

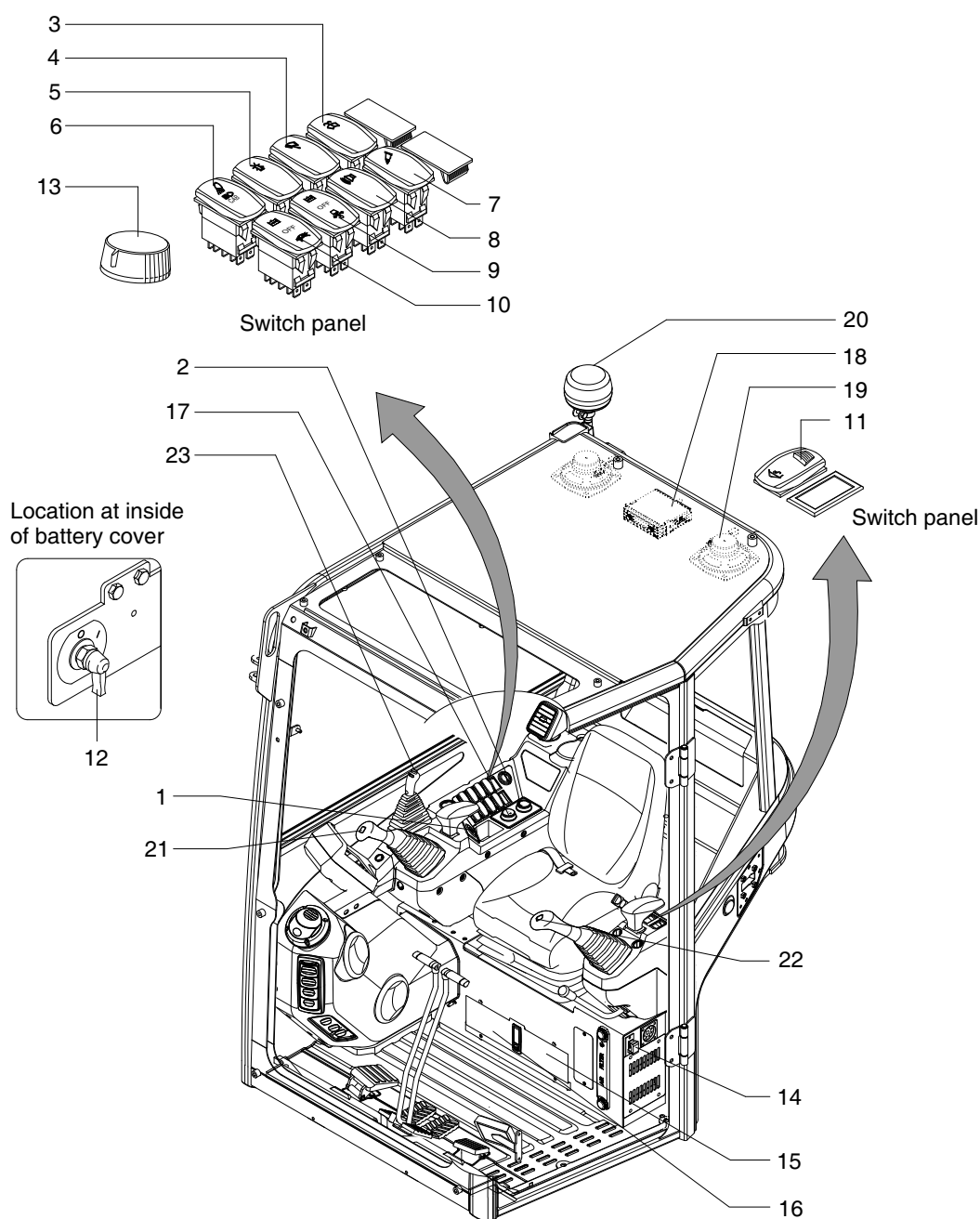
SECTION 4 ELECTRICAL SYSTEM

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SECTION 4 ELECTRICAL SYSTEM

GROUP 1 COMPONENT LOCATION

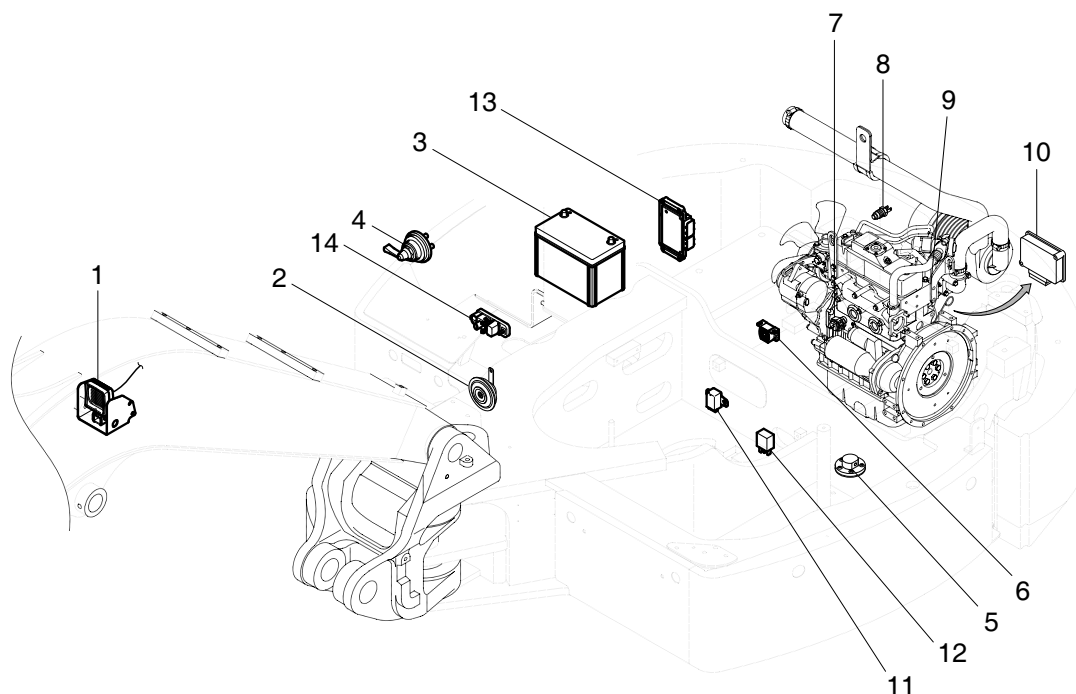
1. LOCATION 1



35AZ4EL01

- | | | |
|-------------------------|---------------------------|---|
| 1 Start switch | 10 Aux switch | 19 Speaker |
| 2 Power socket | 11 Quick coupler switch | 20 Beacon lamp |
| 3 Washer switch | 12 Master switch | 21 RH control lever switch |
| 4 Wiper switch | 13 Accel dial | (horn, quick coupler, breaker, 2-way) |
| 5 Beacon lamp switch | 14 Emergency stop switch | 22 LH control lever switch |
| 6 Work light switch | 15 Relay box | (rotating, proportional on/off) |
| 7 Breaker select switch | 16 Fuse box | 23 Dozer control switch |
| 8 Travel alarm switch | 17 Air conditioner switch | (dozer floating, angle dozer, 2-speed travel) |
| 9 Aux 1 switch | 18 New cassette radio | |

2. LOCATION 2



35AZ4EL02

- | | | | | | |
|---|---------------|----|-----------------------------|----|------------------------|
| 1 | Work lamp | 6 | Travel alarm buzzer | 11 | Inlet wiper relay |
| 2 | Horn | 7 | Engine oil pressure switch | 12 | Micro 12V relay |
| 3 | Battery | 8 | Air cleaner pressure switch | 13 | Hydraulic control unit |
| 4 | Master switch | 9 | Water temperature sender | 14 | Power relay |
| 5 | Fuel sender | 10 | ECU | | |

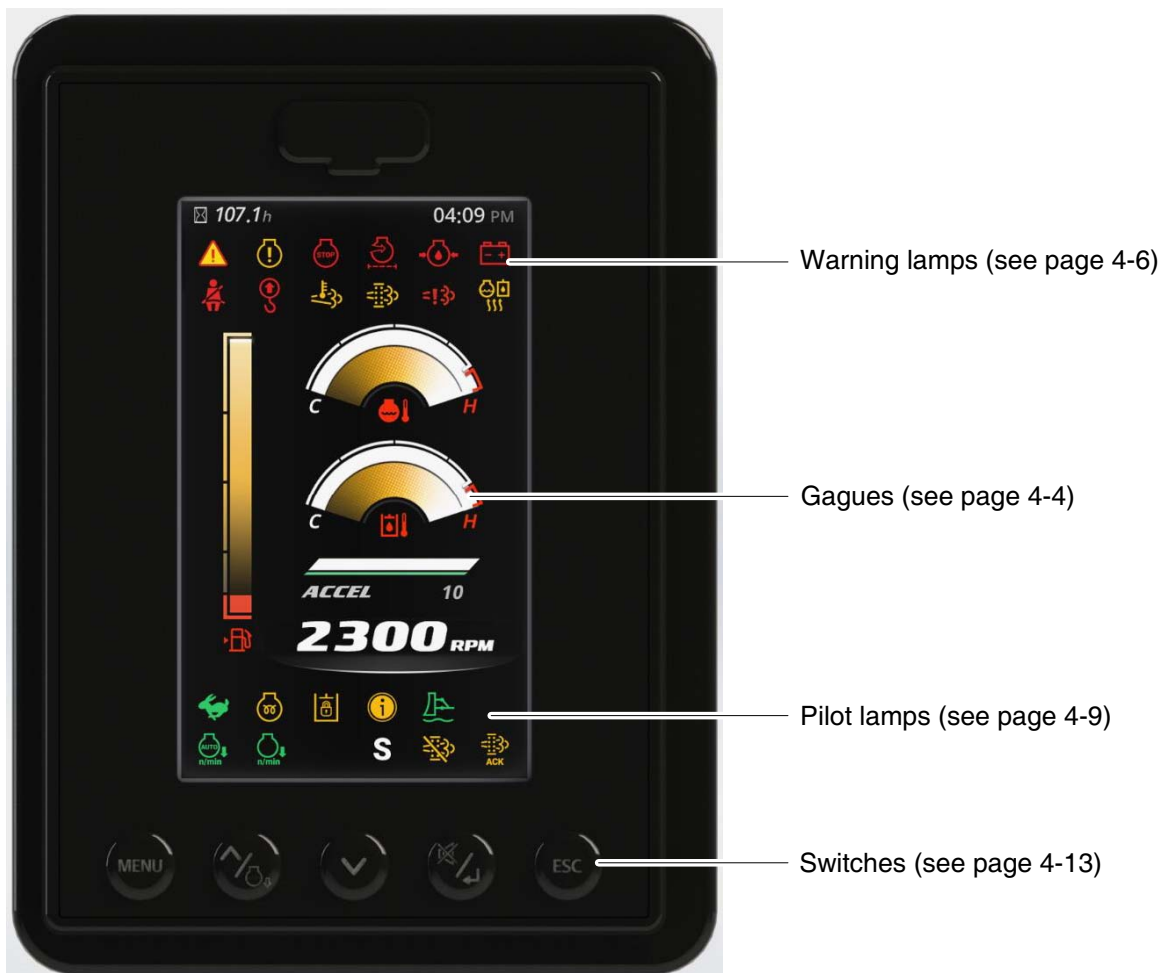
GROUP 2 MONITORING SYSTEM

1) CLUSTER

The cluster consists of LCD and switches as shown below. The LCD is to warn the operator in case of abnormal machine operation or conditions for the appropriate operation and inspection.

The LCD is to display for monitoring, manage and display set with the switches.

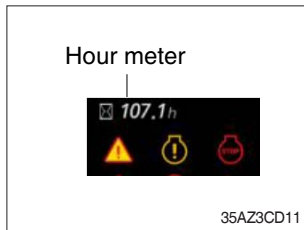
- ※ The cluster installed on this machine does not entirely guarantee the condition of the machine. Daily inspection should be performed according to chapter 6, Maintenance.
- ※ When the cluster provides a warning, immediately check the problem and perform the required action.



35AZ4CD05

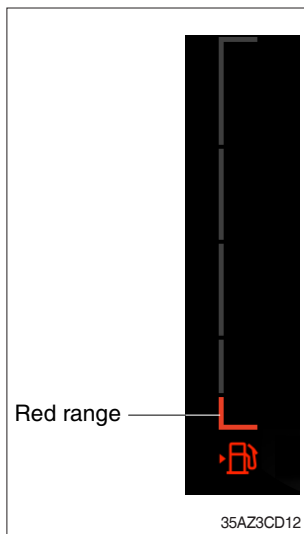
2) GAUGES AND DISPLAYS

(1) Hour meter



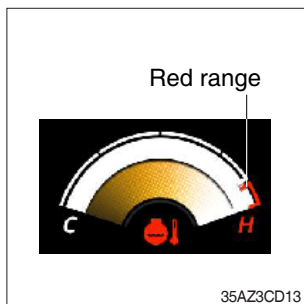
- ① This meter shows the total operation hours of the machine.
- ② Always ensure the operating condition of the meter during the machine operation.
Inspect and service the machine based on hours as indicated in chapter 6, maintenance.

(2) Fuel gauge



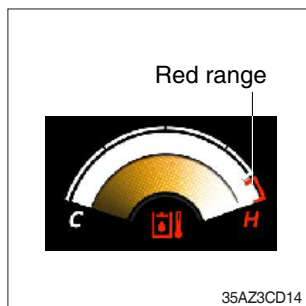
- ① This gauge indicates the amount of fuel in the fuel tank.
- ② Fill the fuel when in the red range or warning lamp  ON.
※ If the gauge illuminates the red range or warning lamp  ON even though the machine is in the normal condition range, check the electric device as this can be caused by poor connection of sensor.

(3) Engine coolant temperature gauge



- ① This indicates the temperature of coolant.
· Red range : Above 115°C (239°F)
- ② When the red range pointed or warning lamp  ON, engine do not abruptly stop but run it at medium speed to allow it to cool gradually, then stop it.
Check the radiator and engine.
※ If the engine is stopped without cooled down running, the temperature of engine parts will rise suddenly, this could cause severe engine trouble.
※ If the gauge indicates the red range or warning lamp  ON in red even though the machine is in the normal condition range, check the electric device as this can be caused by poor connection of sensor.

(4) Hydraulic oil temperature gauge



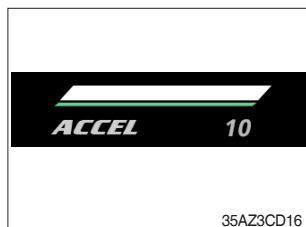
- ① This gauge indicates the temperature of hydraulic oil.
 - Red range : Above 105°C (221°F)
 - ② If the indicator is in the red range or lamp  ON in red, reduce the load on the system. If the gauge stays in the red range, stop the machine and check the cause of the problem.
- ※ If the gauge indicates the red range or warning lamp  ON in red even though the machine is in the normal condition range, check the electric device as this can be caused by poor connection of sensor.

(5) Engine rpm gauge and clinometer



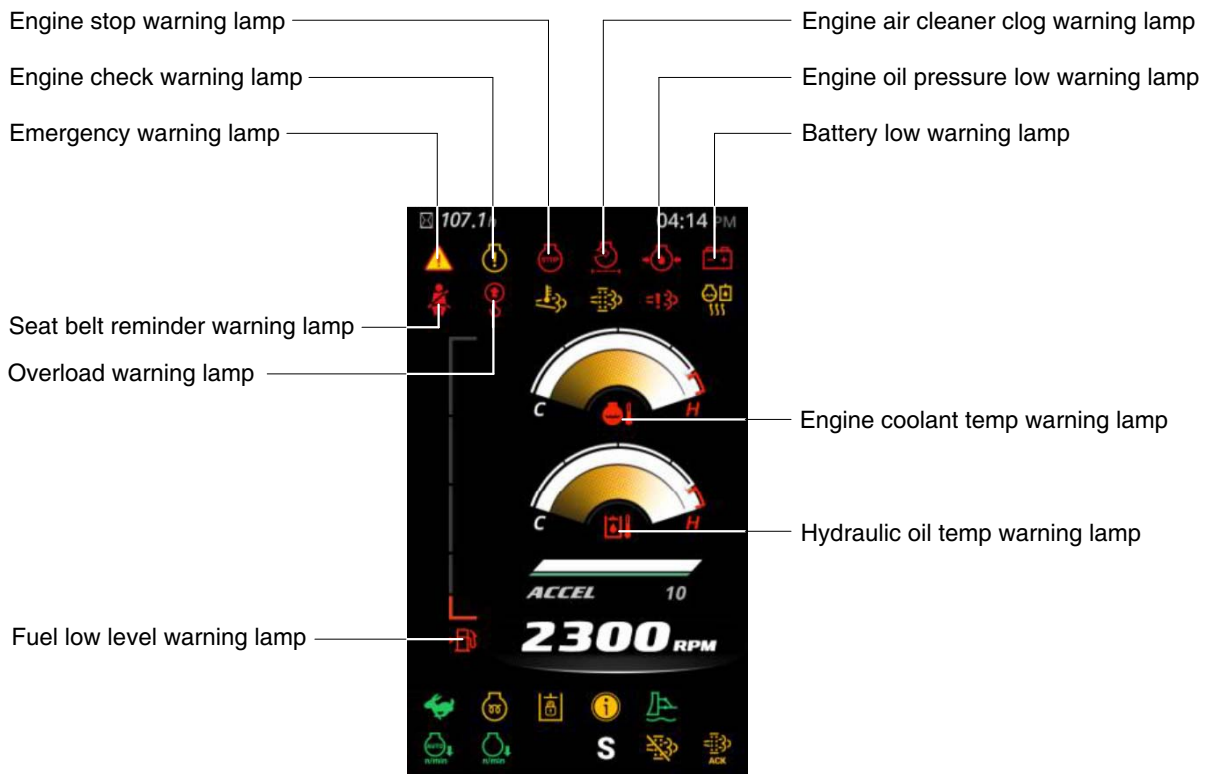
- ① This displays the engine speed.
- ② This displays the tilt of machine.

(6) Accel dial gauge



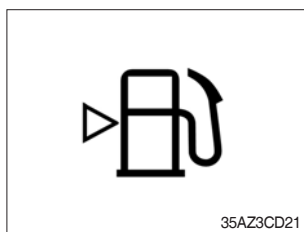
- ① This gauge indicates the level of accel dial from 0 to 10 step.

3) WARNING LAMPS



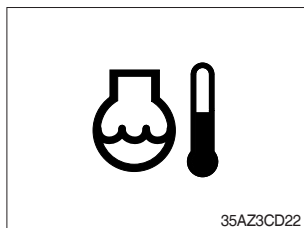
35AZ3CD20

(1) Fuel low level warning lamp



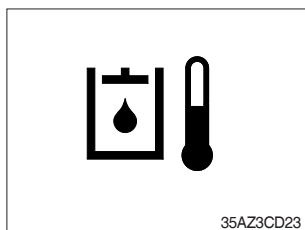
- ① This lamp lights up and buzzer sounds when the level of fuel is below 12.5 ℓ (3.3 U.S. gal).
- ② Fill the fuel immediately when the lamp ON.

(2) Engine coolant temperature warning lamp



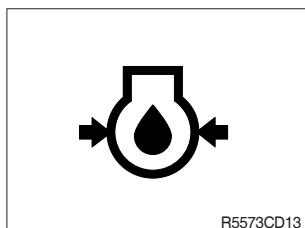
- ① This lamp lights up and buzzer sounds when the temperature of coolant is over the normal temperature 115°C (239°F) .
- ② Check the cooling system when the lamp ON.

(3) Hydraulic temperature warning lamp



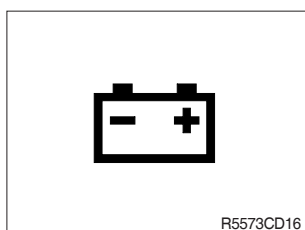
- ① This lamp lights up and buzzer sounds when the temperature of coolant is over the normal temperature 105°C (221°F).
- ② Check the cooling system when the lamp ON.

(4) Engine oil pressure low warning lamp



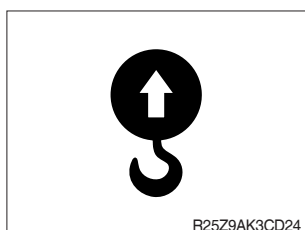
- ① This lamp lights up and buzzer sounds after starting the engine because of the low oil pressure.
- ② If the lamp ON during engine operation, shut OFF engine immediately. Check oil level.

(5) Battery low warning lamp



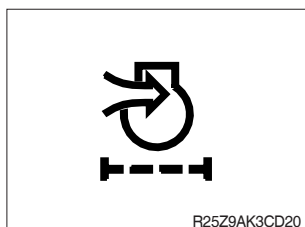
- ① This lamp lights up and buzzer sounds when the starting switch is ON, it is turned OFF after starting the engine.
- ② Check the battery charging circuit when this lamp blinks during engine operation.

(6) Overload warning lamp



- ① When the machine is overloaded, this lamp blinks and buzzer sounds.
- ② Reduce the machine load.

(7) Air cleaner clog warning lamp



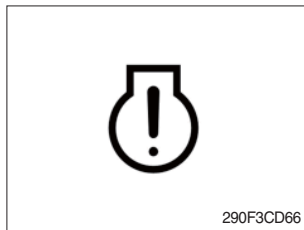
- ① This lamp lights up and buzzer sounds when the element of the air cleaner is clogged.
- ② Check, clean or replace element.

