3)] → Front wiper motor [CN-21 (2)] → Front wiper motor intermittently operating

② **Lo position**

Wiper switch ON [CS-12 (6) → (4)] → Wiper relay Lo [CR-4 (5) → (3)] → Front wiper motor [CN-21 (2)] → Front wiper motor operating (low)

③ **Hi position**

Wiper switch ON [CS-12 (6) → (3)] → Wiper relay Hi [CR-39 (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-4 (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 (28)] → 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 (41)] → Rear washer pump [CN-103 (2)] → Washer operating

Wiper switch ON [CS-3 (3) → (2)] → I/conn [CN-90 (28)] → 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-14 (42)] → Top washer pump [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.

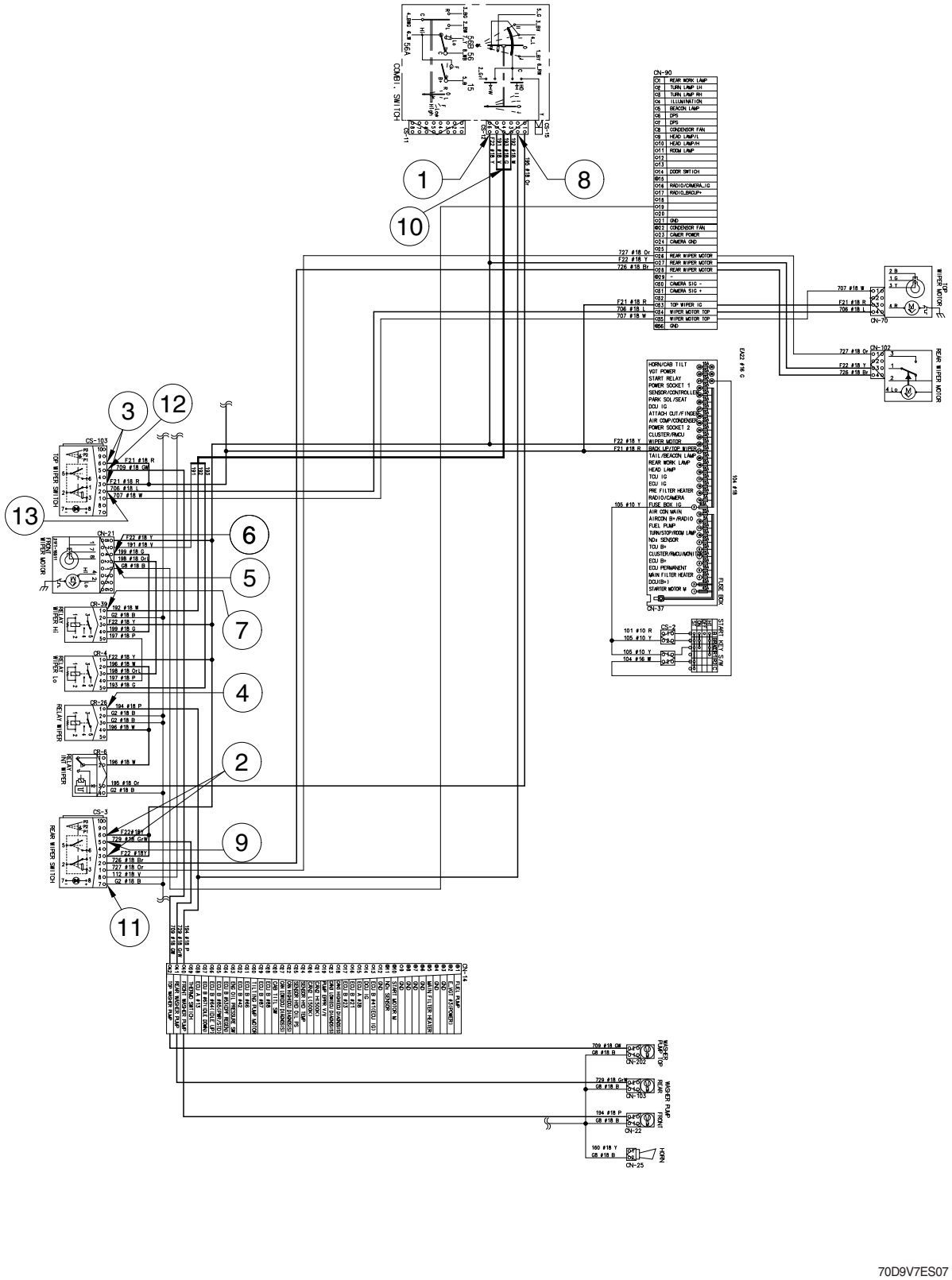
2) CHECK POINT

Engine	Key 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 (Wiper 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)	12 V

※ GND : Ground

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

WIPER AND WASHER CIRCUIT



70D9V7ES07

※ 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 chapter 7. PLANNED MAINTERNACNE 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.

70D9V3KY30

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

(2) Speed meter

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 3-32.**

(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 ℃ (104 ~ 248 °F)
  - Red zone : Over 120 ℃ (248 °F)
  - Warning lamp on : Over 115 ℃ (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

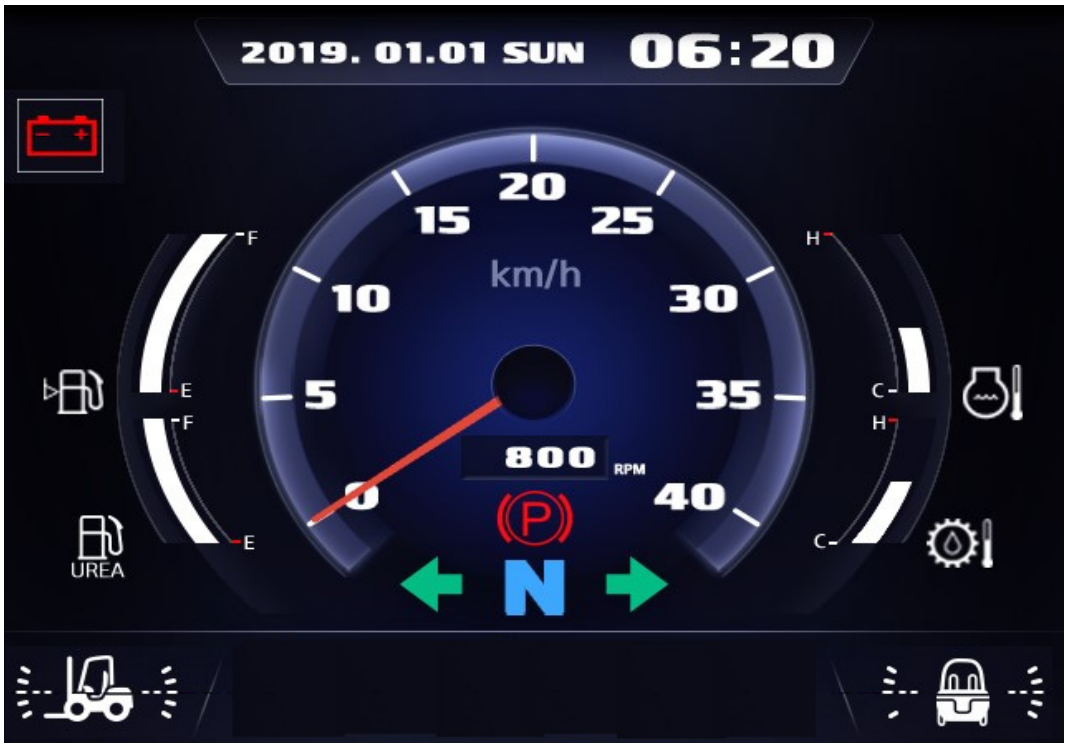
- This range indicates the temperature of transmission oil.
  - White range : 40 ~ 109 ℃ (104 ~ 228 ℉)
  - Amber range : 110 ℃ (230 ℉) or higher
- - Red range : 120 ℃ (248 ℉) or higher
  Keep idling engine at low speed until the indicator is in the operating range.
- If the indicator is in the red range,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

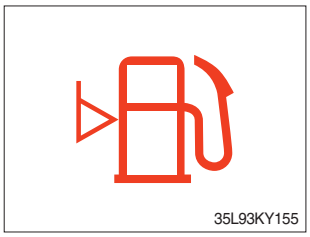


70D9V3KY35

※ 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	11		DPF inhibit warning lamp
2		Coolant temperature warning lamp	12		DPF high temperature warning lamp
3		Engine oil pressure warning lamp	13		Clutch protection warning lamp
4		Air cleaner warning lamp	14		Communication error warning lamp
5		Water in fuel warning lamp	15	UREA	DEF low warning lamp
6	CHECK	Engine check warning lamp	16		Brake fail warning lamp
7		Engine stop warning lamp	17		SCR defect warning lamp
8		Battery charge warning lamp	18		DCU warning lamp
9		Transmission oil temperature warning lamp	19	F F	Fingertip warning lamp
10		DPF regeneration warning lamp	20		Transmission warning lamp

(1) Fuel level warning lamp

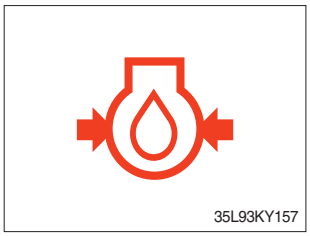


- Warning lamp will be displayed if fuel level is low.
- Please refuel immediately if the lamp is ON.

