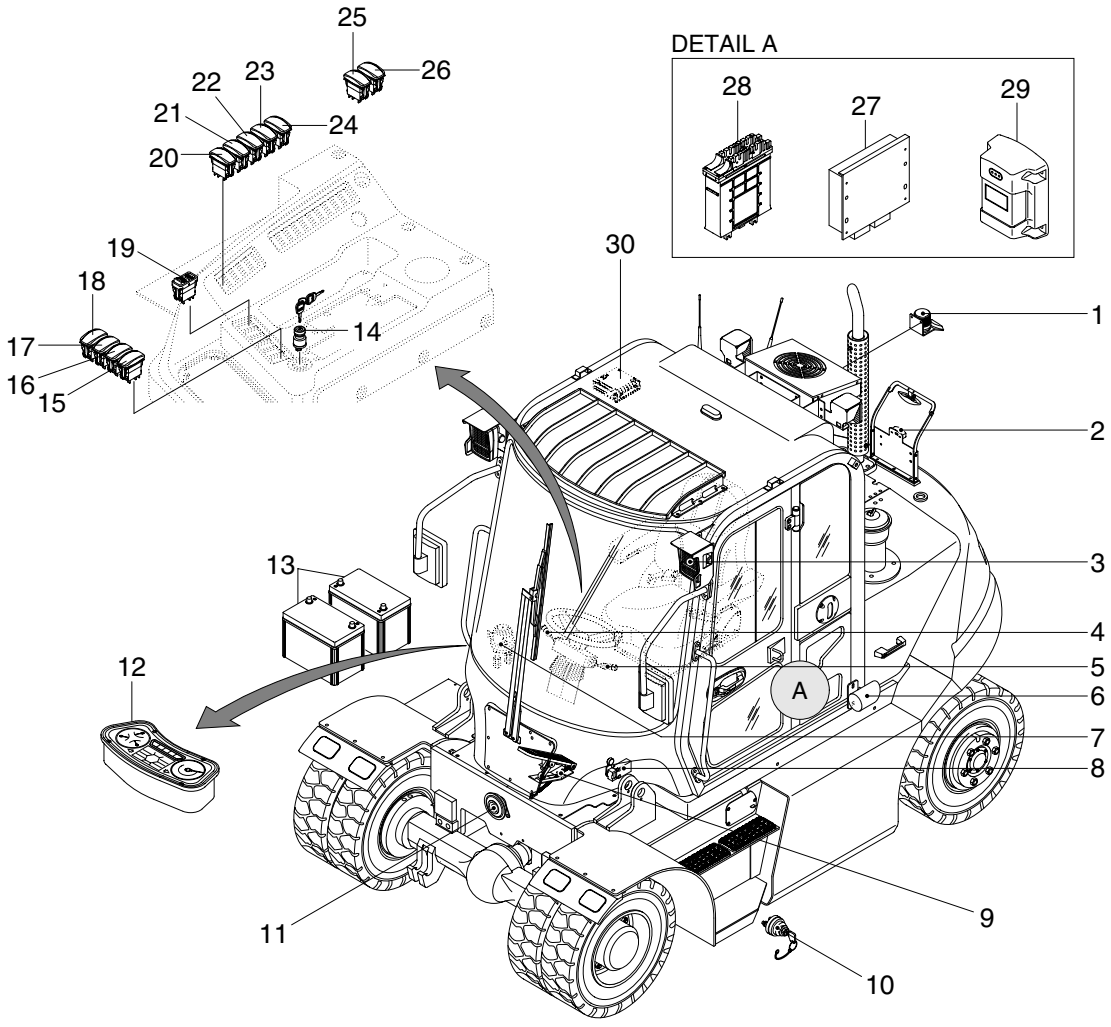
SECTION 7 ELECTRICAL SYSTEM

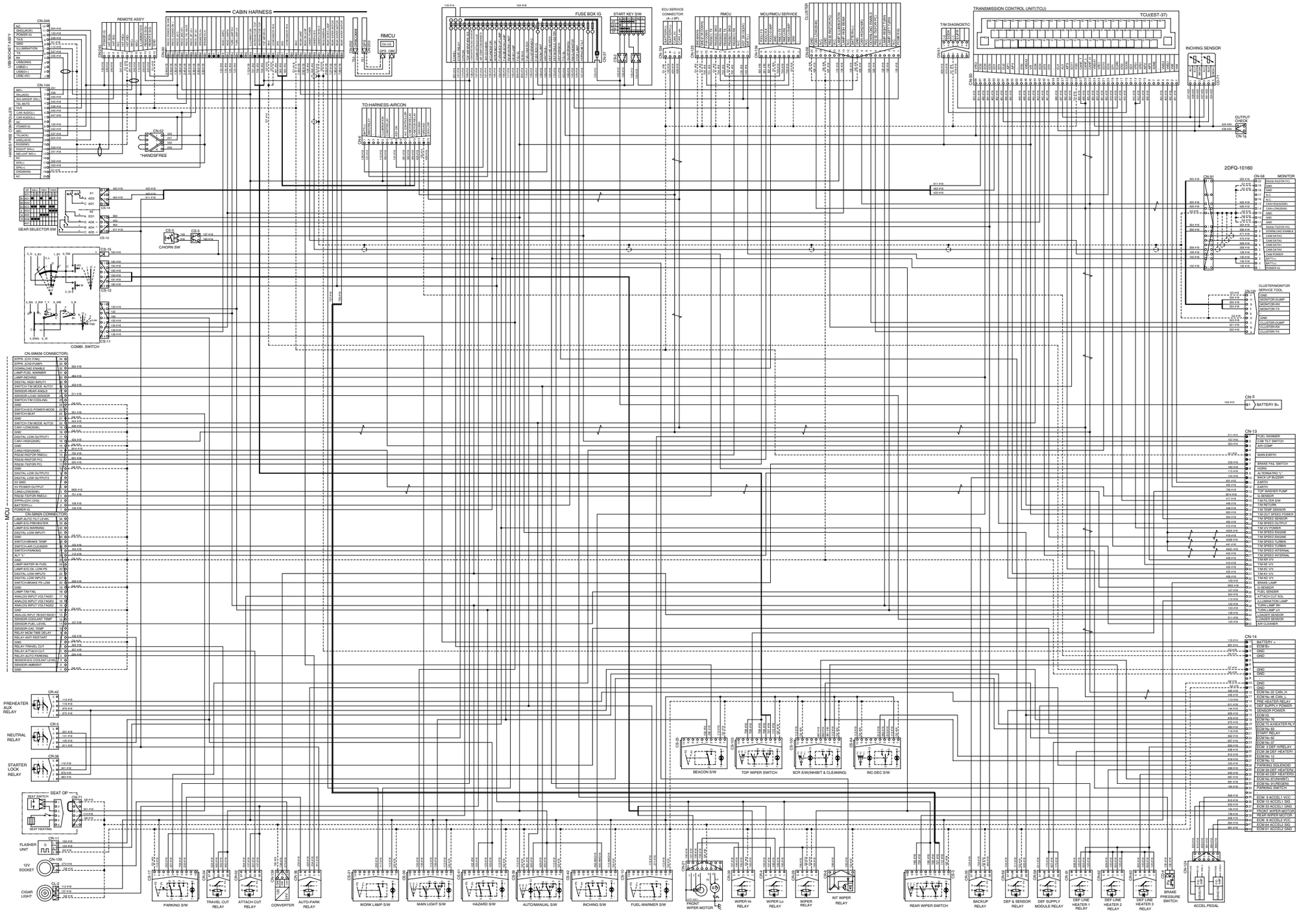
GROUP 1 COMPONENT LOCATION



50D9EL00

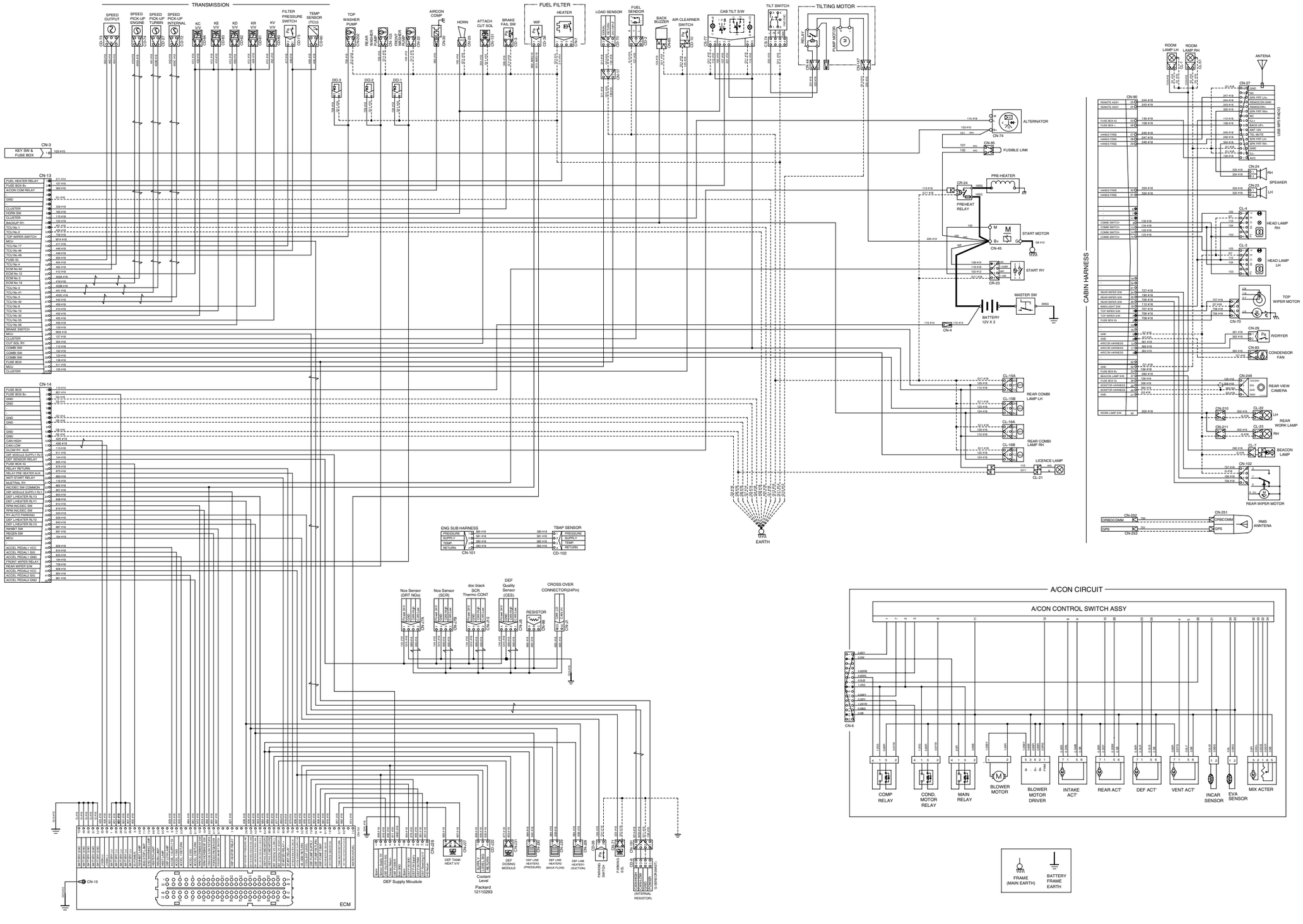
1	Beacon lamp	11	High horn	21	Inching switch
2	License lamp	12	Cluster	22	Fuel warmer switch
3	Work lamp	13	Battery	23	In/decrement switch
4	Combination switch	14	Start switch	24	SCR cleaning switch
5	Gear selector	15	Main light switch	25	Rear wiper/washer switch
6	Backup alarm	16	Hazard switch(opt)	26	Top wiper/washer switch(opt)
7	Start relay	17	Rear work lamp switch(opt)	27	Machine control unit
8	Micro switch	18	Beacon lamp switch(opt)	28	T/M control unit
9	Accelerator pedal	19	Parking brake switch	29	Remote control unit
10	Master switch	20	Auto/manual changeover switch	30	Radio and USB player

· ELECTRICAL CIRCUIT (1/24, 50D-9 : -#0014, 70D-9 : -#0141, 80D-9 : #0079-0107, STD, CABIN TYPE)



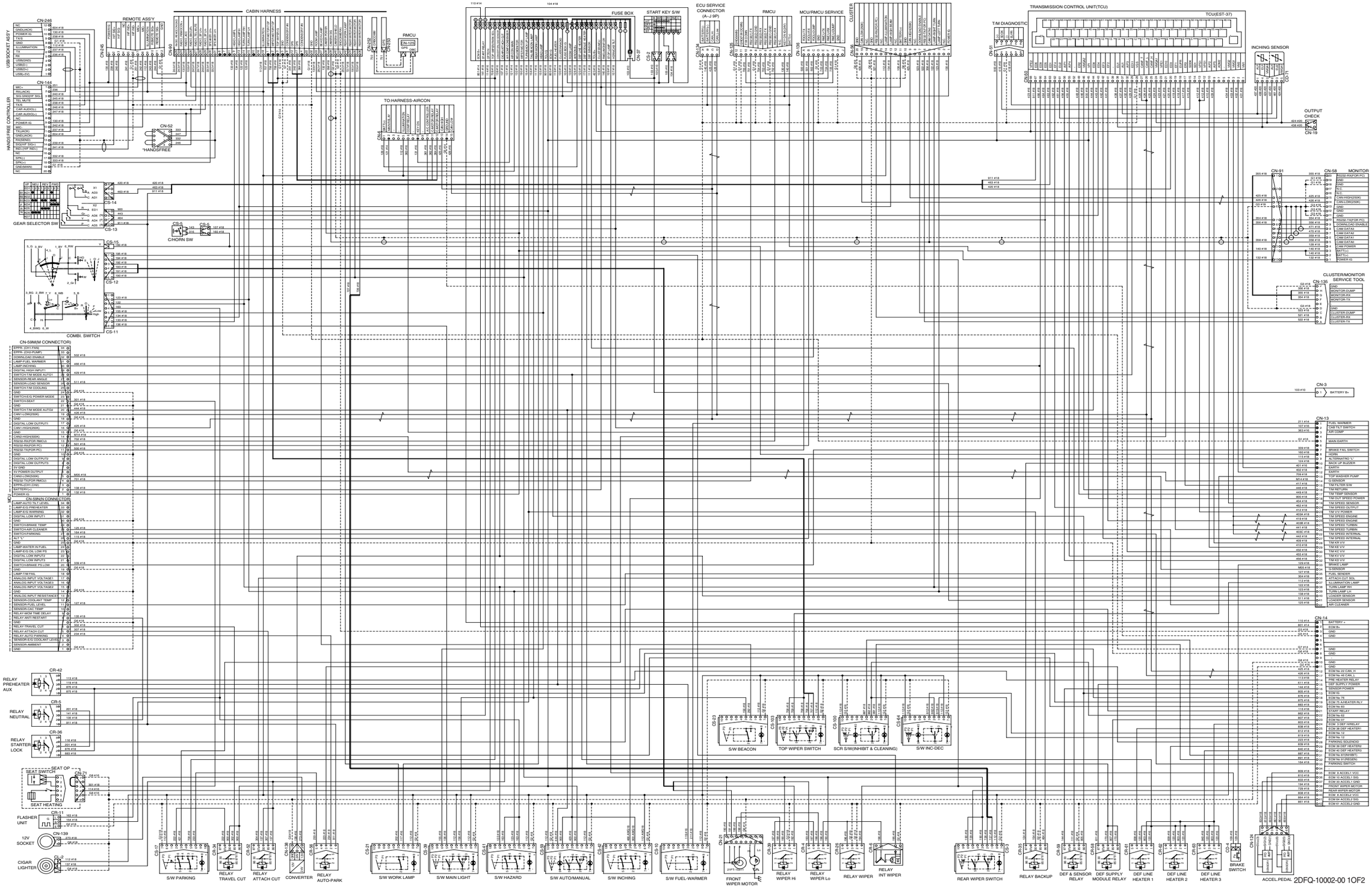
50D9EL01

· ELECTRICAL CIRCUIT (2/24, 50D-9 : -#0014, 70D-9 : -#0141, 80D-9 : #0079-0107, STD, CABIN TYPE)

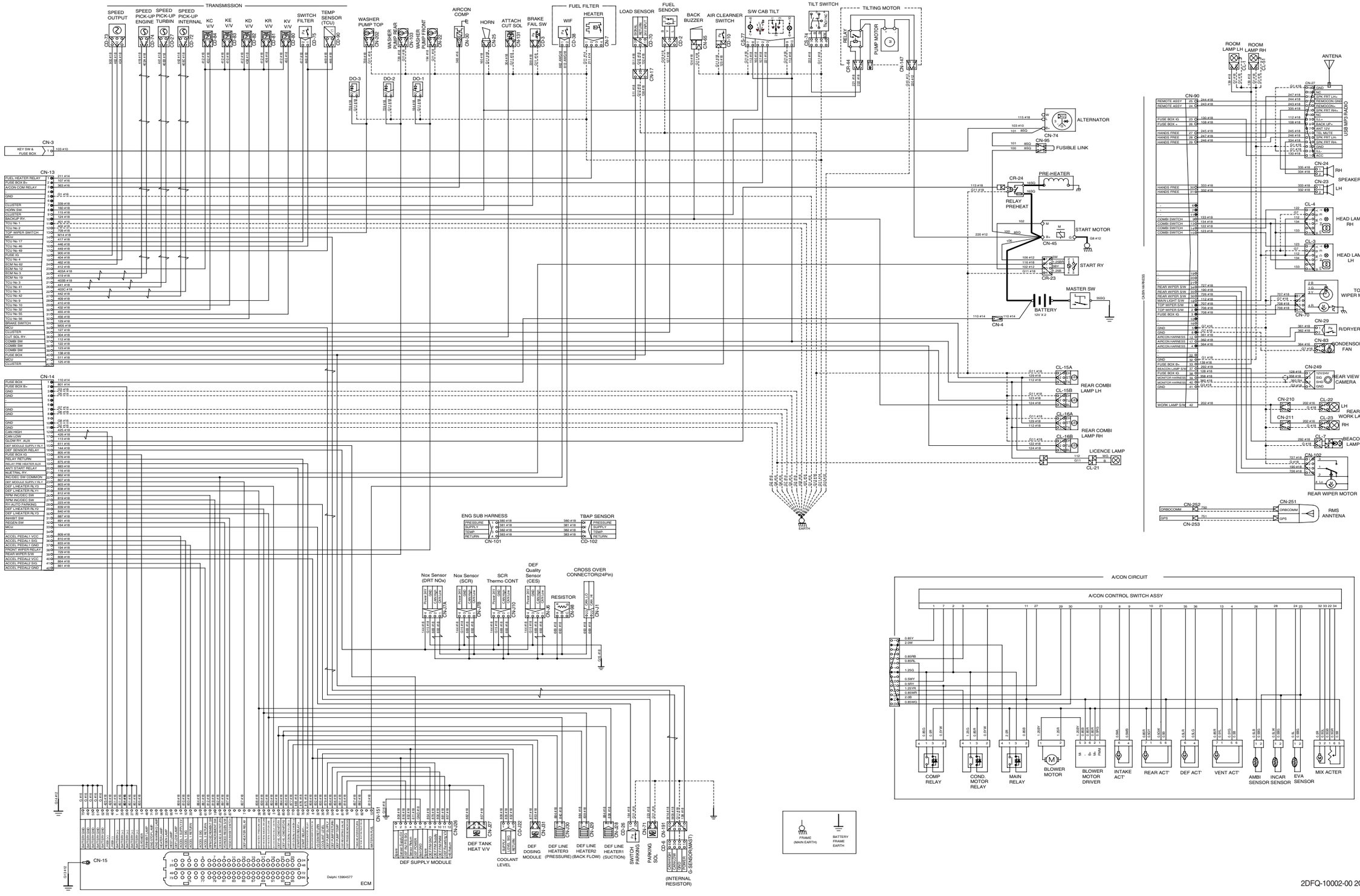


50D9EL02

· ELECTRICAL CIRCUIT (3/24, 50D-9 : #0015-0034, 70D-9 : #0142-0323, 80D-9 : #0108-0173, STD, CABIN TYPE)

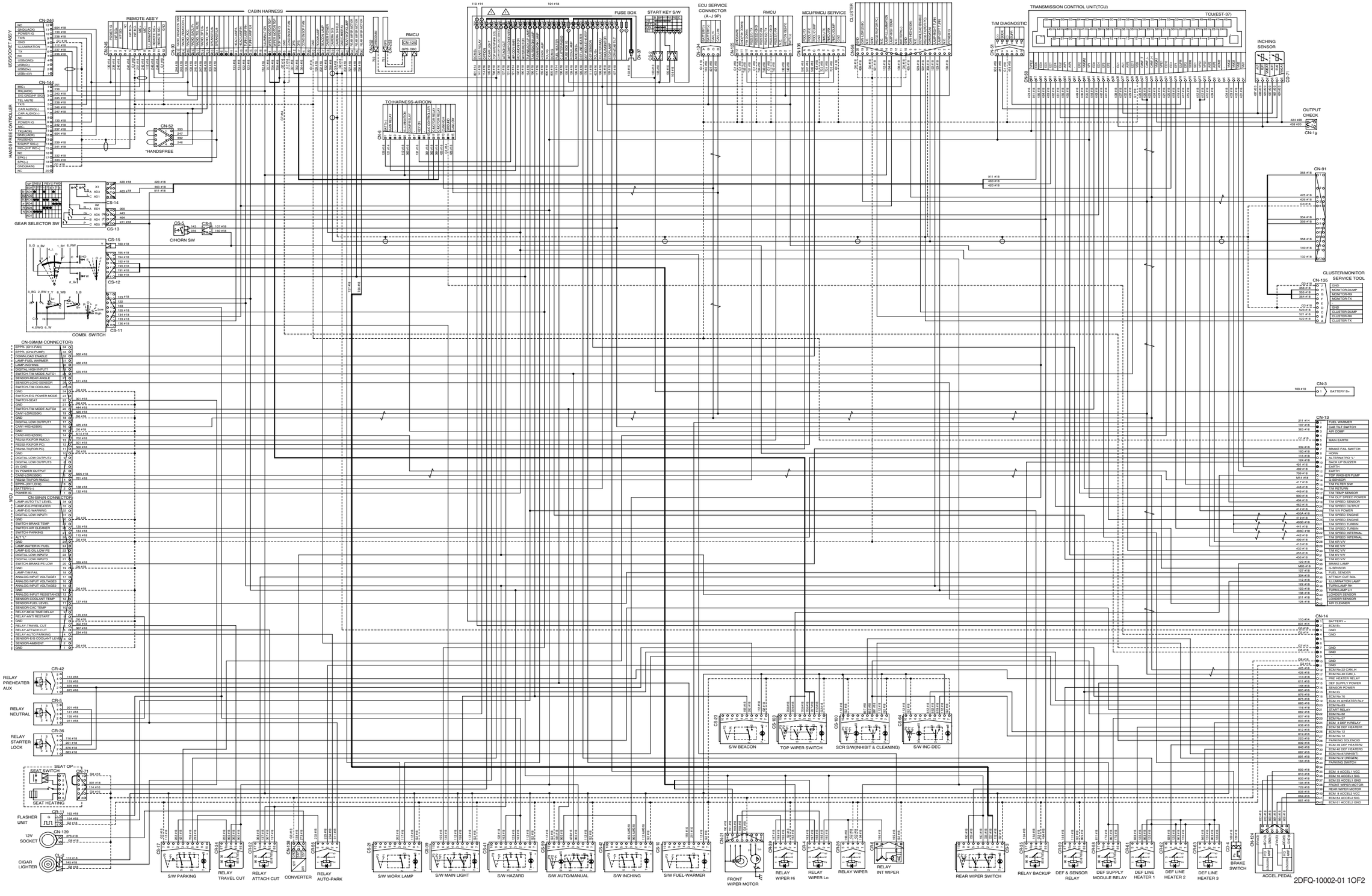


· ELECTRICAL CIRCUIT (4/24, 50D-9 : #0015-0034, 70D-9 : #0142-0323, 80D-9 : #0108-0173, STD, CABIN TYPE)