(8) Emergency warning lamp



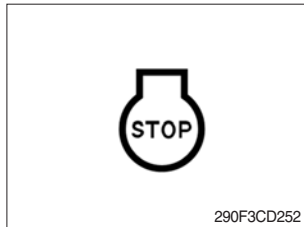
- ① This lamp pops up and the buzzer sounds when each of the below warnings occurs.
 - Hydraulic oil temperature high warning lamp ON
 - Engine coolant temperature high warning lamp ON
 - Communication error with ECU
- ※ **The pop-up warning lamp moves to the original position and lights up when the buzzer stop switch is pushed or pop-up is touched. The buzzer will stop. This is same as following warning lamps.**
- ② When this warning lamp lights up, machine must be checked and serviced immediately.

(9) Check engine warning lamp



- ① This warning lamp lights up and buzzer sounds when the engine must be checked.
- ※ **When the warning lamp lights up, stop the machine and find the cause for repair.**

(10) Engine stop warning lamp



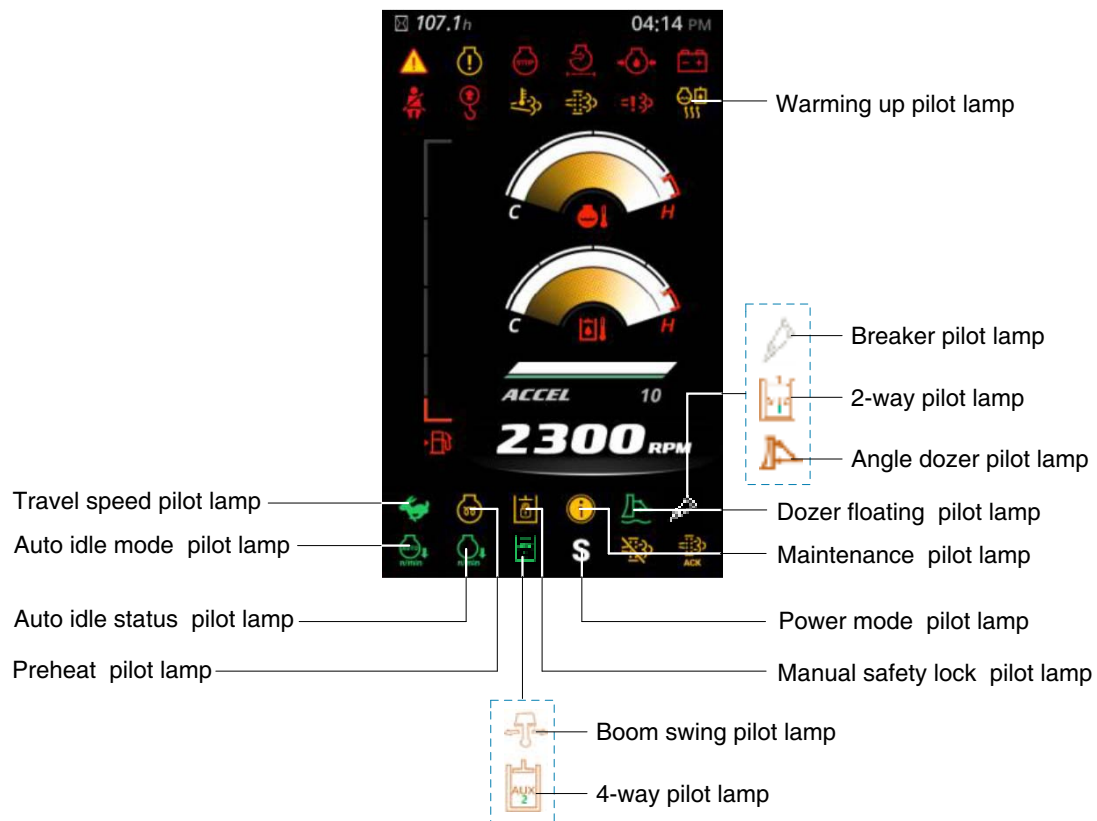
- ① If this warning lamp lights up and buzzer sounds, stop the engine immediately and check the engine.
- ② Check the fault codes on the monitor.
- ※ **Please contact your HD Hyundai Construction Equipment service center or local dealer.**

(11) Seat belt reminder warning lamp



- ① When operator does not fasten the operator's the seat belt, the seat belt reminder warning lamp pops up and buzzer sounds.
- ② Fasten the seat belt.

4) PILOT LAMP

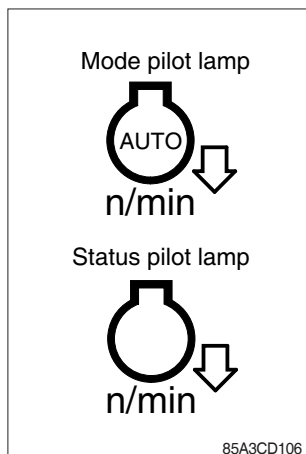


35AZ3CD30

(1) Power mode pilot lamp

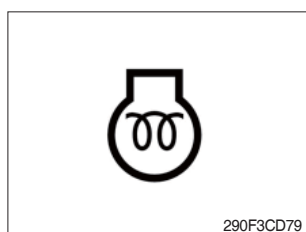
No	Mode	Pilot lamp	Selected mode
1	Power mode		Standard power mode
2	Travel mode		Low speed traveling High speed traveling

(2) Auto idle status/ mode pilot lamp



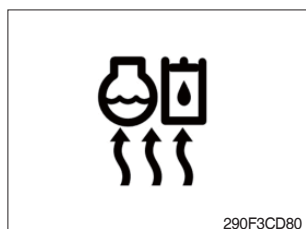
- ① The auto idle mode pilot lamp will light up when the idle mode is selected.
- ② The auto idle status pilot lamp will light up when all levers and pedals are at neutral position and the auto idle mode is selected.
- ③ One of the lever or pedal is operated, the status lamp will go off and the engine speed returns to the previous conditions.

(3) Preheat pilot lamp



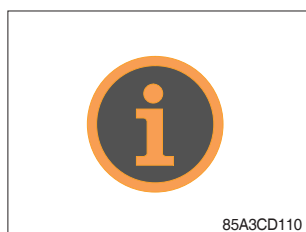
- ① Turning the start key switch to the ON position starts preheating in cold weather.
 - ② Start the engine after this lamp goes OFF.
- ※ Refer to the operator's manual page 4-4 for details.

(4) Warming up pilot lamp



- ① This lamp lights up when the coolant temperature is below 30°C (86°F).
- ② The automatic warming up is cancelled when the engine coolant temperature is above 30°C (86°F), or when 10 minutes have passed since starting the engine.

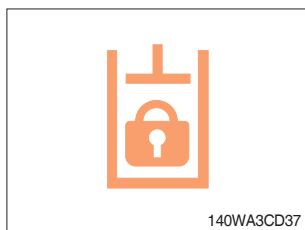
(5) Maintenance pilot lamp



- ① This lamp lights up when consumable parts are in need of replacement. It means that the change or replacement interval of parts is 30 hours from the required change interval.
- ② Check the message in maintenance information of main menu.

Also, this lamp lights up for 3 minutes when the start switch is switched to the ON position.

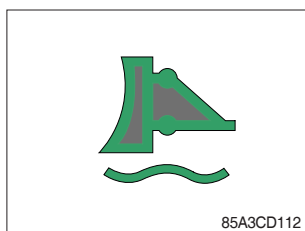
(6) Manual safety lock pilot lamp



① This lamp lights up when the safety lever is set to the LOCK position.

※ Refer to the operator's manual page 3-35 for the safety lever.

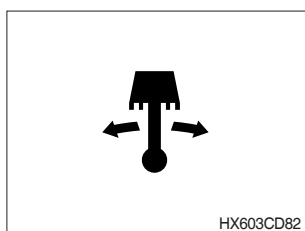
(7) Dozer floating pilot lamp



① This lamp will be light up when the dozer floating lever is pressed.

※ Refer to the operator's manual page 3-33.

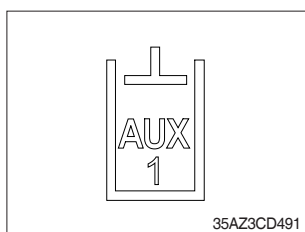
(8) Boom swing pilot lamp



① This lamp lights up when the boom offset switch is pressed.

※ Refer to the operator's manual page 3-32.

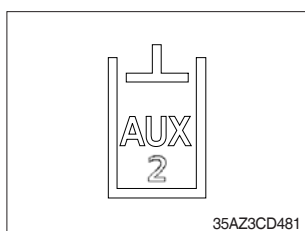
(9) 2-way pilot lamp



① This lamp lights up when the option flow control function is activated in the cluster.

※ Refer to the page 4-25.

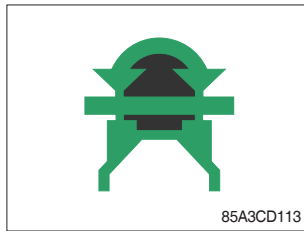
(10) 4-way (rotating) pilot lamp



① This lamp lights up when the boom swing selection switch is set to the rotator (not used boom swing) and the 4-way operation switch on the LH control lever is pressed.

※ Refer to the page 4-25.

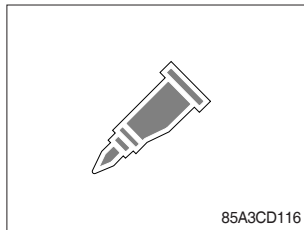
(11) Angle dozer pilot lamp



① This lamp will be light up when the AUX switch is pressed to ANGLE DOZER positions.

※ Refer to the operator's manual page 3-33

(12) Breaker pilot lamp



① This lamp will be light up when the breaker select switch is pressed.

※ Refer to the operator's manual page 3-32.

5) SWITCHES

Sound short beep when each button is pressed.

(1) Menu button



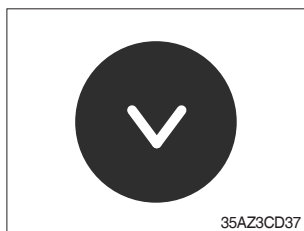
- ① Go into the menu screen.
- ※ Please refer to page 4-14.

(2) Left/up/(+) and auto idle button



- ① Move left in sub menu.
- ② Move up in menu list
- ③ Increase input value in menu
- ④ Auto idle ON or OFF in the operation screen

(3) Right/down/(-) button



- ① Move right in sub menu.
- ② Move down in menu list
- ③ Decrease input value in menu

(4) Enter and buzzer stop button



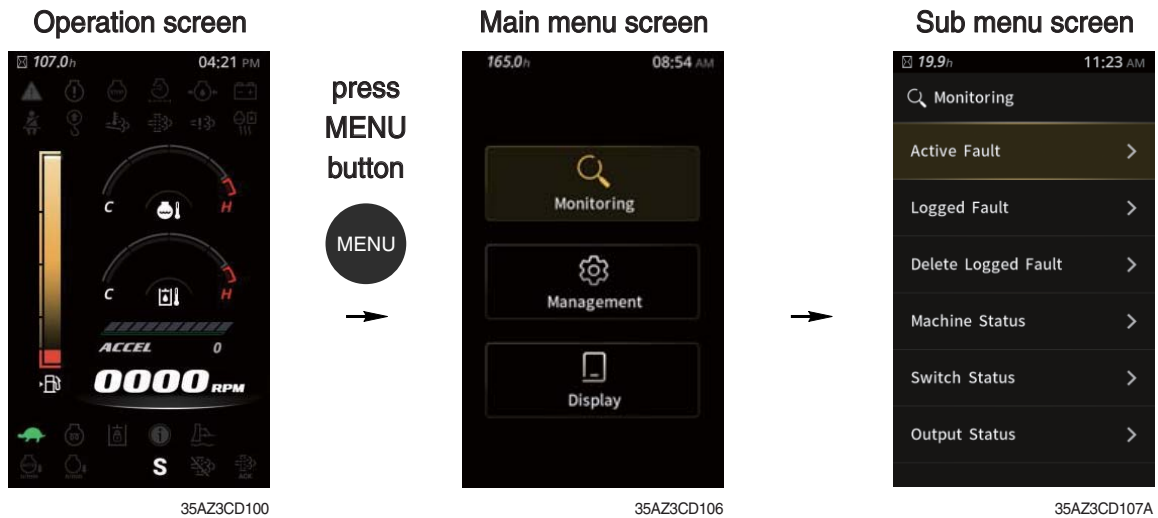
- ① Select menu (enter).
- ② Stop buzzer sound when press this button more than 1.7 sec.

(5) ESC/ rear camera button



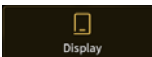
- ① Escape in the menu.
- ② Rear camera ON or OFF in the operation screen

6) MAIN MENU



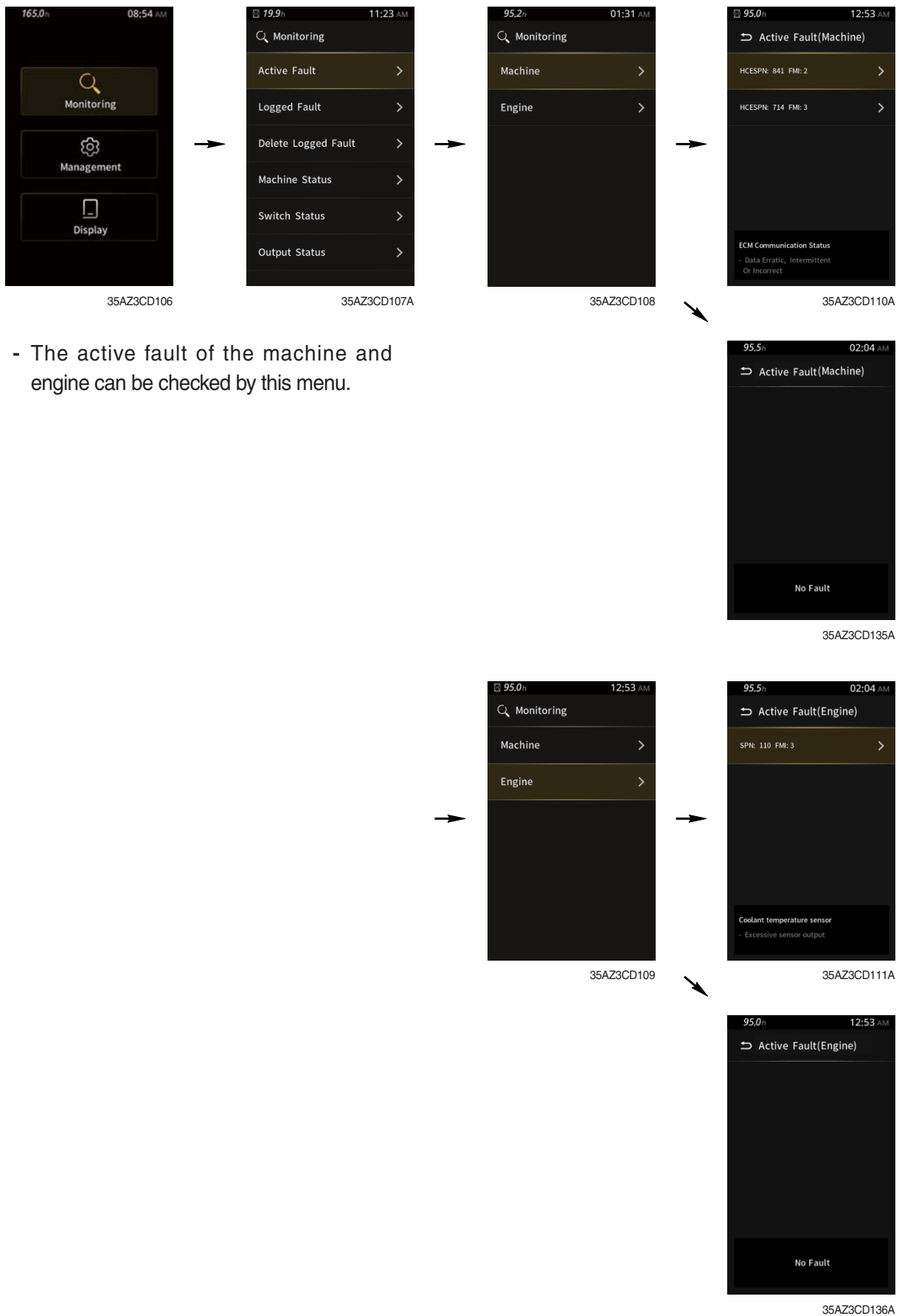
- ※ Please refer to the switches, page 4-13 for selection and change of menus and input values.
- ※ In the operation screen, press the menu button to access the sub-menu screen.

(1) Structure

No	Main menu	Sub menu	Description
1	 Monitoring 35AZ3CD103A	Active fault Logged fault Del logged fault Analog Switch Output	Machine, Engine Machine, Engine Machine, Engine Hyd oil temp, Coolant temp, Battery volt Engine speed, Accel dial volt Safety lever, Dozer floating, Seat belt, Travel speed Travel speed sol, Dozer floating sol, Start limit relay, Buzzer
2	 Management 35AZ3CD104A	Operating hours Maintenance Start limit mode Warning setting on/off Change password Machine information A/S phone number Auxiliary flow	Operating hours Elapsed time, Change interval, Replacement etc. Disabled, Enable (Always), Enable (Interval) Overload on/off Change password Machine, Engine, CMCU A/S phone number, A/S phone number change Auxiliary flow
3	 Display 35AZ3CD105A	Clock Brightness Unit Language	12 Hour, 24 Hour Manual, Auto Temperature, Pressure Korean, English, Turkish

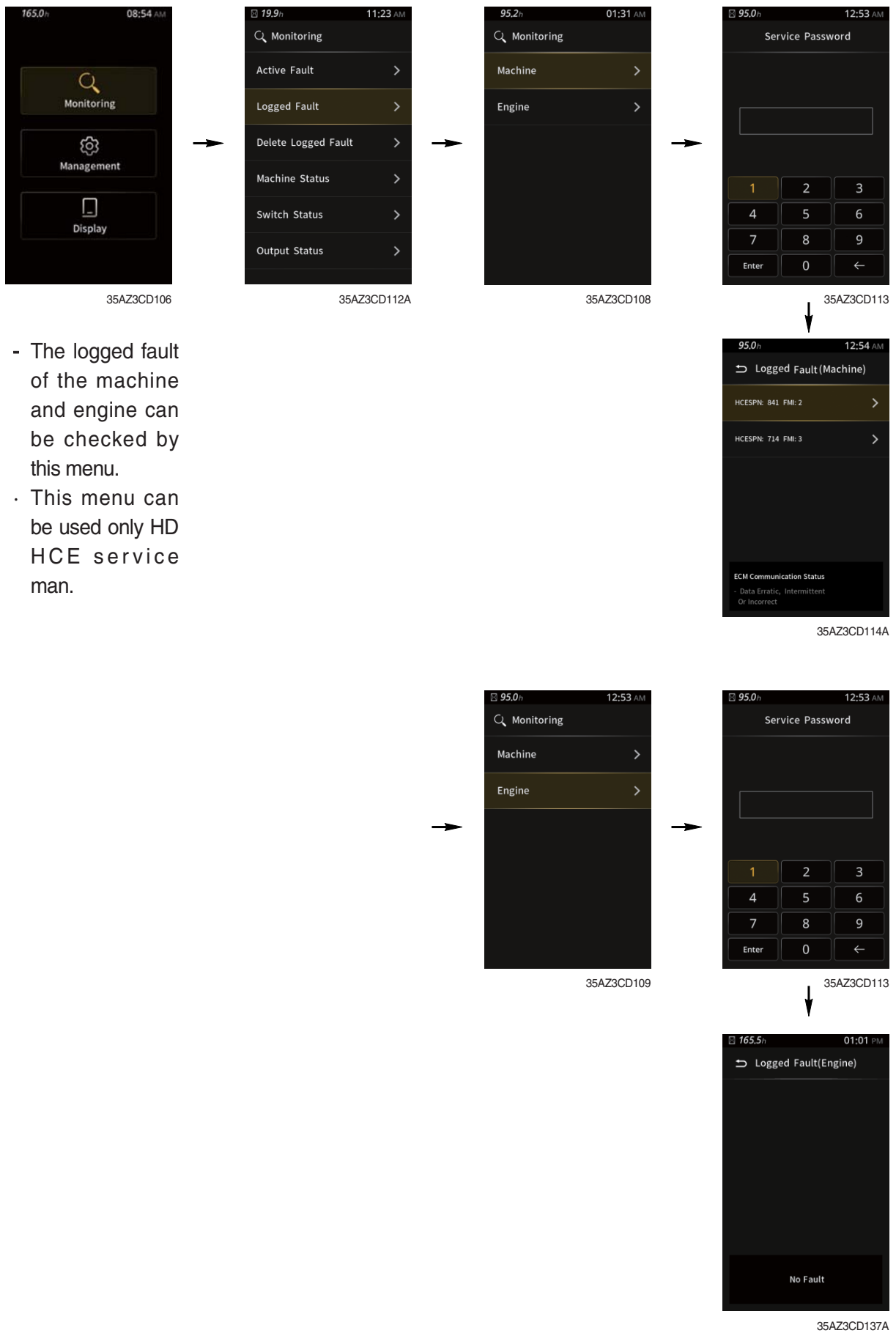
(2) Monitoring

① Active fault



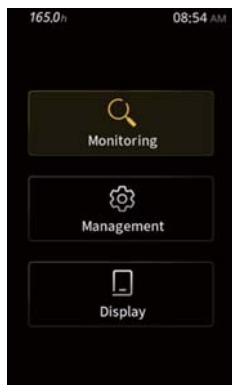
- The active fault of the machine and engine can be checked by this menu.

② Logged fault

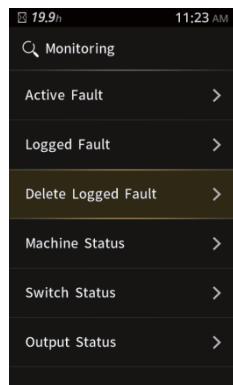


- The logged fault of the machine and engine can be checked by this menu.
- This menu can be used only HD HCE service man.