(2) Coolant temperature warning lamp

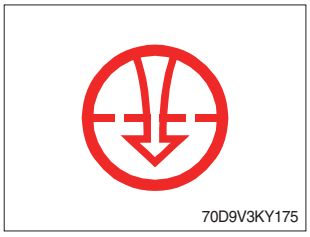
- Coolant temperature warning will be lit up when temperature is over 115 ℃ (239 °F).
- If the warning lamp is on continuously, please inspect the coolant system.

(3) Engine oil pressure warning lamp



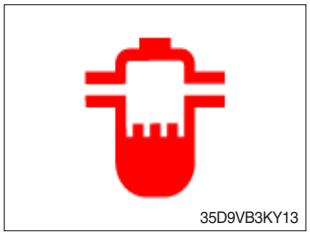
- This warning lamp will be lit up when engine oil pressure is low.
- Stop the engine immediately if the warning lamp is lit up. Please check the engine oil.

(4) Air cleaner warning lamp



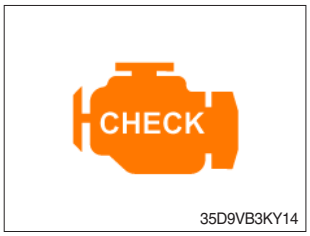
- This warning lamp is lit when air cleaner filter is clogged up.
- Please clean up or replace the filter.

(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

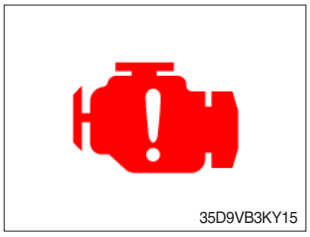


- When the engine is ON, it blinks for about 3 seconds. If the warning light remains on after 3 seconds, there is something wrong with the engine control, fuel supply and so on.
- Check the failure code of cluster.

※ **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.**

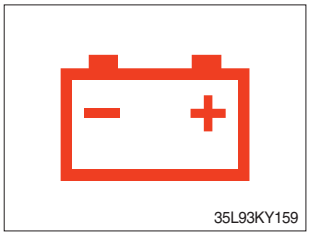
(7) Engine stop warning lamp



- If the lamp lights on, stop the engine immediately and check the engine.

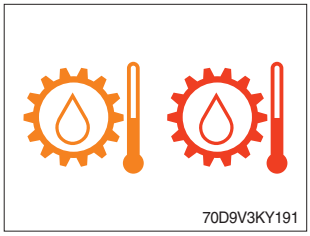
※ **Please contact your Hyundai service center or local dealer.**

(8) Battery charge warning lamp



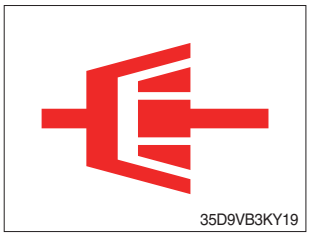
- This warning lamp is lit when battery charging voltage is low.
- Please inspect the battery charging circuit if the warning lamp is lit.

(9) Transmission oil temperature warning lamp



- Transmission oil temperature warning is consisted of two indications.
  - 110 ℃ (230 °F) or higher : Amber is light up
  - 120 ℃ (248 °F) or higher : Red is flashing
- When this lamp light 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) Communication error warning lamp

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

(13) DPF

※ During auto regeneration, it is possible to operate the truck (driving and handling the load).

※ Sufficient automatic regeneration could reduce the frequency of parked regeneration.

① Inhibit regeneration switch : OFF

Level	Warning lamp				Stage of regeneration
	DPF inhibit	DPF regeneration	DPF high temp	Engine check	
Level 0 (No need regeneration)			★On		Regeneration is not required.
Level 1 (Auto regeneration)			★On		Regeneration starts automatically when the PM (particulate matter) level reaches to this level.
Level 2 (Request parked regeneration)		On	★On		ECU requests parked regeneration. Operator needs to follow parked regeneration method. Automatic regeneration does not stop in this level.
Level 3 (Parked regeneration)		On	★On	On	Automatic regeneration stops. Operator had better park the machine and start parked regeneration as soon as possible. During parked regeneration, machine operation is restricted. Engine output will be limited from Level 3.
Level 4 (Regeneration with service tools)		Blink	Blink	Blink	Parked regeneration is impossible. Regeneration is possible with service tools only.

★ : When regenerating

② Inhibit regeneration switch : ON

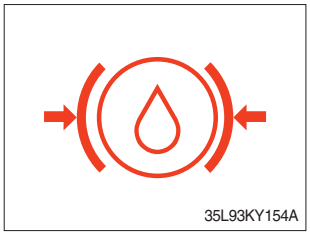
Level	Warning lamp				Stage of regeneration
	DPF inhibit	DPF regeneration	DPF high temp	Engine check	
Level 0 (No need regeneration)	On				Regeneration is not required.
Level 1 (Auto regeneration)	On				Automatic regeneration inhibit.
Level 2 (Request parked regeneration)	On	Blink			ECU requests parked regeneration. Operator needs to follow parked regeneration method. (Automatic regeneration inhibit)
Level 3 (Parked regeneration)	On	Blink		On	Operator had better park the machine and start parked regeneration as soon as possible. During parked regeneration, machine operation is restricted. Engine output will be limited from Level 3.
Level 4 (Regeneration with service tools)	On	Blink		Blink	Parked regeneration is impossible. Regeneration is possible with service tools only.

(14) 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.**

(15) Brake fail warning lamp

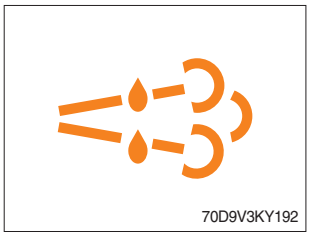


· The lamp lights ON when the oil pressure of service brake drops below the nomal range.

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

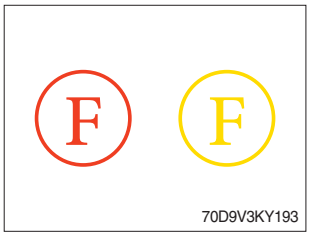
※ **Do not operate untill andy problems are corrected.**

(16) DCU warning lamp



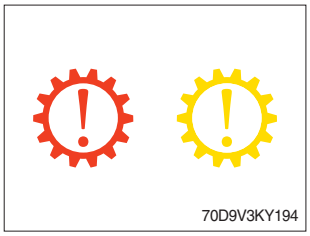
- If the lamp lights ON, check the engine.
- If the warning lights are lit while driving, stop the engine and check the forklift.

(17) Fingertip warning lamp



- If this warning light is lighted, check the finger tips.
- If the warning lights are lit while driving, stop the engine and check the forklift.

(18) Transmission warning lamp



- If this warning light is lighted, check the transmission.
- If the warning lights are lit while driving, stop the engine and check the forklift.

(16) SCR (Selective Catalyitc Reduction) system warning lamp

The urea water system is an exhaust gas reduction system that uses urea to convert the remaining nitrogen oxides (NOx) in the exhaust gas into nitrogen and water. The urea consumption depends on the driving pattern and environment, so it is recommended to supplement it based on the time when the urea shortage warning light is turned on.