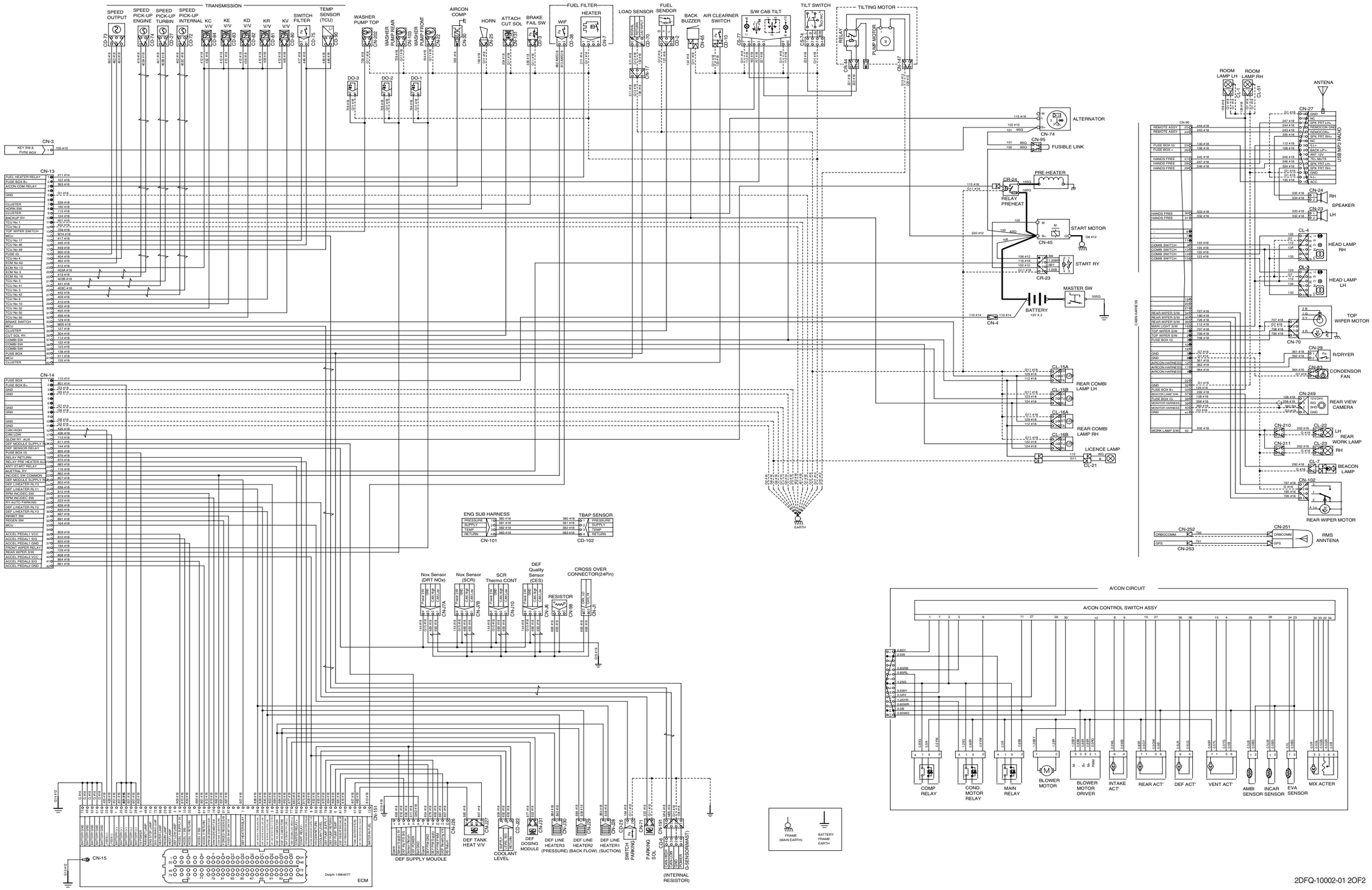


2DFQ-10002-00 2OF2

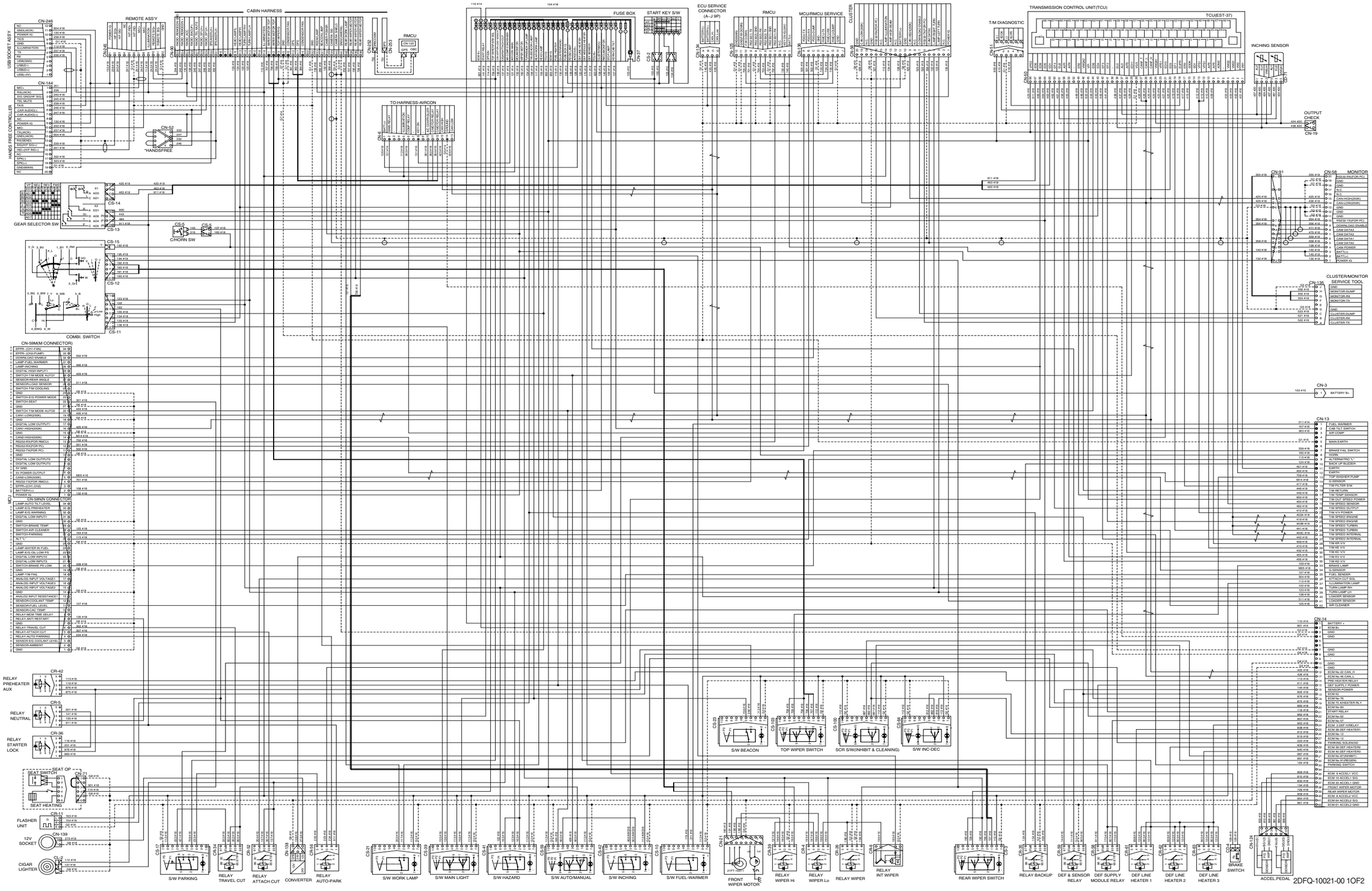
· ELECTRICAL CIRCUIT (5/24, 50D-9 : #0035-0048, 70D-9 : #0324-0414, 80D-9 : #0174-0181, STD, CABIN TYPE)



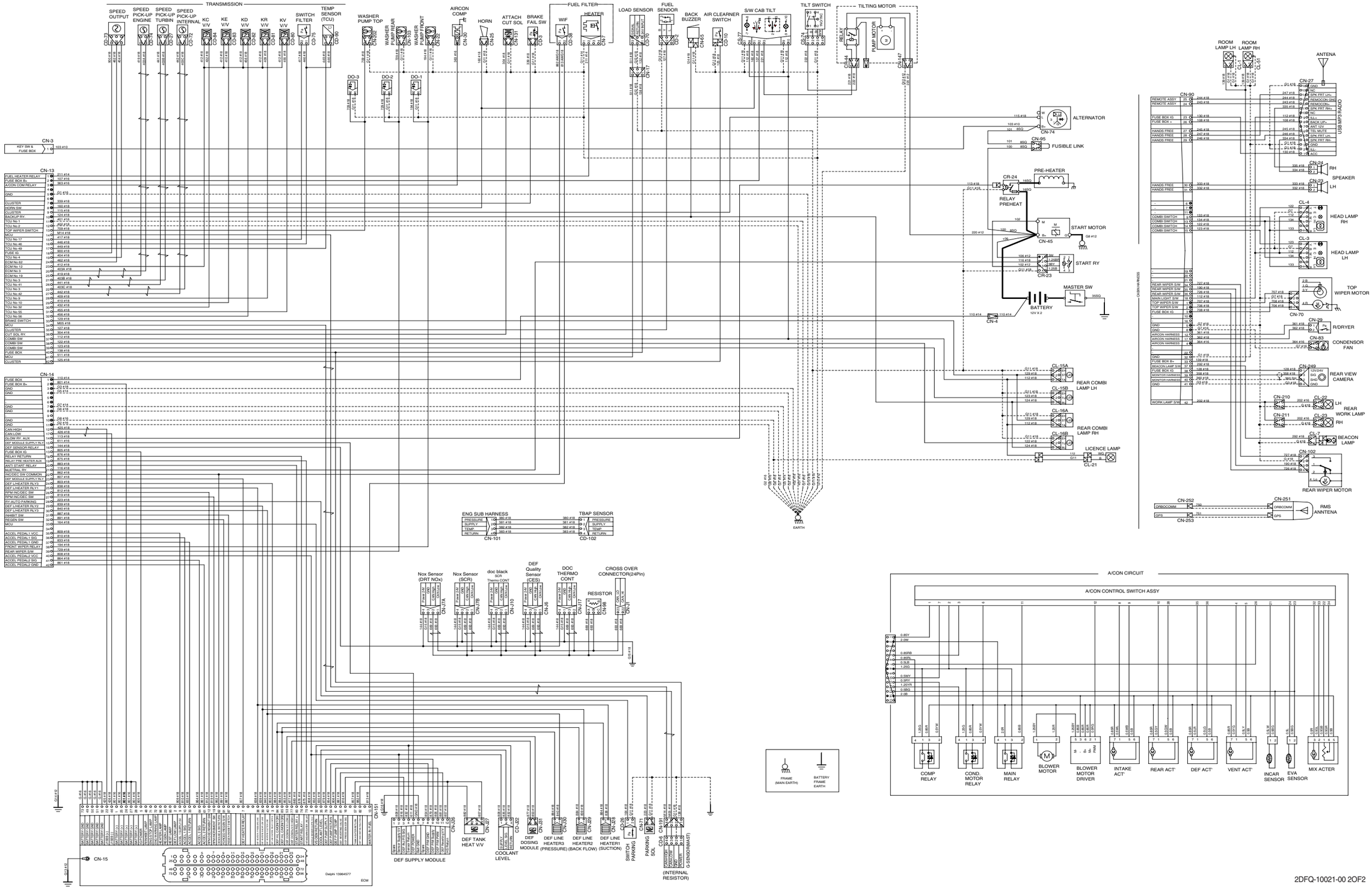
· ELECTRICAL CIRCUIT (6/24, 50D-9 : #0035-0048, 70D-9 : #0324-0414, 80D-9 : #0174-0181, STD, CABIN TYPE)



· ELECTRICAL CIRCUIT (7/24, 50D-9 : #0015-0034, 70D-9 : #0142-0323, 80D-9 : #0108-0173, OPT, CABIN TYPE)

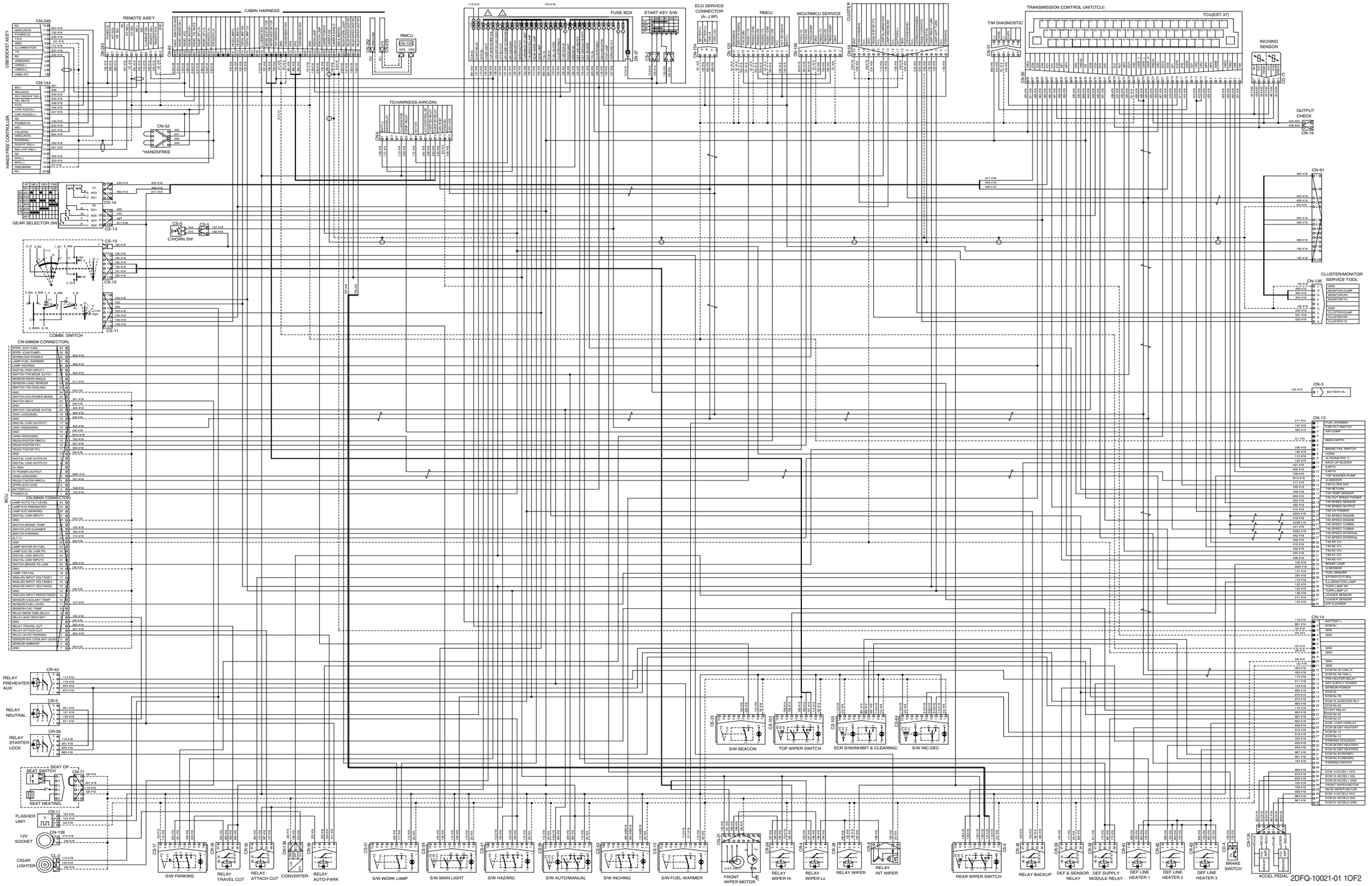


· ELECTRICAL CIRCUIT (8/24, 50D-9 : #0015-0034, 70D-9 : #0142-0323, 80D-9 : #0108-0173, OPT, CABIN TYPE)

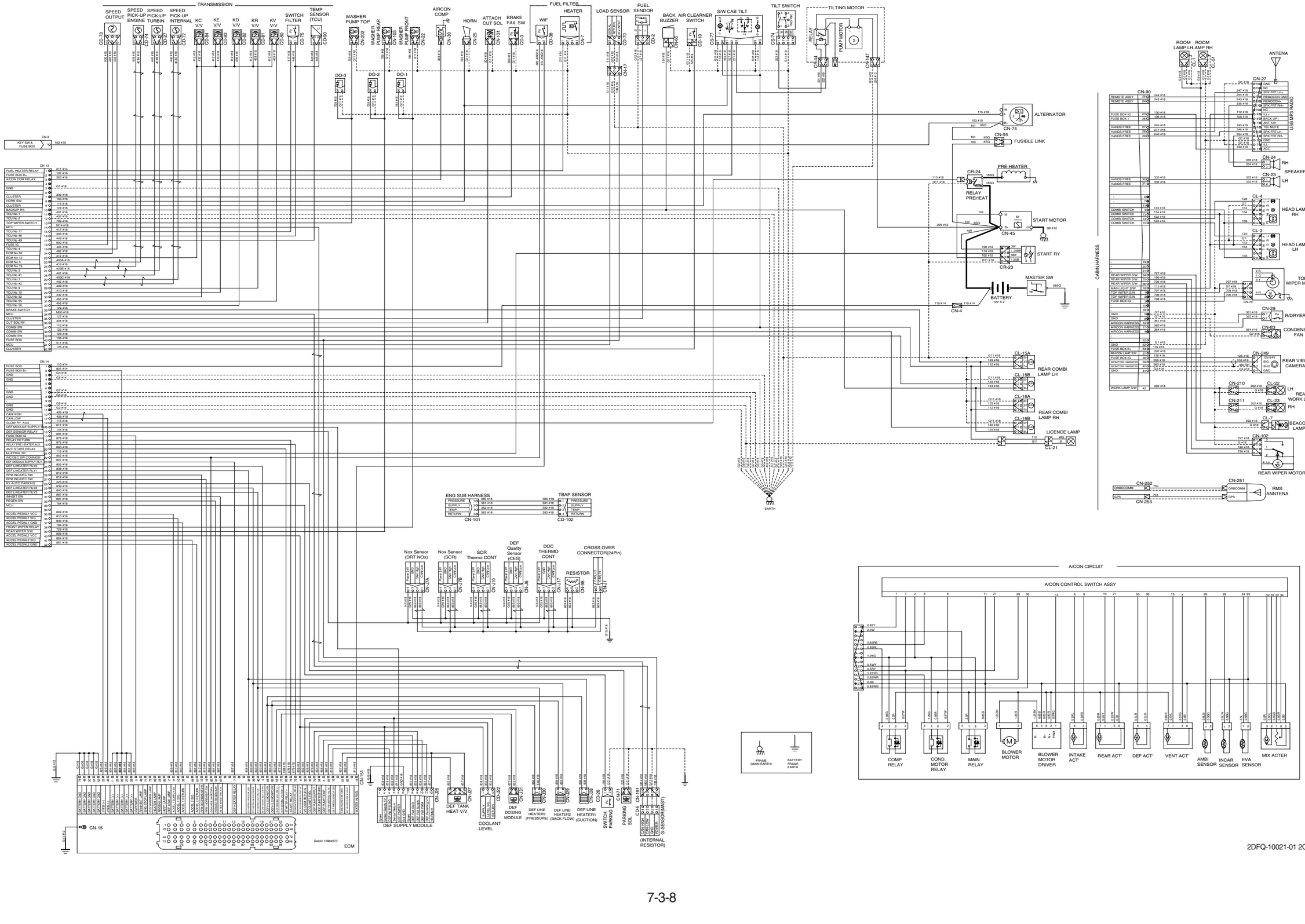


2DFQ-10021-00 2OF2

· ELECTRICAL CIRCUIT (9/24, 50D-9 : #0035-0048, 70D-9 : #0324-0414, 80D-9 : #0174-0181, OPT, CABIN TYPE)

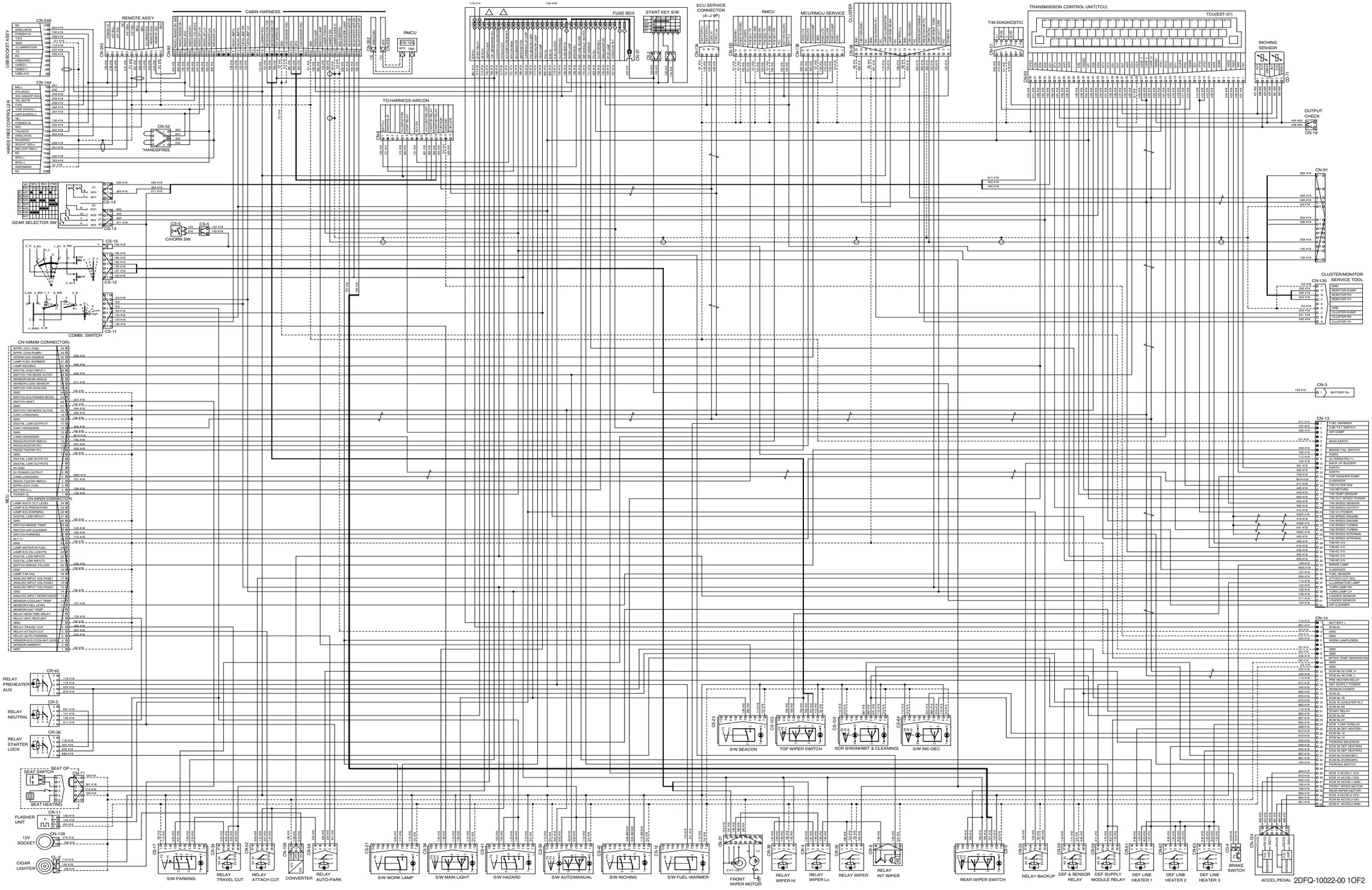


· ELECTRICAL CIRCUIT (10/24, 50D-9 : #0035-0048, 70D-9 : #0324-0414, 80D-9 : #0174-0181, OPT, CABIN TYPE)