③ Delete logged fault



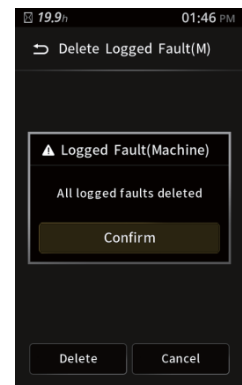
35AZ3CD106



35AZ3CD116A

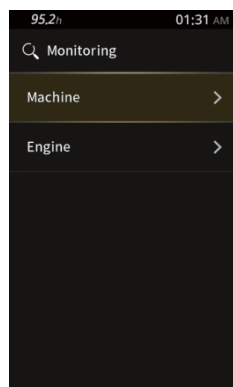


35AZ3CD119A

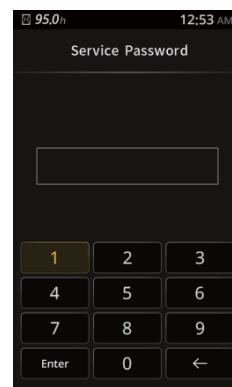


35AZ3CD118A

- The logged fault of the machine and engine can be deleted by this menu.
(It is possible under the engine stop conditions)



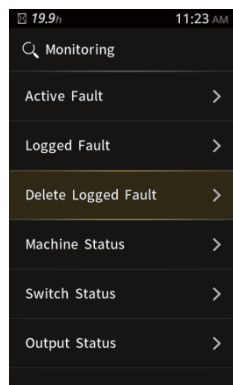
35AZ3CD108



35AZ3CD113



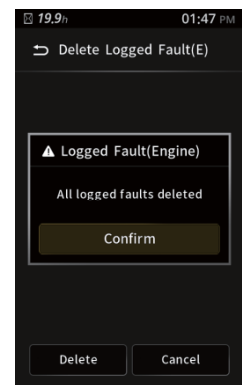
35AZ3CD117A



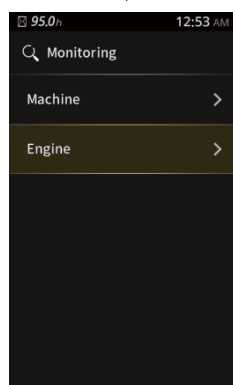
35AZ3CD116A



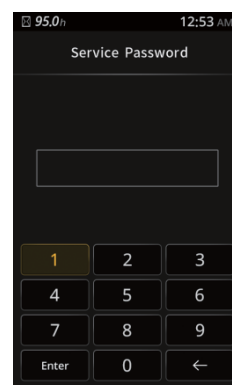
35AZ3CD122A



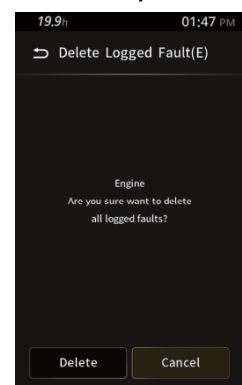
35AZ3CD123A



35AZ3CD109



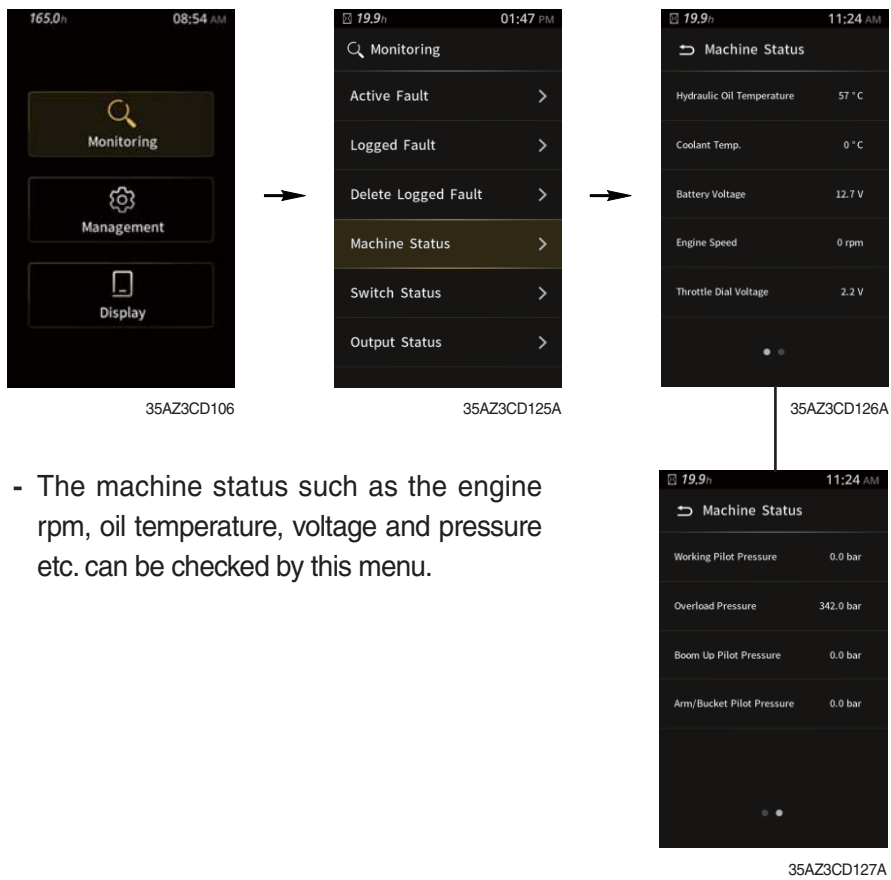
35AZ3CD113



35AZ3CD124A

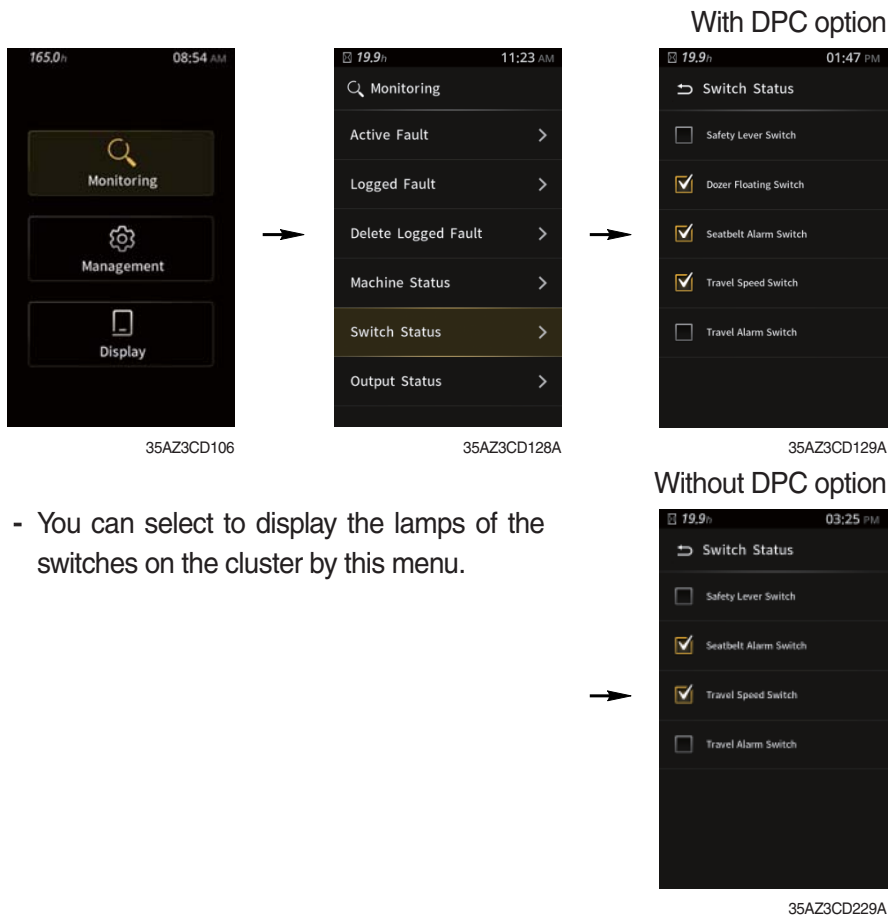
“All logged faults deleted” or “Failure”

④ Machine status



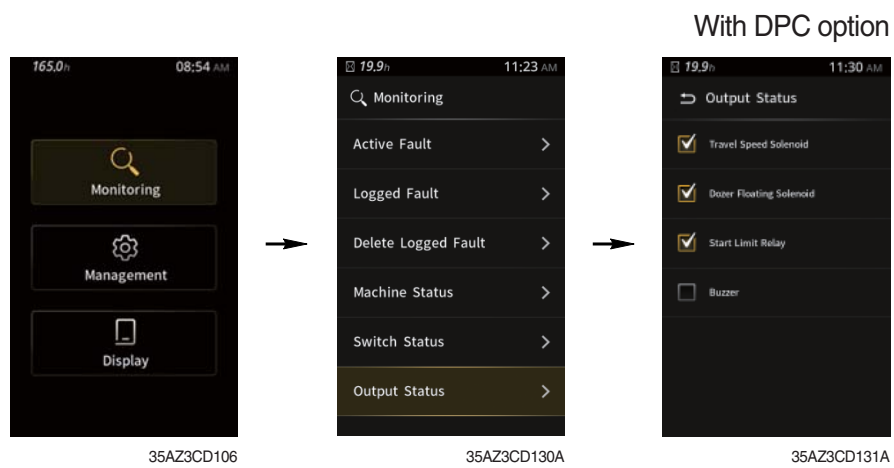
- The machine status such as the engine rpm, oil temperature, voltage and pressure etc. can be checked by this menu.

⑤ Switch status



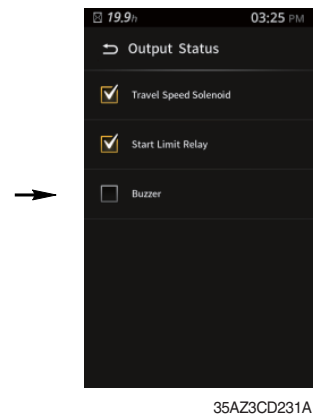
- You can select to display the lamps of the switches on the cluster by this menu.

⑥ Output statue



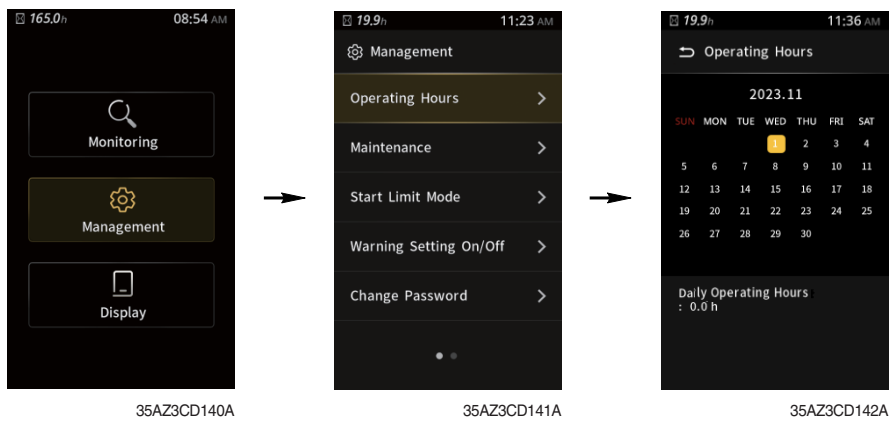
- The output status can be confirmed by this menu.

Without DPC option



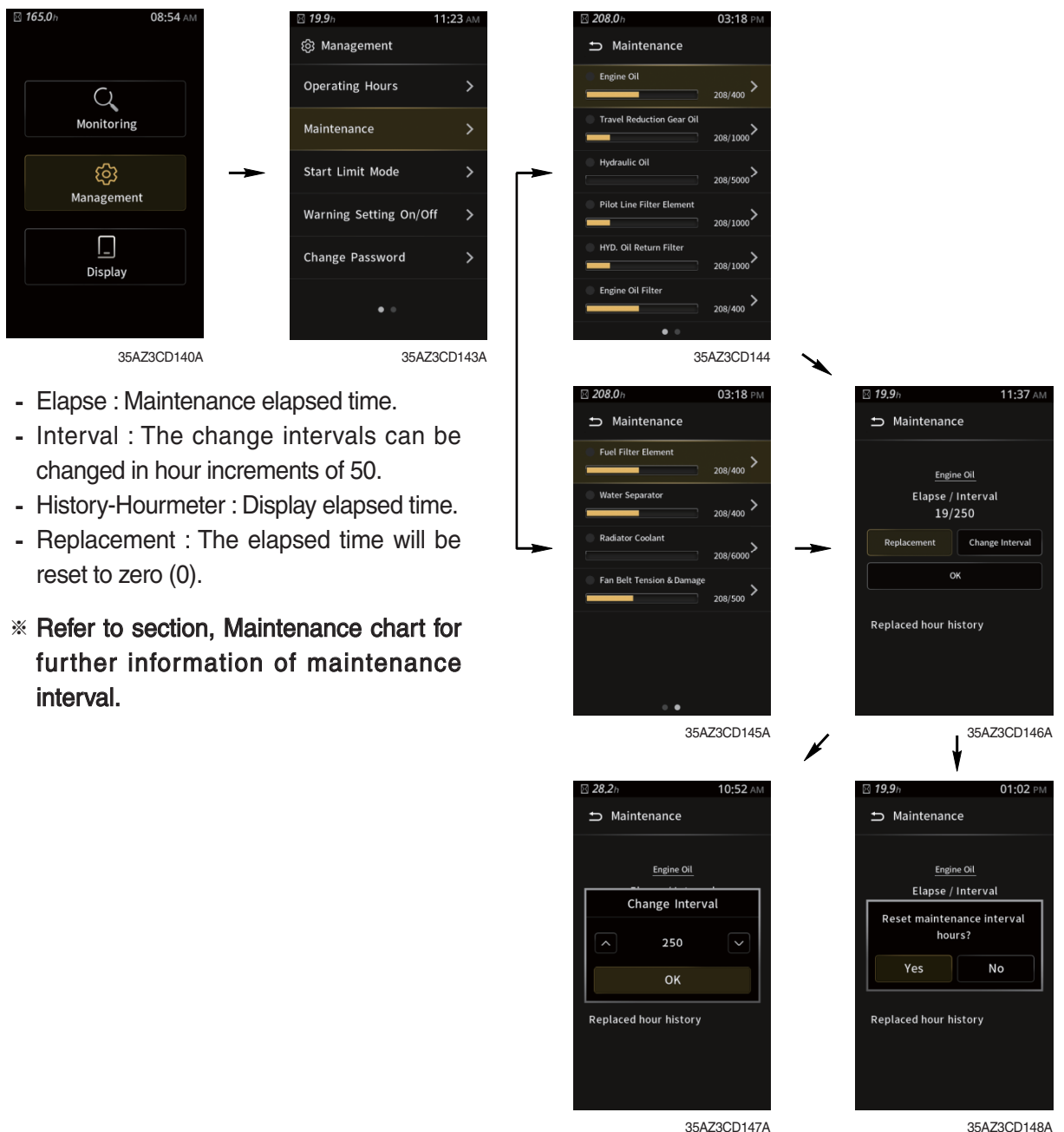
(3) Management

① Operating hours



- You can check the operating hours by this menu.

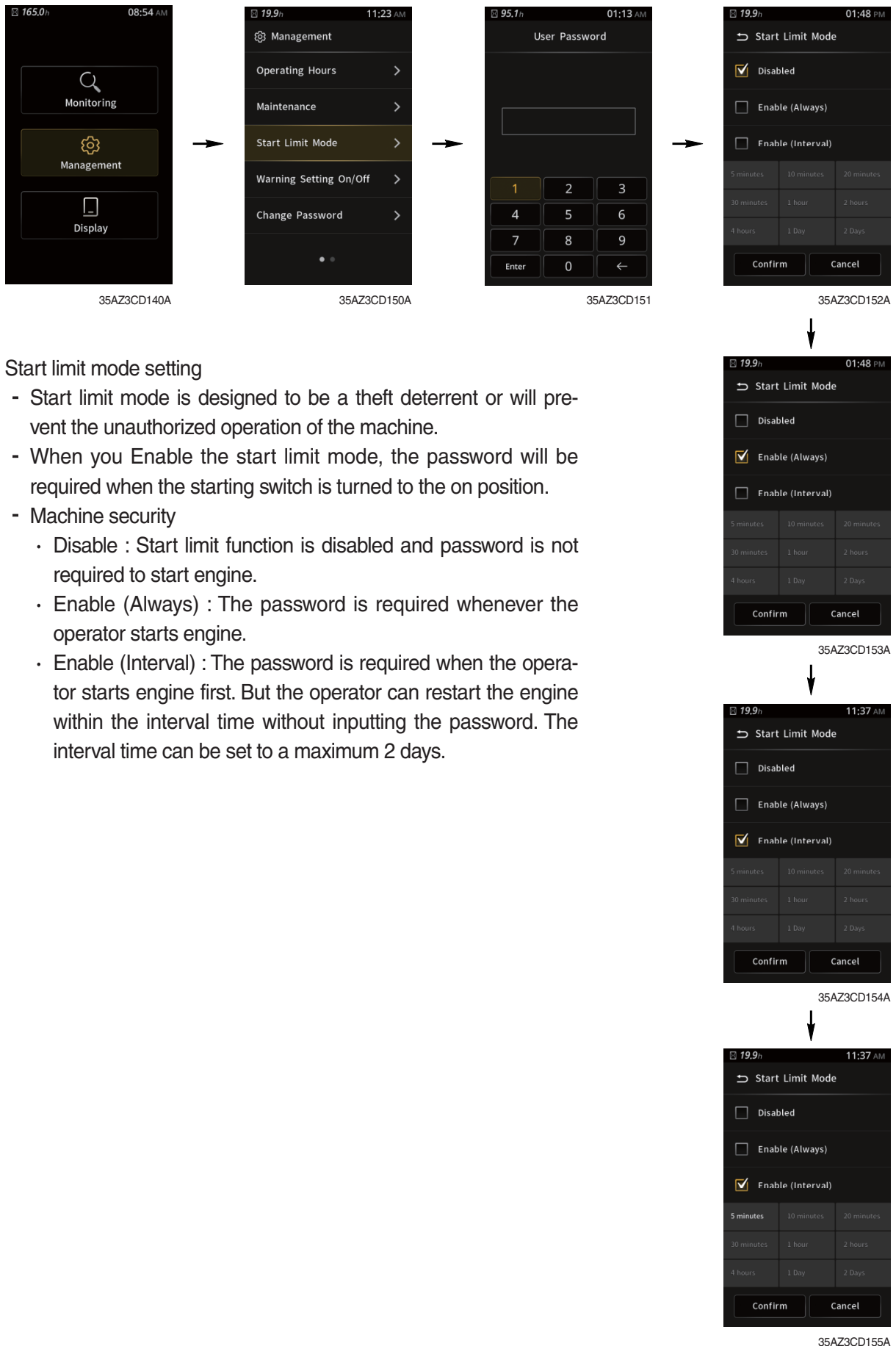
② Maintenance



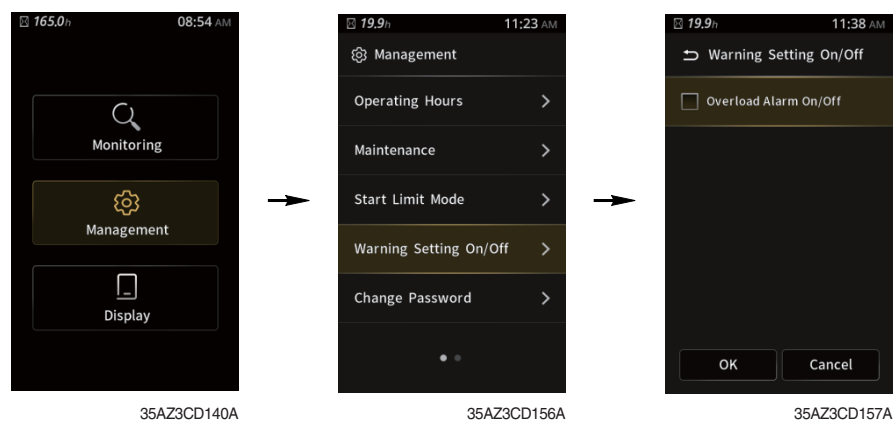
- Elapse : Maintenance elapsed time.
- Interval : The change intervals can be changed in hour increments of 50.
- History-Hourmeter : Display elapsed time.
- Replacement : The elapsed time will be reset to zero (0).

※ Refer to section, Maintenance chart for further information of maintenance interval.