① Warning system due to shortage of urea

Setp	Urea residue	Warning lamp		Torque limit
		DEF low	SCR defect	
				
Warning	Less than 12 %	On	Off	X
Warning escalation	Less than 6 %	Blink	Off	X
Low level inducement	Less than 4 %		Blink	O
Severe level inducement	1 % or less			
Deactivation of inducement	12 % or over	Off	Off	X

② Warning system due to defect of SCR system

Setp	EGR valve clogging	Manipulation	Urea consumption deviation	Unsuitable urea	SCR defect warning lamp	Torque limit
						
Warning	Determine and activate defects				On	X
Low level inducement	36 hours after defect		10 hours after defect		Blink	O
Severe level inducement	100 hours after defect		20 hours after defect			
Deactivation of inducement	After 40 hours of repair, it is deactivated. If a defect occurs within 40 hours of engine operation after repair, In the case of low level inducement : Count from time of repair				X	X
	In the case of severe level inducement : Count from 95 hours		In the case of severe level inducement : Count from 18 hours			

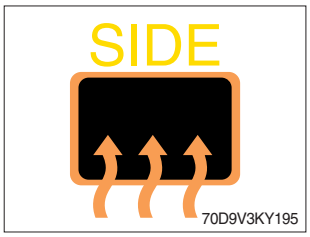
4) INDICATOR LAMPS

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.

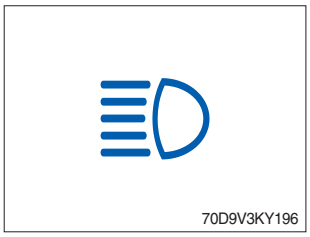
No.	Indicator lamp		No.	Indicator lamp	
1		Consumables management indicator lamp	7	N	Driving indicator lamp
2		Engine warning up indicator lamp	8	F F1 F2 F3	
3		Fuel warmer indicator lamp	9	R R1 R2 R3	
4		Parking brake indicator lamp	10	SIDE	Side mirror heated action indicator lamp
5	TILT LOCK	Tilt lock indicator lamp (if installed)	11		High beam indicator lamp
6	OP SS	OPSS indicator lamp	12	M A A1 A2	Shift mode indicator lamp
7		Driving turn lamp	-	-	-

(9) Side mirror heated action indicator lamp



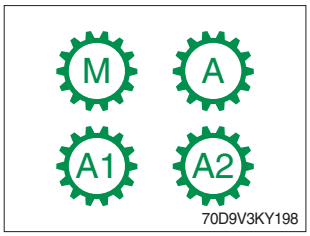
- This indicator is displayed when the heating switch is pressed.
- The heating operation is maintained for 10 minutes and canceled the operation when the switch is pressed again.

(10) High beam indicator lamp



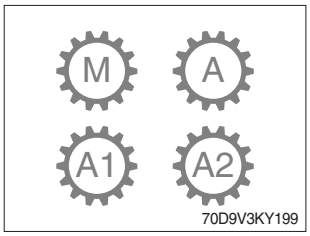
- This indicator is displayed when the vehicle's high beam is on.

(11) 1st shift mode indicator lamp



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

(12) 2nd shift mode indicator lamp



- 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

70D9V3KY41

· Display the real time tilt of mast.

(2) Truck front/rear tilt

35D9VB3KY36

· 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

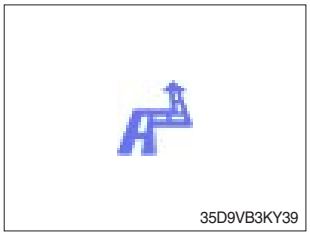
35D9VB3KY37

· 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)

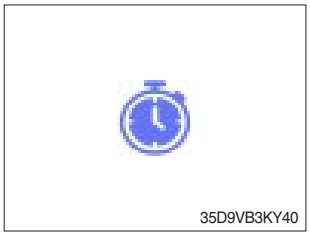
- Display the load weight.
- Screen will display blurry if the weight sensor has not been mounted.

(5) Total trip distance



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

(6) Operation time



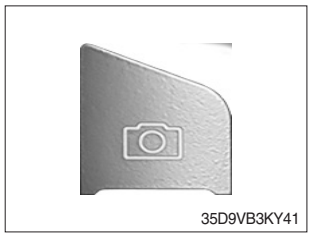
- Display the used time of the truck.

(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.

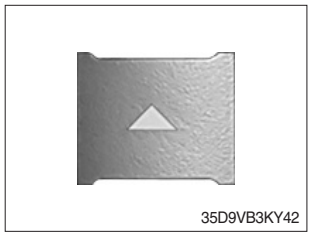
6) BUTTONS

(1) Camera



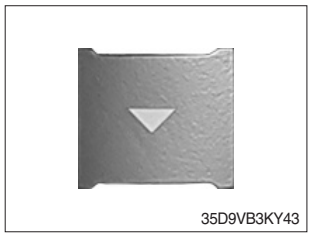
· This switch displays rear camera images. (if the camera is mounted)

(2) UP/Left



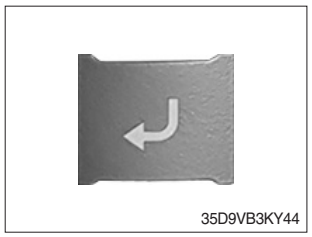
· This switch is used to move upward or leftward in menu or increase the value.

(3) Down/Right



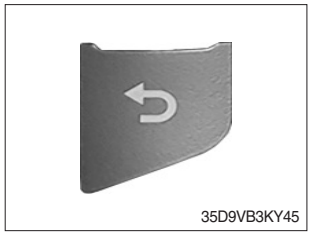
· This switch is used to move downward or rightward in menu or decrease the value.

(4) 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 inforamation	· 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)

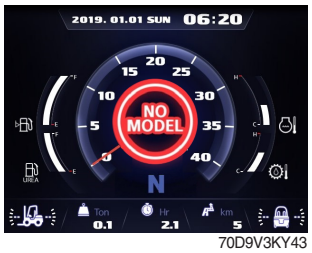
Check under the start switch ON status. Selection will be canceled if press the cancel button.

※ **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



70D9V3KY43

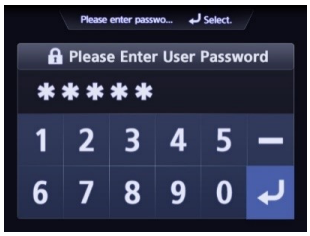
Select the your model.

2. Equipment

35D9VB3KY47

Enter to Equipment.

3. Password



35D9VB3KY51

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

4. Model select

70D9V3KY54

Choose Model Select and enter.

5. Diesel or LPG

35D9VB3KY53

Please select the fuel type.

6. Truck weight

70D9V3KY44

Please select the truck weight level.

7. Truck model

70D9V3KY45

Please select the exact model name.

8. Confirm

70D9V3KY46

Confirm the model which you select.

9. Completion

70D9V3KY47

Model selection is completed.

10. Check

70D9V3KY48

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)

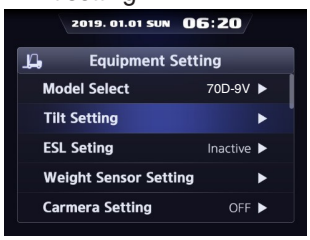
70D9V3KY49

1. Equipment

35D9VB3KY47

Enter to Equipment.

2. Tilt setting



70D9V3KY50

Choose Tilt Setting and enter.

3. Instruction

70D9V3KY51

Follow the instruction showing in the screen.

4. 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 : ±2.3° (1.5 tons ~ 5.0 tons)

· Driving : ±10.2° (1.5 tons ~ 5.0 tons)

d) Left or right truck tilt warning (red)

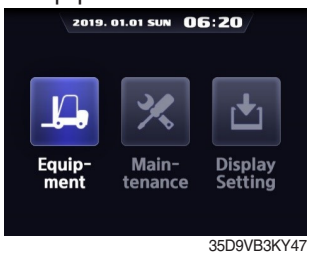
- Stop : ±3.4° (1.5 tons ~ 5.0 tons)
- Driving

Truck weight	Warning angles (red)
1.5 tons ~ 2.0 tons	±20.3°
2.2 tons ~ 3.3 tons	±20.8°
3.5 tons ~ 4.5 tons	±24.2°
5.0 tons ~	±28.0°

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

a. Setting

1. Equipment



35D9VB3KY47

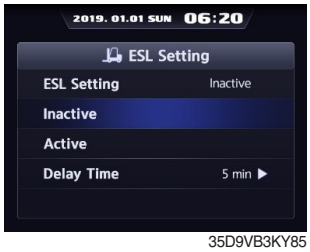
Enter to Equipment.

2. ELS Setting

70D9V3KY55

Choose ESL setting and enter.