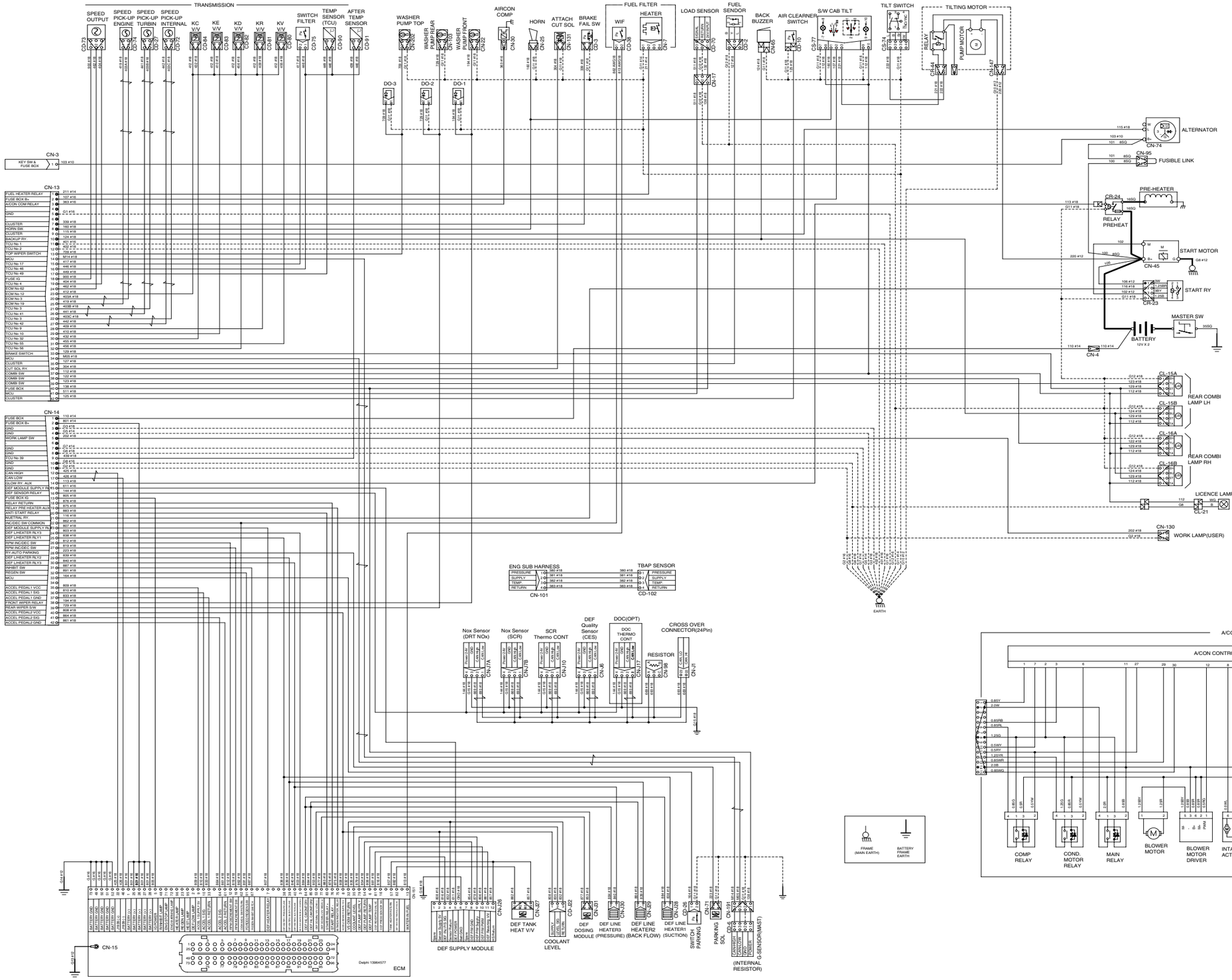


2DFQ-10021-01 2OF2

· ELECTRICAL CIRCUIT (11/24, 50D-9 : #0049-0065, 70D-9 : #0415-0763, 80D-9 : #0182-0299, OPT, CABIN TYPE)

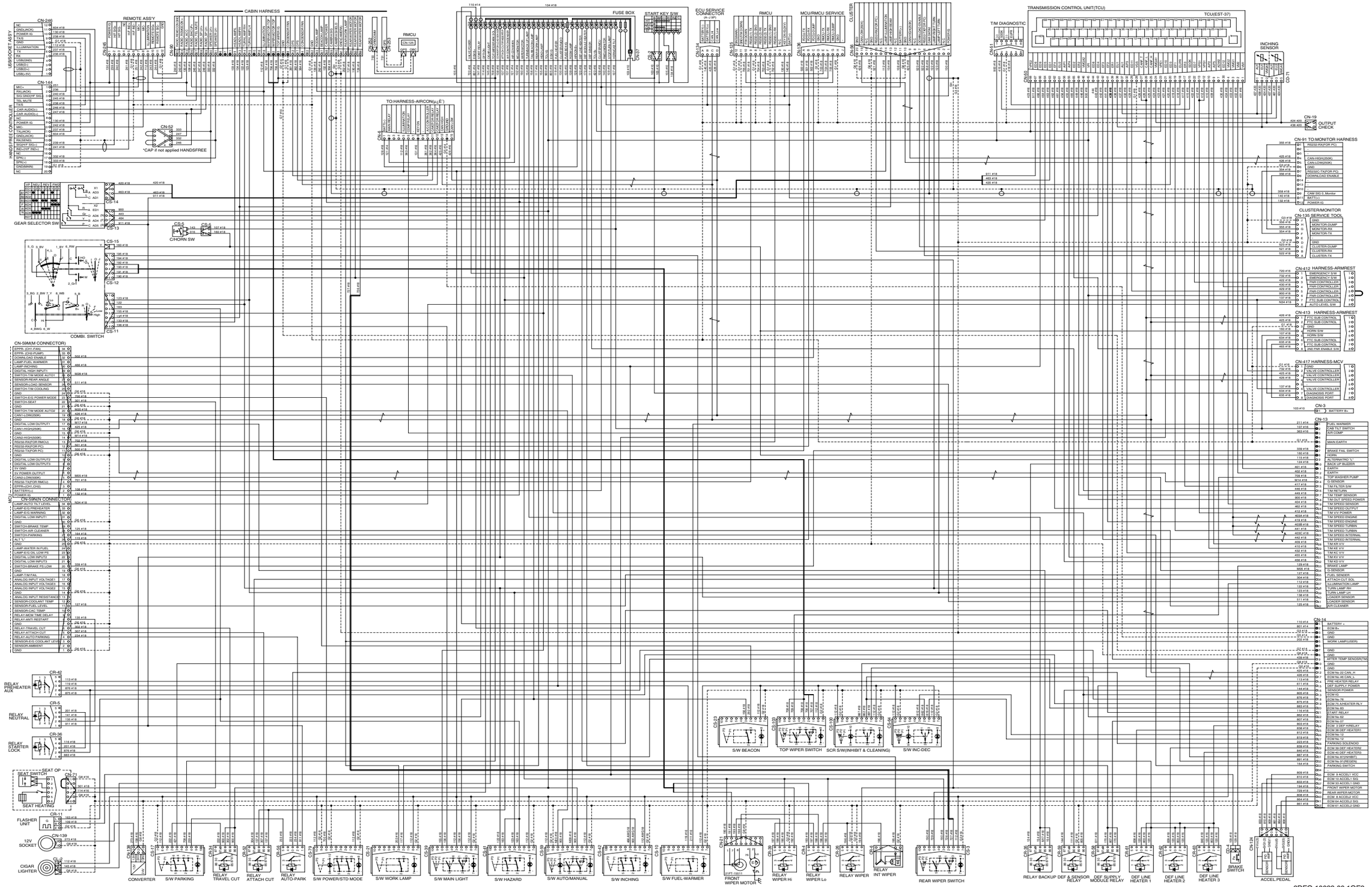


· ELECTRICAL CIRCUIT (12/24, 50D-9 : #0049-0065, 70D-9 : #0415-0763, 80D-9 : #0182-0299, OPT, CABIN TYPE)

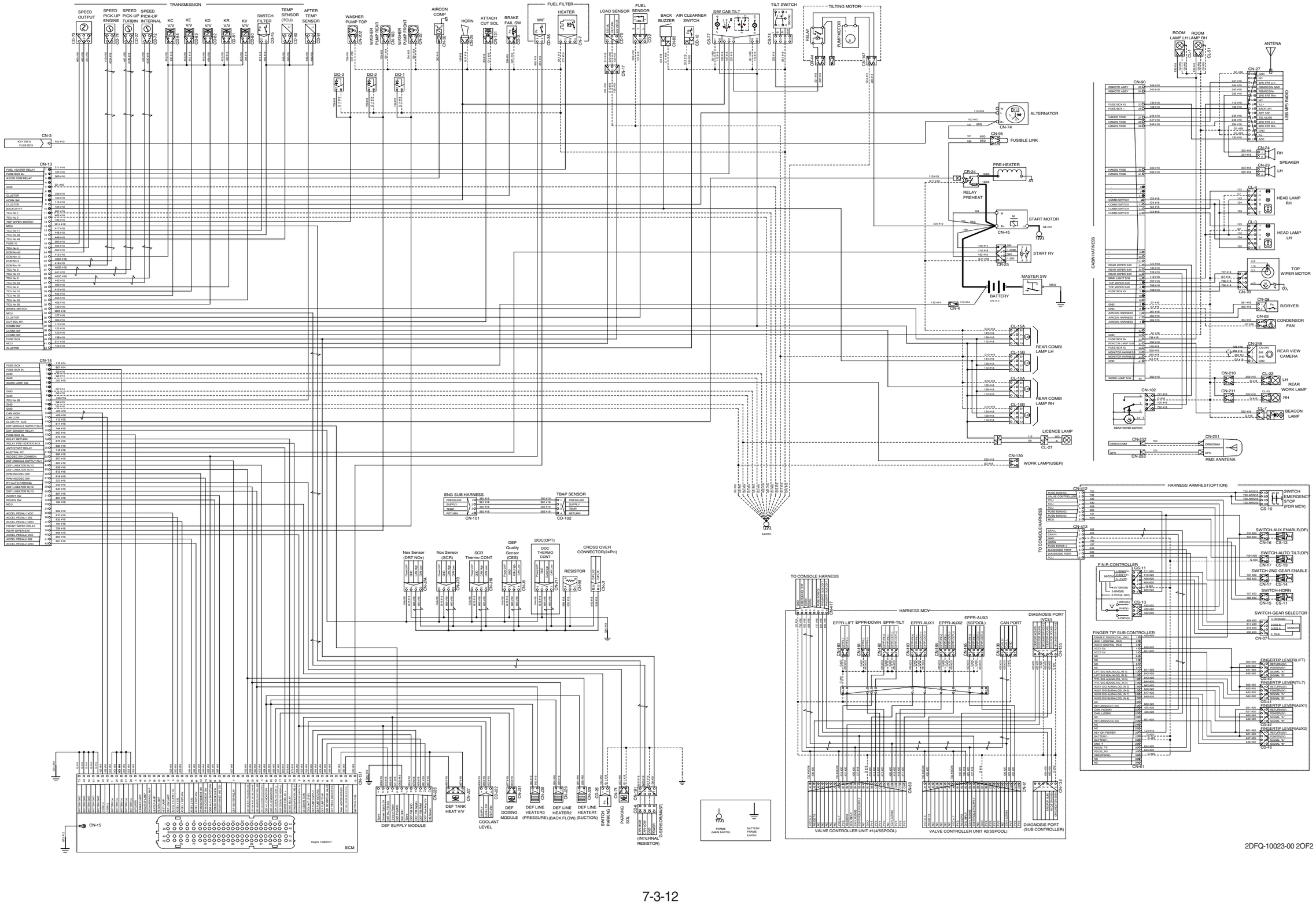


2DFQ-10022-00 2OF2

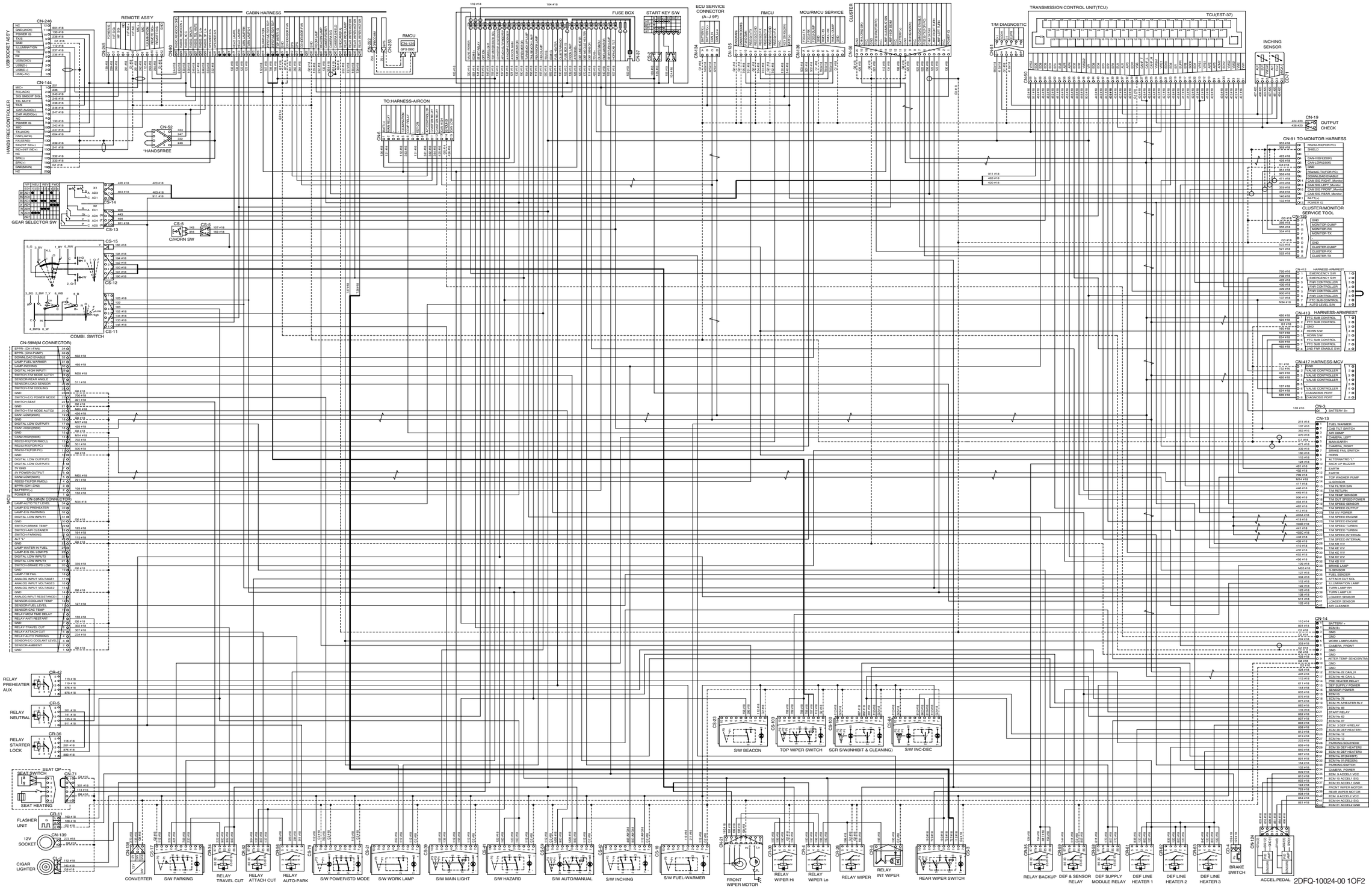
· ELECTRICAL CIRCUIT (13/24, 50D-9 : #0066-0082, 70D-9 : #0764-0824, 80D-9 : #0300-0373, OPT, CABIN TYPE)



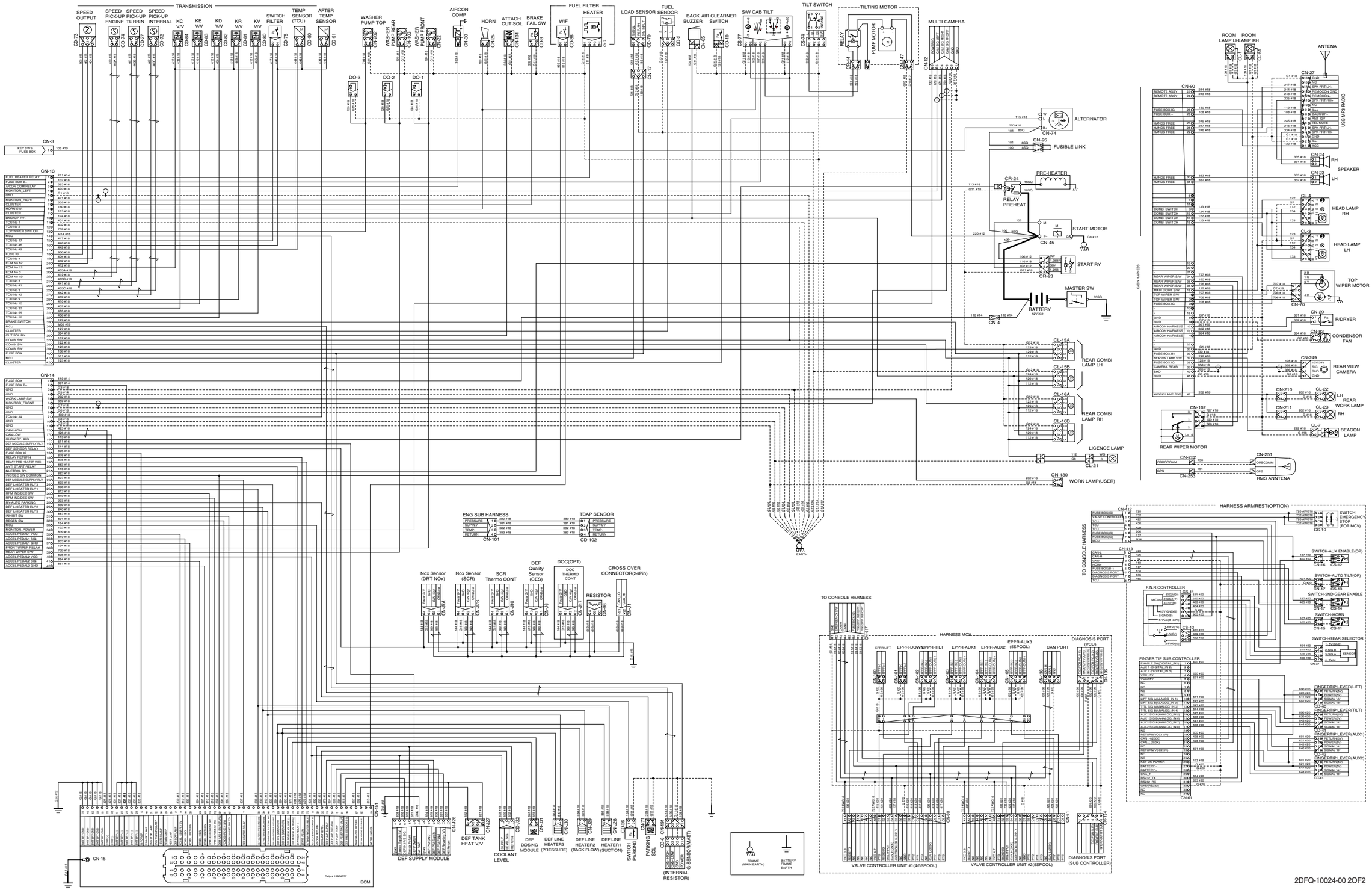
· ELECTRICAL CIRCUIT (14/24, 50D-9 : #0066-0082, 70D-9 : #0764-0824, 80D-9 : #0300-0373, OPT, CABIN TYPE)



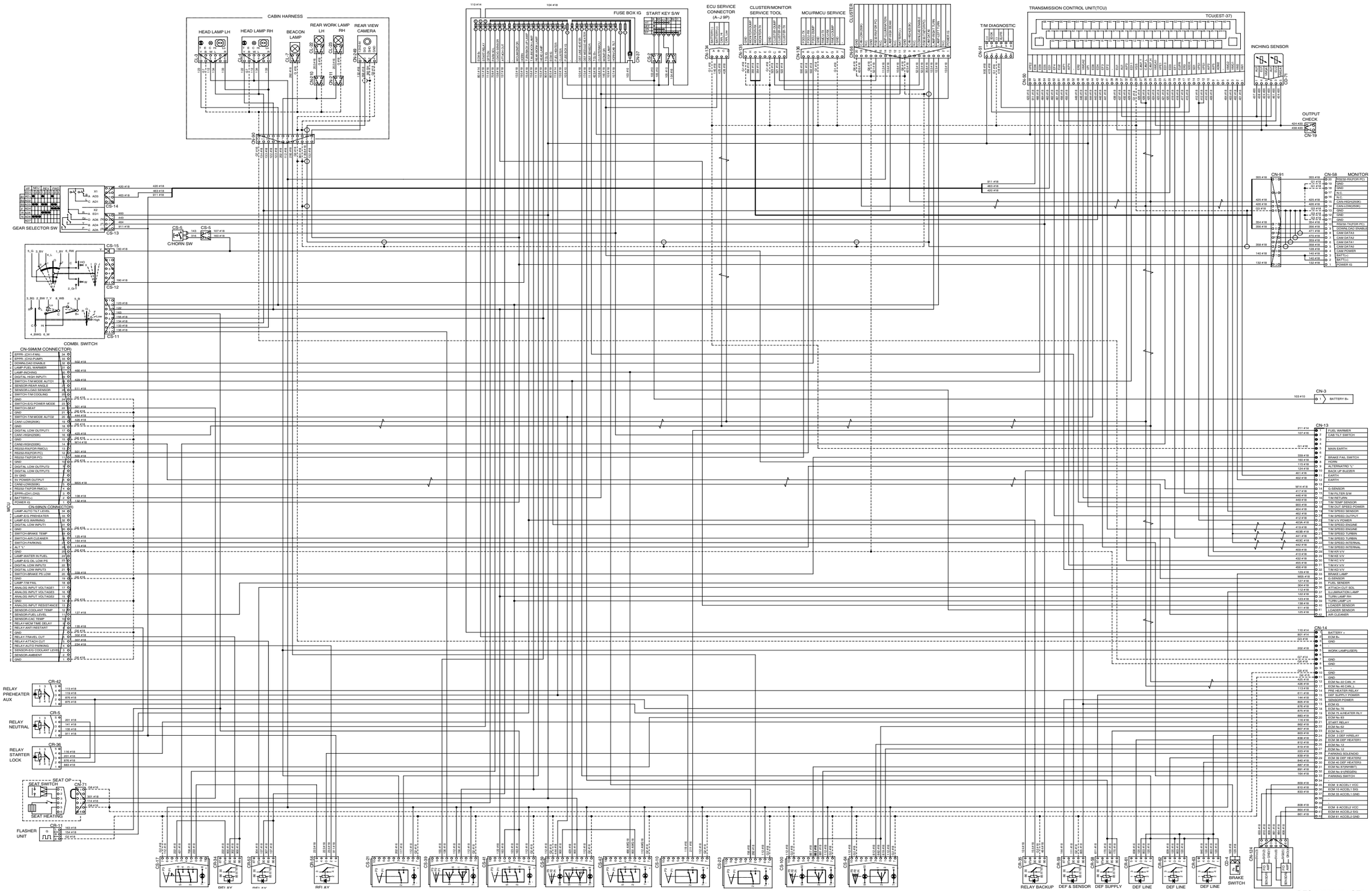
· ELECTRICAL CIRCUIT (15/24, 50D-9 : #0083-, 70D-9 : #0825-, 80D-9 : #0374-, OPT, CABIN TYPE)



· ELECTRICAL CIRCUIT (16/24, 50D-9 : #0083-, 70D-9 : #0825-, 80D-9 : #0374-, OPT, CABIN TYPE)