③ Start limit mode

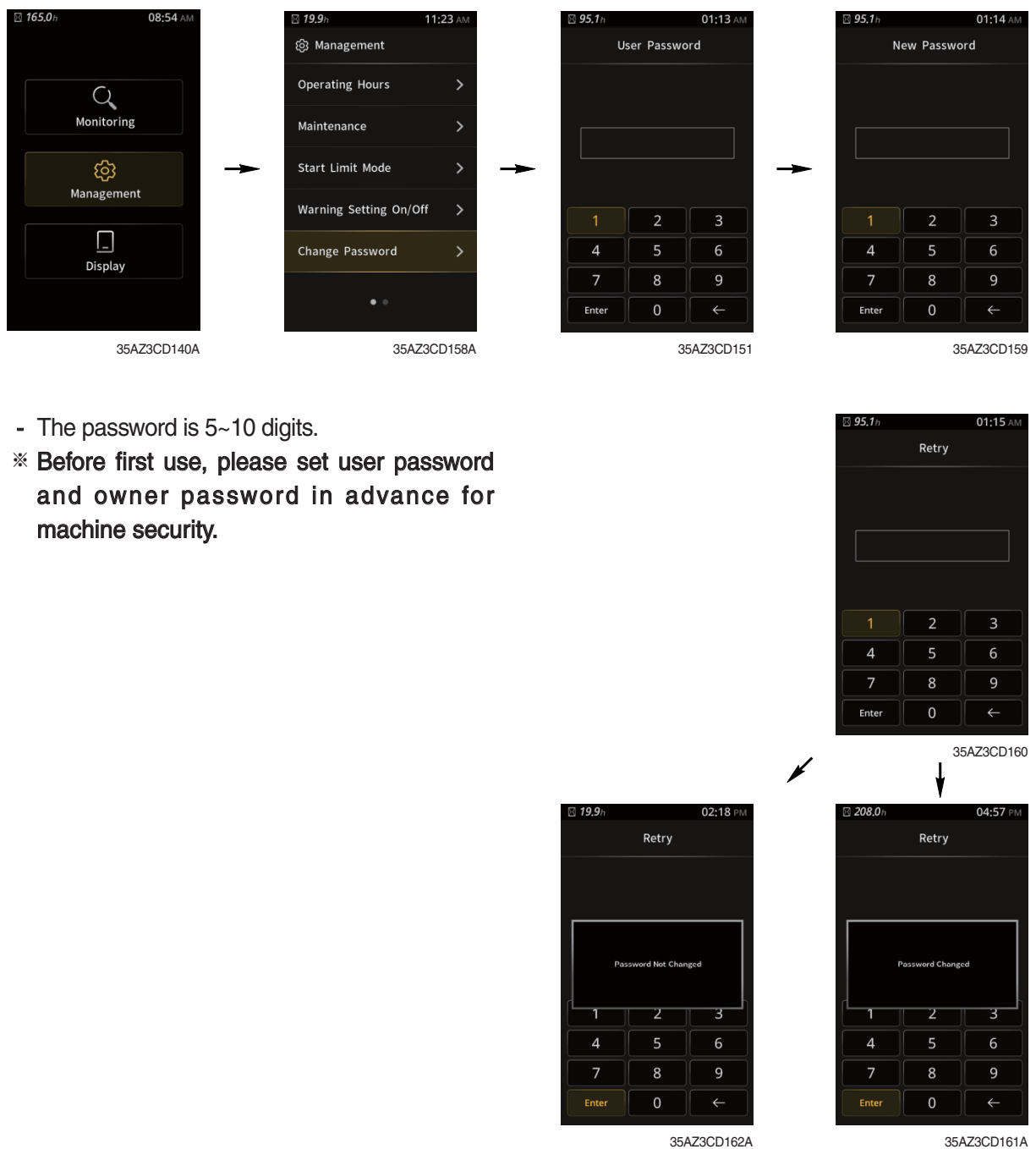


④ Warning setting on/off



- You can set the warning items by this menu.

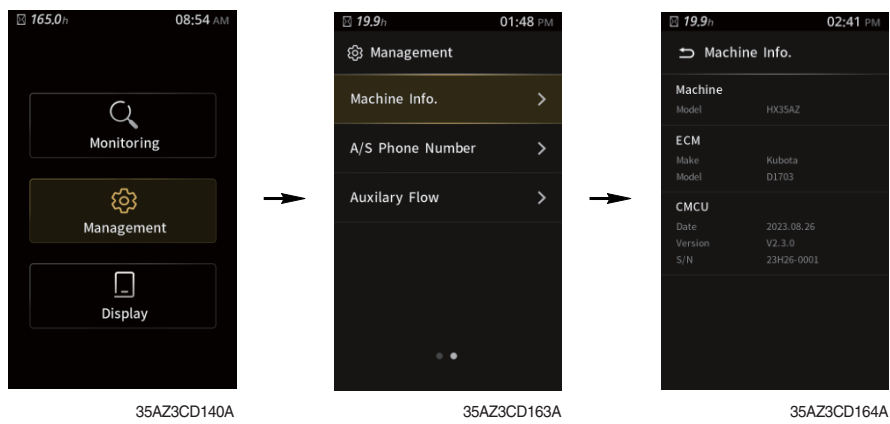
⑤ Change password



- The password is 5~10 digits.

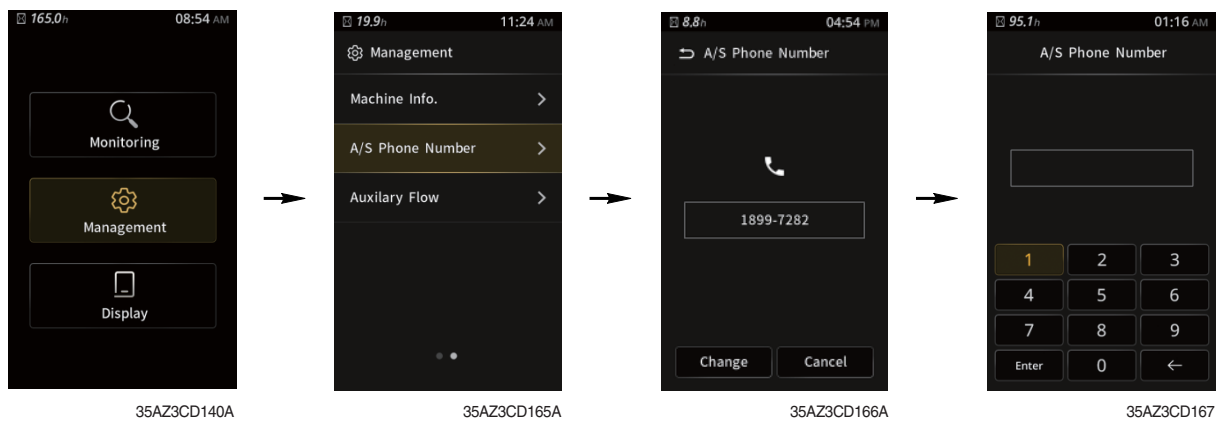
※ Before first use, please set user password and owner password in advance for machine security.

⑥ Machine information



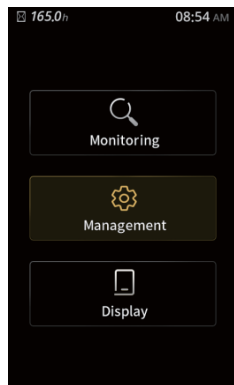
- This can confirm the identification of the machine, engine and cluster.

⑦ Contact

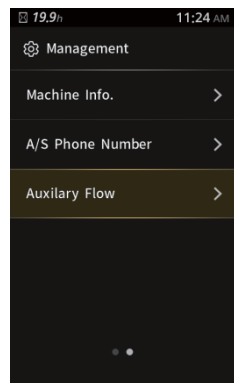


- The A/S phone number can be checked and changed.

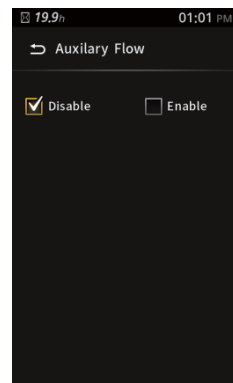
⑧ Aux. Flow



35AZ3CD140A



35AZ3CD170A

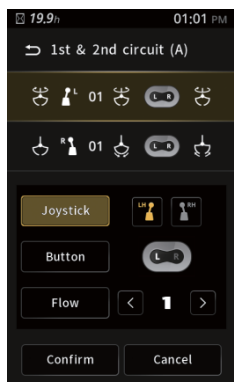


35AZ3CD171A

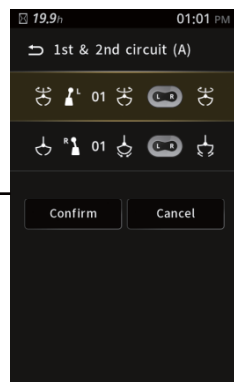
- 3 kinds of option attachment can be selected by this menu.

- a. Rotary grapple (4-way)
- b. Grapple (2-way)
- c. Auger (2-way)

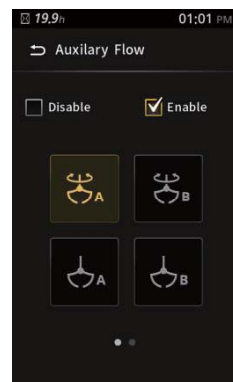
- There are two user modes (type A or B) in each option attachment.



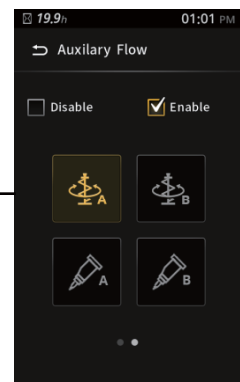
35AZ3CD177A



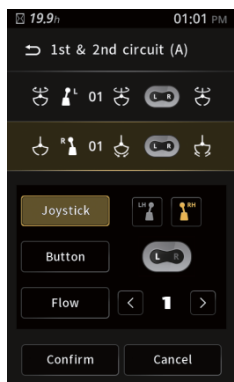
35AZ3CD176A



35AZ3CD172A



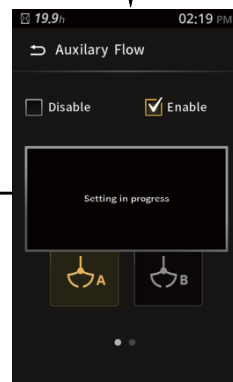
35AZ3CD173A



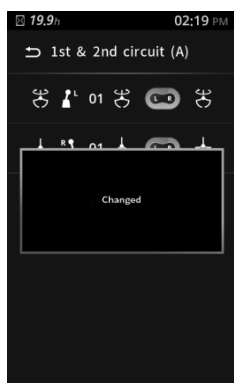
35AZ3CD179A



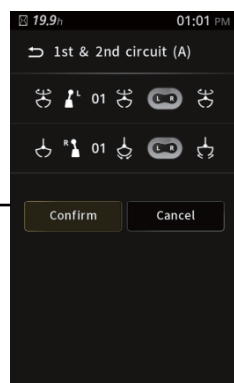
35AZ3CD178A



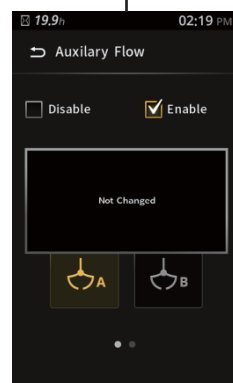
35AZ3CD174A



35AZ3CD181A



35AZ3CD180A



35AZ3CD175A

(4) Display set

① Clock



- Set the time (12 hours or 24 hours)

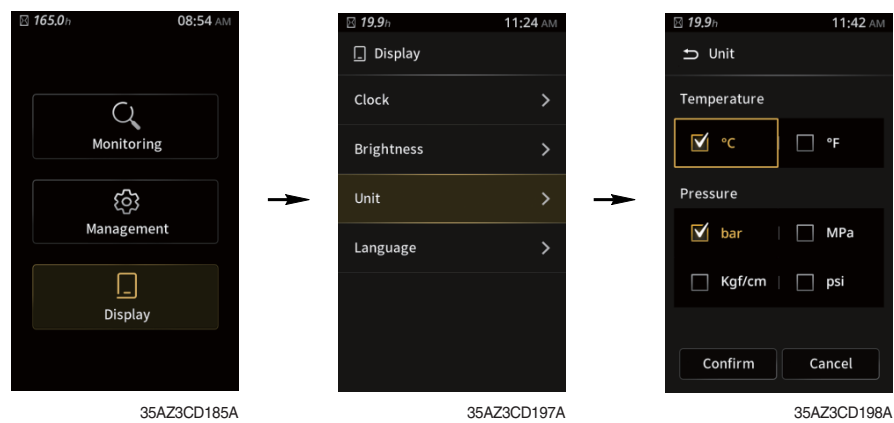
② Brightness



- Manual : Manual setting for LCD brightness.
- Automatic : Automatic control of LCD brightness as set level of Day/Night.
- Setting day time : Set the time for daylight.

(in figure, black area represents night time while orange shows day time)

③ Unit



- Temperature : °C ↔ °F
- Pressure : bar ↔ MPa ↔ kgf/cm² ↔ psi

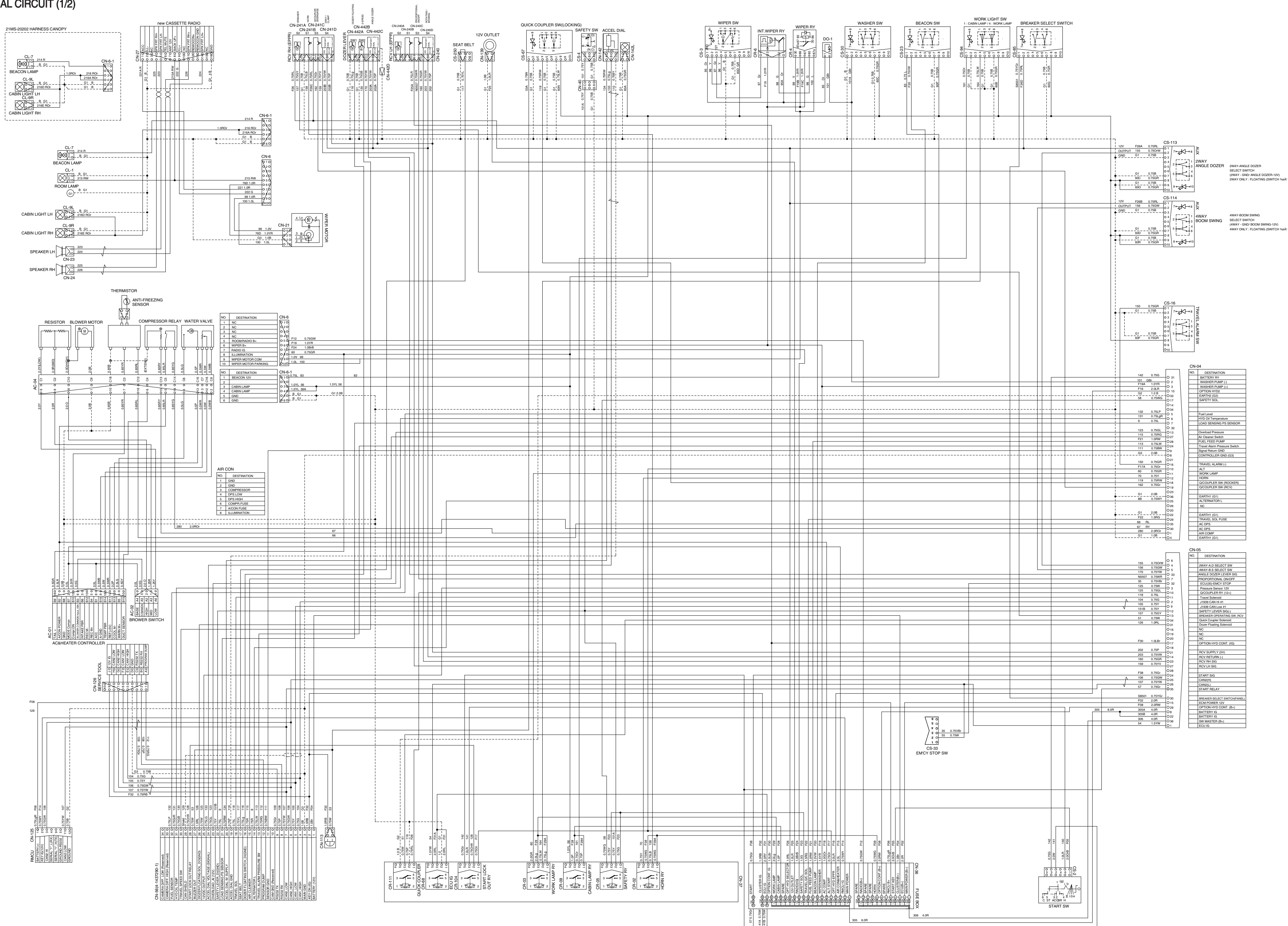
④ Language



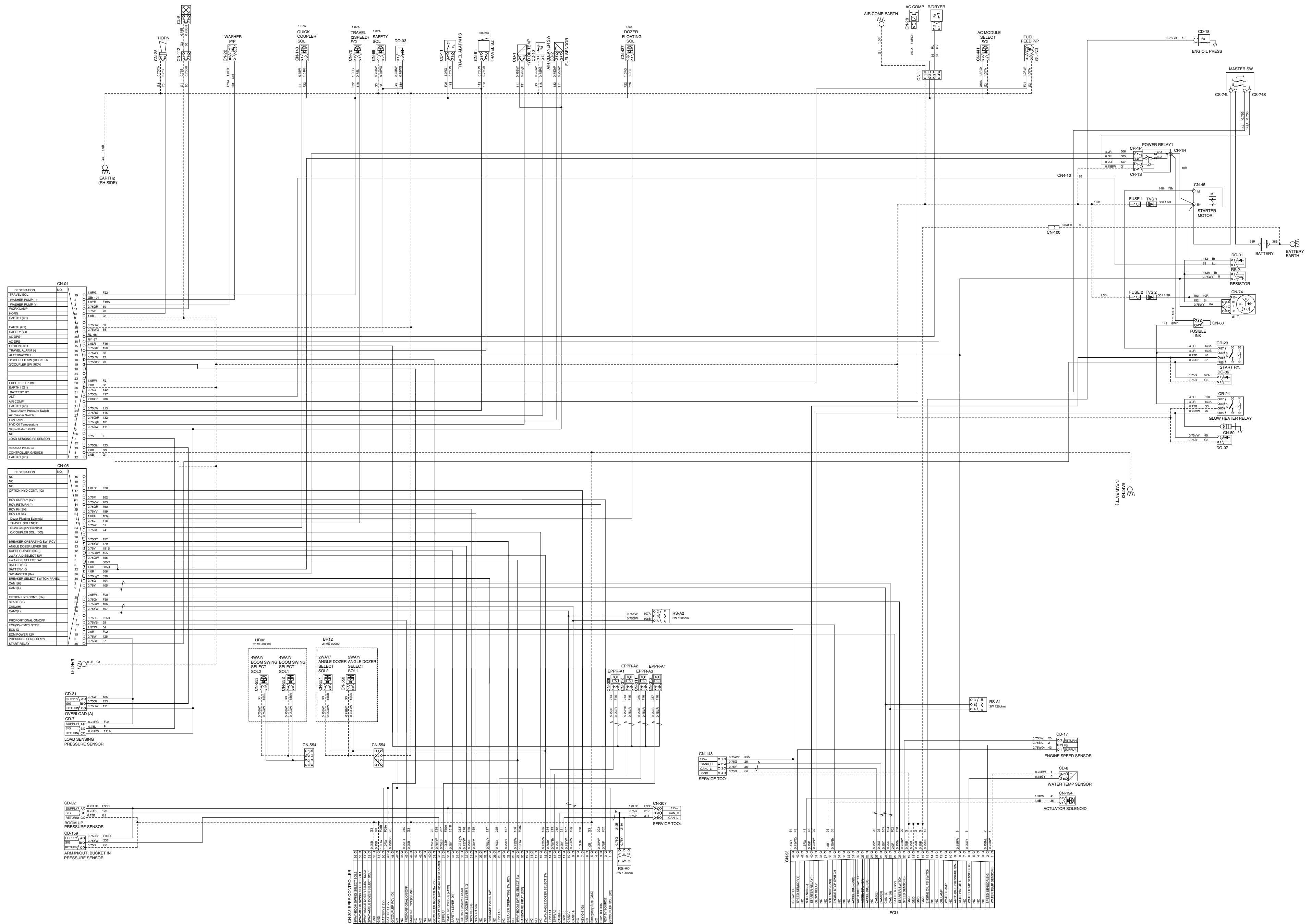
- User can select preferable language and all displays are changed to the selected language (한국어, English or Turkish).