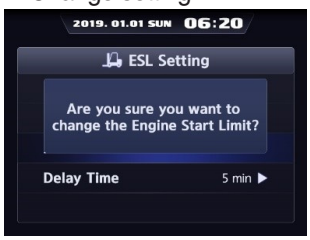
3-1. Inactive



35D9VB3KY85

Choose Inactive.

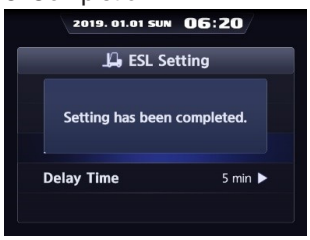
4. Change setting



35D9VB3KY86

If you want to change setting, press enter button.

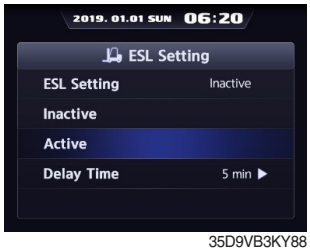
5. Completion



35D9VB3KY87

Setting has been completed.

3-2. Active



35D9VB3KY88

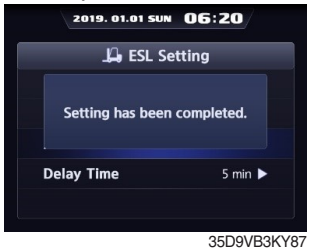
Choose Active.

4. Change setting

35D9VB3KY89

If you want to change setting, press enter button.

5. Completion



35D9VB3KY87

Setting has been completed.

b. Check functions

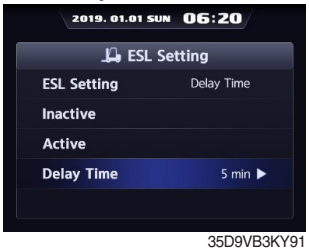
a) The active mode can be set when engine is starting. (cf. inactive mode can change any time.)
b) Upon start switch ON, the password screen pops up and starting is prohibited until the right password has been offered. (But, driver still can start the truck if starts within 10 seconds from start switch OFF)
c) Set the mode as 5 minutes of delay time and start switch OFF.
d) Check if truck can start within 5 minutes and start switch OFF.
e) Check if truck requests password after 5 minutes.

※ **Start switch ON screen (When startup control mode is ON)**

35D9VB3KY90

c. Delay Time

3-3. Delay time



35D9VB3KY91

Choose Delay Time.

4. Select value

35D9VB3KY92

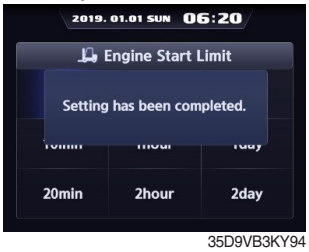
Select value you want to apply.

5. Change setting

35D9VB3KY93

If you are sure to change ESL, press enter.

6. 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

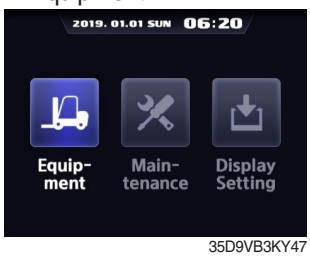
Model	V-mast	TF-mast	TS-mast
70D-9V 80D-9V	113.49	132.73	141.76

· Truck that has not applied the weight sensor

· Truck that has applied the weight sensor (option)

70D9V3KY53

1. Equipment



35D9VB3KY47

Enter to Equipment.

2. Weight Sensor Setting

70D9V3KY56

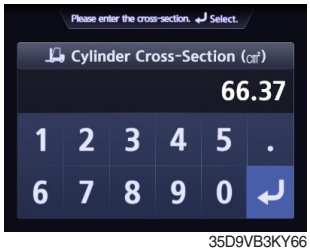
Choose Weight Sensor Setting and enter.

3-1. Cylinder Cross-Section

70D9V3KY57

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

4. Value



35D9VB3KY66

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

5. Completion

35D9VB3KY67

Setting has been completed.

6. Check

70D9V3KY58

Check the value whether it is right.

b. Unloaded status adjustment

3-2. Load Weight Adjustment

70D9V3KY59

Choose Load Weight Adjustment and enter.

4-1. Unloaded Status Adjustment

70D9V3KY60

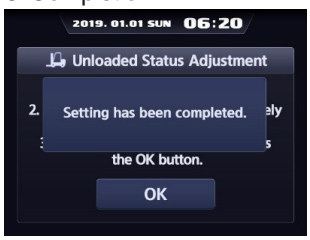
Choose Unloaded Status Adjustment and enter.

5. Instruction

35D9VB3KY71

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

6. 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 only the load lift task within 30 seconds. 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.

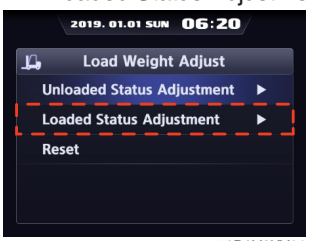
※ Perform again, if the measurement malfunction is occurred.

3-2. Load Weight Adjustment

70D9V3KY59

Choose Load Weight Adjustment and enter.

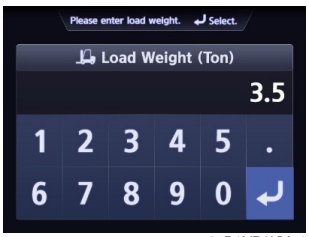
4-2. Loaded Status Adjustment



70D9V3KY61

Choose Load Weight Adjustment and enter.

5. Value



35D9VB3KY74

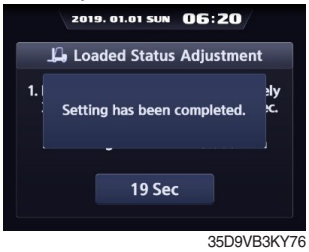
Enter load weight using up or down buttons.

5. Instruction

35D9VB3KY75

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

6. Completion



35D9VB3KY76

Setting has been completed.

d. Reset

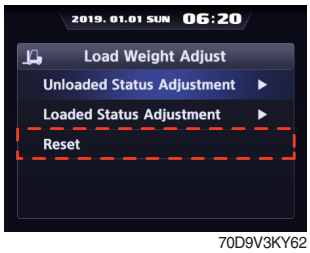
Initialize the all values of 'Unloaded and Loaded Status Adjustment' that were entered previously. (Cylinder cross-sectional area is not initialized.)

3-2. Load Weight Adjustment

70D9V3KY59

Choose Load Weight Adjustment and enter.

4-3. Reset



70D9V3KY62

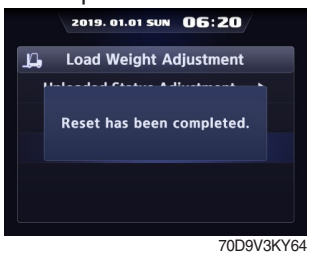
Enter to Reset.

5. Check

70D9V3KY63

Press the enter button.

6. Completion



70D9V3KY64

Reset has been completed.

e. Weight Display Setting

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

3-3. Weight Display Setting

70D9V3KY65

Choose weight sensor setting and enter.

4. Unit

35D9VB3KY81

Choose unit what you want to use.

5. Completion

35D9VB3KY80

Setting has been completed.

· 100 kg unit

70D9V3KY66

· 10 kg unit

70D9V3KY67

f. Overload Alarm

3-4. Overload alarm

70D9V3KY68

Enter to Overload alarm.

4. Select

35D9VB3KY81

Select ON or OFF.

5. Completion

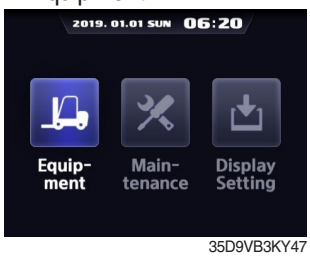
35D9VB3KY80

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

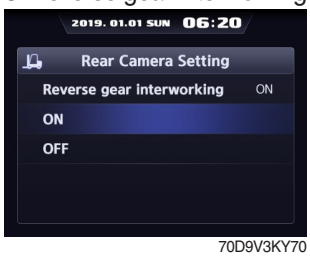
Enter to Equipment.

2. Camera Setting

70D9V3KY69

Choose Camera Setting and enter.

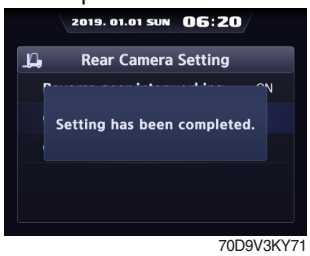
3. Reverse gear interworking



70D9V3KY70

Select ON or OFF.