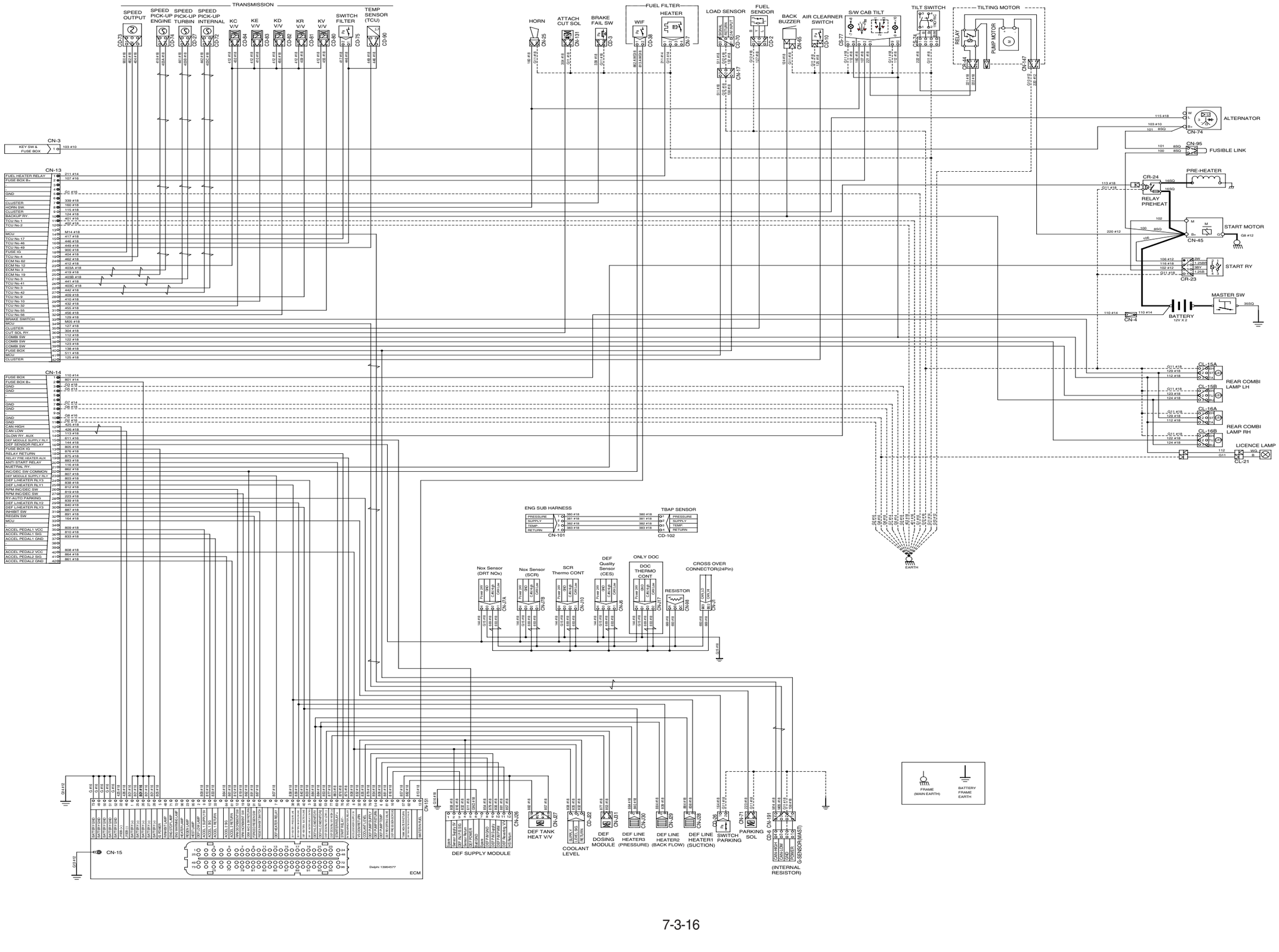


· ELECTRICAL CIRCUIT (17/24, 50D-9 : #0035-0048, 70D-9 : #0324-0414, 80D-9 : #0174-0181, OPT, OVERHEAD GUARD TYPE)



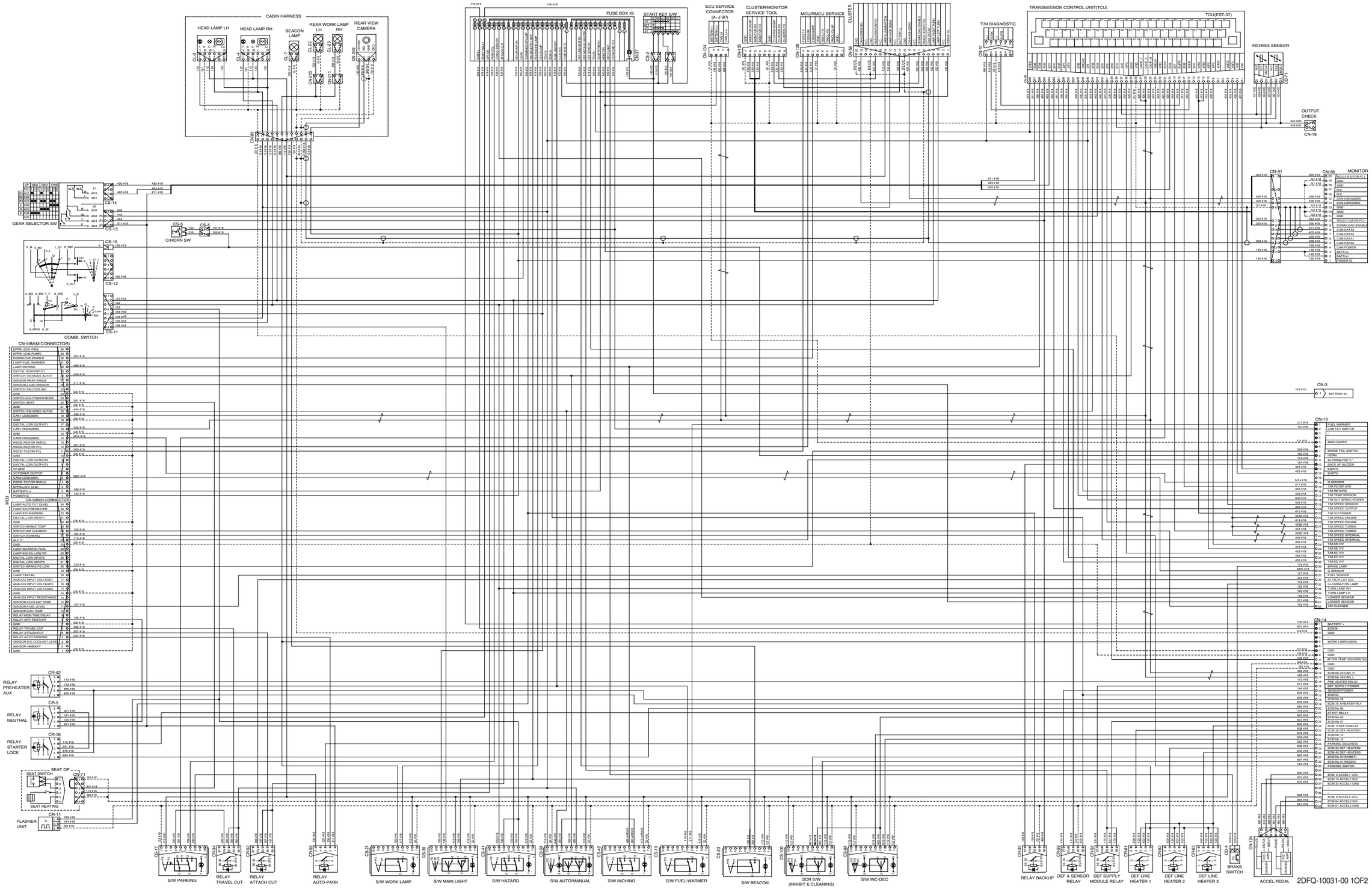
2DFQ-10030-00 1OF2

· ELECTRICAL CIRCUIT (18/24, 50D-9 : #0035-0048, 70D-9 : #0324-0414, 80D-9 : #0174-0181, OPT, OVERHEAD GUARD TYPE)



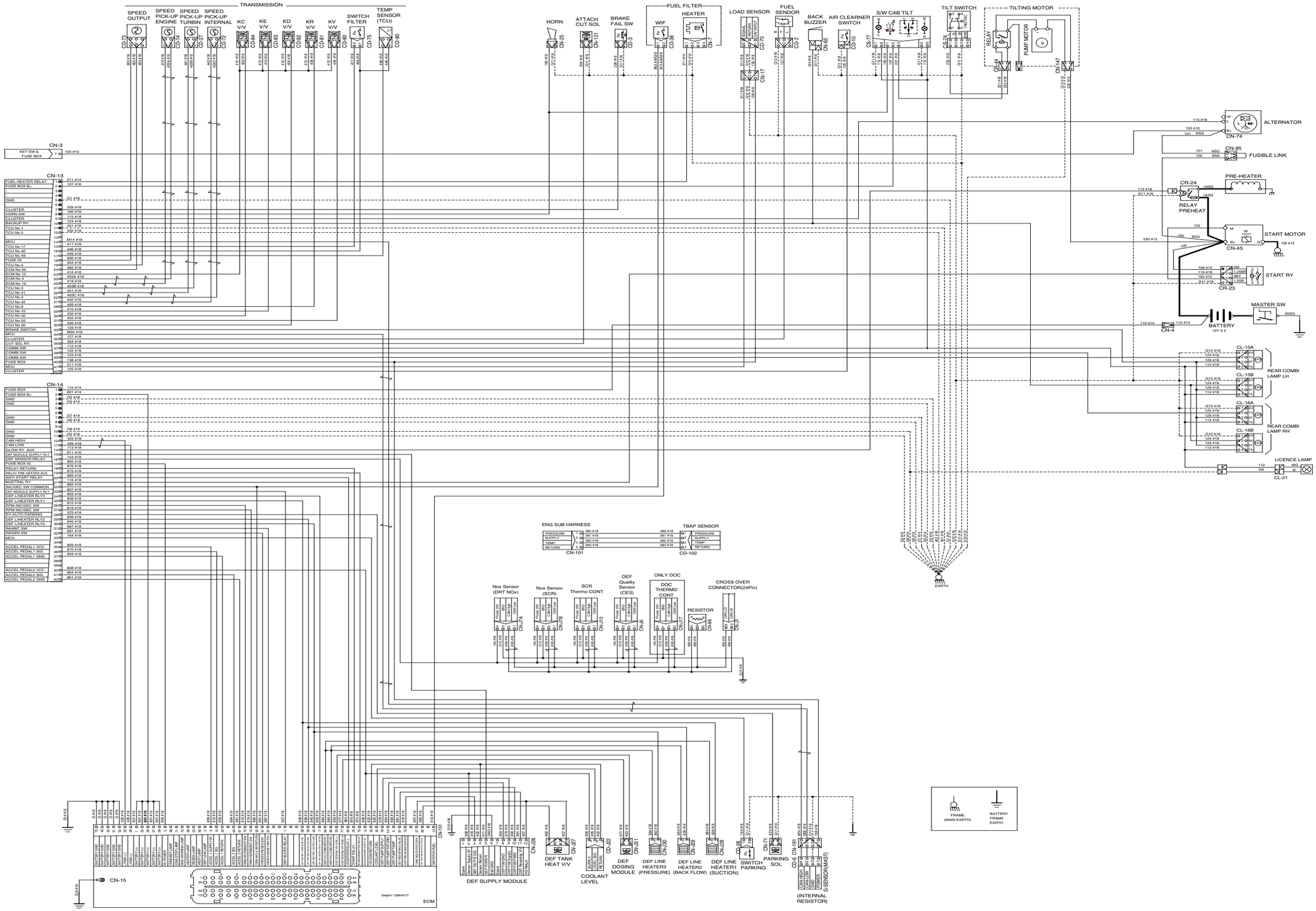
2DFQ-10030-00 2OF2

· ELECTRICAL CIRCUIT (19/24, 50D-9 : #0049-0065, 70D-9 : #0415-0763, 80D-9 : #0182-0299, STD, OVERHEAD GUARD TYPE)



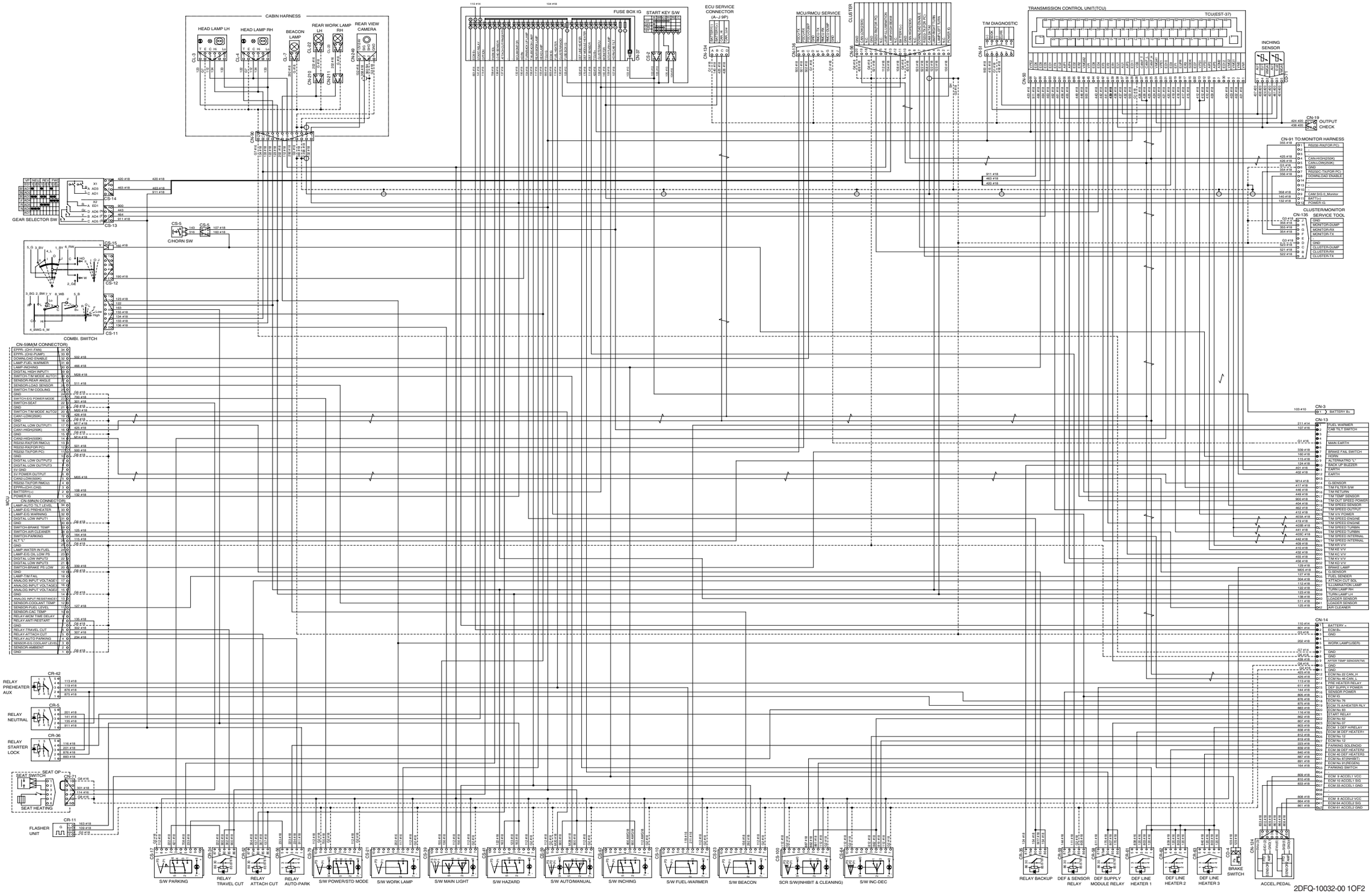
2DFQ-10031-00 1OF2

· ELECTRICAL CIRCUIT (20/24, 50D-9 : #0049-0065, 70D-9 : #0415-0763, 80D-9 : #0182-0299, STD, OVERHEAD GUARD TYPE)



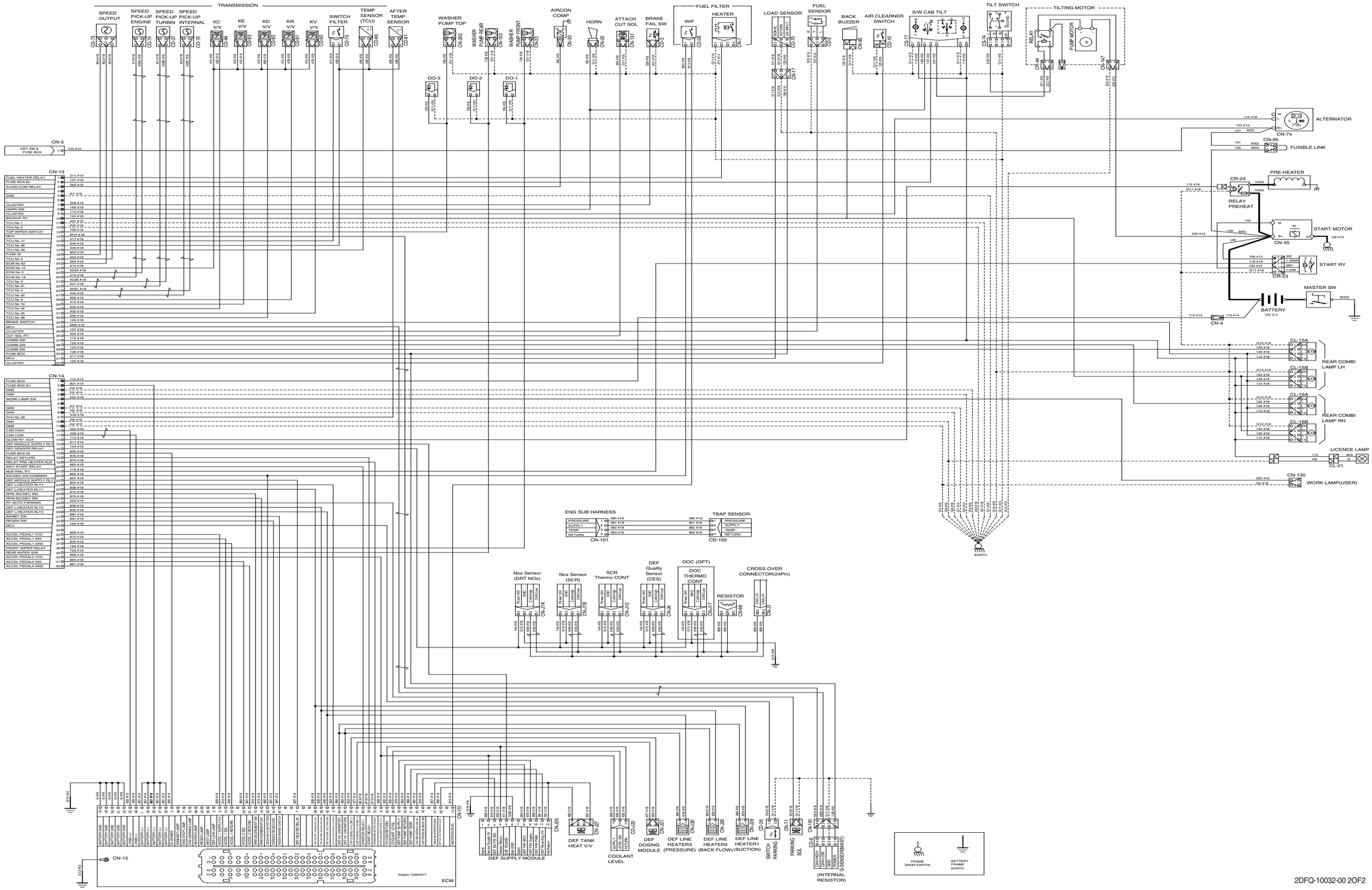
2DFQ-10031-00 2OF2

· ELECTRICAL CIRCUIT (21/24, 50D-9 : #0066-0082, 70D-9 : #0764-0824, 80D-9 : #0300-0373, STD, OVERHEAD GUARD TYPE)



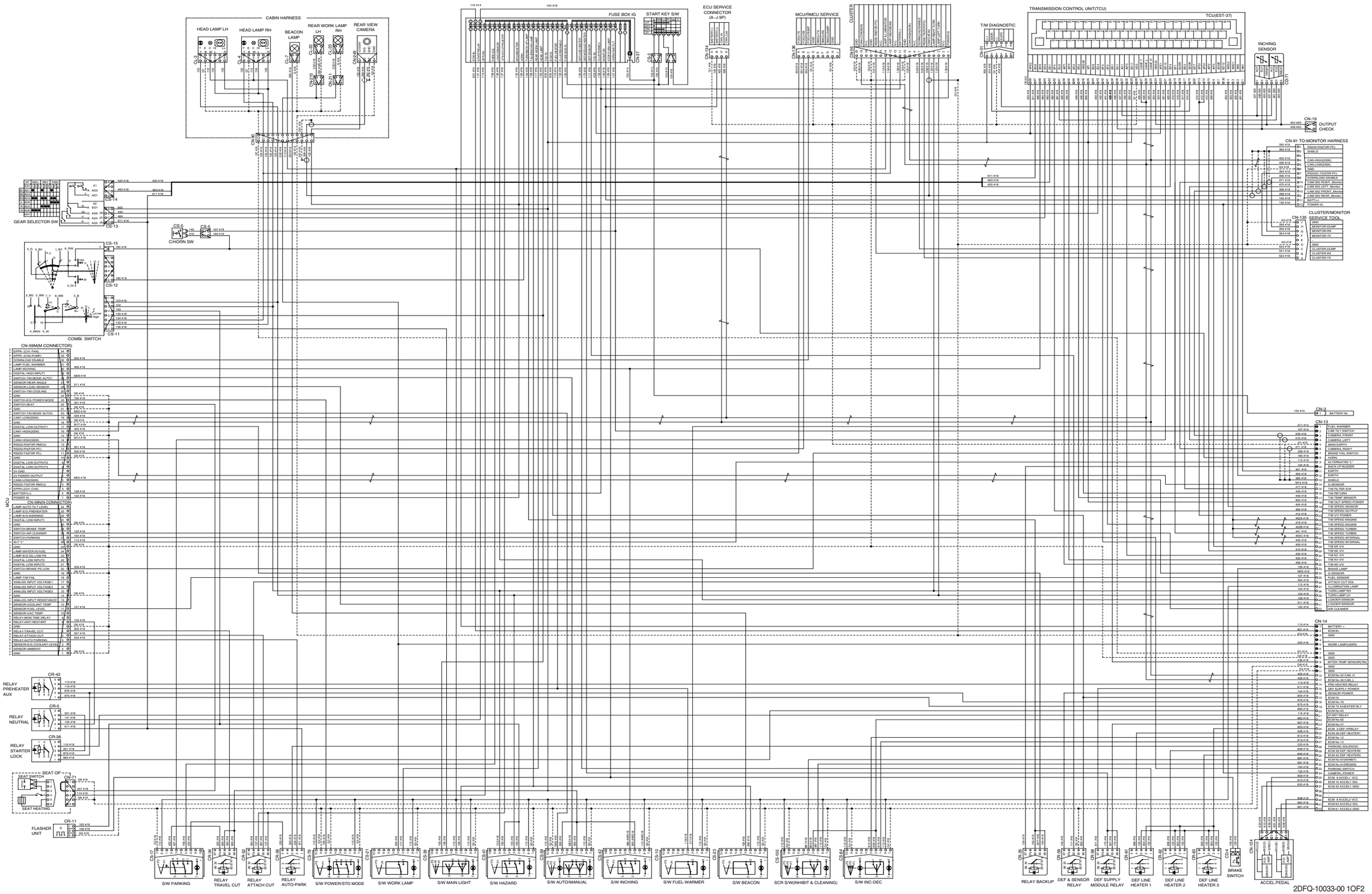
2DFQ-10032-00 1OF2

· ELECTRICAL CIRCUIT (22/24, 50D-9 : #0066-0082, 70D-9 : #0764-0824, 80D-9 : #0300-0373, STD, OVERHEAD GUARD TYPE)