GROUP 3 ELECTRICAL CIRCUIT

· ELECTRICAL CIRCUIT (1/2)



· ELECTRICAL CIRCUIT (2/2)



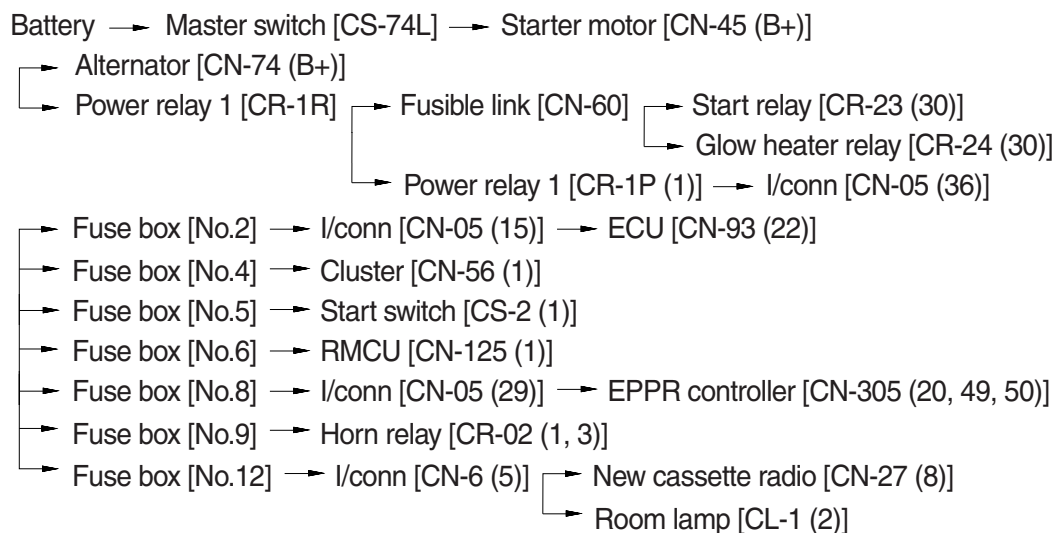
MEMORANDUM

1. POWER CIRCUIT

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

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

1) OPERATING FLOW



※ I/conn : Intermediate connector

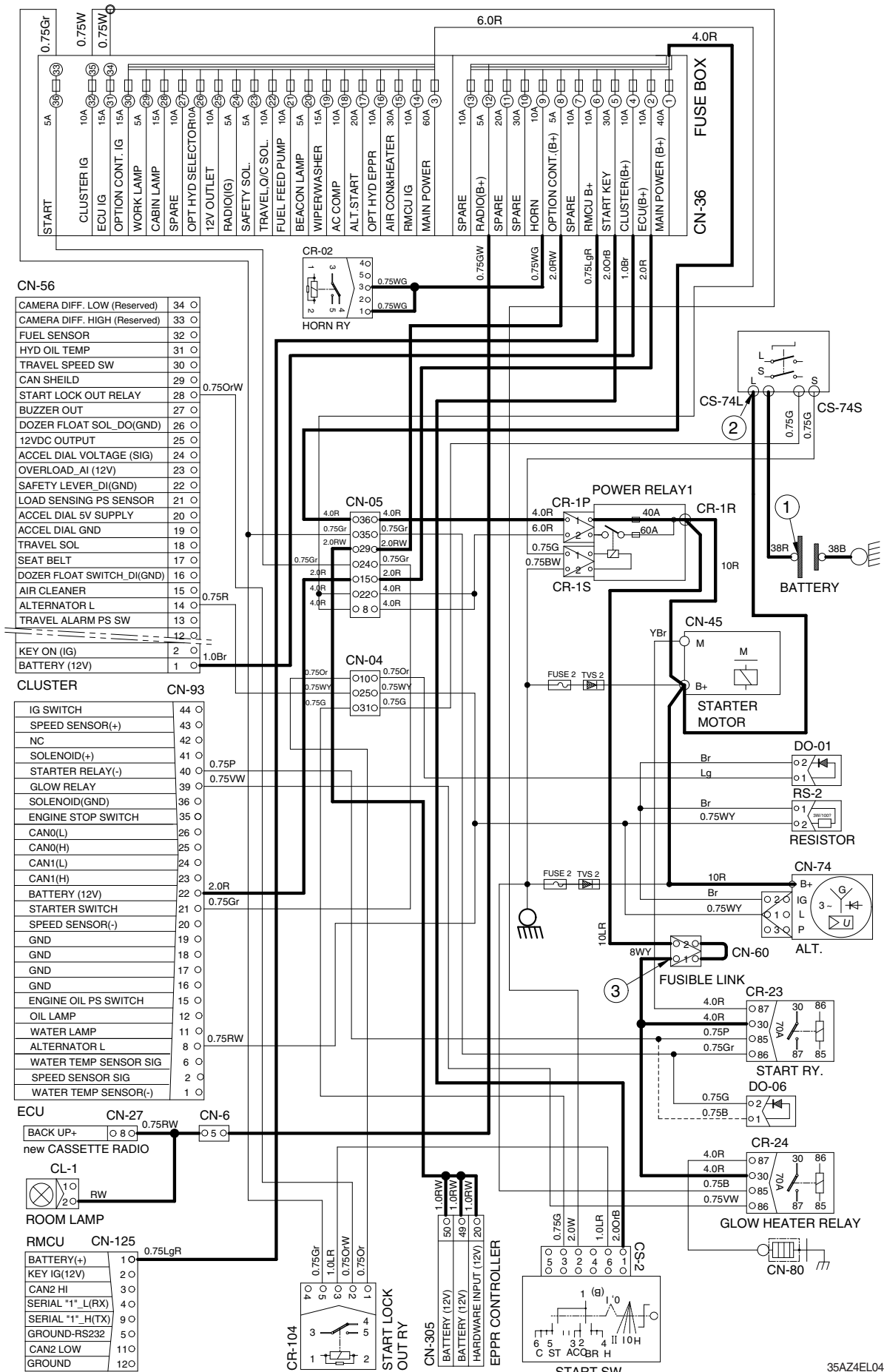
2) CHECK POINT

Engine	Start switch	Check point	Voltage
OFF	OFF	① - GND (Battery) ② - GND (Master switch) ③ - GND (Fusible link)	10~12.5 V

※ GND : Ground

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

POWER CIRCUIT



2. STARTING CIRCUIT

1) OPERATING FLOW

Battery(+) terminal → Master switch [CS-74L] → Starter motor [CN-45 (B+)] → Power relay 1 [CR-1P (1)]
 → I/conn [CN-05 (36)] → Fuse box No.5 → Start switch [CS-2 (1)]

(1) Start switch : ON

Start switch ON [CS-2 (2)] → Fuse box [No. 34 → 31] → ECU IG relay [CR-68 (1, 3 → (5))]
 → I/conn [CN-05 (1)] → ECU [CN-93 (44)]

Start switch ON [CS-2 (3)] → I/conn [CN-04 (31)] → Master switch [CS-74S] → Power relay 1 [CR-1S (1)]
 Power relay 1 [CR-1P (2)] → I/conn [CN-05 (8, 22)] → Fuse box [No.23] → Safety relay [CR-05 (1, 3)]

(2) Start switch : START

Start switch START [CS-2 (6)] → Start lock out relay [CR-104 (3) → (5)]

→ Fuse box [No. 33 → 36] → I/conn [CN-05 (24)] → ECU [CN-93 (21)]

→ I/conn [CN-05 (35)] → Start relay [CR-23 (86) → (87)] → Start motor [CN-45 (M)] → Starter operating

2) CHECK POINT

Engine	Start switch	Check point	Voltage
Operating	START	① - GND (Battery) ② - GND (Start key) ③ - GND (master switch) ④ - GND (Starter B+) ⑤ - GND (Starter M) ⑥ - GND (Fusible link)	10~12.5 V

※ GND : Ground

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

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



35AZ4EL05

3. CHARGING CIRCUIT

When the starter is activated and the engine is started, the operator releases the key switch to the ON position.

Charging current generated by operating the alternator flows into the battery through the master switch (CS-73).

The current also flows from alternator to each electrical component and controller through the fuse box.

1) OPERATING FLOW

(1) Warning flow

Alternator [CN-74 (L)] → I/conn [CN-04 → (25)] → Cluster [CN-56 (14)] → Cluster warning lamp
→ ECU [CN-93 (87)]

(2) Charging flow

Alternator [CN-74 (B+)] → Start motor [CN-45 (B+)]
→ Master switch [CS-74L] → Battery (+) terminal → Battery charging
→ Power relay 1 [CR-1P (1)] → I/conn [CN-05 (38)] → Fuse box [No.1~13]
→ Power relay 1 [CR-1P (2)] → I/conn [CN-05 (8, 22)] → Fuse box [No.3~30]

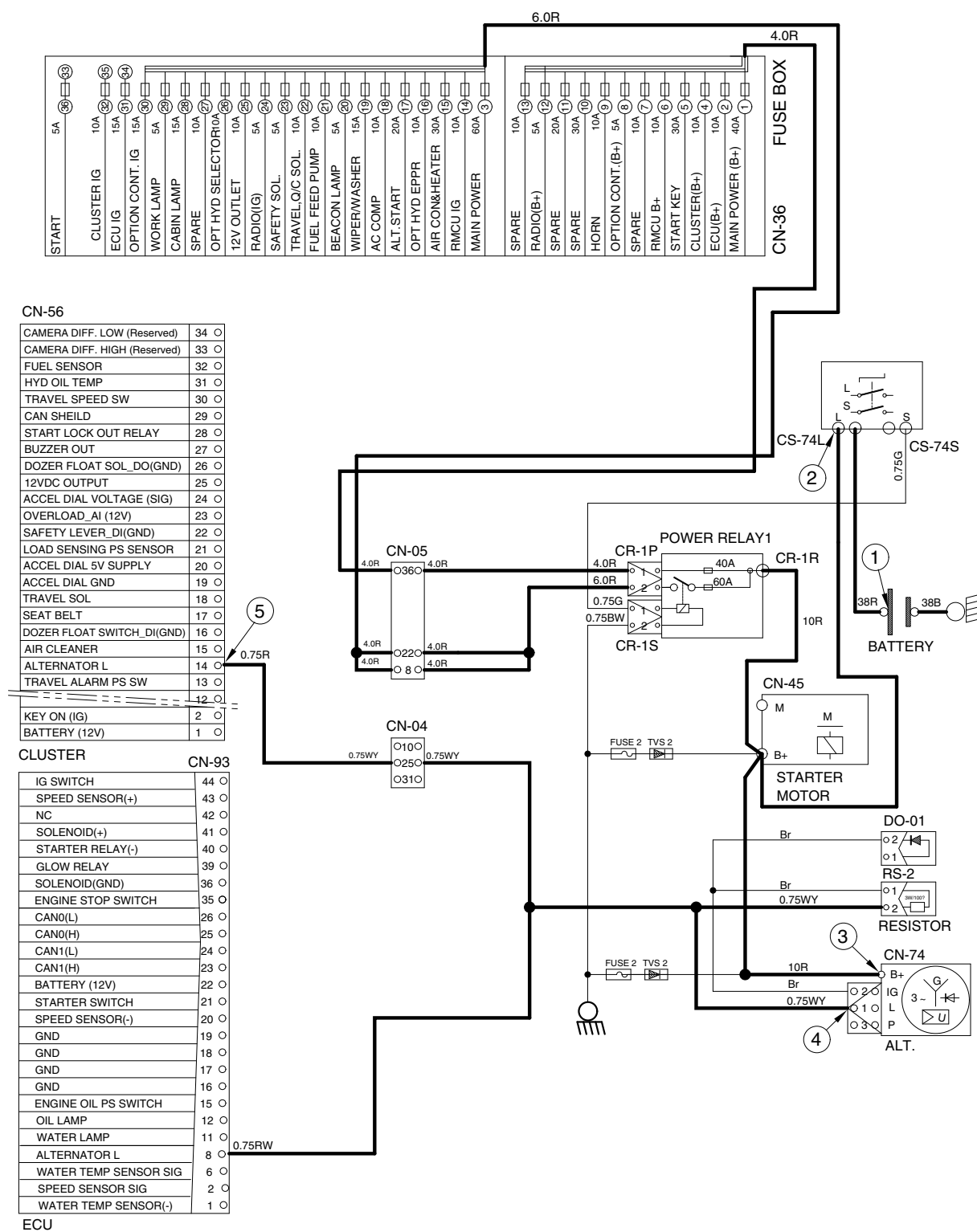
2) CHECK POINT

Engine	Start switch	Check point	Voltage
Operating	START	① - GND (battery voltage) ② - GND (master switch) ③ - GND (alternator B ⁺ terminal) ④ - GND (alternator 1 terminal) ⑤ - GND (cluster)	10~12.5 V

※ GND : Ground

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

CHARGING CIRCUIT



35AZ4EL06

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

4. CABIN AND WORK LAMP CIRCUIT

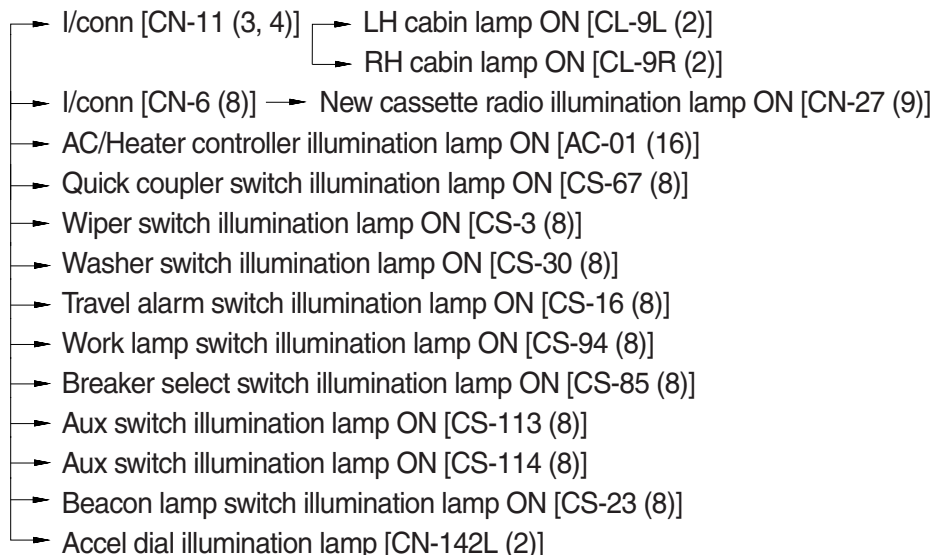
1) OPERATING FLOW

Fuse box (No.28) → Cabin lamp relay [CR-09 (1, 3)]

Fuse box (No.29) → Work lamp relay [CR-03 (1, 3)]

(1) Work lamp switch ON : 1st step

Work lamp switch ON [CS-94 (1)] → Cabin lamp relay [CR-09 (2) → (5)]



(2) Work lamp switch ON : 2st step

Work lamp switch ON [CS-94 (4)] → Work lamp relay [CR-03 (1) → (5)] → I/conn [CN-04 → (11)]
 → I/conn [CN-112 (2)] → Work lamp ON [CL-5 (2)]

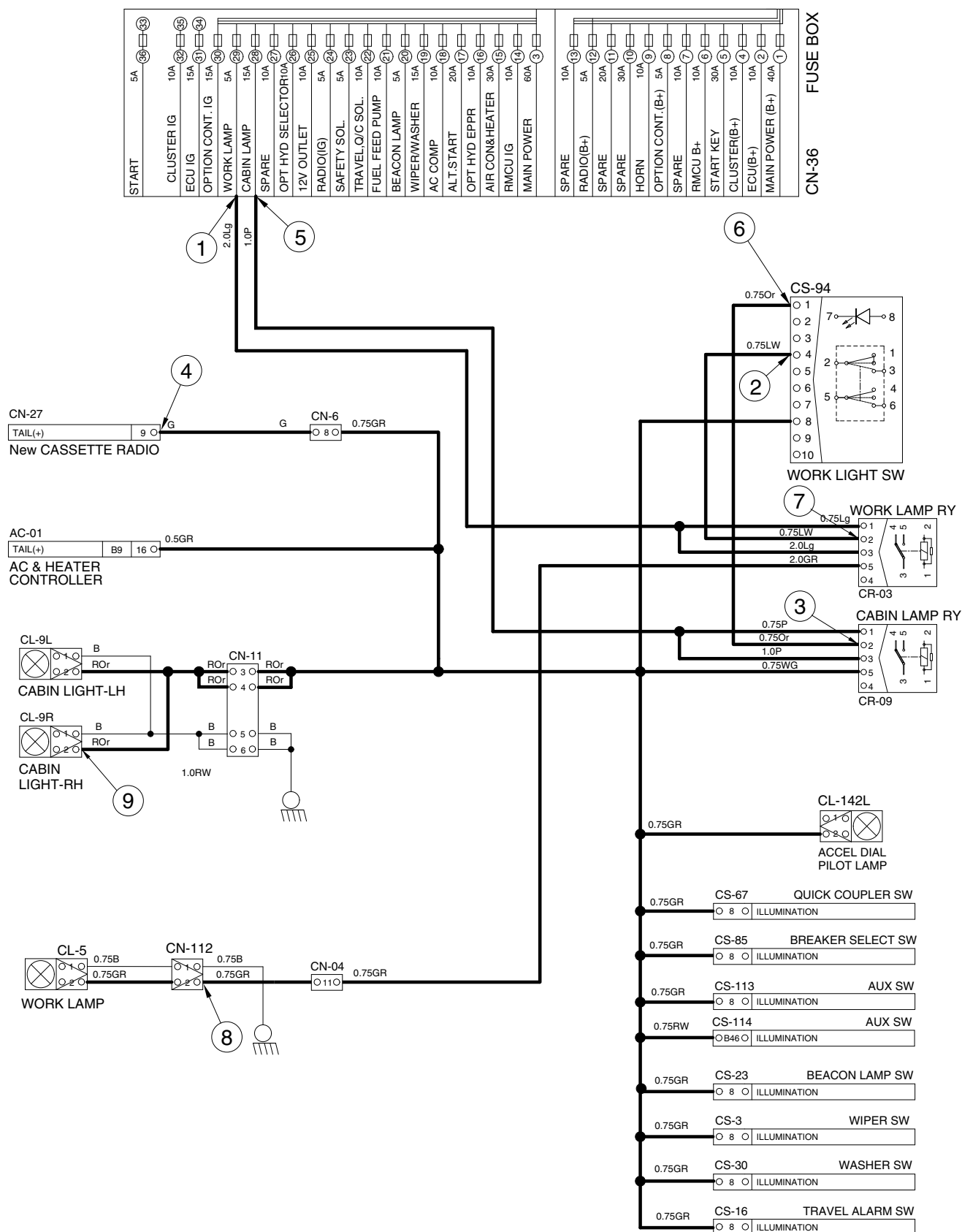
2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	ON	① - GND (fuse box) ② - GND (switch power input) ③ - GND (switch power output) ④ - GND (illumination lamp) ⑤ - GND (fuse box) ⑥ - GND (switch power input) ⑦ - GND (switch power output) ⑧ - GND (work light) ⑨ - GND (cabin light)	10~12.5 V

※ GND : Ground

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

CABIN AND WORK LAMP CIRCUIT



35AZ4EL07

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

5. BEACON LAMP CIRCUIT

1) OPERATING FLOW

Fuse box (No.20) → Beacon lamp switch [CS-23 (2)]

(1) Beacon lamp switch ON

Beacon lamp switch ON [CS-23 (1)] → I/conn [CN-6-1 (1)] → Beacon lamp ON [CL-7 (2)]

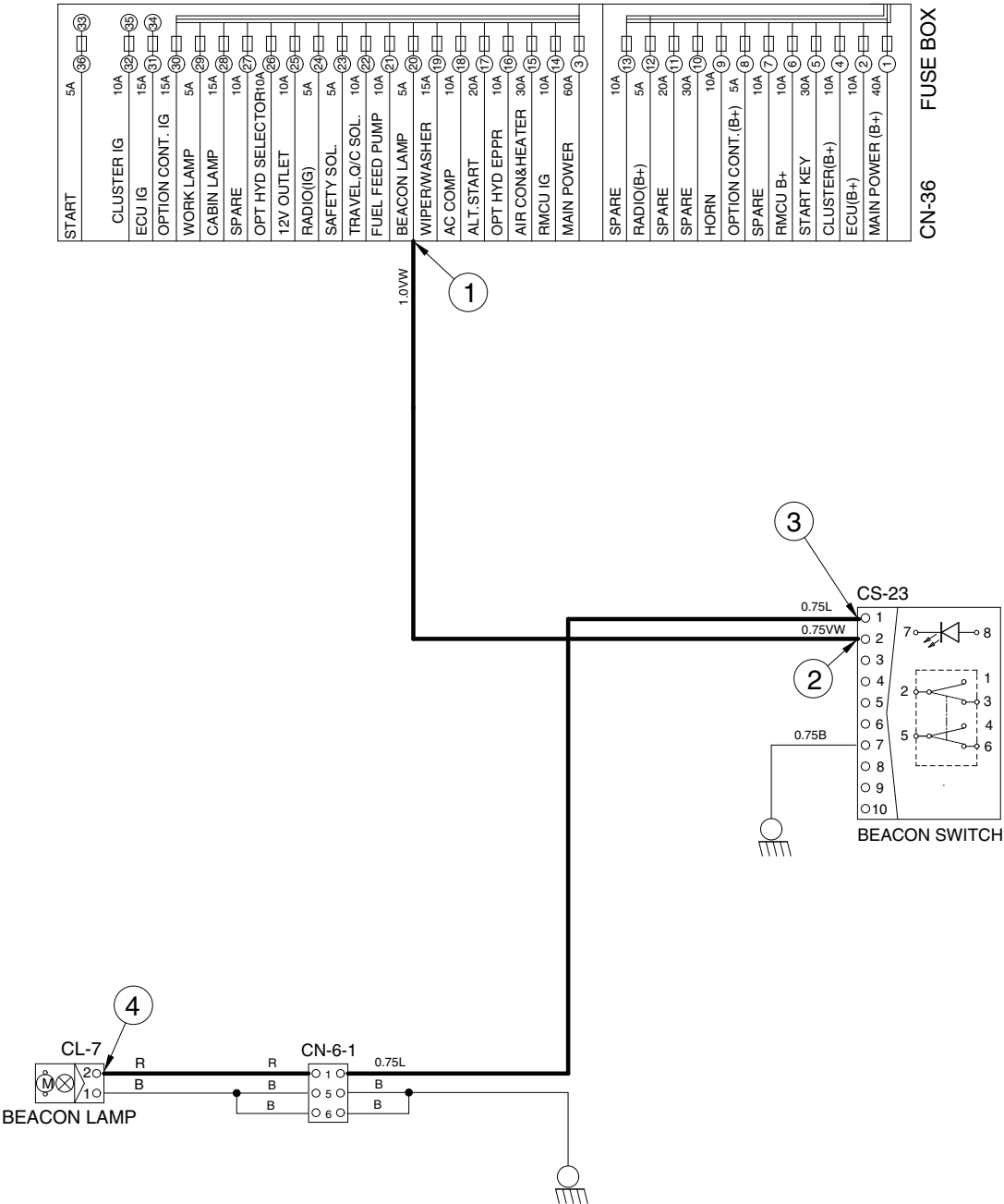
2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	ON	① - GND (fuse box) ② - GND (switch power input) ③ - GND (switch power output) ④ - GND (beacon lamp)	10~12.5 V

※ GND : Ground

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

BEACON LAMP CIRCUIT



35AZ4EL08

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

6. WIPER AND WASHER CIRCUIT

1) OPERATING FLOW

(1) Start switch ON

Fuse box (No.19) → Wiper relay [CR-4 (86, 87)]
→ Int wiper relay [CR-6 (3)]
→ I/conn [CN-6 (6)] → Wiper motor [CN-21 (3)]

(2) Wiper switch ON : 1st step (low speed)

Wiper switch ON [CS-3 (3)] → Int wiper relay [CR-6 (4) → (2)]
→ Wiper relay [CR-4 (85) → (30)] → I/conn [CN-6 (9)]
→ Washer motor operating [CN-21 (4)]

(3) Wiper switch ON : 2nd step (washer)