4. Completion



70D9V3KY71

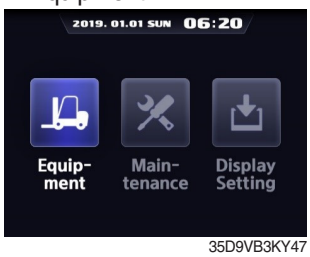
Setting has been completed.

35D9VB3KY98

⑥ FingerTips Setting (option)

a. Lever Position Setting

1. Equipment



35D9VB3KY47

Enter to Equipment.

2. FingerTips Setting

70D9V3KY72

Choose FingerTips Setting and enter.

3-1. Lever Position Setting

70D9V3KY73

Choose Lever Position Setting and Enter

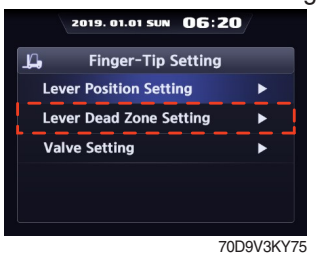
5. Setting

70D9V3KY74

Set minimum and maximum value.

b. Lever Dead Zone Setting

3-2. Lever Dead Zone Setting



70D9V3KY75

Choose Lever Dead Zone Setting and enter.

4. Setting

70D9V3KY76

Set lever dead zone range.

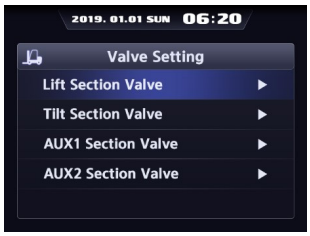
c. Valve setting

3-3. Valve Setting

70D9V3KY77

Choose Valve Setting and enter.

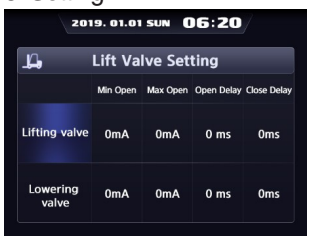
4. Lift Section Valve



70D9V3KY78

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

5. Setting.

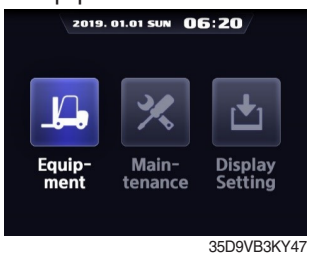


70D9V3KY79

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

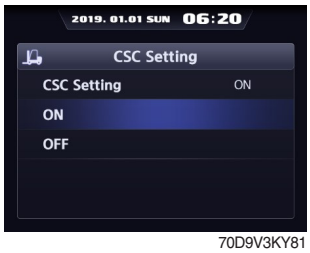
Enter to Equipment.

2. CSC Setting

70D9V3KY80

Choose CSC setting and enter.

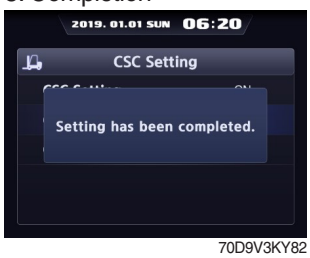
3. Select



70D9V3KY81

Select ON or OFF.

5. Completion



70D9V3KY82

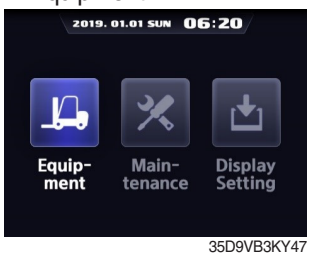
Setting has been completed.

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. Auto Shift Setting

70D9V3KY83

Choose Auto Shift setting and enter.

3-1. Mode Select

70D9V3KY84

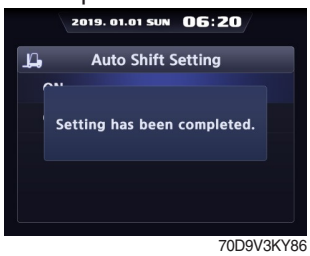
Choose Mode Select.

4. Select

70D9V3KY85

Select ON or OFF.

5. 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.

3-2. Speed Setting

35D9VB3KY47

Choose Speed Setting and enter.

4. Adjustment

70D9V3KY83

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

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

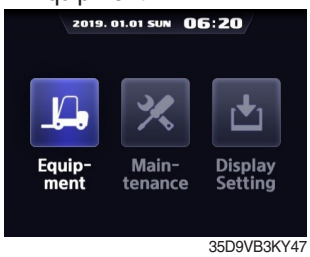
· Set the mode ON. Below is how this feature functions.

· 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.**

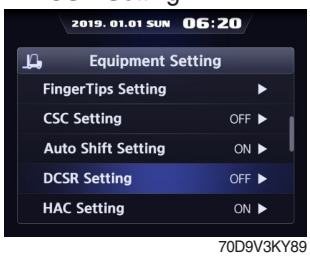
1. Equipment



35D9VB3KY47

Enter to Equipment.

2. DCSR Setting



70D9V3KY89

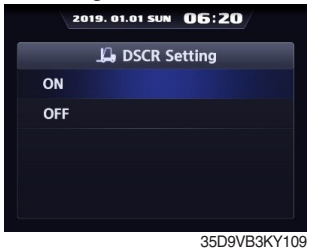
Choose DCSR setting and enter.

3. Mode Select

35D9VB3KY108

Select Mode Select.

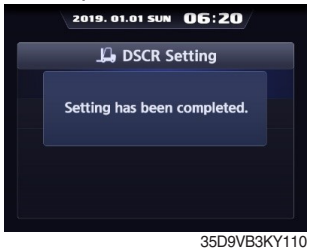
4. Setting



35D9VB3KY109

Select ON or OFF.

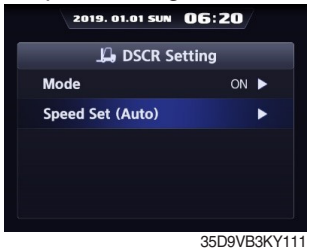
5. Completion



35D9VB3KY110

Setting has been completed.

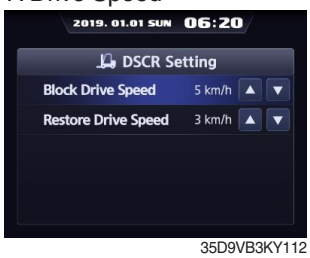
6. Speed Setting



35D9VB3KY111

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

7. Drive Speed



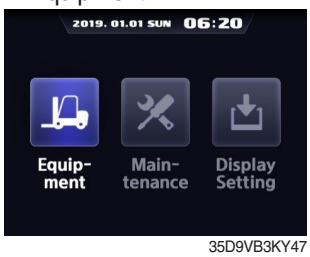
35D9VB3KY112

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



35D9VB3KY47

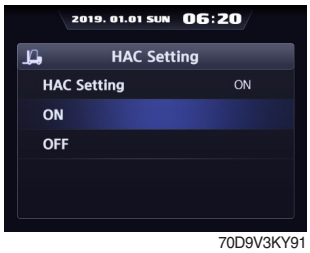
Enter to Equipment.

2. HAC Setting

70D9V3KY90

Choose DCSR setting and enter.

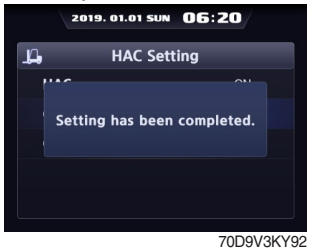
3. Select



70D9V3KY91

Select ON or OFF.

5. Completion

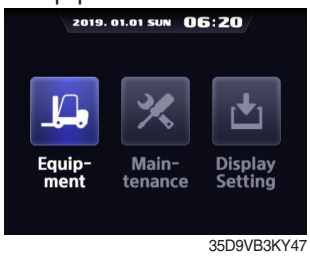


70D9V3KY92

Setting has been completed.

⑪ Vehicle Max Speed Limit

1. Equipment



35D9VB3KY47

Enter to Equipment.

2. Vehicle Max Speed Limit

70D9V3KY93

Choose Vehicle Max Speed Limit and enter.

3. Mode

70D9V3KY94

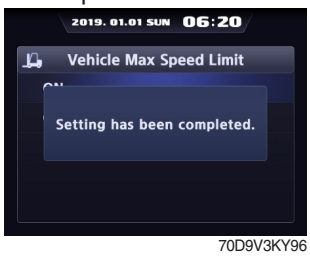
Enter to Mode.