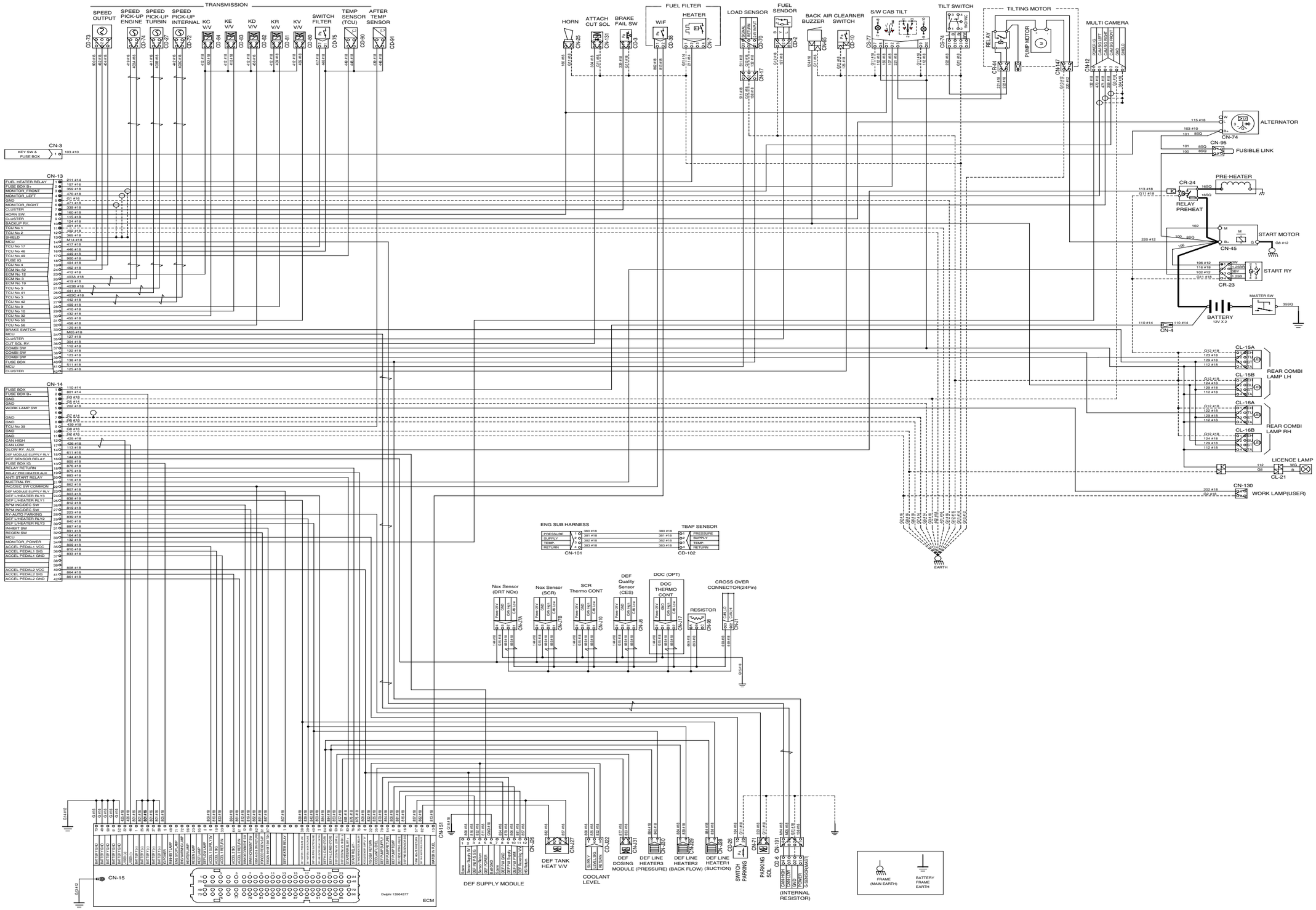
2DFQ-10032-00 2OF2

· ELECTRICAL CIRCUIT (23/24, 50D-9 : #0083-, 70D-9 : #0825-, 80D-9 : #0374-, STD, OVERHEAD GUARD TYPE)



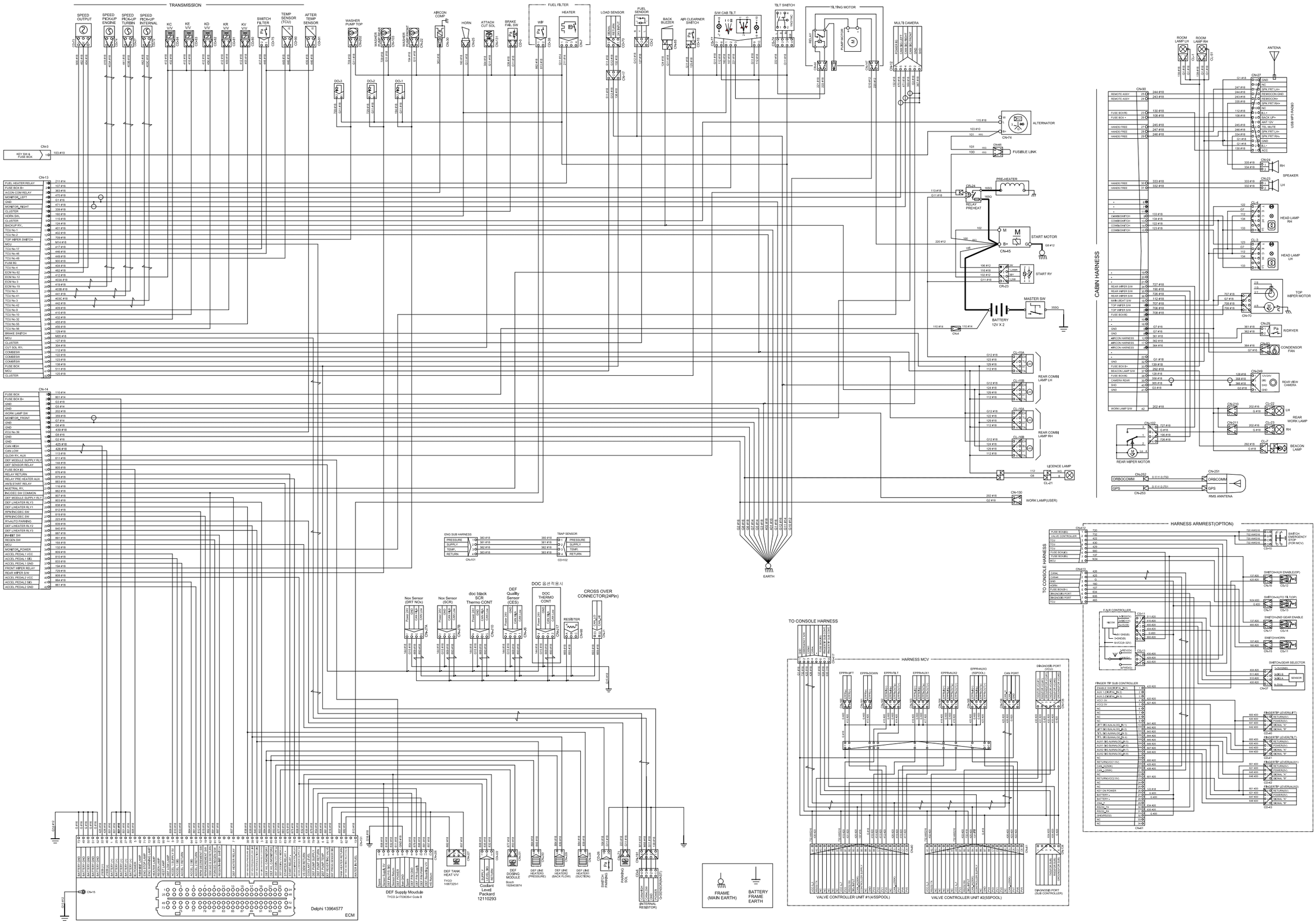
2DFQ-10033-00 1OF2

· ELECTRICAL CIRCUIT (24/24, 50D-9 : #0083-, 70D-9 : #0825-, 80D-9 : #0374-, STD, OVERHEAD GUARD TYPE)

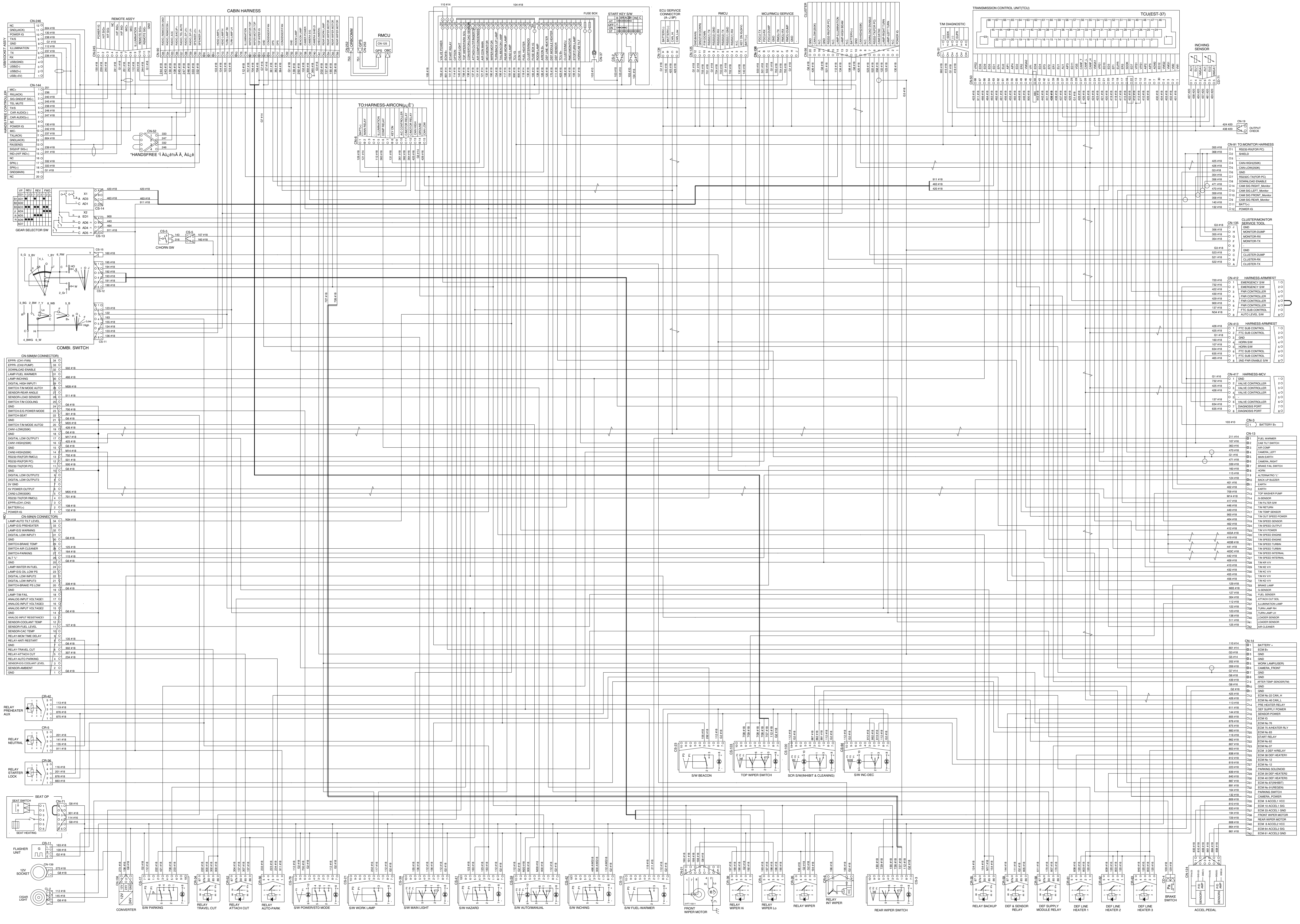


2DFQ-10033-00 2OF2

Wiring Diagram (1/2, Include Fingertip option)



Wring Diagram (2/2, Include Fingertip option)



MEMORANDUM


Robex
HYUNDAI HEAVY INDUSTRIES CO., LTD.
CONSTRUCTION EQUIPMENT DIV.

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(+)
  - I/conn [CN-4] → I/conn [CN-14 (1)] → Fues box [CN-37 (32)] → I/conn [CN-14 (2)] → ECM [CN-151 (1, 25, 26, 27, 28)]
  - Start motor [CN-45 (B+)]
    - Heater relay [CR-24]
    - Start relay [CR-23]
    - Tilting motor [CN-174] → Tilting motor relay [CR-44]
    - Fusible link [CN-95] → Alternator [CN-74 (B+)]
      - I/conn [CN-3] Start key switch [CS-2 (2)]
      - Fuse box [CN-37]
        - Fuse box [No.4]
          - I/conn [CN-13 (8)] → Cab tilt switch [CS-77 (2)]
          - Horn switch [CS-5 (1)]
        - Fuse box [No.5] → Brake pressure switch [CD-4]
        - Fuse box [No.6]
          - I/conn [CN-91 (11)] → Monitor [CN-58 (2, 3)]
          - RMCU [CN-125 (1)]
          - ECU service connector [CN-135 (B)]
        - Fuse box [No.7]
          - MCU [CN-59M (2)]
          - Cluster [CN-56 (11)]
          - I/conn [CN-90 (26)] → Radio and USB player [CN-27 (3)]
        - Fuse box [No.8] → TCU [CN-50 (23, 68)]
        - Fuse box [No.9] → DEF and sensor relay [CR-59 (30)]
        - Fuse box [No.10] → DEF supply module relay [CR-58 (30, 86)]
        - Fuse box [No.11]
          - DEF line heater relay 1 [CR-61 (1, 3)]
          - DEF line heater relay 2 [CR-62 (1, 3)]
          - DEF line heater relay 3 [CR-63 (1, 3)]
        - Fuse box [No.12] → Air conditioner harness [CN-6 (1)]
        - Fuse box [No.13] → I/conn [CN-90 (33)]
          - LH cabin room lamp [CL-1 (1)]
          - RH cabin room lamp [CL-51 (1)]

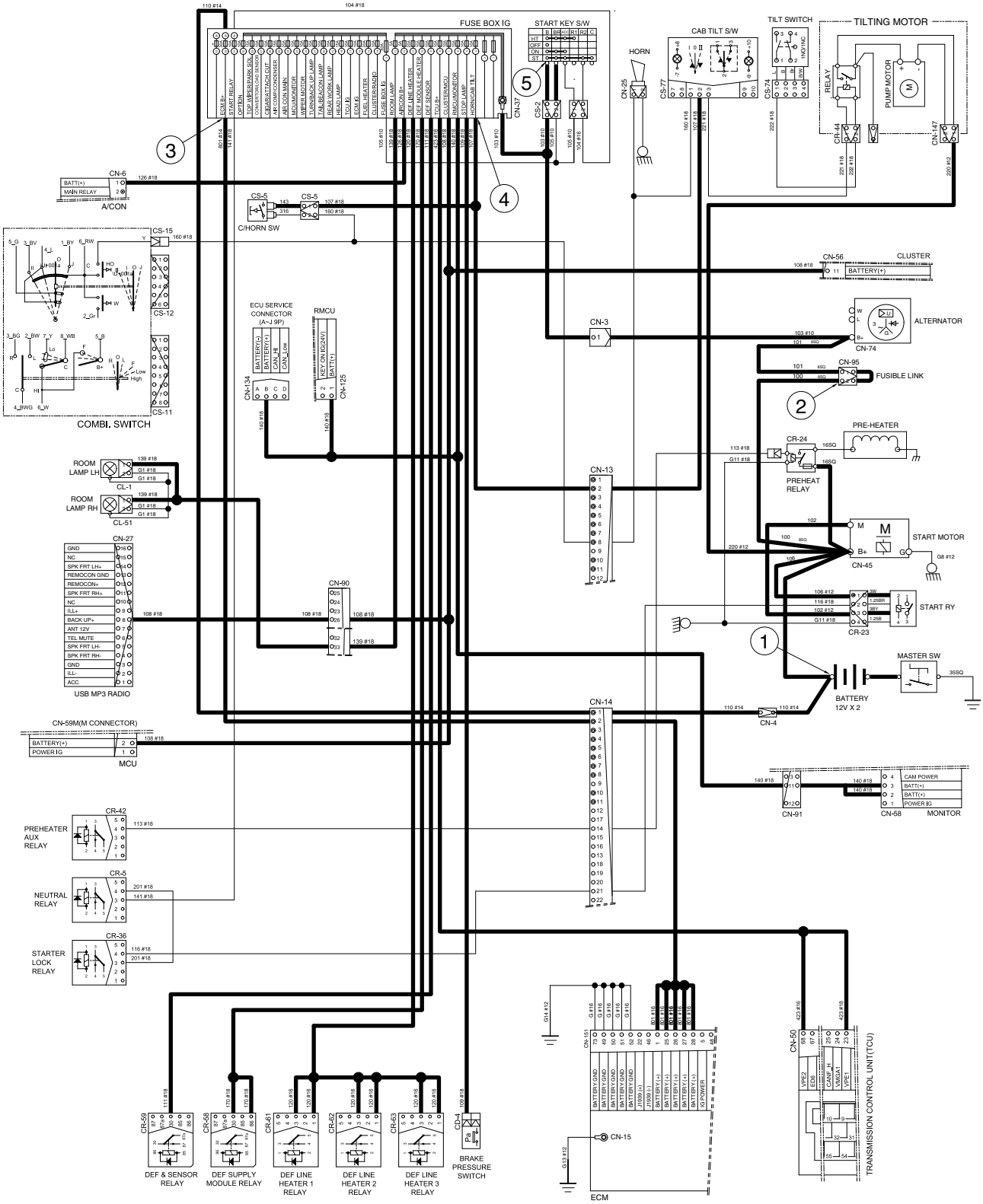
2) CHECK POINT

Engine	Key switch	Check point	Voltage
OFF	OFF	① - GND (Battery (+)) ② - GND (Fusible link) ③ - GND (Fuse No.32) ④ - GND (Fuse No.4) ⑤ - GND (Start key)	24V

※ GND : Ground

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

POWER CIRCUIT



50D9EL03

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

2. STARTING CIRCUIT

1) OPERATING FLOW

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

※ 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] → Neutral relay [CR-5 (3)→(4)]
→ Start lock relay [CR-36 (3)→(4)] → I/conn [CN-14 (21)] → Start relay [CR-23 (2)→(3)]
→ Start motor [CN-45 (M)] → Start motor operating

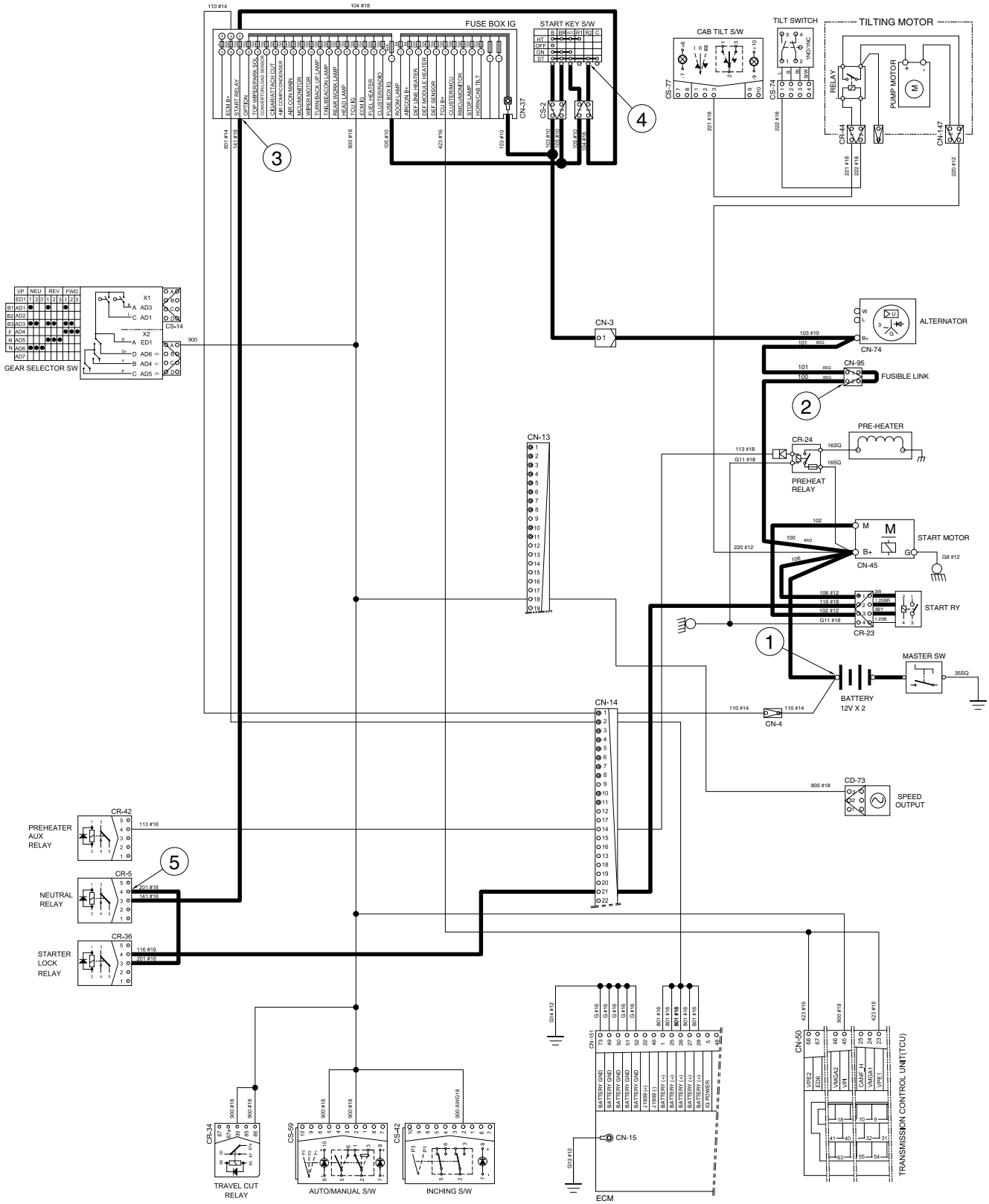
2) CHECK POINT

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

※ GND : Ground

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

STARTING CIRCUIT



50D9EL04

※ 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

Alternator [CN-74 (L)] → I/conn [CN-13 (9)] → MCU alternator level [CN-59N (26)]
→ Cluster charging warning lamp (Via CAN interface)

(2) Charging flow

Alternator [CN-74 (B+)] → Fusible link [CN-95] → Starter [CN-45 (B+)] → Battery (+) terminal charging
I/conn [CN-3] → Start switch [CS-2 (1)]
Fuse box