Wiper switch ON [CS-3 (4)] → Int wiper relay [CR-6 (1)] → Washer switch [CS-30 (2)]
→ Wiper relay [CR-4 (85) → (87a)]
→ Wiper motor operating [CN-21 (4)]
Washer switch ON [CS-30 (2)] → I/conn [CN-04 (2)] → Washer pump operating [CN-22 (1)]

(4) Auto parking (when switch OFF)

Switch OFF → Wiper relay [CN-21(1)] → Wiper switch [CS-3] → Int wiper relay [CR-6 (4) → (2)]
→ Wiper relay [CR-4 (85) → (30)] → I/conn [CN-6 (9)] → Wiper motor [CN-21 (4)]
→ Wiper motor parking position by wiper motor controller

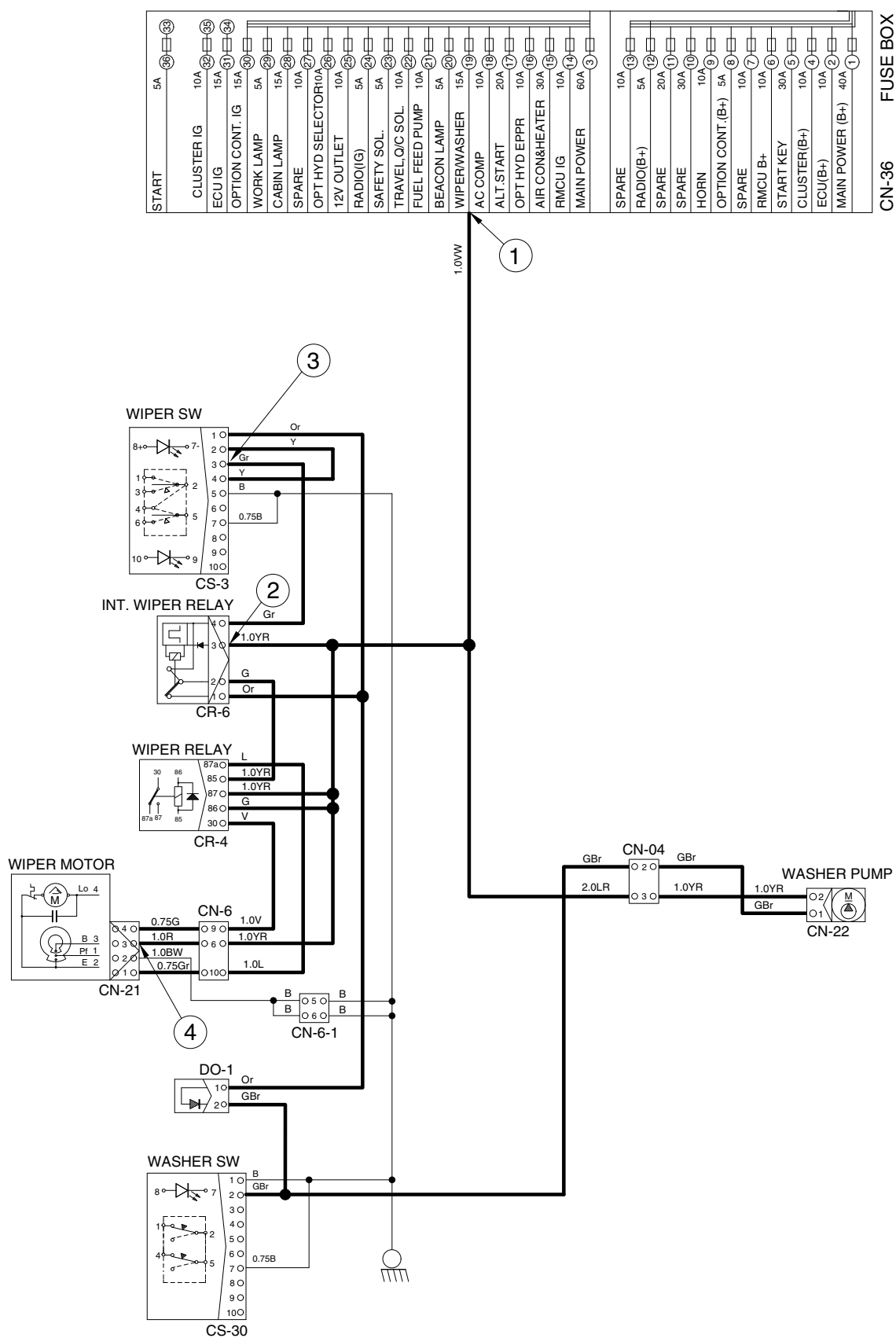
2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	ON	① - GND (fuse box) ② - GND (switch power input) ③ - GND (switch power output) ④ - GND (wiper motor)	10~12.5 V

※ GND : Ground

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

6. WIPER AND WASHER CIRCUIT



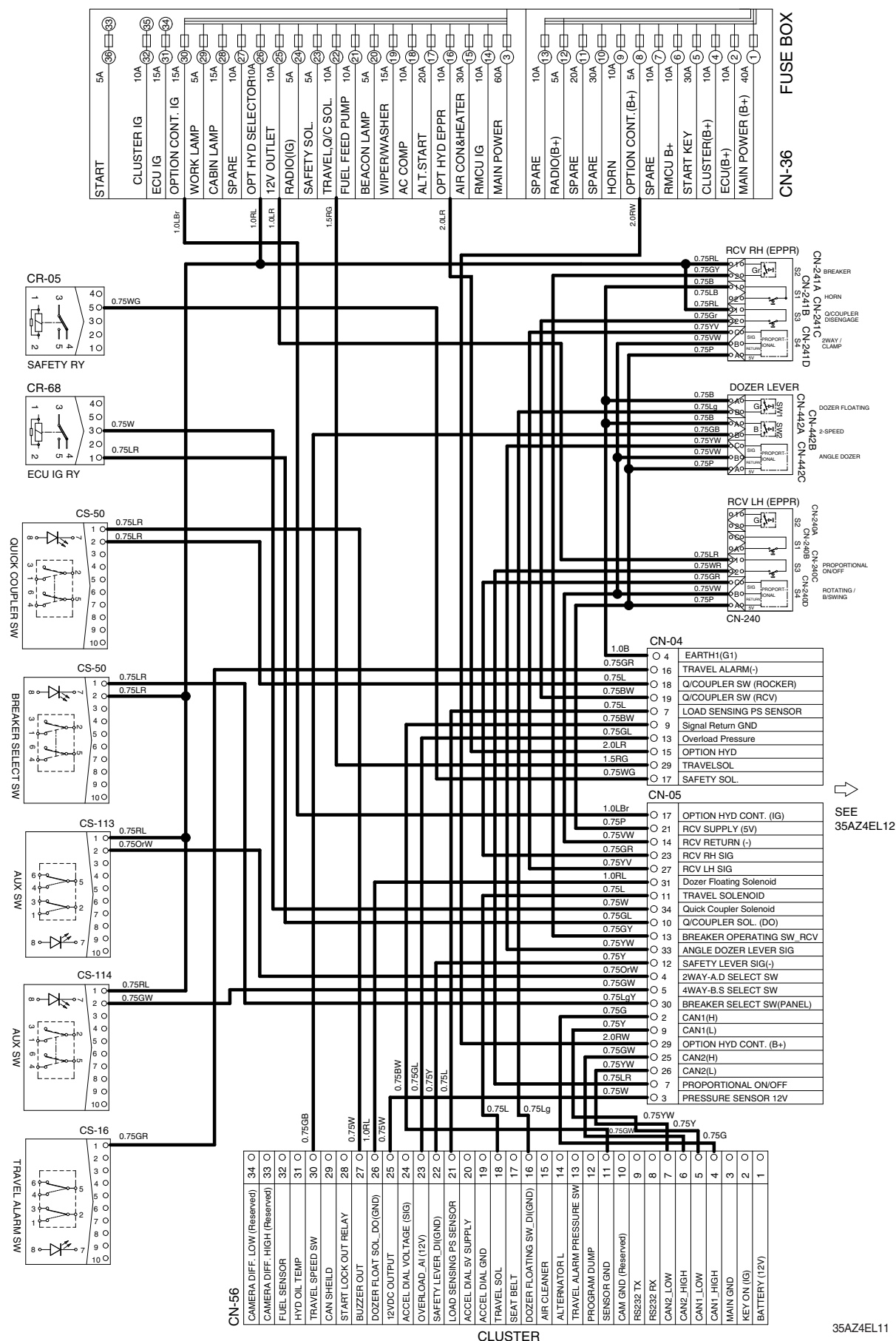
35AZ4EL09

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

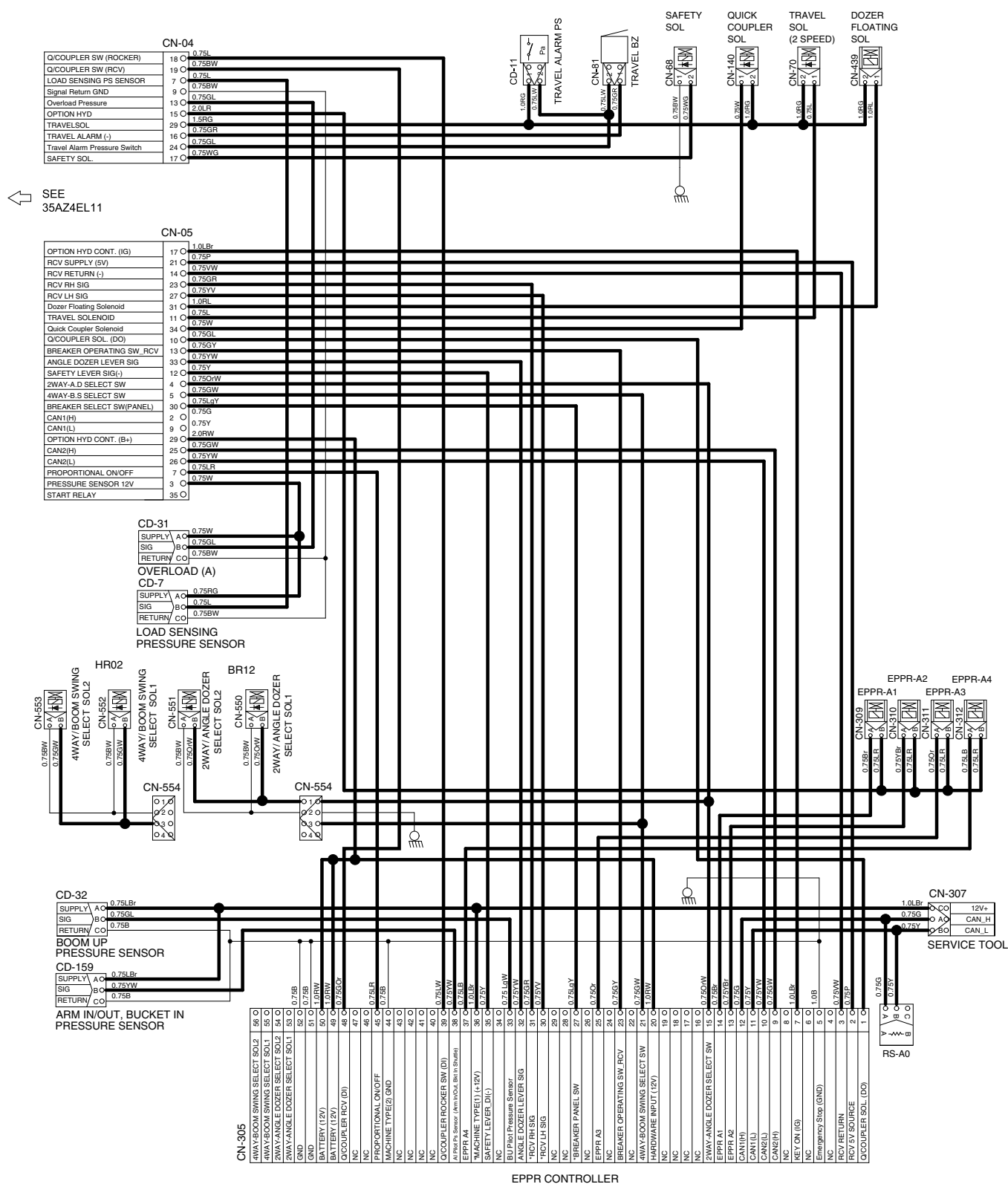
※ The circuit diagram may differ from the equipment, so please check before a repair.



8. ELECTRIC CIRCUIT FOR HYDRAULIC (1/2)



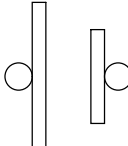
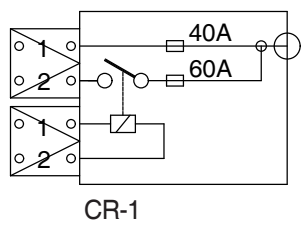
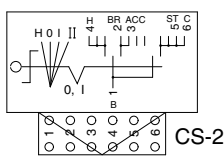
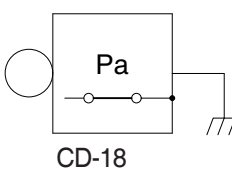
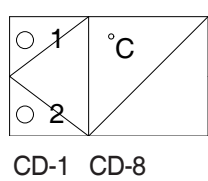
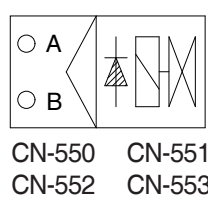
ELECTRIC CIRCUIT FOR HYDRAULIC (2/2)

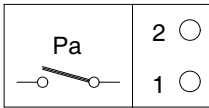
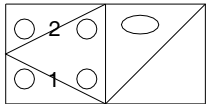
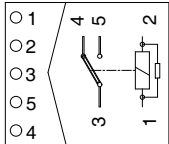
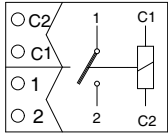
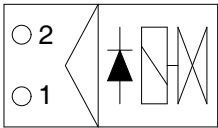
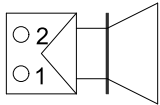


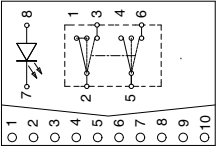
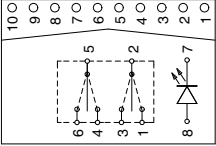
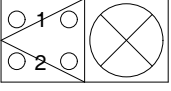
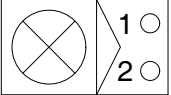
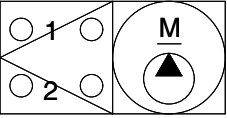
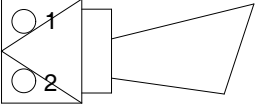
35AZ4EL12

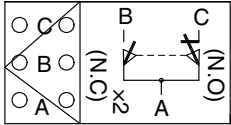
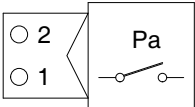
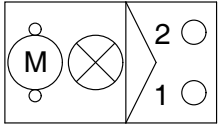
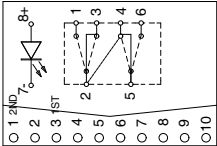
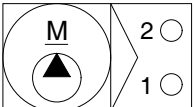
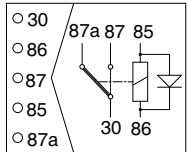
※ The circuit diagram may differ from the equipment, so please check before a repair.

GROUP 4 ELECTRICAL COMPONENT SPECIFICATION

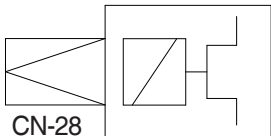
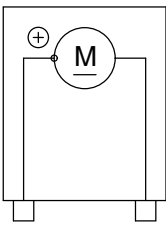
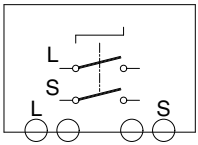
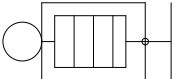
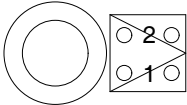
Part name	Symbol	Specification	Check
Battery		12V × 72Ah	※ Check specific gravity 1.280 over : over charged 1.280 ~ 1.250 : normal 1.250 below : recharging
Power relay 1		Rated load : 12V 100A (continuity) 1000A (30 second)	※ Check coil resistance Normal : about 12Ω ※ Check contact Normal : ∞Ω
Start switch		12V	※ Check contact OFF : ∞Ω (for each terminal) ON : 0Ω (for terminal 1-3 and 1-2) START : 0Ω (for terminal 1-6)
Pressure switch (for engine oil)		0.5 kgf/cm ² (N.C TYPE)	※ Check resistance Normal : 0Ω (CLOSE)
Hydraulic oil temperature sensor		0.5 kgf/cm ² (N.C TYPE)	※ Check resistance 50°C : 804Ω 80°C : 310Ω 100°C : 180Ω
Solenoid valve		12V 1A	※ Check resistance Normal : 15~25Ω (for terminal 1-2)

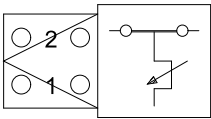
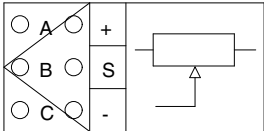
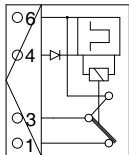
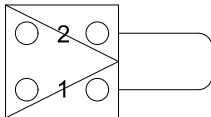
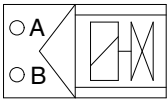
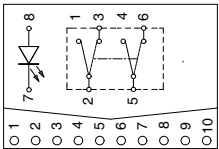
Part name	Symbol	Specification	Check
Air cleaner pressure switch	 CD-10	Pressure: 635mmH ₂ O (N.O TYPE)	※ Check contact Normal : $\infty \Omega$ (for terminal 1-2)
Fuel sender	 CD-2	-	※ Check resistance Full : 100 Ω Low : 500 Ω Empty warning : 700 Ω
Relay	 CR-02 CR-03 CR-05 CR-09 CR-68 CR-104 CR-111	12V 20A	※ Check resistance Normal : about 200 Ω (for terminal 2-4) : 0 Ω (for terminal 1-5) : $\infty \Omega$ (for terminal 1-3)
Relay	 CR-23 CR-24	12V 60A	※ Rated coil current $1.2 \pm 0.3A$
Solenoid valve	 CN-66 CN-68 CN-70 CN-121 CN-140 CN-194 CN-437 CN-441	12V 1A	※ Check resistance Normal : 15~25 Ω (for terminal 1-2)
Speaker	 CN-23(LH) CN-24(RH)	4 Ω 20W	※ Check resistance Normal : 4 Ω

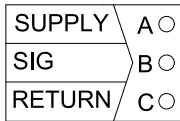
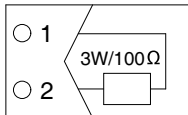
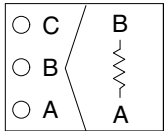
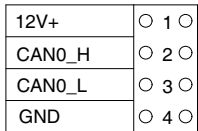
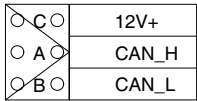
Part name	Symbol	Specification	Check
Work lamp switch	 CS-94	12V 16A	※ Check contact Normal OFF - $\infty \Omega$ (for terminal 2-1, 5-4) - 0Ω (for terminal 2-3, 5-6)
Quick clamp switch	 CS-67	12V 16A	※ Check contact Normal OFF - $\infty \Omega$ (for terminal 2-3, 5-6)
Lamp	 CL-4 CL-9L CL-9R	12V LED	※ Check disconnection Normal : 1.2Ω
Room lamp	 CL-1	12V 10W	※ Check disconnection Normal : a few Ω
Fuel filler pump	 CN-61	12V 35 ℓ /min	※ Check operation Supply power (for terminal 1-2) : 12V
Horn	 CN-20 CN-25	12V	132±5dB

Part name	Symbol	Specification	Check
Safety switch	 CS-4	Micro	※ Check contact Normal : 0Ω (for terminal A-B) : $\infty\Omega$ (for terminal A-C) Operating : $\infty\Omega$ (for terminal A-B) : 0Ω (for terminal A-C)
Pressure switch	 CD-11	10bar (N.C type)	※ Check contact Normal : 0.1Ω
Beacon lamp	 CL-7	12V LED (Strobe type)	※ Check disconnection Normal : a few Ω
Wiper switch	 CL-3	12V 16A	※ Check contact Normal : $\infty\Omega$ (for terminal 2-1, 5-6)
Washer pump	 CN-22	12V 3.8A	※ Check contact Normal : 3Ω (for terminal 1-2)
Relay	 CR-4	12V 20A	※ Check coil resistance Normal : about 200Ω (for terminal 85-86)

Part name	Symbol	Specification	Check
Wiper motor	CN-21	12V 3A	※ Check contact Normal : 6Ω (for terminal 2-4)
Radio & USB player	CN-27	12V 2A	※ Check voltage 10 ~ 12.5V (for terminal 1-3, 3-8)
Receiver dryer	CN-29	12V	※ Check contact Normal : 0Ω
Starter	CN-45	12V 1.2kW	※ Check contact Normal : 0.1Ω
Alternator		12V 30A	※ Check contact Normal : 10 ~ 12.5V
Travel buzzer	CN-81	12V 600mA	※ Check contact Normal : 5.2Ω

Part name	Symbol	Specification	Check																				
Compressor	 CN-28	12V 79W	-																				
Blower motor		12V 9.5A	※ Check resistance 2.5Ω (for terminal 1-2)																				
Blower switch	<table border="1" data-bbox="502 878 678 1025"> <tr> <td>BASE</td><td>A4</td><td>6</td><td>○</td></tr> <tr> <td>COMMON</td><td>A5</td><td>5</td><td>○</td></tr> <tr> <td>HIGH</td><td>A2</td><td>2</td><td>○</td></tr> <tr> <td>MID</td><td>A3</td><td>1</td><td>○</td></tr> <tr> <td>LOW</td><td>A6</td><td>4</td><td>○</td></tr> </table> AC-02	BASE	A4	6	○	COMMON	A5	5	○	HIGH	A2	2	○	MID	A3	1	○	LOW	A6	4	○	12V	-
BASE	A4	6	○																				
COMMON	A5	5	○																				
HIGH	A2	2	○																				
MID	A3	1	○																				
LOW	A6	4	○																				
Master switch		12V 1000A	-																				
Preheater	 CN-80	12V 42A 500W	-																				
12V socket		12V 120W	-																				