4. Select

70D9V3KY95

Select ON or OFF.

5. Completion



70D9V3KY96

Setting has been completed.

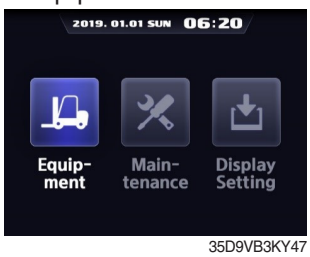
· Limit speed : 10 km/h

70D9V3KY96

The truck does not exceed the limit speed.

⑫ Zero Start Setting (if installed)

1. Equipment



35D9VB3KY47

Enter to Equipment.

2. Zero Start Setting

70D9V3KY98

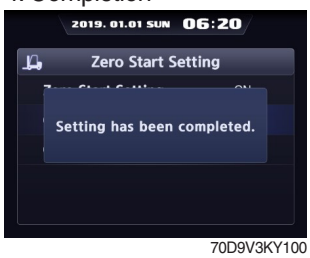
Choose Zero Start Setting and enter.

3. Select

70D9V3KY99

Select ON or OFF.

4. Completion



70D9V3KY100

Setting has been completed.

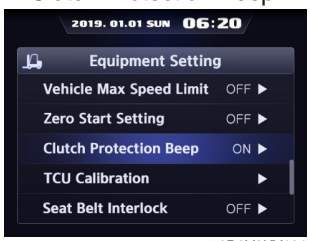
⑬ Clutch Protection Beep (if installed)

1. Equipment

35D9VB3KY47

Enter to Equipment.

2. Clutch Protection Beep



70D9V3KY101

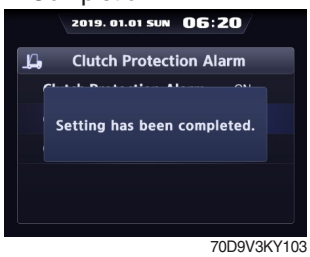
Choose Clutch Protection Beep and enter.

3. Select

70D9V3KY102

Select ON or OFF.

4. Completion



70D9V3KY103

Setting has been completed.

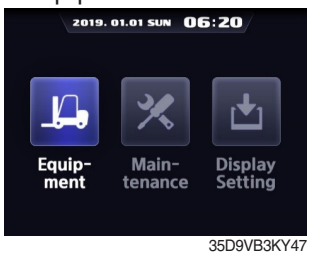
⑭ ZF TCU Calibration

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. ZF TCU Calibration

70D9V3KY127

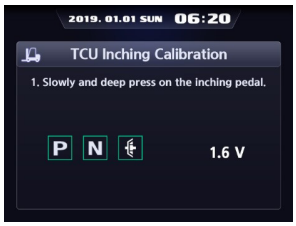
Choose ZF TCU Calibration and enter.

3. Prepare for Calibration

70D9V3KY128

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

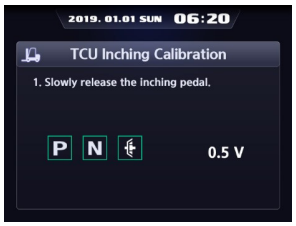
4. Calibration 1



70D9V3KY129

Fully press the inching pedal.

5. Calibration 2



70D9V3KY130

Take your foot off the inching pedal.

6. Calibration 3

70D9V3KY131

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

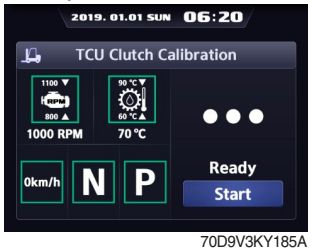
b. Clutch Calibration

2-1. ZF TCU Calibration

70D9V3KY127

Choose ZF TCU Calibration and enter.

3. Prepare for Calibration



70D9V3KY185A

Before starting calibration, must be satisfied with 5 conditions.

※ Conditions

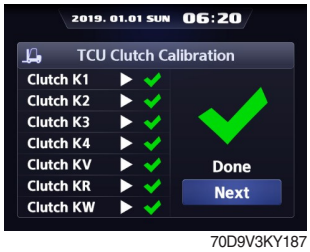
- Engine RPM 800 to 1100
- T/M temperature 60℃ to 90℃
- Truck speed 0 km/h (stop)
- Gear neutral
- Parking swtich ON

4. Calibration 1

70D9V3KY186

Wait untill the next button is ON.

4. Calibration 1



70D9V3KY187

Enter the next button.

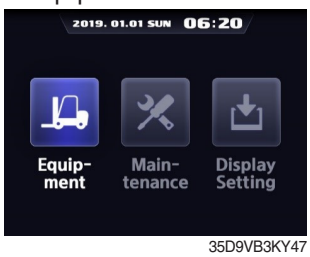
5. Calibration 2

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



35D9VB3KY47

Enter to Equipment.

2. Seat Belt Interlock

70D9V3KY132

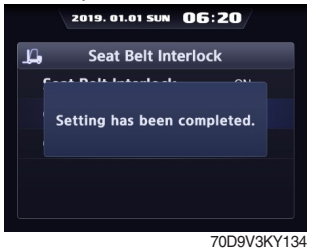
Choose Seat Belt Interlock and enter.

3. Select

70D9V3KY133

Select ON or OFF.

4. Completion

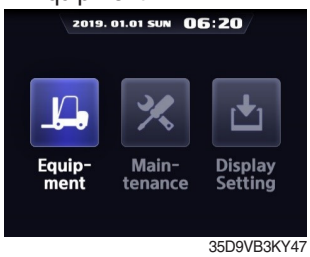


70D9V3KY134

Setting has been completed.

⑯ Cluster-CI

1. Equipment



35D9VB3KY47

Enter to Equipment.

2. Version

70D9V3KY136

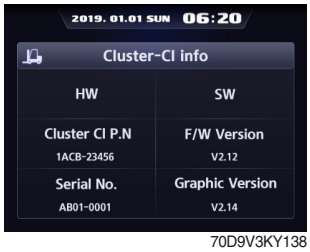
Choose Version and enter.

3. Cluster-CI

70D9V3KY137

Choose Cluster-CI and enter.

4. Check Version



70D9V3KY138

(2) Maintenance

① Failure History

1. Maintenance

35D9VB3KY48

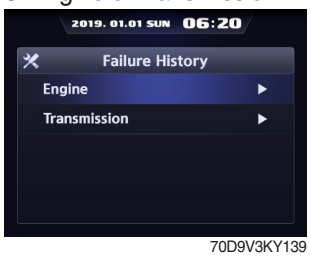
Enter to Maintenance.

2. Failure History

70D9V3KY138

Choose Failure History and enter.

3. Engine or Transmission



70D9V3KY139

Choose what needs to check.

4. History

70D9V3KY140

5. Failure List

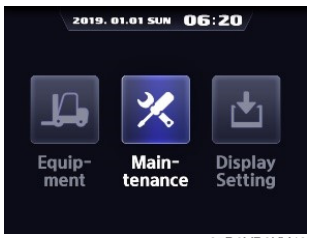
70D9V3KY141

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 operator's manual page 7-12 about periodic replacement parts.

1. Maintenance



35D9VB3KY48

Enter to Maintenance.

2. Consumables Mangement

70D9V3KY142

Choose Consumables Mangement and enter.

3. Select Replacement Item

70D9V3KY143

Select the replaced item.

4-1. Replacement History

70D9V3KY144

Select Replacement History.

5. Check.

70D9V3KY145

Check history.

4-2. Replacement

70D9V3KY146

Select Replacement.

5. Confirm

70D9V3KY147

Press enter button.

4-3. Change

70D9V3KY148

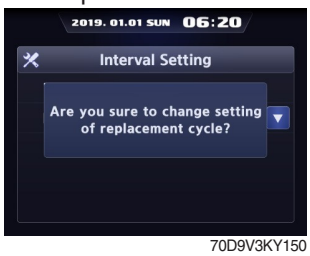
Select Change.

5. Setting Cycle

70D9V3KY149

Change properly the interval.

6. Completion



70D9V3KY150

Setting has been completed.

③ I/O Information

1. Maintenance

35D9VB3KY48

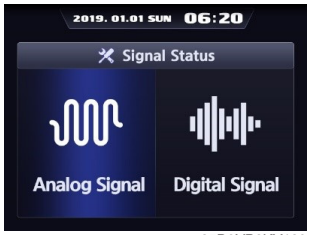
Enter to Maintenance.