2) CHECK POINT

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

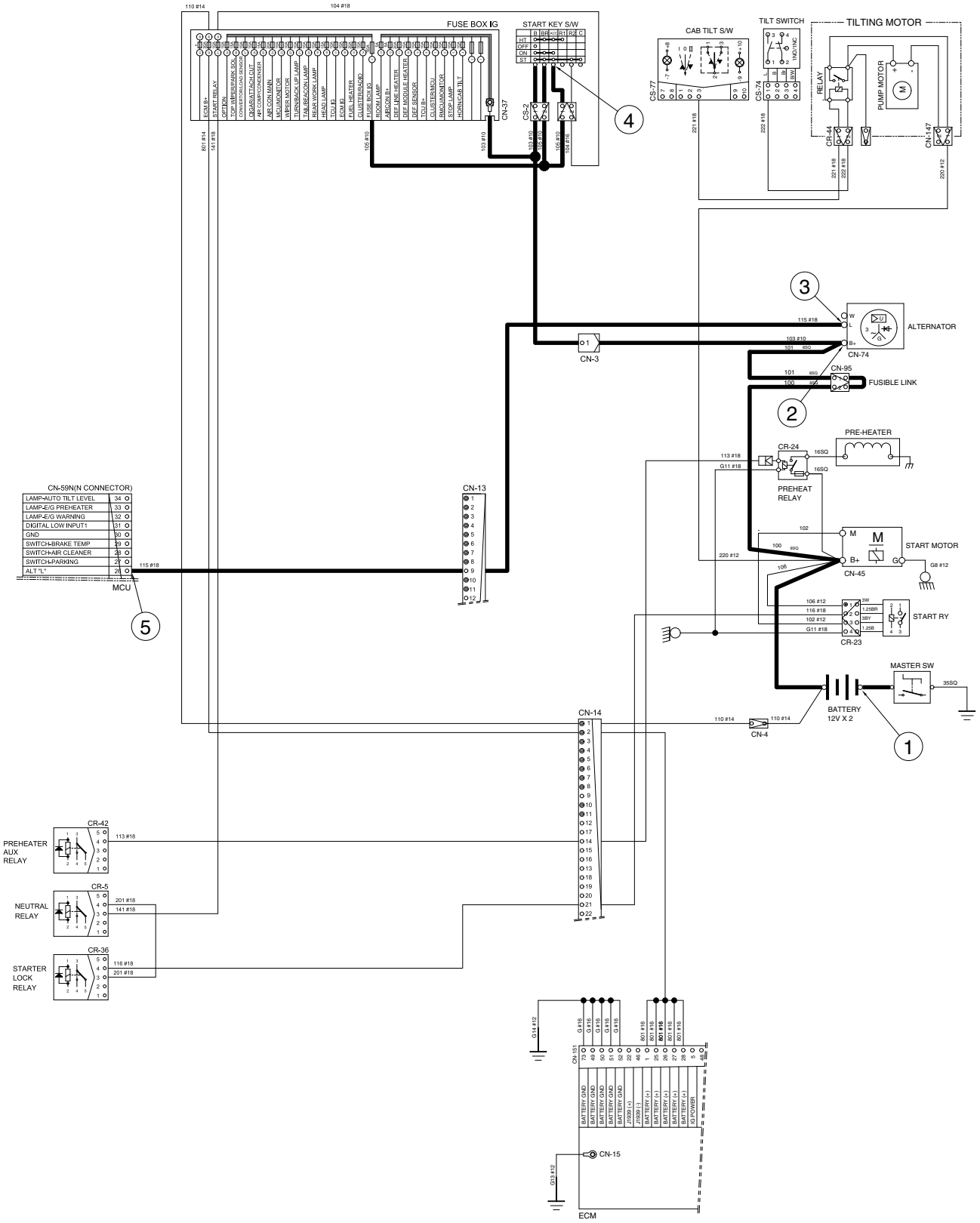
※ GND : Ground

※ Cautions

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

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

CHARGING CIRCUIT



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

4. PREHEATING CIRCUIT

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

1) OPERATING FLOW

Battery (+) terminal → Start motor [CN-45 (B+)] → Heater relay [CR-24]

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

Start switch ON [CS-2 (2)]

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

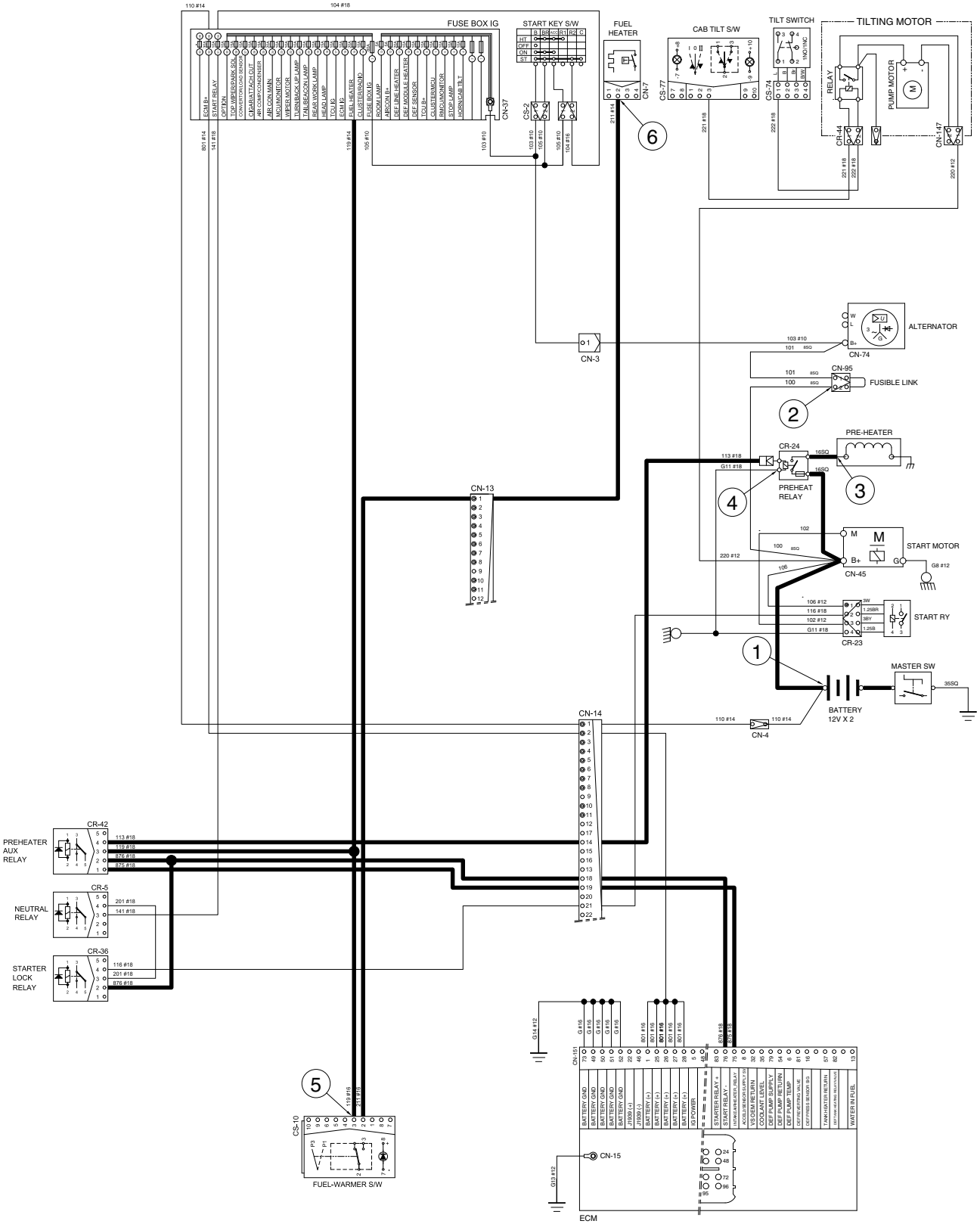
2) CHECK POINT

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

※ GND : Ground

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

PREHEATING CIRCUIT



50D9EL07

※ 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 (6)]
  - → RH Head light low beam ON [CL-4 (6)]
- → Multi function switch DOWN [CS-11 (6)]
  - → Cluster high beam pilot lamp ON [CN-56 (13)]
  - → I/conn [CN-90 (13)]
    - → LH Head light high beam ON [CL-3 (2)]
    - → RH Head light high beam ON [CL-4 (2)]

(2) Rear work light

Fuse box (No.19) → Rear work light switch [CS-21 (2)] → Switch ON [CS-21 (3)]
→ I/conn [CN-90 (42)]
- → I/conn [CN-210 (2)] → LH rear work light ON [CL-22 (2)]
- → I/conn [CN-211 (2)] → RH rear work light ON [CL-23 (2)]

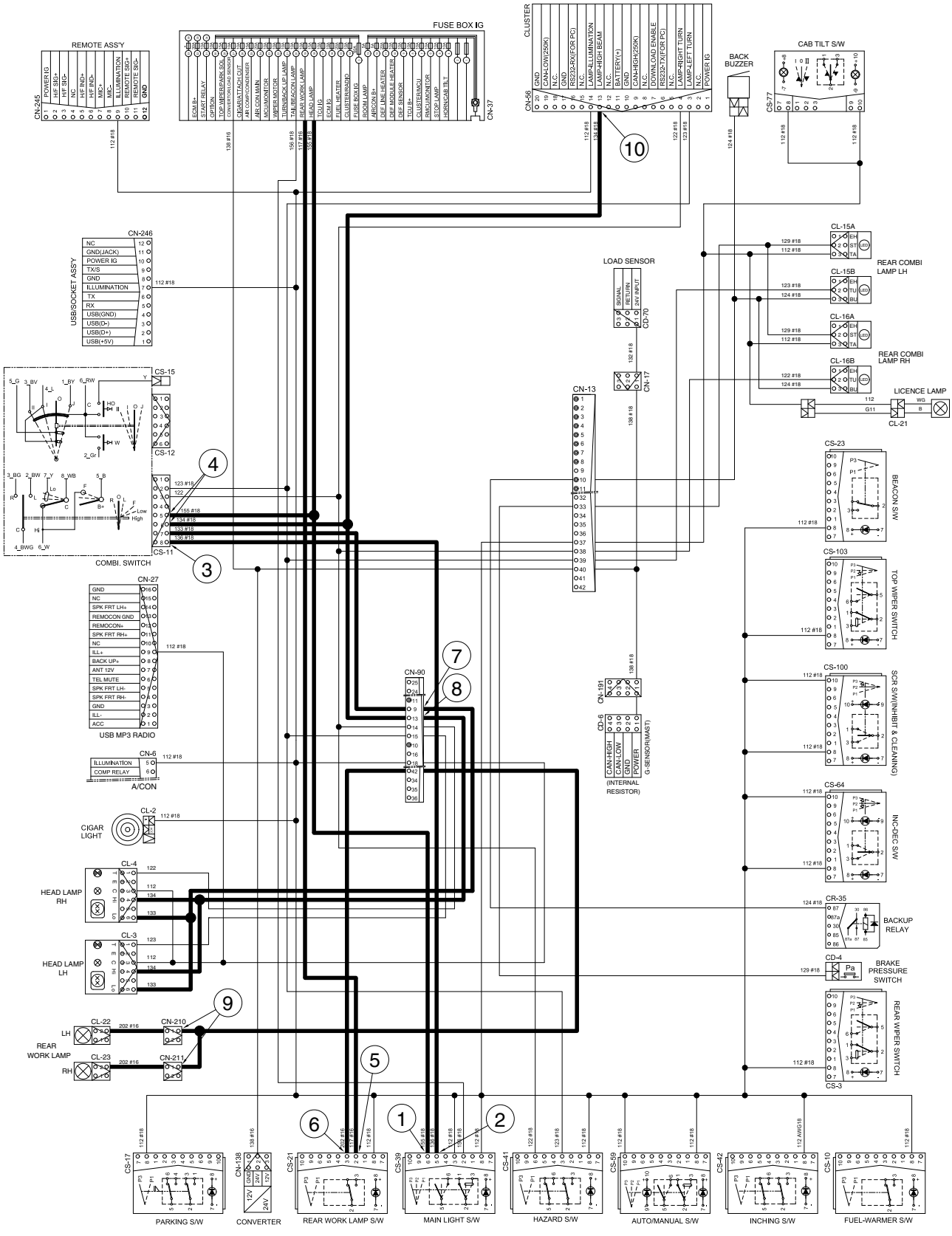
2) CHECK POINT

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) ⑩ - GND (Cluster high beam pilot lamp input)	20~25V

※ GND : Ground

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

HEAD LIGHT AND REAR WORK LIGHT CIRCUIT



※ 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 & washer switch [CS-3 (3, 6)]
→ I/conn [CN-90 (35)] → Rear wiper motor [CN-102 (3)]

Fuse box [No.28] → Top wiper & 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)]
→ Washer tank [CN-22 (2)] → I/conn [CN-14 (38)] → Front washer operating
→ Wiper relay [CR-26 (1)→(4)] → Front wiper relay Lo [CR-4 (2)→(3)]
→ Front wiper motor [CN-21 (2)] → Wiper motor operating (low)

(2) Front wiper switch ON

① **INT position**
Wiper switch ON [CS-12 (6)→(1)] → Int wiper relay [CR-6 (3)] → Front 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)→(2)] →
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 (36)] → Rear wiper motor [CN-102 (4)] →
Rear wiper motor operating

② **Washer switch ON** (2nd step)
Washer switch ON [CS-3 (6)→(3)] → I/conn [CN-14 (39)] → Rear washer tank [CN-103 (2)] →
Washer operating
Wiper switch ON [CS-3 (3)→(2)] → I/conn [CN-90 (36)] → Rear wiper motor [CN-102 (4)] →
Rear wiper motor operating

(5) Top wiper and washer switch

① **Wiper switch ON** (1st step)
Wiper switch ON [CS-103 (3)→(2)] → I/conn [CN-90 (2)] → Top wiper motor [CN-70 (4)] →
Top wiper motor operating

② **Washer switch ON** (2nd step)
Washer switch ON [CS-103 (6)→(5)] → I/conn [CN-13 (13)] → Top washer tank [CN-202 (2)] →
Washer operating
Wiper switch ON [CS-103 (3)→(2)] → I/conn [CN-90 (2)] → Top wiper motor [CN-70 (4)] →
Top wiper motor operating

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

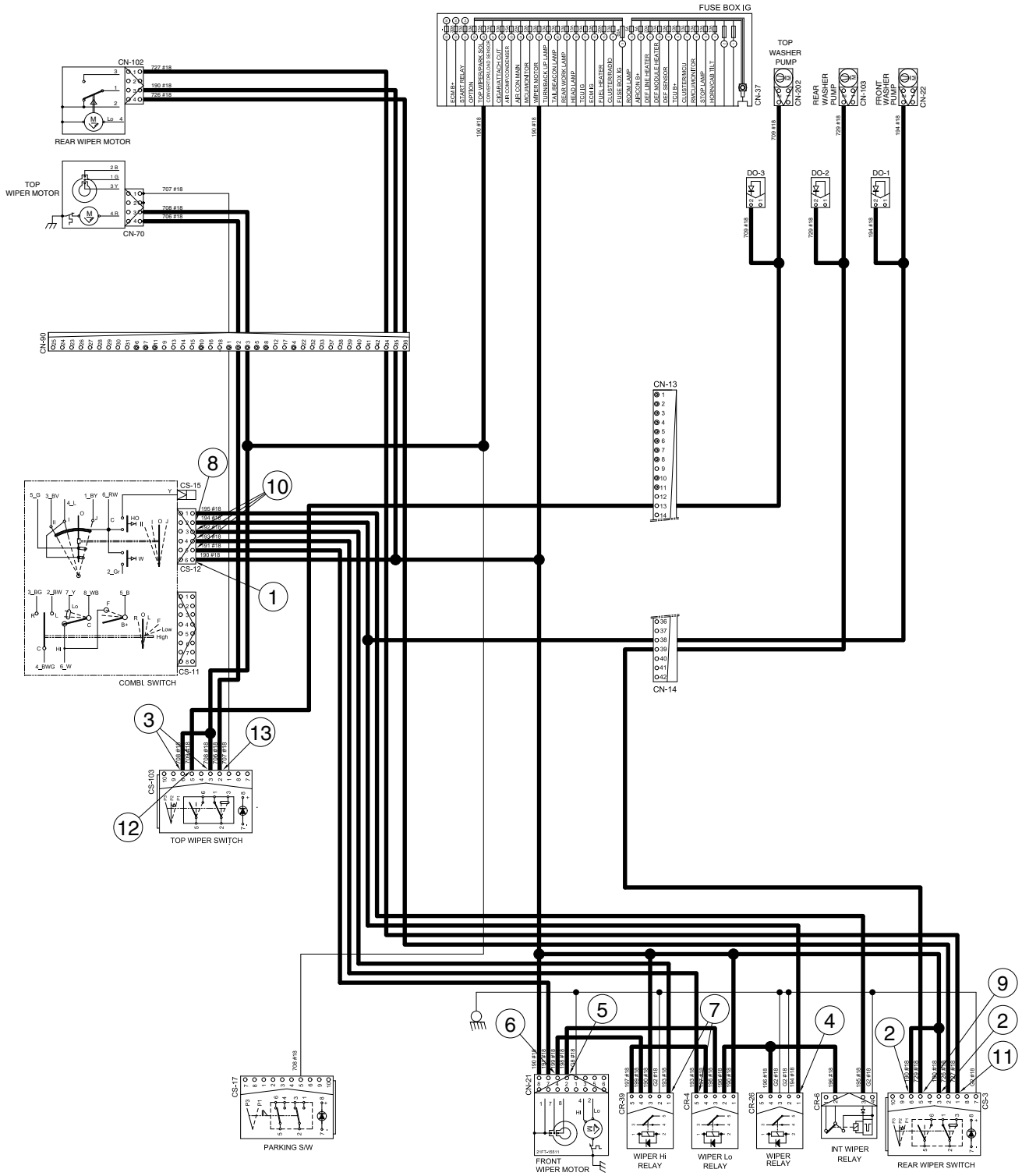
2) CHECK POINT

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)	20~25V

※ GND : Ground

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

WIPER AND WASHER CIRCUIT



50D9EL09

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

3. CLUSTER

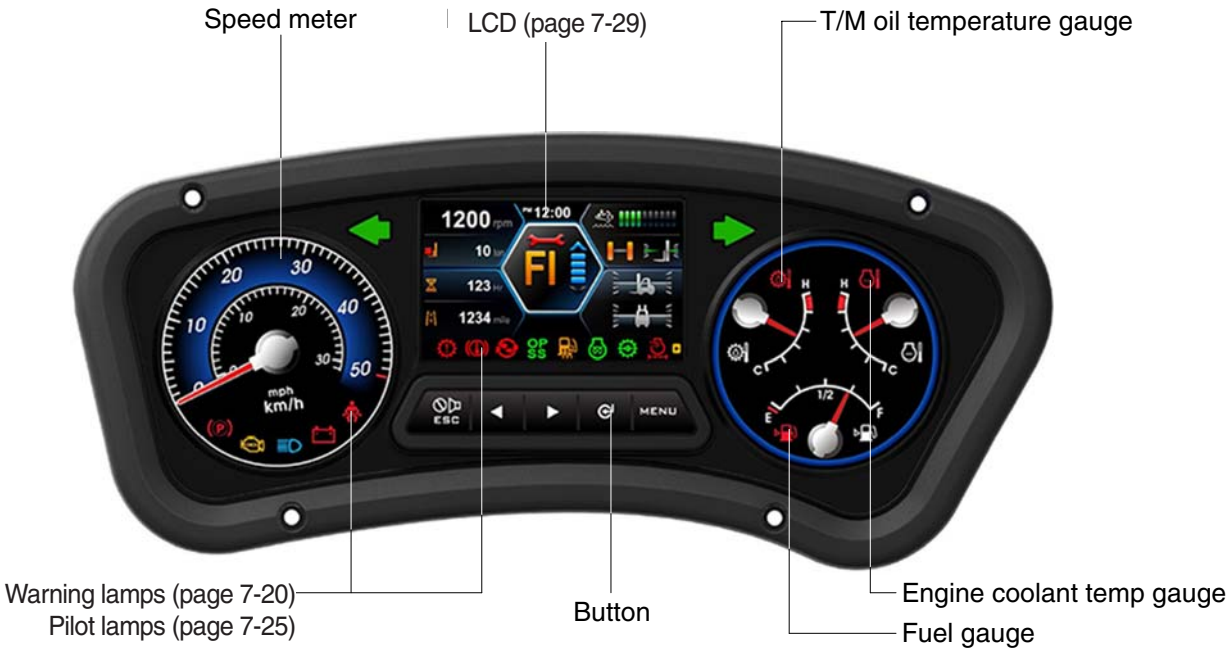
1) STRUCTURE

The cluster consists of gauges, lamps, buttons and LCD as shown below, to warn the operator in case of abnormal truck operation or conditions for the appropriate operation and inspection.

- Gauges : Indicate operating status of the truck.
- Warning lamps : Indicate abnormality of the truck.
- Pilot lamps : Indicate operating status of the truck.
- LCD : Display the truck model, error code and engine speed etc.
- Buttons : Select the truck model, error code and engine speed etc and stop the buzzer sound.

※ **The cluster installed on this truck does not entirely guarantee the condition of the truck. Daily inspection should be performed according to chapter 7. PLANNED MAINTENANCE AND LUBRICATION of the operator's manual.**

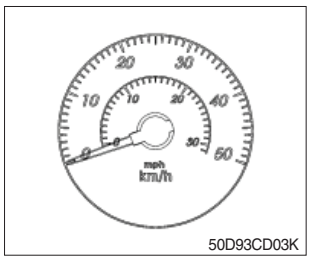
※ **When the cluster provides a warning immediately check the problem, and perform the required action.**



50D9CD02

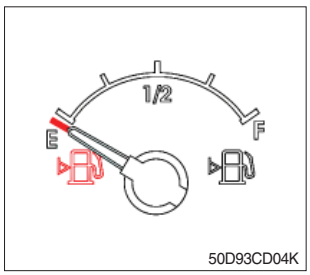
2) GAUGE

(1) Speed meter



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

(2) Fuel gauge

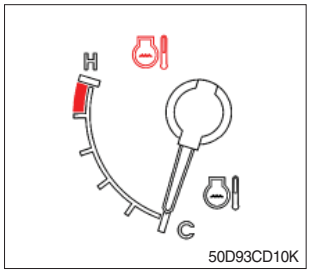


① This gauge indicates the amount of fuel in the fuel tank.

② Fill the fuel when the indicator moves E point, refuel as soon as possible to avoid running out of fuel.

※ **If the gauge indicates below E point even though the truck is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.**

(3) Engine coolant temperature gauge



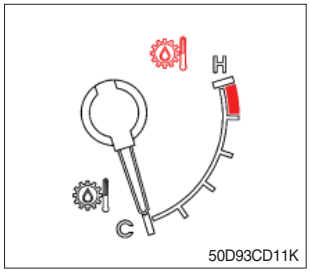
① This indicates the temperature of coolant.
- White range : 40~104˚C
- Red range : Above 104˚C (219˚F)

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

③ If the indicator is in the red range, turn OFF the engine and check the radiator and engine.

※ **If the gauge indicates red range even though the truck is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.**

(4) Transmission oil temperature gauge

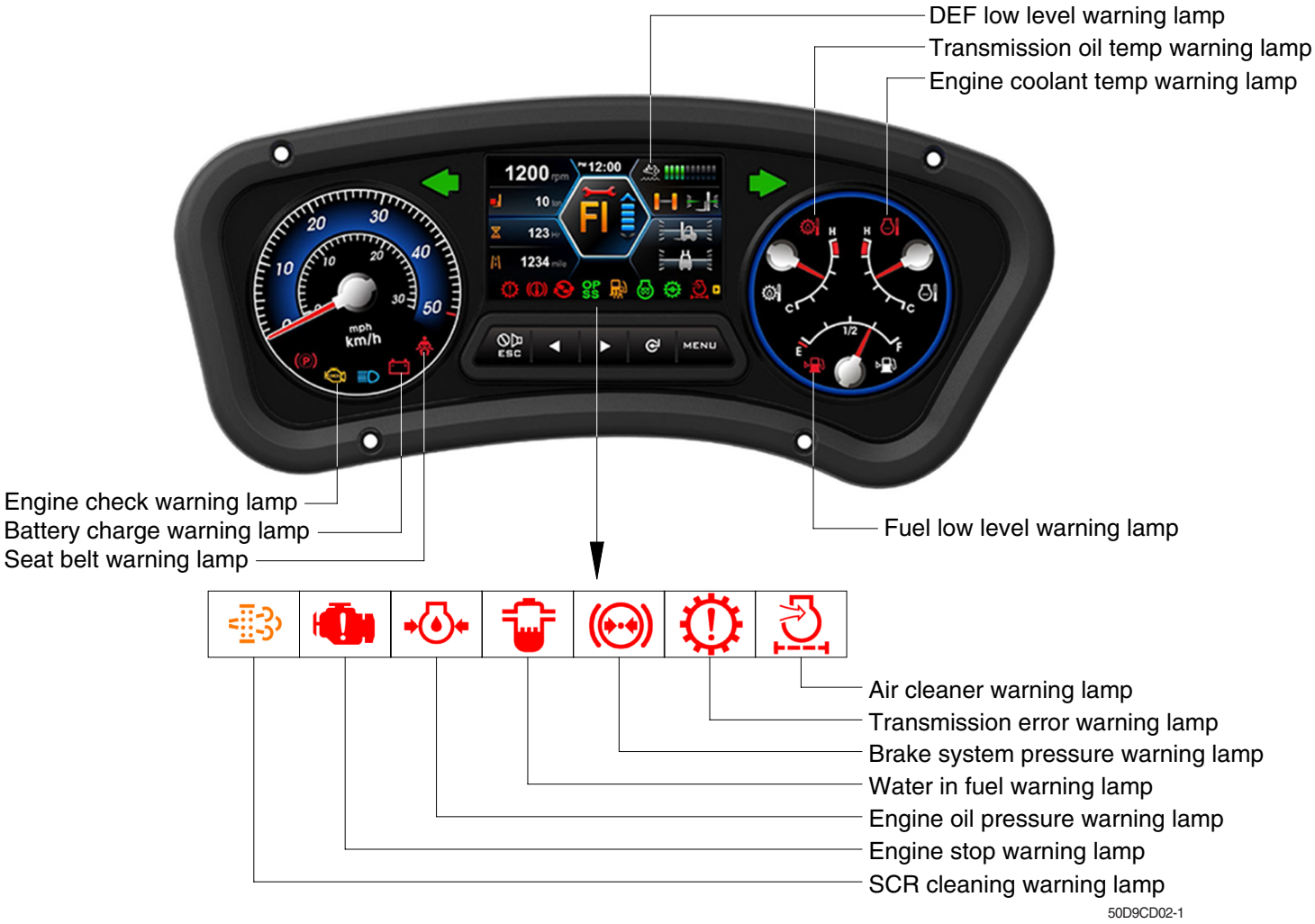


① This range indicates the temperature of transmission oil.
- White range : 40~107˚C
- Red range : Above 107˚C (225˚F)

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

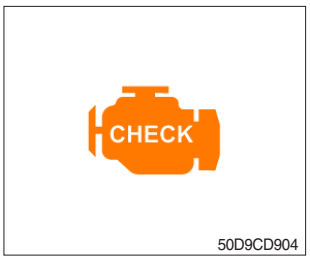
③ If the indicator is in the red range, it means the transmission is overheated. Be careful that the indicator does not move into the red range.