Part name	Symbol	Specification	Check
Duct sensor		1°C OFF 4°C ON	※ Check resistance Normal : 0Ω (for terminal 1-2) the atmosphere temp : over 4°C
Accel dial	 CN-142	-	※ Check resistance Normal : about 5kΩ (for terminal A-C) ※ Check voltage Normal : about 5V (for terminal A-C) : 2~4.5V (for terminal C-B)
Int wiper relay	 CR-6	12V 12A	-
Fusible link	 CN-60	12V	-
EPPR valve	 CN-309 CN-310 CN-311 CN-312	-	-
Switch	 CS-16 CS-23 CS-30 CS-85 CS-113 CS-114	-	※ Check contact Normal OFF - ∞Ω (for terminal 2-1, 5-4) 0Ω (for terminal 2-3, 5-6)

Part name	Symbol	Specification	Check
Pressure sensor	 CD-7 CD-17 CD-31 CD-32 CD-159	12V	-
Resistor	 RS-1	3W 100Ω	-
Resistor	 RS-A0 RS-A1 RS-A2	3W 120Ω	-
Service tool	 CN-148	-	-
Service tool		-	-

GROUP 5 CONNECTORS

1. CONNECTOR DESTINATION

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-04	AMP	36	Main harness - Seat base harness	1743059-2	1743062-2
CN-05	AMP	36	Main harness - Seat base harness	1743632-2	1743636-2
CN-6	AMP	10	Seat base harness - Cab harness	174657-2	-
CN-6A	AMP	6	Seat base harness	174264-2	-
CN-6-1	AMP	6	Seat base harness - Cab harness	174264-2	-
CN-11	-	4	Air-con	174257-2	174259-2
CN-16B	AMP	6	Emergency rpm dial connector	174262-2	21NB-10710
CN-21	KET	4	Wiper motor	MG610047	-
CN-22	KET	2	Washer tank	MG640650	-
CN-23	YAZAKI	2	Speaker-LH	7123-1520	-
CN-24	YAZAKI	2	Speaker-RH	7123-1520	-
CN-25	DEUTSCH	2	Horn	DT06-2S-EP06	-
CN-27	-	16	New cassette radio	PK145-16017	-
CN-28	YAZAKI	1	Air conditioner compressor	1723-2815	-
CN-29	KET	2	Receiver dryer	MG640795	-
CN-36	-	-	Fuse box	21MN-55010	-
CN-37	-	-	Relay box	21HN-55110	-
CN-40	DEUTSCH	3	Safety switch	DT06-3S-EP06	-
CN-45	RING TERM	-	Start motor B+	S820-408000	-
CN-45M	YAZAKI	1	Start motor M	7323-2115	-
CN-56	AMP	34	Cluster	4-1437290-0	-
CN-60	KET	2	Fusible link	MG610557	-
CN-68	DEUTSCH	2	Safety solenoid	DT06-2S-EP06	-
CN-70	DEUTSCH	2	Travel solenoid	DT06-2S-EP06	-
CN-74	SUMTOMO	3	Alternator	6189-0443	-
CN-74	RING TERM	-	Alternator B+	S820-306000	-
CN-80	RING TERM	-	Glow plug	S820-304000	-
CN-81	KET	2	Buzzer	MG610320	-
CN-93	TYCO	44	ECU	1376886-1	-
CN-100	KET	1	ECU earth	MG640944-5	-
CN-112	DEUTSCH	2	Main harness-Boom harness	DT6-2S-EP06	DT04-2P
CN-113	KET	6	Buzzer	MG614354	-
CN-125	DEUTSCH	12	RMCU	DT06-12S	-
CN-126	DEUTSCH	9	Service tool	-	HD10-9-96P
CN-126	AMP	10	Service tool	-	S816-110002

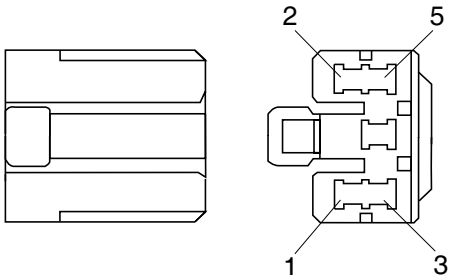
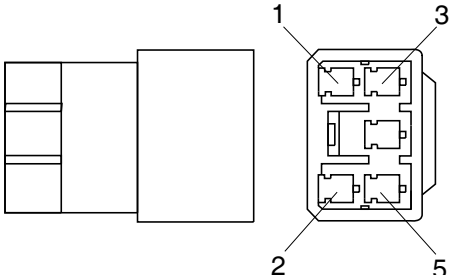
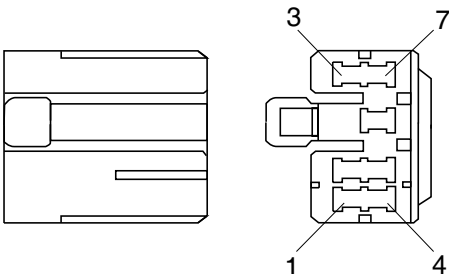
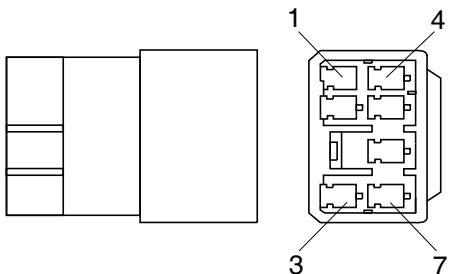
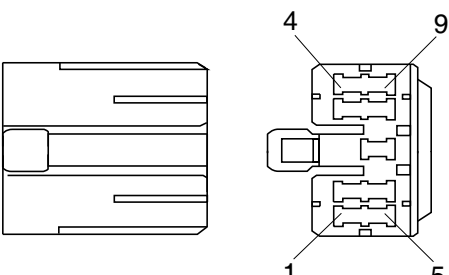
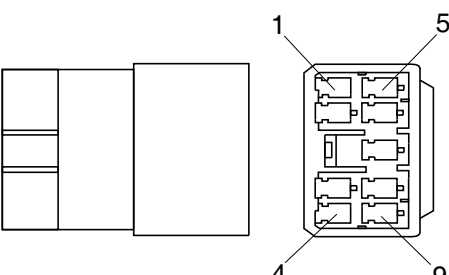
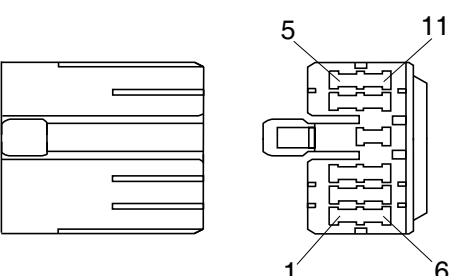
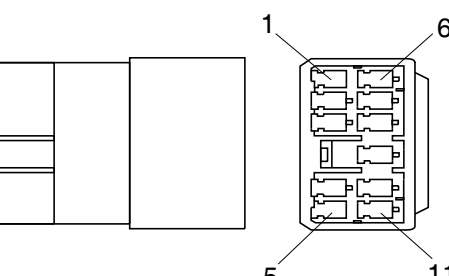
Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-126	AMP	10	Service tool	174655-2	-
CN-139	AMP	2	Power socket	172434-2	-
CN-140	DEUTSCH	2	Quick coupler solenoid	DT06-2S-EP06	DT04-2P-E005
CN-142	DEUTSCH	3	Accel dial	DT06-3S-EP06	-
CN-142L	AMP	2	Accel dial pilot lamp	174352-2	-
CN-145	YAZAKI	2	Fuel feed pump	7123-6423-30	-
CN-148	TYCO	4	Service tool	174257-2	174259-2
CN-194	SUMITOMO	2	Engine actuator solenoid	6189-0249	-
CN-554	DEUTSCH	4	Main harness-opt harness	DT06-4S-EP06	DT04-4P-E005
CN-240C	-	-	Proportional ON/OFF	-	CA104
CN-240D	DEUTSCH	3	LH RCV EPPR	DT06-3S-EP06	-
CN-241A	DEUTSCH	2	Breaker sw	DT06-2S-E005	-
CN-241B	DEUTSCH	2	Horn sw	-	DT04-2P-E005
CN-241C	DEUTSCH	3	EPPR sw	DT06-3S-EP06	-
CN-305	REXROTH	56	EPPR controller	1-928-405-217	-
CN-307	DEUTSCH	3	EPPR service tool	DT06-3S-E005	DT04-3P-E005
CN-309	DEUTSCH	2	EPPR-A1	DT06-2S-EP06	DT04-2P-E005
CN-310	DEUTSCH	2	EPPR-A2	DT06-2S-EP06	DT04-2P-E005
CN-311	DEUTSCH	2	EPPR-A3	DT06-2S-EP06	DT04-2P-E005
CN-312	DEUTSCH	2	EPPR-A4	DT06-2S-EP06	DT04-2P-E005
CN-437	DEUTSCH	2	Dozer float switch	DT06-2S-EP06	DT04-2P-E005
CN-441	DEUTSCH	2	AC mode solenoid	DT06-2S-EP06	DT04-2P-E005
CN-442A	DEUTSCH	2	Dozer floating switch	DT06-2S-E005	-
CN-442B	DEUTSCH	2	2-speed sw	-	DT04-2P-E005
CN-442C	DEUTSCH	3	Dozer floating	DT06-3S-EP06	DT04-3P
CN-442D	-	1	GND	CB104	-
CN-550	DEUTSCH	2	Option solenoid 1	DT06-2S-EP06	-
CN-551	DEUTSCH	2	Option solenoid 2	DT06-2S-EP06	-
CN-552	DEUTSCH	2	Option solenoid 1	DT06-2S-EP06	-
CN-553	DEUTSCH	2	Option solenoid 2	DT06-2S-EP06	-
CN-554	DEUTSCH	2	AVCU-Main harness	-	DT04-4P-E005
CN-554	DEUTSCH	4	Main harness-opt harness	DT06-4S-EP06	DT04-4P-E005
AC-01	KET	16	HAVC controller	MG655666	-
AC-02	KET	6	Brower switch	MG610049	-
AC-04	KET	18	HAVC unit	936204-1	-

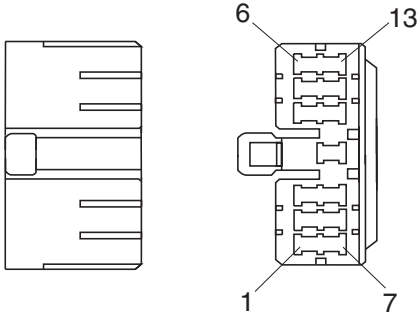
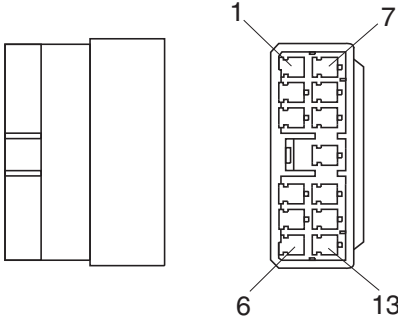
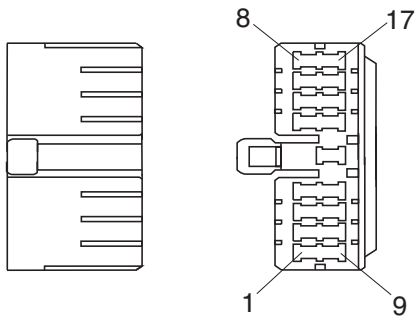
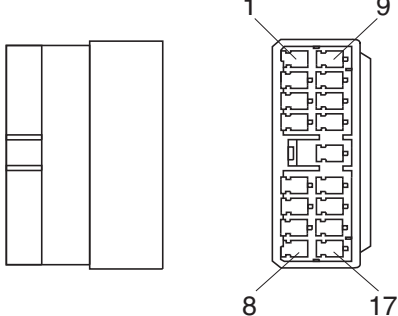
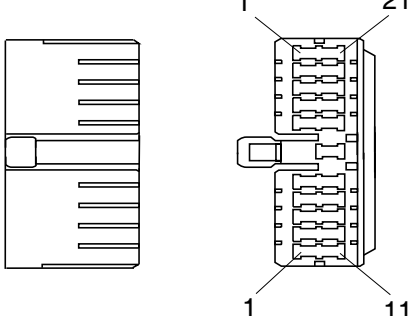
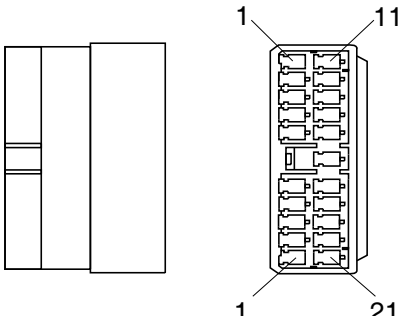
Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
· LAMP					
CL-1	KET	2	Room lamp	MG610392	-
CL-5	-	2	Work lamp	DT06-2S	-
CL-7	DEUTSCH	2	Beacon lamp	-	DT04-2P-E005
CL-9L	DEUTSCH	2	Work lamp - LH	DT06-2S-EP06	DT04-2P-E005
CL-9R	DEUTSCH	2	Work lamp - RH	DT06-2S-EP06	DT04-2P-E005
· RELAY					
CR-1R	RING TERM	2	Power relay 1	S820-106000	-
CR-1P	-	2	Power relay 1	32004A2	-
CR-1S	-	2	Power relay 1	282080-1	-
CR-04	-	5	Wiper motor relay	VCFM-1002	-
CR-06	KET	6	Wiper int relay	MG610049	-
CR-23	KET	4	Start relay	MG612017-5	-
CR-24	KET	4	Air heater relay	MG612017-5	-
· SENSOR					
CD-1	AMP	2	Hydraulic temp sender	85202-1	-
CD-2	DEUTSCH	2	Fuel sender	DT06-2S-E006	-
CD-7	DEUTSCH	3	Pressure sensor	DT06-3S-E006	-
CD-8	SUMITOMO	2	Water temperature sensor	6189-0552	-
CD-10	AMP	2	Air cleaner switch	85202-1	-
CD-11	KET	2	Travel pressure switch	MG640795	-
CD-17	YAZAKI	3	Engine speed sensor	7283-8732-40	-
CD-18	RING TERM	-	Engine oil pressure switch	S820-106000	-
CD-31	DEUTSCH	3	Overload pressure sensor	DT06-3S-EP06	DT04-3P-E005
CD-32	DEUTSCH	3	Boom up pressure sensor	DT06-3S-E006	DT04-3P-E005
CD-159	DEUTSCH	3	Arm in/out, bucket in ps sensor	DT06-3S-E006	DT04-3P-E005
DO-01	-	2	Diode	21EA-50550	-
DO-02	-	2	Diode	174352-2	-
DO-03	-	2	Diode	174352-2	-
DO-06	-	2	Diode	174352-2	21EA-50550
DO-07	-	2	Diode	174352-2	21EA-50550
· SWITCH					
CS-2	KET	6	Start switch	MG610335	-
CS-3	CARLING	10	Wiper switch	21HN-56300	-
CS-4	-	3	Safety switch	-	-
CS-16	CARLING	10	Travel alarm switch	21NH-56300	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CS-23	CARLING	10	Beacon switch	21HN-56300	-
CS-30	CARLING	10	Washer switch	21HN-56300	-
CS-33	AMP	6	Emergency stop switch	174262-2	-
CS-67	CARLING	10	Quick coupler switch	21HN-56300	-
CS-74L	RING TERM	-	Master switch L	S820-106000	-
CS-74S	RING TERM	-	Master switch S	S820-608000	-
CS-85	CARLING	10	Breaker select switch	21HN-56300	-
CS-94	CARLING	10	Work lamp switch	21HN-56300	-
CS-113	CARLING	10	Aux 1 switch	21HN-56300	-
CS-114	CARLING	10	Aux 2 switch	21HN-56300	-
CS-250	DEUTSCH	3	Seat belt warning	DT06-3S-EP06	-

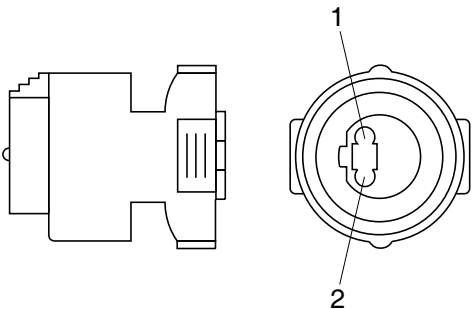
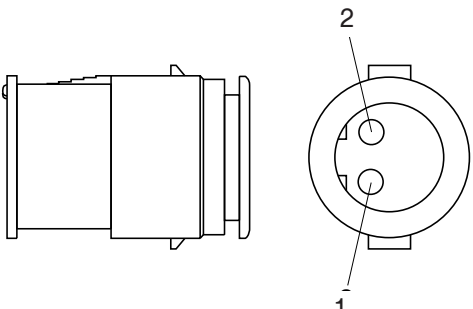
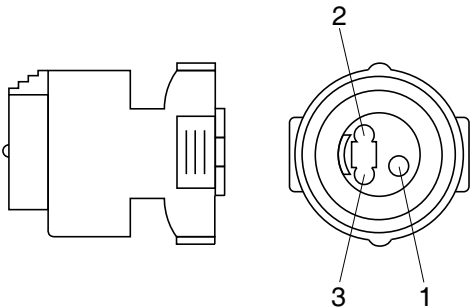
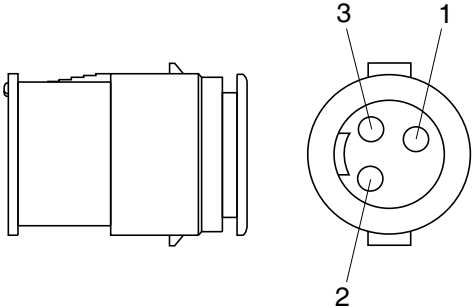
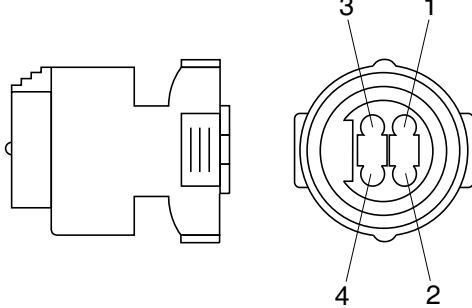
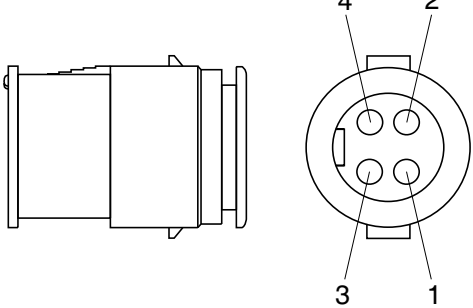
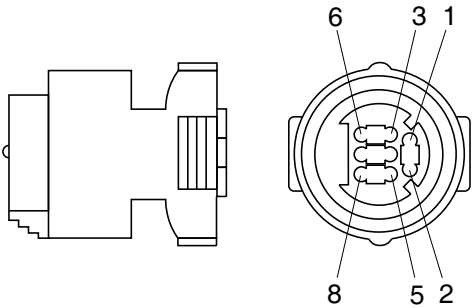
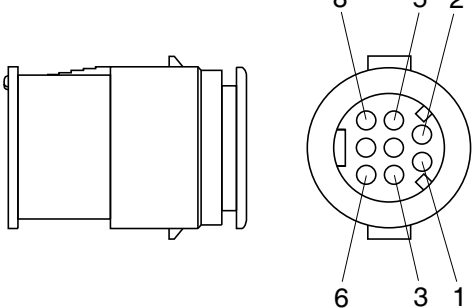
2. CONNECTION TABLE FOR CONNECTORS