2. I/O Information

70D9V3KY151

Choose I/O Information and enter.

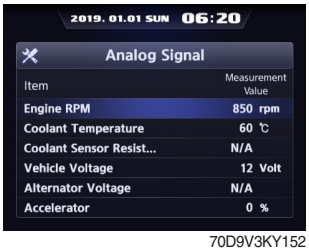
3-1. Analog signal



35D9VB3KY139

Enter to Analog Signal.

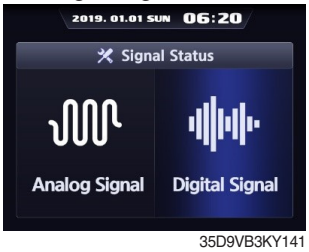
4. Analog signal list



70D9V3KY152

Check the analog signal list.

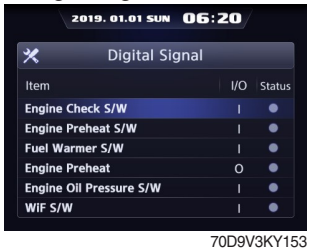
3-2. Digital signal



35D9VB3KY141

Enter to Digital Signal

4. Digital signal list



70D9V3KY153

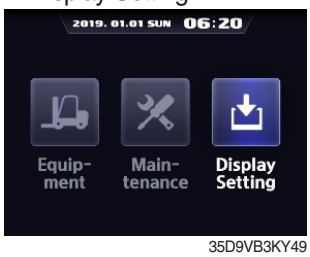
Check the digital signal list.

(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



35D9VB3KY49

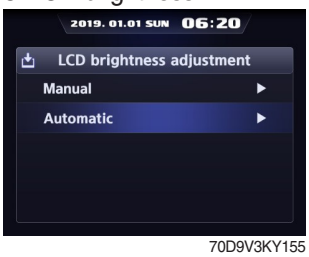
Enter to Display Setting.

2. LCD Brightness Adjustment

70D9V3KY154

Choose LCD Brightness Adjustment and enter.

3. LCD brightness



70D9V3KY155

Select Manual or Automatic.

4. LCD Brightness (Day/Night)

70D9V3KY156

Set day and night brightness in the manual mode.

5. LCD Brightness

35D9VB3KY148

Set LCD brightness in the manual mode.

② User Setting

Enable to set time, unit, and language.

a. Time Setting

1. Display Setting

35D9VB3KY49

Enter to Display Setting.

2. User Setting

35D9VB3KY149

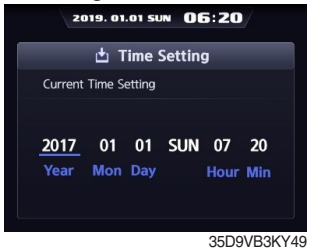
Choose User Setting and enter.

3-1. Time Setting

35D9VB3KY150

Select Time Setting.

4. Setting

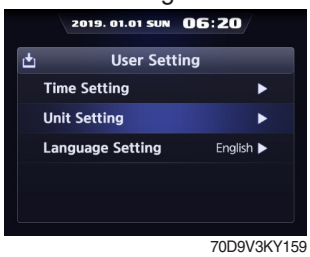


35D9VB3KY49

Set time.

b. Unit Setting

3-2. Unit Setting



70D9V3KY159

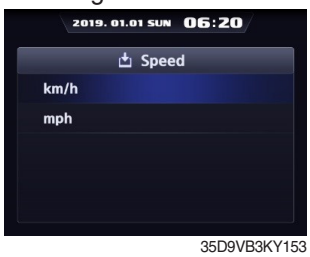
Select Unit Setting.

4. Unit Setting Litst

35D9VB3KY152

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

5. Setting



35D9VB3KY153

Set unit.

3-3. Language Setting

70D9V3KY160

Select Language Setting.

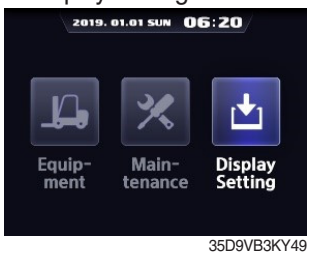
4. Setting

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.

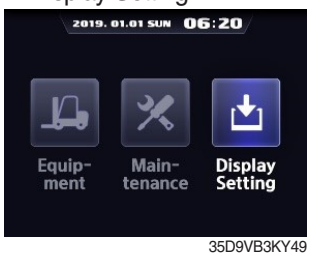
· This function is to allow to change password from default password to user defined password.

· Password length must be 5~10 digits.

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

a. User Password Change

1. Display Setting



35D9VB3KY49

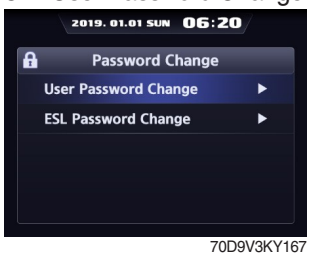
Enter to Display Setting.

2. Password Change

70D9V3KY166

Choose Password Change and enter.

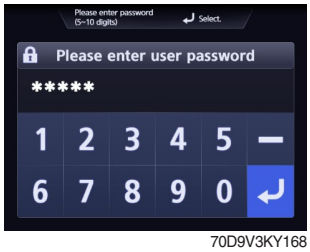
3-1. User Password Change



70D9V3KY167

Select User Password Change.

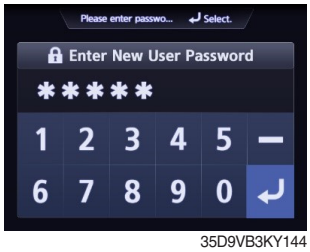
4. Current User Password



70D9V3KY168

Enter the current user passwrd.

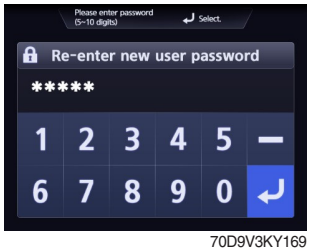
5. New User Password



35D9VB3KY144

Enter a new user password.

6. Re-enter



70D9V3KY169

Enter a new user password again.

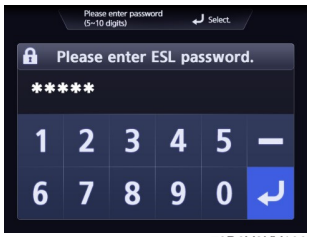
b. ESL Password Change

3-2. ESL Password Change

35D9VB3KY49

Select ESL Password Change.

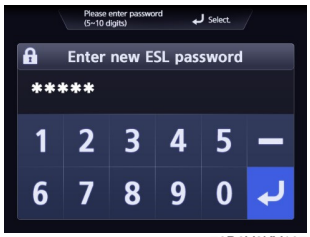
4. Current User Password



70D9V3KY166

Enter the current user password.

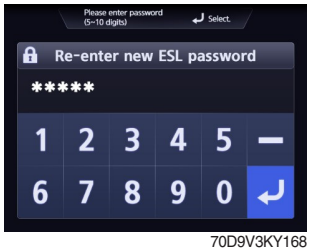
5. New User Password



70D9V3KY167

Enter a new user password.

6. Re-enter

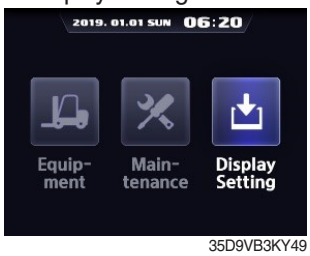


70D9V3KY168

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	CHECK	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	DPF regeneration warning		DPF regeneration warning lamp	DPF regeneration is required.
8	DPF inhibit warning		DPF inhibit warning lamp	DPF regeneration is inhibited.
9	DPF High temp warning		DPF high temp 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 ℃ (230 °F) or higher : Amber 120 ℃ (248 °F) or higher : Red
12	Parking brake indicator	P	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 warming		Clutch protection warming 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 (TCU)		Communication error warning lamp	Communication between cluster-CI and TCU has been failed. Check communication line.
26	DEF low warning		DEF low warning lamp	DEF levle is low. Please fill the DEF.
27	Brake fail warning		Brake fail warning lamp	Stop the engine and check for its cause.
28	SCR defect warning		SCR defect warning lamp	Check the SCR system.