3) WARNING LAMPS



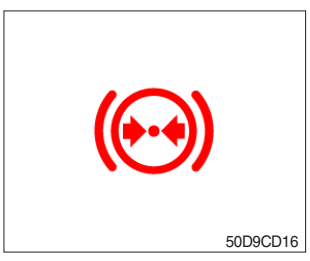
※ **When the warning and pilot lamps occur over eight, you can display next lamps by push the button (▶).**

(1) Engine check lamp



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

(2) Brake fail warning lamp

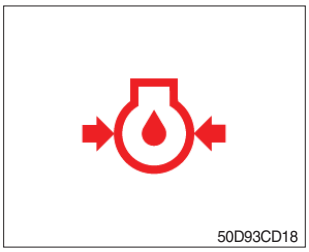


① The lamp lights ON when the oil pressure of service brake drops below the normal range.

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

※ **Do not operate until the problems are corrected.**

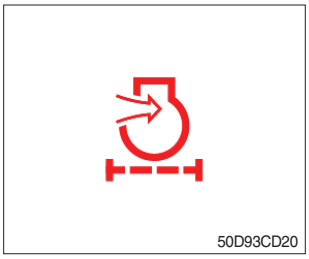
(3) Engine oil pressure warning lamp



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

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

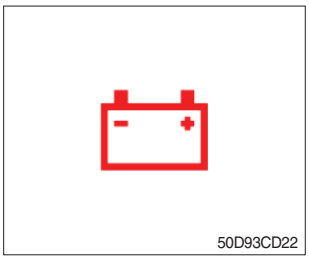
(4) Air cleaner warning lamp



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

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

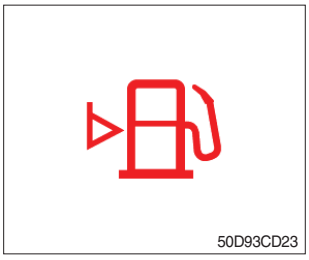
(5) Battery charging warning lamp



① This lamp is ON after key switch is turned ON, it is turned OFF after starting the engine.

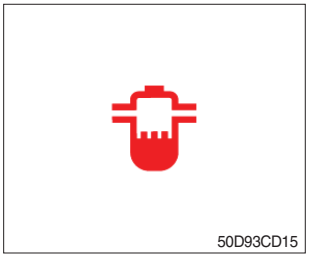
② Check the battery charging circuit when this lamp comes ON during engine operation.

(6) Fuel low level warning lamp



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

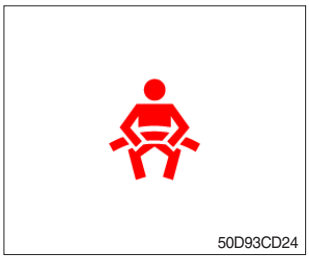
(7) Water in fuel warning lamp



① This lamp lights up when the prefilter is filled with water or malfunctioning.

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

(8) Seat belt warning lamp

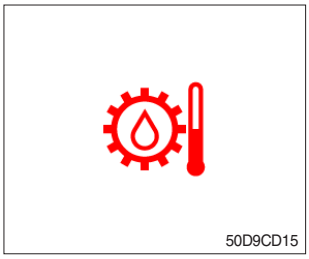


① This lamp lights ON for the first five seconds after starting the engine.

(9) Engine coolant temperature warning lamp

① This lamp is turned ON when the temperature of cooling water is over the normal temperature(104°C, 219°F).
② Check the cooling system when the lamp is ON.

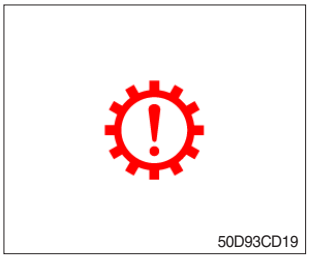
(10) Transmission oil temperature warning lamp



① This lamp informs the operator that transmission oil is above the specified temperature (107˚C, 225˚F).
- Lamp ON : Abnormal
- Lamp OFF : Normal

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

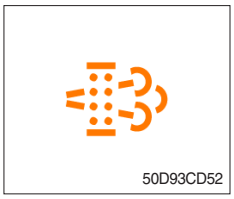
(11) Transmission error warning lamp



① This lamp lights ON and the information window of the LCD shows the error code when an error occur in the transmission.
② Immediately pull the truck to a convenient stop. Stop the engine. Investigate the cause.

※ **Consult a HYUNDAI dealer to investigate the cause.**
※ **Do not operate until the cause has been corrected.**

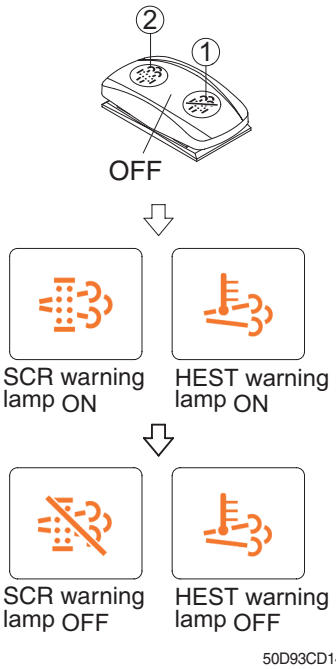
(12) SCR (Selective Catalytic Reduction) CLEANING WARNING LAMP



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

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

※ Manual SCR cleaning method



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

① Stop and park the machine.

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

※ Refer to the page 3-29 of the operator's manual for the switch operation.

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

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

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

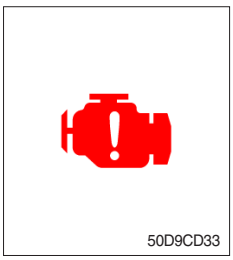
(13) DEF (Diesel Exhaust Fluid) low warning lamp

① This warning lamp indicates, when illuminated or flashing, that the diesel exhaust fluid level is low.

※ **Add the diesel exhaust fluid into DEF tank.**

※ **Refer to the page 7-23 for detail.**

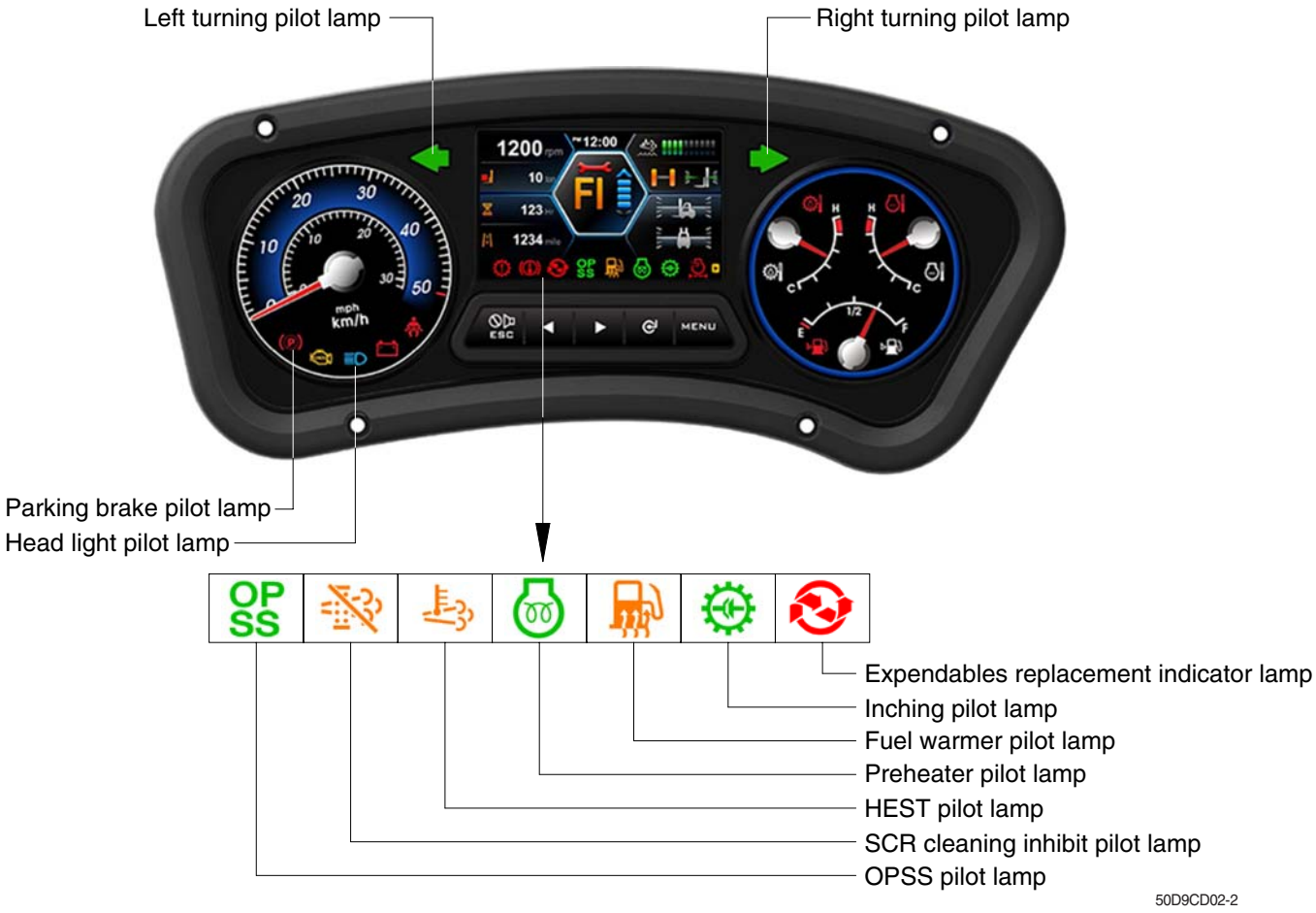
(14) Engine stop warning lamp



① When this warning lamp lights ON, stop the engine immediately and and check the DEF level and related parts of the engine.

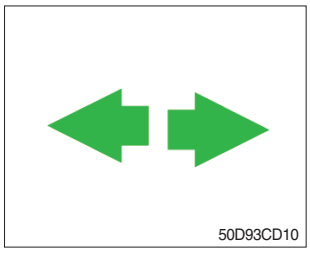
※ **Please contact your Hyundai service center or local dealer.**

4) PILOT LAMPS



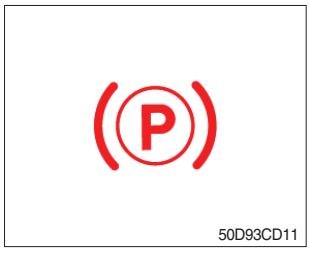
※ **When the warning and pilot lamps occur over eight, you can display next lamps by push the button (▶).**

(1) Direction pilot lamp



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

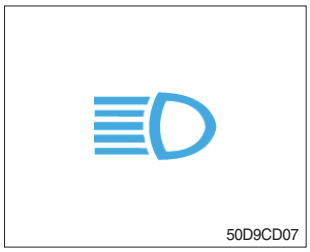
(2) Parking brake pilot lamp



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

※ **Check the lamp is OFF before driving.**

(3) Head light pilot lamp



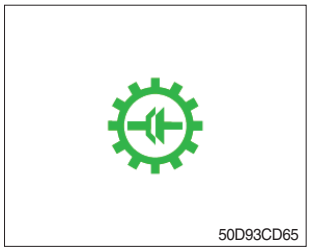
① This lamp comes ON when the main light switch is operated to 2nd step.

(4) Preheater pilot lamp

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

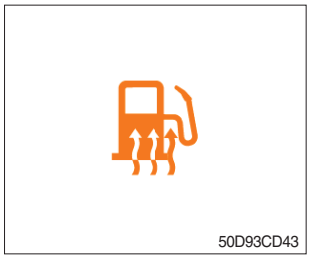
② When the lamp goes out the operator should start cranking the engine.

(5) Inching pilot lamp



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

(6) Fuel warmer pilot lamp



① This lamp lights ON when the fuel warmer switch is pressed.

(7) OPSS pilot lamp

① This signal lamp lights ON when the operator leaves the seat.

② Powered travel movement of the truck shall be possible only if the operator is in the normal operating position. Transmission will automatically shift to neutral upon the exiting of the operator.

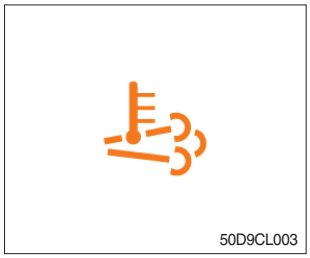
③ The forward/reverse lever must be cycled through neutral with the operator in the normal operating position to regain powered direction control.

(8) SCR cleaning inhibit pilot lamp

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

※ **Refer to the page 3-37 of the operator's manual for the SCR cleaning switch.**

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



① This warning lamp indicates, when illuminated, that exhaust temperatures are high due to SCR cleaning.

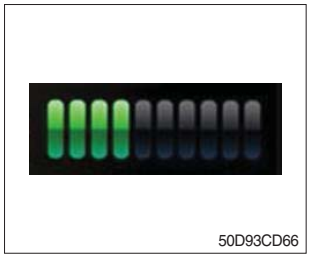
② The lamp will also illuminate during a manual SCR cleaning.

③ When this lamp is illuminated, be sure the exhaust pipe outlet is not directed at any surface or material that can melt, burn, or explode.

⚠ **When this lamp is illuminated, the exhaust gas temperature could reach 800℃ [1500℉], which is hot enough to ignite or melt common materials, and to burn people.**

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

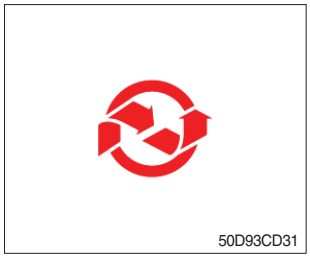
(10) DEF (Diesel Exhaust Fluid) level pilot lamp



① This gauge indicates the level of DEF (10 steps).

② Fill the DEF when the level is low.

(11) Expendables replacement indicator lamp



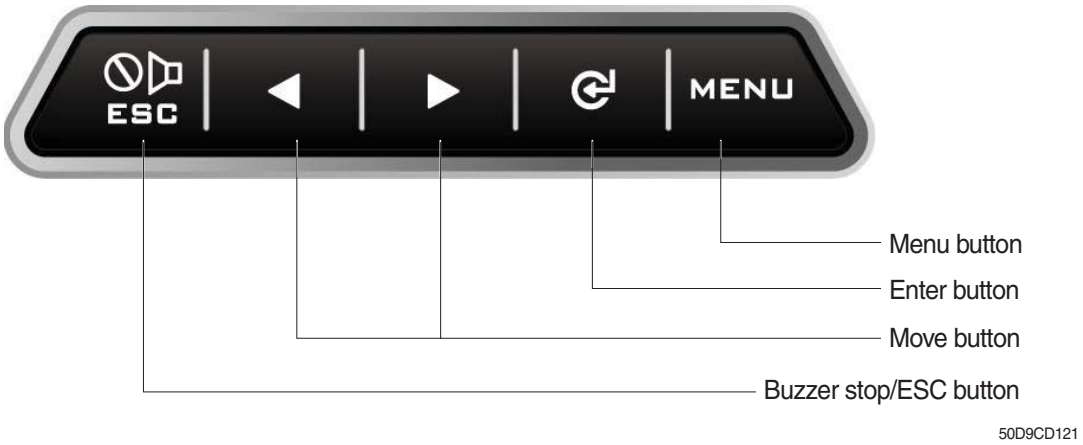
① This lamp lights ON if expendables which must be replaced are exist.

② The lamp will light up only 3 minutes since KEY ON, and then light off.

③ Please check the expendables management list in maintenance menu.

4) CLUSTER BUTTON

Each button has the following function.



50D9CD121

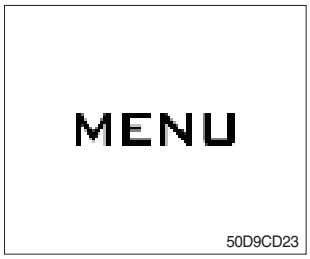
(1) Buzzer stop/ESC button

50D9CD22

① This button is used to stop the buzzer sound.

② If another alarm condition occurs after this button has been pressed, the alarm buzzer will re-sound.

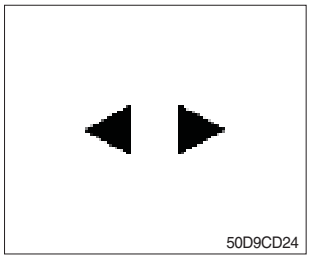
(2) Menu button



50D9CD23

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

(3) Move button



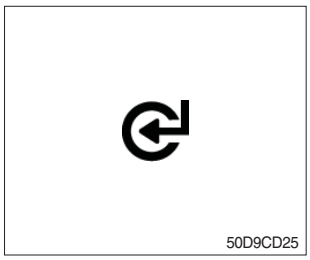
50D9CD24

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

② Decrease / Increase input value.

③ When the warning and pilot lamps occur over six, you can display next lamps by push the button (▶).

(4) Enter button



50D9CD25

① This button is used to select menu.

5) LCD

(1) Main screen

※ You can select or set the menu by the button of the cluster.

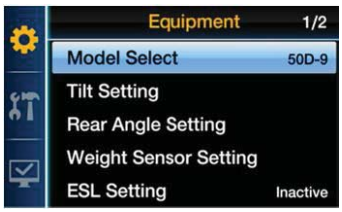
※ Please refer to the page 7-28 for the selection and change of the menu and input value.

Main screen

50D9CD10

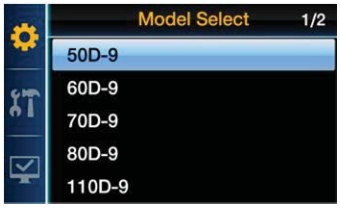
MENU

Main menu screen



50D9CD11

Sub menu screen



50D9CD12

Communication error

50D9CD13

※ Main screen when occurred communication error between the cluster and TCU/ MCU / ECU

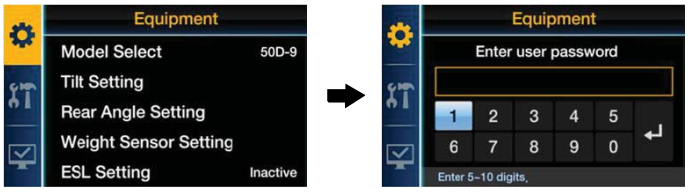
1 Engine rpm
2 Load indicator (opt)
3 Hour meter
4 Odometer
5 Current time
6 DEF level gauge
7 Rear wheel angle (opt)
8 Mast angle (opt)
9 Vehicle angle X (opt)
10 Vehicle angle Y (opt)
11 T/M info (error code, gear, warning)
12 Temperature (outdoor temp., setting temp)
13 Warning and pilot lamps

(2) Main menu

No.	Main menu	Sub menu	Description
1	 Equipment 50D9CD14K	Model select Tilt setting Rear angle setting Weight sensor setting ESL setting Vehicle max speed limit AEB setting (R) MCU/cluster information	Model select Tilt setting (mast and vehicle angle) Rear angle setting Cross-section, load weight adjust, weight display setting, load indicator buzzer ESL setting Vehicle max speed limit (10~30 km) AEB setting (R)MCU/cluster information
2	 Maintenance 50D9CD15K	Current failure history Maintenance management Signal statue User password change RMCU comm	Display failure status (engine, transmission) Replacement, Change interval oils and filters Display information of sensors User password change (5~10 digit) Orbcomm, GPS antenna
3	 Display setting 50D9CD16K	LCD adjustment Time setting Unit setting Language setting AS phone number ESL password change Maintenance management	LCD brightness setting Time setting Unit setting (temp, speed, weight, pressure) Language setting (13 languages) Check and change AS phone number ESL password change (5~10 digit) Maintenance information (cycle, elapsed time, change count, alarm info)

(3) Equipment

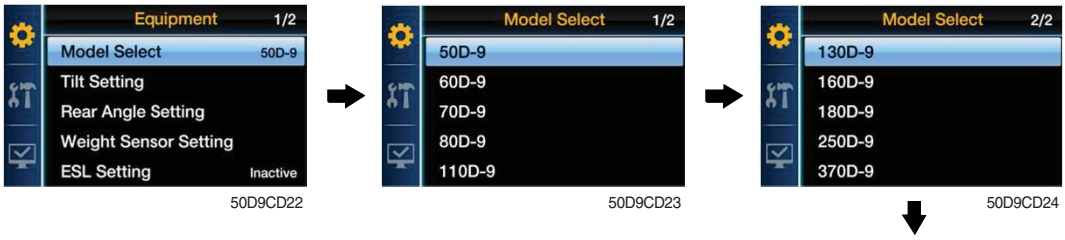
① Choose the equipment



50D9CD20 50D9CD21

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

② Model select



50D9CD22 50D9CD23 50D9CD24

- Select the Model

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

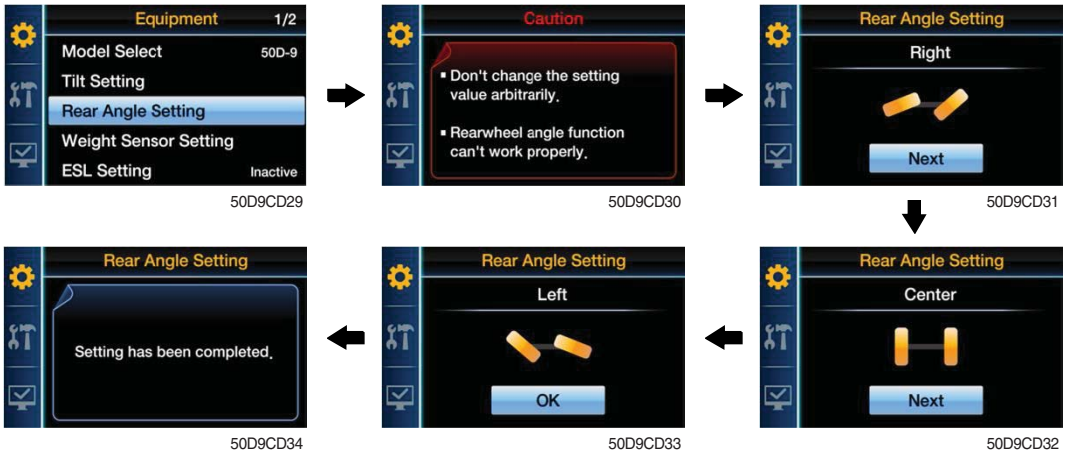
50D9CD25 50D9CD24-1

③ Tilt setting

50D9CD26 50D9CD27 50D9CD28

- Set the offset about mast angle sensors and vehicle angle sensors.