1) PA TYPE CONNECTOR

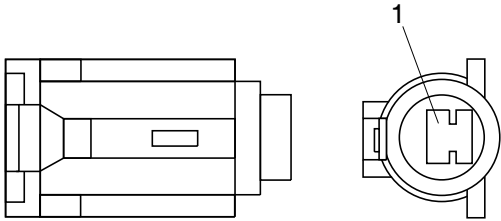
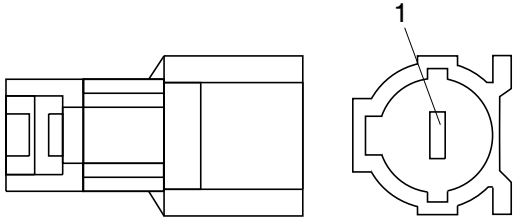
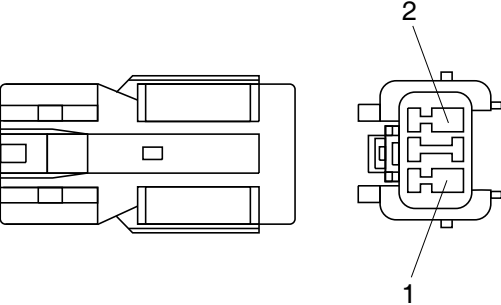
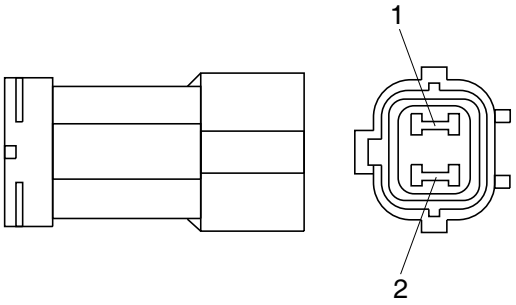
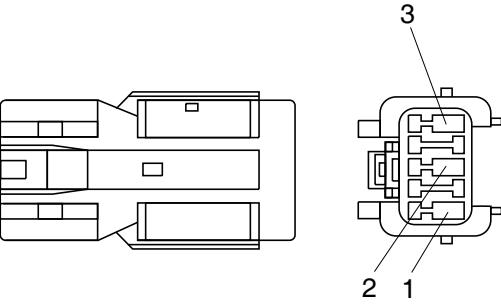
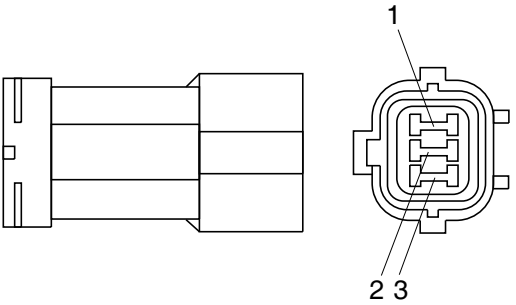
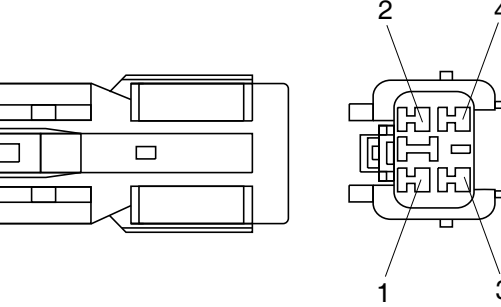
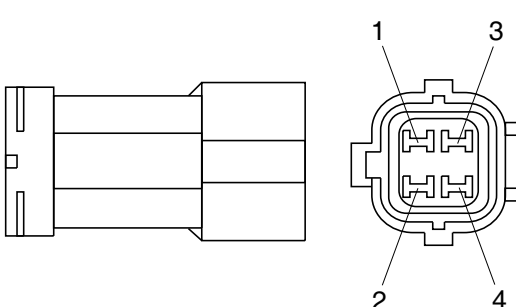
No. of pin	Receptacle connector (female)	Plug connector (male)
5	 S811-005002	 S811-105002
7	 S811-007002	 S811-107002
9	 S811-009002	 3S811-109002
11	 S811-011002	 S811-111002

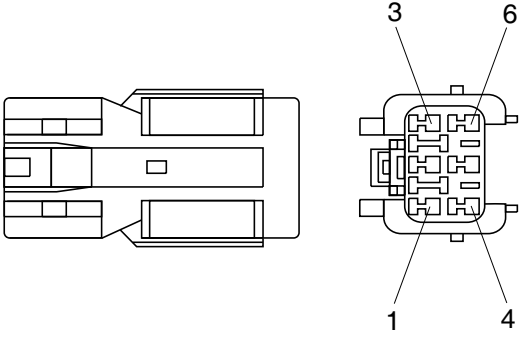
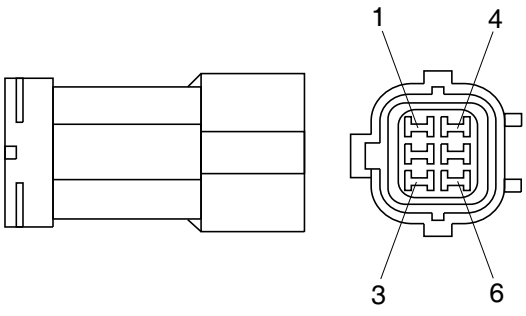
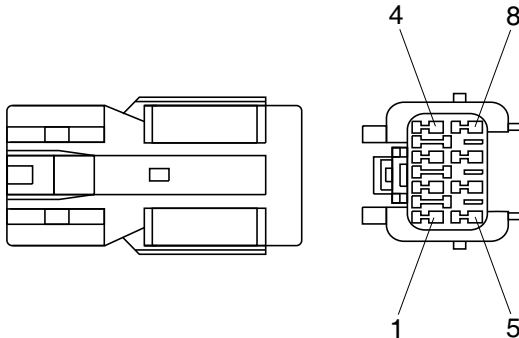
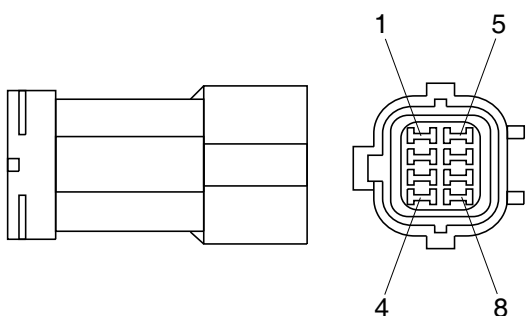
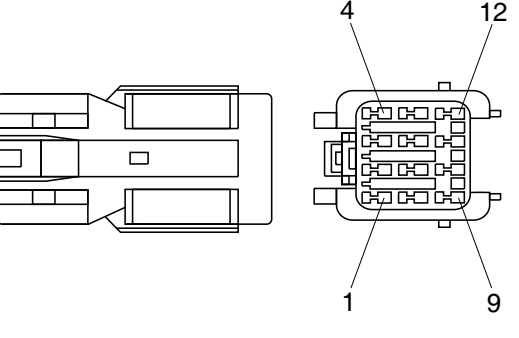
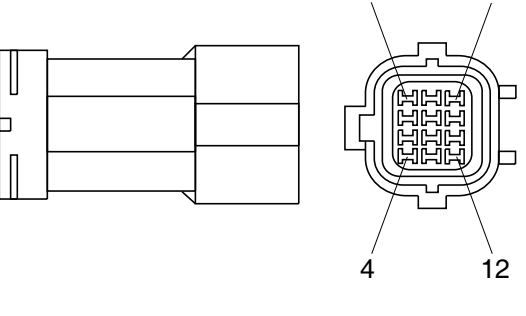
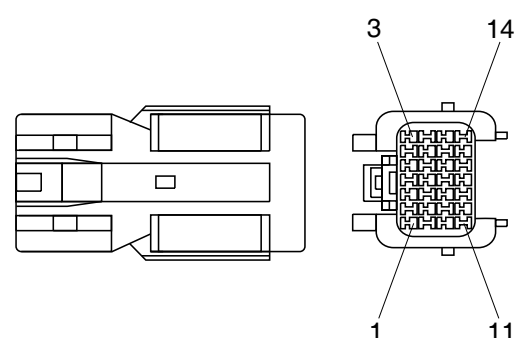
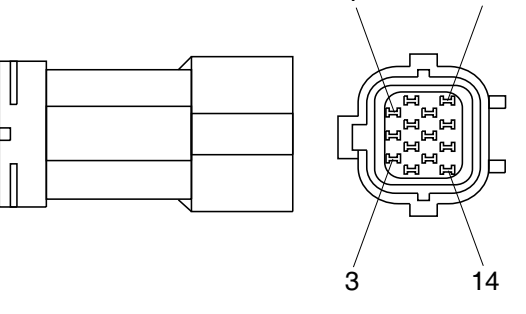
No. of pin	Receptacle connector (female)	Plug connector (male)
13	 S811-013002	 S811-113002
17	 S811-017002	 S811-117002
21	 S811-021002	 S811-121002

2) J TYPE CONNECTOR

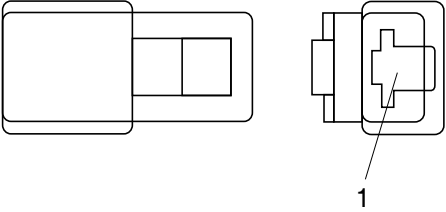
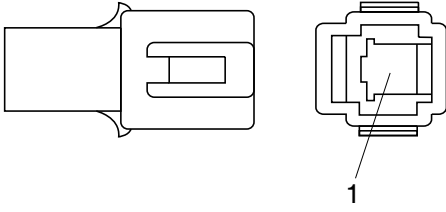
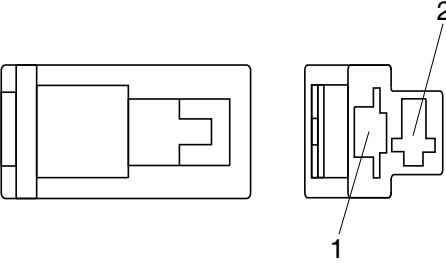
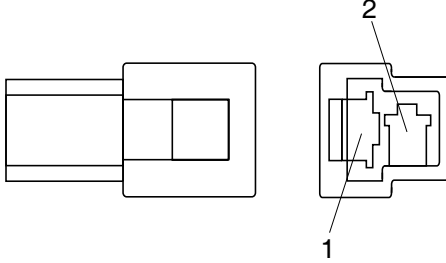
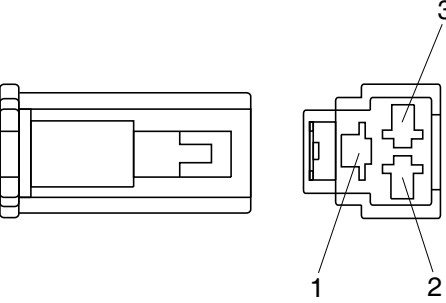
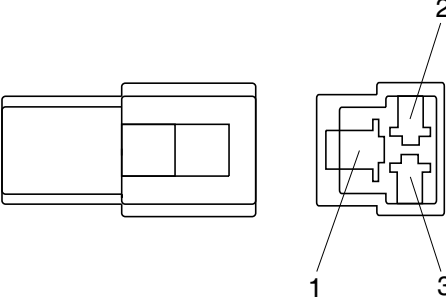
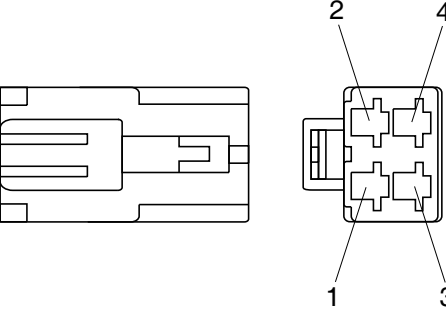
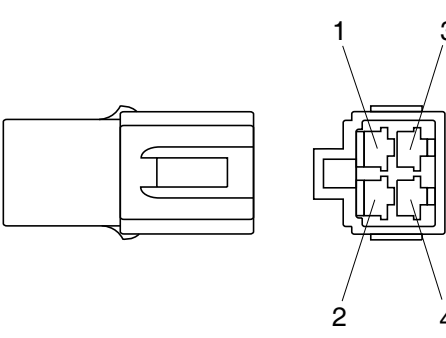
No. of pin	Receptacle connector (female)	Plug connector (male)
2	 S816-002001	 S816-102001
3	 S816-003001	 S816-103001
4	 S816-004001	 S816-104001
8	 S816-008001	 S816-108001

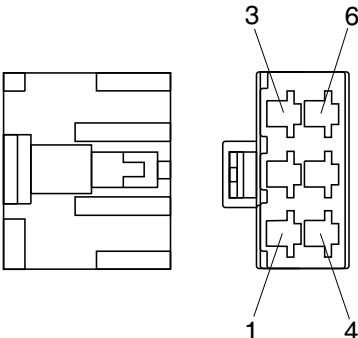
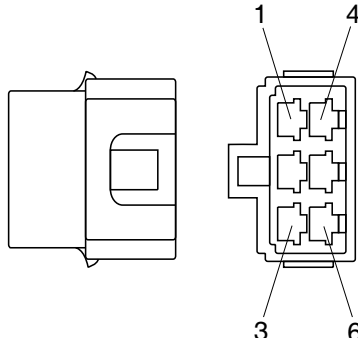
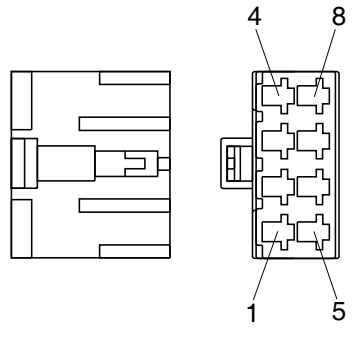
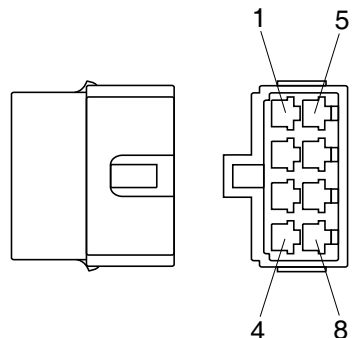
3) SWP TYPE CONNECTOR

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

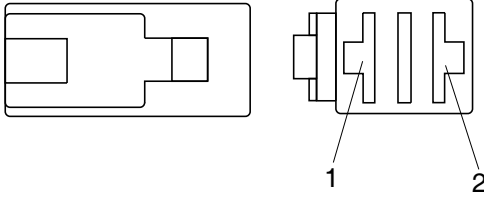
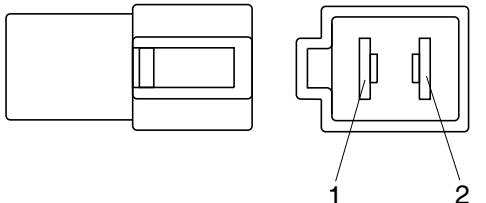
No. of pin	Receptacle connector (female)	Plug connector (male)
6	 S814-006000	 S814-106000
8	 S814-008000	 S814-108000
12	 S814-012000	 S814-112000
14	 S814-014000	 S814-114000

4) CN TYPE CONNECTOR

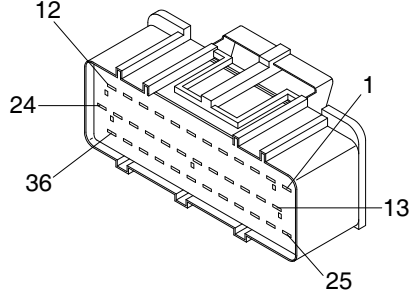
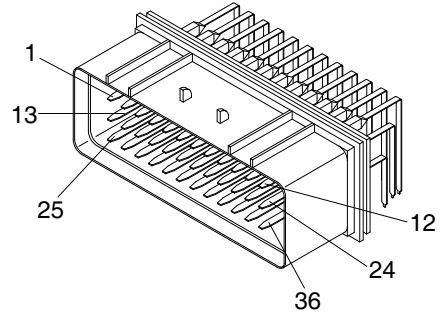
No. of pin	Receptacle connector (female)	Plug connector (male)
1	 S810-001202	 S810-101202
2	 S810-002202	 S810-102202
3	 S810-003202	 S810-103202
4	 S810-004202	 S810-104202

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

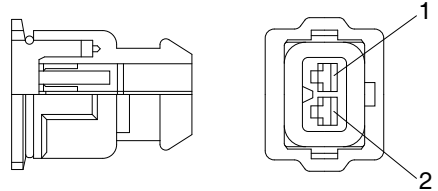
5) 375 FASTEN TYPE CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
2	 S810-002402	 S810-102402

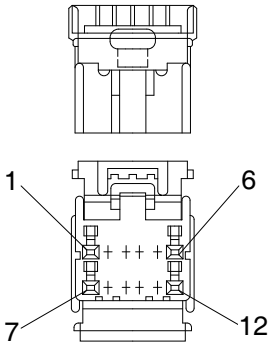
6) AMP ECONOSEAL CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
36	 344111-1	 344108-1

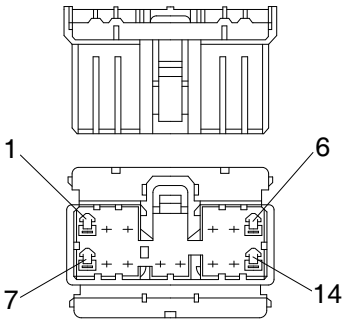
7) AMP TIMER CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
2	 85202-1	

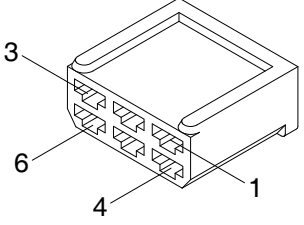
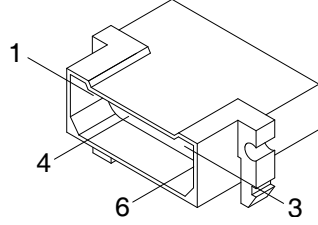
8) AMP 040 MULTILOCK CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
12	 174045-2	

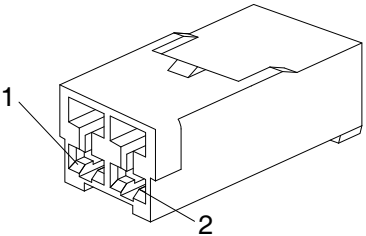
9) AMP 070 MULTILOCK CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
14	 173852	

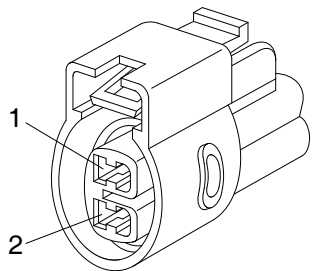
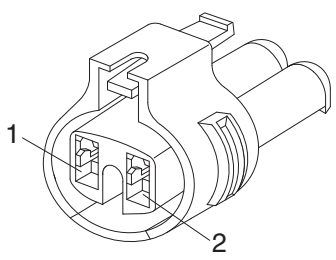
10) AMP FASTIN - FASTON CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
6	 925276-0	 480003-9

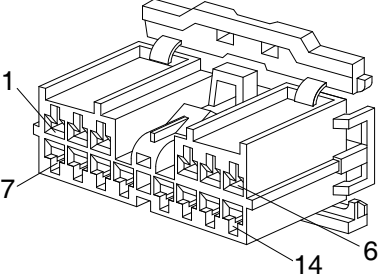
11) KET 090 CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
2	 MG610070	

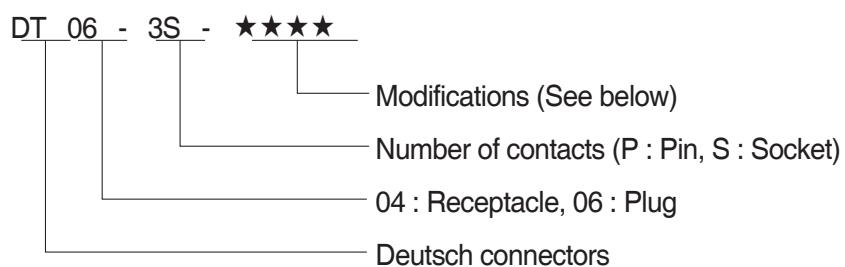
12) KET 090 WP CONNECTORS

No. of pin	Receptacle connector (female)	Plug connector (male)
2	 MG640605	
2	 MG640795	

13) KET SDL CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
14	 MG610406	

14) DEUTSCH DT CONNECTORS



※ Modification

E003 : Standard end cap - gray

E004 : Color of connector to be black

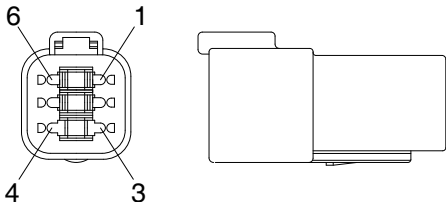
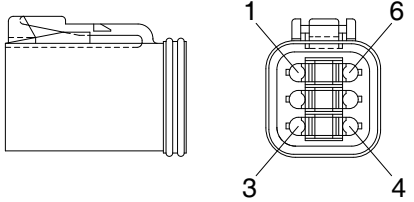
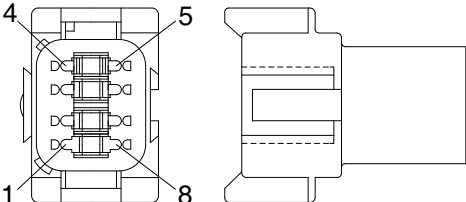
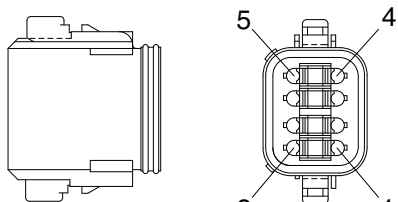
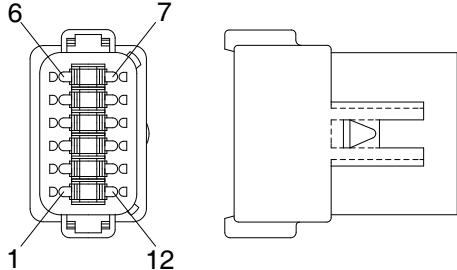
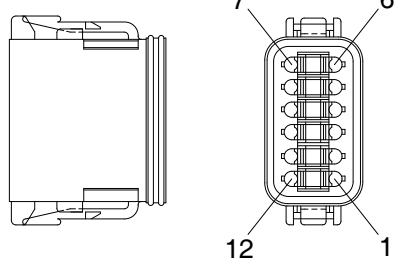
E005 : Combination - E004 & E003

EP04 : End cap

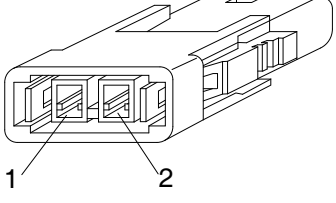
EP06 : Combination P012 & EP04

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

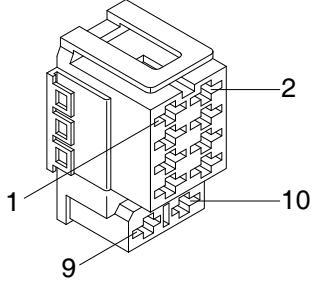
No. of pin	Receptacle connector (female)	Plug connector (male)
2	DT06-2S	DT04-2P
3	DT06-3S	DT04-3P
4	DT06-4S	DT04-4P

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

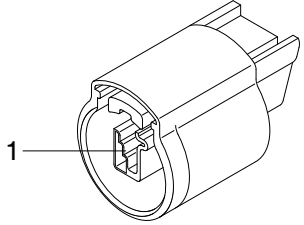
15) MOLEX 2CKTS CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
2	 35215-0200	

16) ITT SWF CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
10	 SWF593757	

17) MWP NMWP CONNECTOR

No. of pin	Receptacle connector (female)	Plug connector (male)
1	 NMWP01F-B	