No.	Warning lamp types	Symbol	Warning and indicator lamp	Causes and correction
29	DCU warning		DCU warning lamp	To check DCU error code.
30	Fingertip warning		Fingertip warning lamp	Check the fingertip.
31	Transimission warning		Transimission warning lamp	Check the transimission.
32	Side mirror heated action idicator		Side mirror heated action idicator lamp	The heated mirror switch is ON.
33	High beam indicator		High beam indicator lamp	The position of the dimmer switch is DOWN.
34	Shift mode indicator		Shift mode indicator lamp	This lamp shows the current shift mode.

GROUP 4 COMPONENT SPECIFICATION

No	Part name	Qty	Specification
1	Battery	2	12 V×100 AH RC : 190 min CCA : 850 A
2	LED work lamp	2	12~24 V, 20~27 W
3	License lamp (opt)	1	12 V, 5 W
4	LED rear combination lamp	2	12 V, LED (turn signal, tail, stop)
5	LED head and turn lamp	2	12 V, 26 W (high and low), 18 W (low) 12 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	12 V, 20 A
13	Flasher unit	1	12 V, 85±10 C/M, (23 W+23 W)×2+3 W×2
14	Back buzzer	1	12 V, 90±5 dB, 60±10 C/M, 300 mA
15	Warning buzzer	1	12 V, 85±5 dB, 120±20 C/M, 50 mA
16	Horn	1	12 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	Float indicator: Empty / 7/14 / Full Resistance (Ω): EC / 350 / 50 Tolerance (Ω): ±(R×1.5 %+1 Ω)
19	Start switch	1	24 V, 60 A
20	Parking brake switch	1	12 V, 20 A
21	Main light switch	1	24 V, 15 A
22	Auto shift switch	1	12 V, 20 A
23	Power switch	1	12 V, 20 A
24	Inhching switch	1	12 V, 20 A
25	In/decrement switch	1	12 V, 20 A
26	Rear wiper and washer switch	1	12 V, 20 A
27	Regeneration switch	1	12 V, 20 A
28	Rear work lamp switch (opt)	1	12 V, 20 A
29	Hazard switch (opt)	1	12 V, 20 A
30	Top wiper/washer switch (opt)	1	12 V, 20 A
31	Multi function switch	1	12 V, 2 A
32	Gear selector switch	1	12 V, 3.5 A
33	Master switch (opt)	1	6~36 V, 180 A
34	Cabin tilt switch	1	12 V, 20 A

GROUP 5 CONNECTOR DESTINATION

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-6	KET	2	Key switch (B+)	-	MG652934-5
CN-4	AMP/KET	3	I/conn (frame-main harness)	MG642292	MG652290
CN-13	AMP	42	I/conn (main-frame harness)	936421	936429
CN-14	AMP	42	I/conn (frame-main harness)	936421	936429
CN-15	KET	6	I/conn (main-frame harness)	MG610335	MG640337
CN-17	AMP	3	Load sensor	174357-2	174359-2
CN-19	KET	2	Outpu check	MG610320	-
CN-20	KET	1	Tiliting motor (B+)	-	MG650943-5
CN-21	KET	1	Tiliting motor (B+)	MG640944-5	MG650943-5
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-43	HCE	1	MIDI fuse	S820-308000	-
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-61	HCE	1	Fuel pump	S820-104000	-
CN-61	HCE	1	Fuel pump	S820-105000	-
CN-65	KET	1	Backup buzzer	ST730018-3	ST750036-2
CN-70	-	4	Top wiper motor	180900	-
CN-71	KET	2	Pakring solenoide	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
CN-92	AMP	6	I/conn (monitor-main harness)	174262-2	174264-2
CN-96	DELPHI	2	Fuel heater	10737780	-
CN-97	DELPHI	2	Prefilter fuel heater	1530027	-
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

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-125	DEUTSCH/-	12/1	RMCU	DT06-12S	TNJ-C-58
CN-125	-	1	GPS	-	SMA-C-316R/V
CN-128	AMP	94	DCU	1897301-2	-
CN-131	KET	2	Attach cut solenoide	MG610320	-
CN-134	MOLEX	16	Diagnosis	51115-1601	-
CN-136	AMP	4	RMCU service	174257-2	-
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	36	Engine	-	1743062-2
CN-152	AMP	36	Engine	-	1743062-3
CN-154	KET	1	Engine	MG613801-5	-
CN-155	DEUTSCH	2	Pump EPPR valve	DT06-2S	-
CN-161	BOSCH	4	Pump module	1-928-403-736	-
CN-162	BOSCH	2	Dosing module	1-928-403-874	-
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	G sensor	174257-2	174259-2
CN-202	KET	2	Washer pump top	MG640605	-
CN-202	KET	2	Washer pump front	MG640605	-
CN-202	KET	2	Washer pump rear	MG640605	-
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-383	DEUTSCH	2	Urea hose heater	DT06-2S	-
CN-412	AMP	6	I/conn (armrest-main harness)	174264-2	174262-2
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
· Switch					
CS-2	KET	2	Start key switch	MG610281	MG620282
CS-3	CARLING	10	Rear wiper switch	21HN-56300	-
CS-5	KET	2	Center horn	-	MG640322
CS-11	KET	8	Multi function switch	MG610339	-
CS-12	KET	6	Multi function switch	MG610335	-
CS-13	DEUTSCH	18	Gear selector	DT16-18SA-K004	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
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-75	CARLING	10	Regeneration switch	21HN-56300	-
CS-77	CARLING	10	Cabin tilt switch	21HN-56300	-
CS-79	CARLING	10	Power 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	Relay INT wiper	MG652999	-
CR-11	DAEDONG	3	Flsher unit	312 GIHUNG 3P	-
CR-16	HELLA		Brake	8JA003526-001	-
CR-24	FCI	6	Glow controller	F162210	-
CR-34	HELLA		Travel cut	8JA003526-001	-
CR-35	HELLA		Back up	8JA003526-001	-
CR-44	AMP	2	Cabin tilt relay coil	174352-2	-
CR-52	HELLA		Attach cut	8JA003526-001	-
CR-59	HELLA		NOx sensor	8JA003526-001	-
CR-71	HELLA		Cab tilt safety	8JA003526-001	-
· Sensor and pressure switch					
CD-2	KET	3	Fuel sender	MG610045	-
CD-3	DEUTSCH	3	Brake fail switch (PS)	DT06-3S	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CD-4	AMP	1	Brake switch	171809-2	-
CD-5	DEUTSCH	4	Hydraulic pressure and temperature 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	-	936292-2
CD-39	AMP	2	Speed pickup internal	1-1418483-1	-
CD-40	AMP	2	Speed output	1-1418483-1	-
CD-60	AMP	2	Thermo switch	282080-1	-
CD-71	AMP	6	Inching sensor	1-967616-1	-
CD-77	KET	3	Differential sensor	MG644453-5	-
CD-78	DELPHI	2	Exhuast gas temperature sensor (DPF T5)	33401218	-
CD-79	DELPHI	2	Exhaust gas temperautre sensor (DOC T4)	33401219	-
CD-80	HIRSCHMANN	5	NOx sensor (SCR front)	872-860-541	-
CD-81	HIRSCHMANN	5	NOx sensor (SCR rear)	872-860-541	-
CD-82	DELPHI	2	Exhaust gas temperautre sensor (SCR T6)	33401219	-
CD-87	AMP	2	Ambient temperature sensor	936059-1	-
CD-88	BOSCH	5	Level sensor and heater	1-928-403-738	-
CD-89	HIRSCHMANN	4	UQS (Urea Quality Sensor)	805-122-541	-
CD-91	AMP	2	After temperature sensor	963040-3	-
DO-1	AMP/QPL	2	DIODE1	174352-2	21EA-50550
DO-2	AMP/QPL	2	DIODE2	174352-2	21EA-50550
DO-3	AMP/QPL	2	DIODE3	174352-2	21EA-50550
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-98	DEUTSCH/QPL	3	RESISTOR	DT06-3S-EP06	DT04-3P
CN-155	KET	6	Diagnosis port	MG610335	MG642554
CN-M1	DEUTSCH	2	Lift down	DT06-2S	-
CN-M2	DEUTSCH	2	Lift up	DT06-2S	-
CN-M3	DEUTSCH	2	Tilt out	DT06-2S	-
CN-M4	DEUTSCH	2	Tilt in	DT06-2S	-
CN-M5	DEUTSCH	2	Aux 1 in	DT06-2S	-
CN-M6	DEUTSCH	2	Aux 1 out	DT06-2S	-
CN-M7	DEUTSCH	2	Aux 2 in	DT06-2S	-
CN-M8	DEUTSCH	2	Aux 2 out	DT06-2S	-

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