④ Rear angle setting



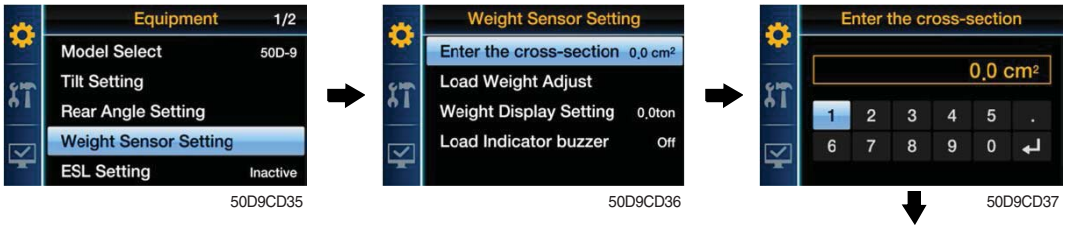
50D9CD29 50D9CD30 50D9CD31

50D9CD34 50D9CD33 50D9CD32

- The user revises a forklift truck steering angle.
- Display set to approve a condition.
  - Right set rear wheel calibration.
  - Center set rear wheel calibration.
  - Left set rear wheel calibration.

⑤ Weight sensor setting

a. Cross-section

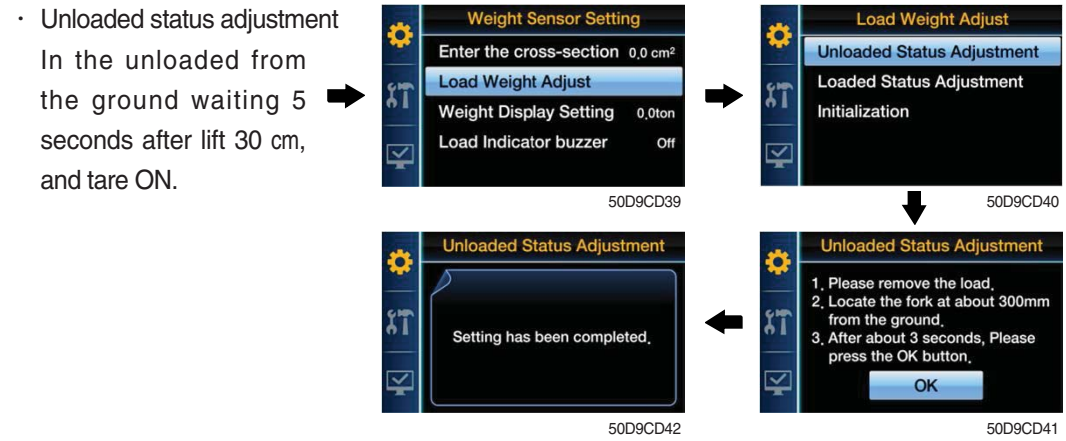


50D9CD35 50D9CD36 50D9CD37 50D9CD38

· Enter the designated cross-section.

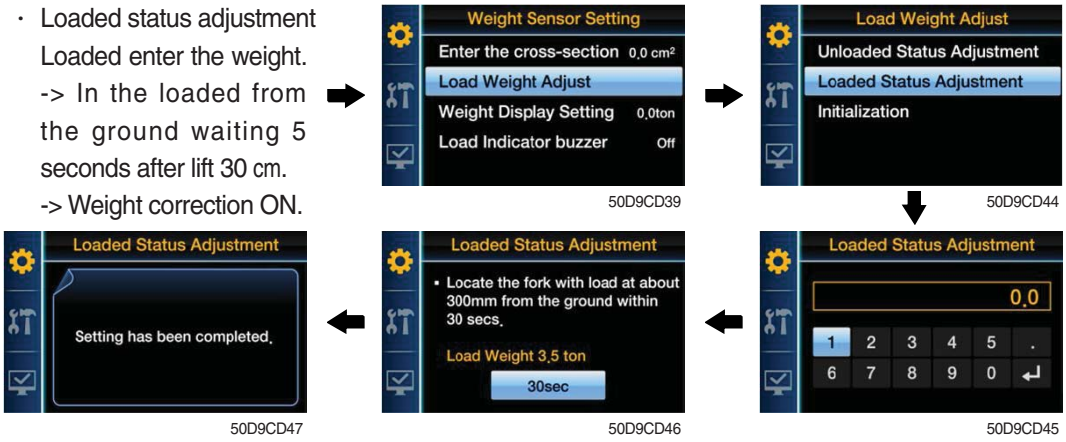
b. Load weight adjust

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



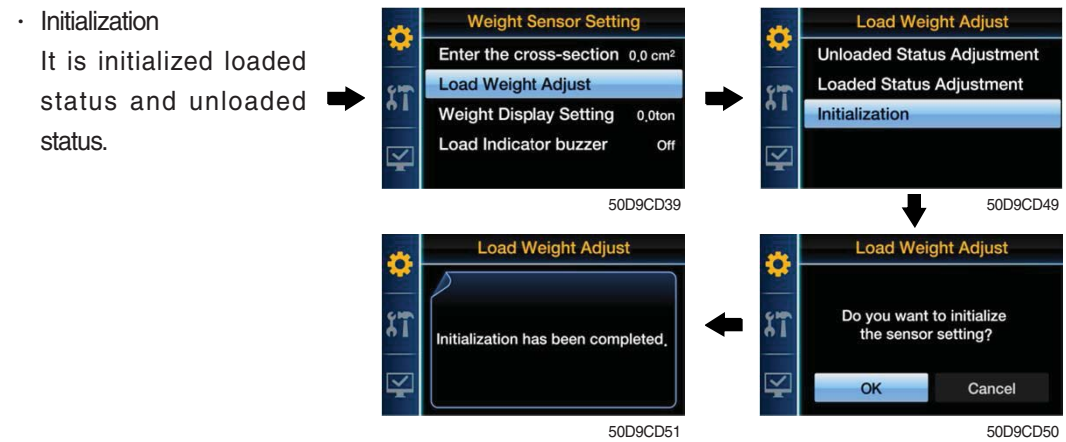
50D9CD39 50D9CD40 50D9CD41 50D9CD42

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



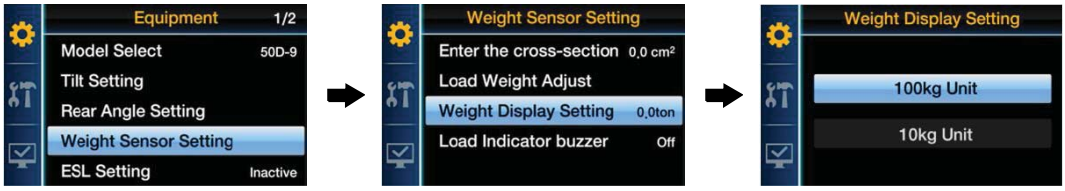
50D9CD39 50D9CD44 50D9CD45 50D9CD46 50D9CD47

· Initialization
It is initialized loaded status and unloaded status.



50D9CD39 50D9CD49 50D9CD50 50D9CD51

c. Weight display setting



50D9CD35 50D9CD53 50D9CD54

50D9CD55

· Select the number of points of weight value display.

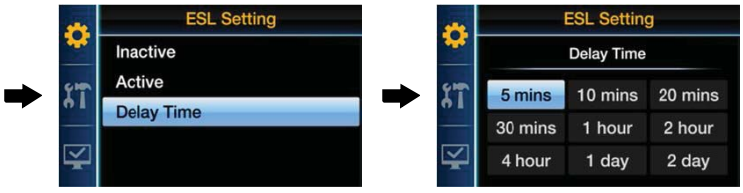
d. Load indicator buzzer

50D9CD35 50D9CD57 50D9CD58

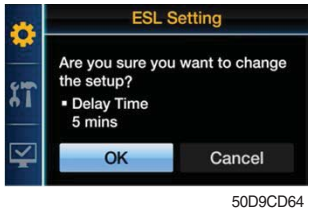
· Choose using buzzer when over weight.

⑥ ESL setting

50D9CD59 50D9CD60 50D9CD61



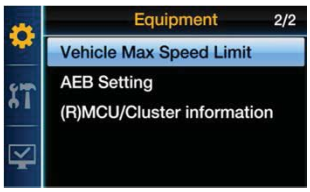
50D9CD62 50D9CD63



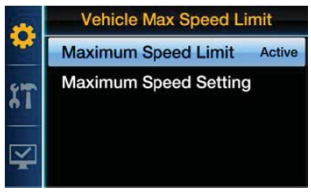
50D9CD64

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

⑦ Vehicle max speed limit



50D9CD65

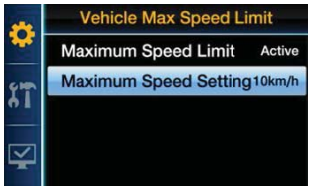


50D9CD66

50D9CD67

50D9CD68

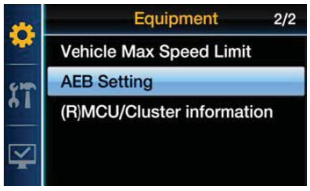
- Set the maximum speed.
- 10 km/h~30 km/h (1 km/h intervals)



50D9CD69

50D9CD70

⑧ AEB setting

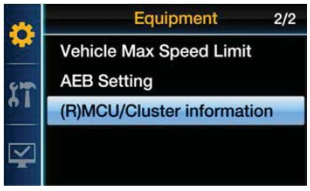


50D9CD71

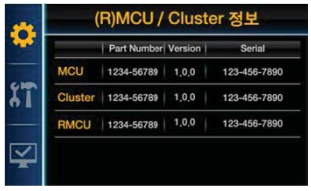
50D9CD72

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

⑨ (R) MCU / Cluster information



50D9CD73



50D9CD74

- Software version check for MCU/Cluster/RMCU.

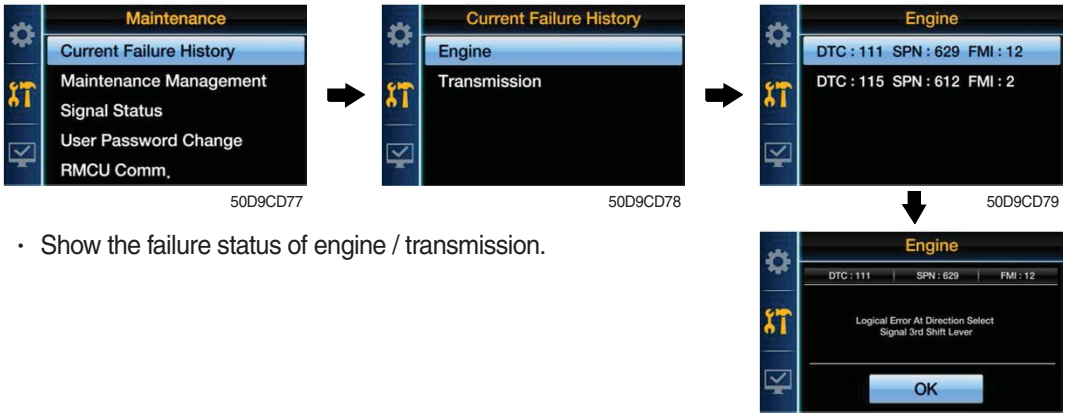
(4) Maintenance

① Choose the maintenance

50D9CD75 50D9CD76

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

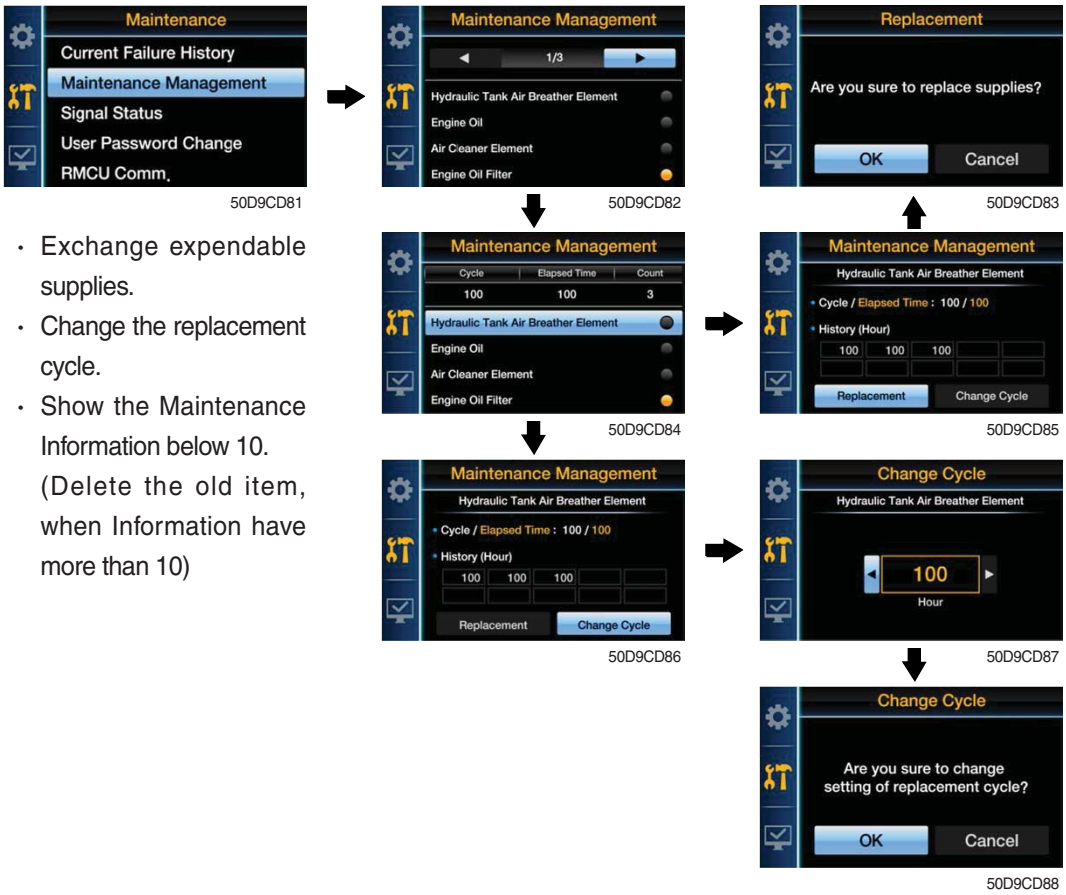
② Current failure history



50D9CD77 50D9CD78 50D9CD79 50D9CD80

- Show the failure status of engine / transmission.

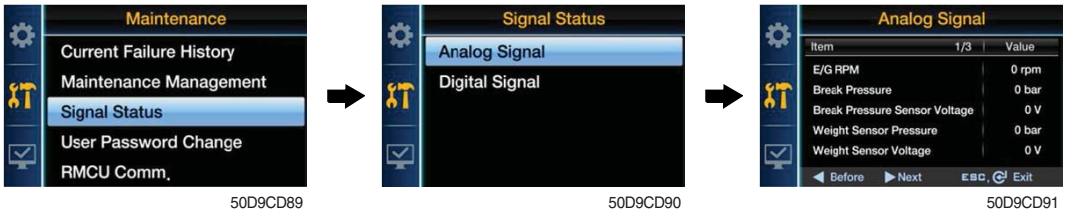
③ Maintenance management



50D9CD81 50D9CD82 50D9CD83 50D9CD84 50D9CD85 50D9CD86 50D9CD87 50D9CD88

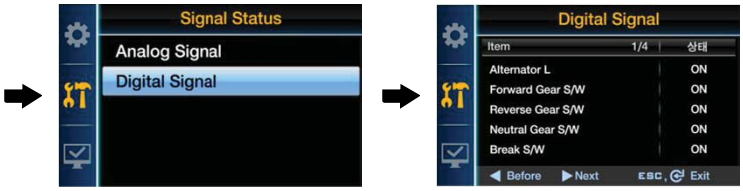
- Exchange expendable supplies.
- Change the replacement cycle.
- Show the Maintenance Information below 10. (Delete the old item, when Information have more than 10)

④ Signal status



50D9CD89 50D9CD90 50D9CD91

- Display information of each sensors.



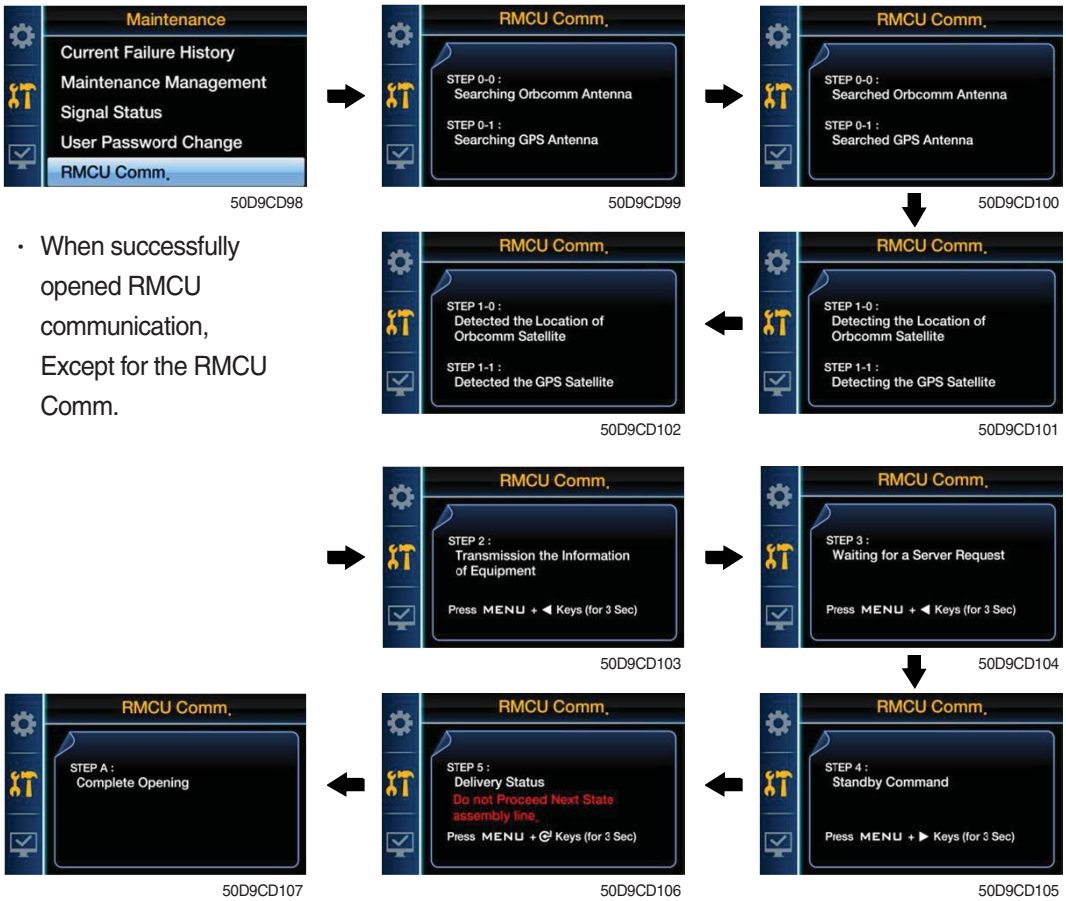
50D9CD92 50D9CD93

⑤ User password change

50D9CD94 50D9CD95 50D9CD96 50D9CD97

- You should set password by five to ten digit.

⑥ RMCU Comm

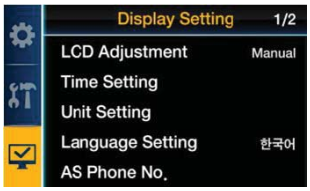


50D9CD98 50D9CD99 50D9CD100 50D9CD101 50D9CD102 50D9CD103 50D9CD104 50D9CD105 50D9CD106 50D9CD107

- When successfully opened RMCU communication, Except for the RMCU Comm.

(5) Display setting

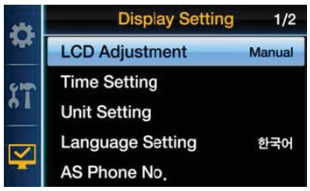
① Choose the display setting



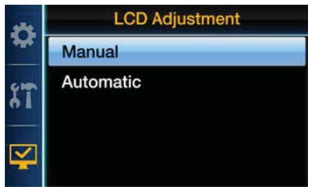
50D9CD108

- No password is required.

② LCD adjustment

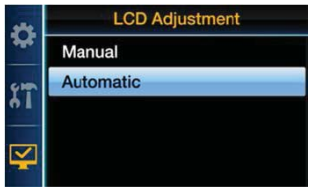


50D9CD109



50D9CD110

50D9CD111



50D9CD112

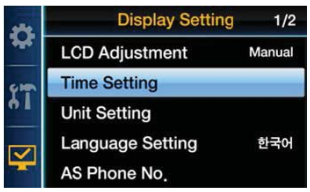
50D9CD113

50D9CD114

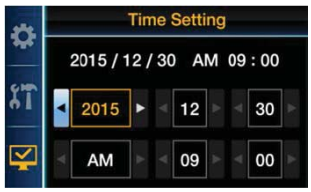
50D9CD115

- Manual : Manual setting for LCD brightness.
- Automatic : Automatic control of LCD brightness as set level of Day/Night.
- Setting day time : Set the time for daylight.
  (If you set the time for daylight, the rest time will be night.)

③ Time setting



50D9CD116



50D9CD117

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

④ Unit setting

50D9CD118 50D9CD118-1 50D9CD119

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

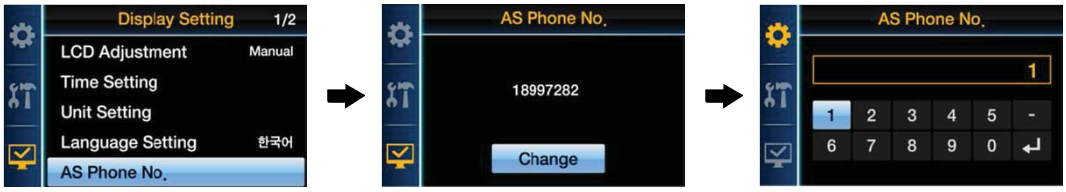
⑤ Language setting

50D9CD120 50D9CD121 50D9CD122

50D9CD123

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

⑥ A/S phone number



50D9CD124 50D9CD125 50D9CD126

· Check and change of contact information for customer service.

⑦ ESL password change

50D9CD127 50D9CD128 50D9CD129

50D9CD130

· You should set password by five to ten digit.

⑧ Maintenance management

50D9CD131 50D9CD132 50D9CD133

· Show the maintenance information (replacement cycle, elapsed time, change count, alarm information).

GROUP 4 COMPONENT SPECIFICATION

<table>
<tr><th>No</th><th>Part name</th><th>Qty</th><th>Specification</th></tr>
<tr><td>1</td><td>Battery</td><td>2</td><td>12V × 80 AH
RC : 130 min
CCA : 640A</td></tr>
<tr><td>2</td><td>Working lamp</td><td>1</td><td>24V, 70W</td></tr>
<tr><td>3</td><td>License lamp</td><td>1</td><td>24V, 3W × 2</td></tr>
<tr><td>4</td><td>Rear Combination lamp</td><td>2</td><td>24V, 21/5W (Turn signal)
24V, 10W (Tail)
24V, 10W (Stop)</td></tr>
<tr><td>5</td><td>Head lamp</td><td>2</td><td>24V, 70W</td></tr>
<tr><td>6</td><td>Flasher lamp</td><td>2</td><td>24V, 25/10W</td></tr>
<tr><td>7</td><td>Room lamp</td><td>1</td><td>24V, 10W</td></tr>
<tr><td>8</td><td>Beacon lamp</td><td>1</td><td>24V, 0.8A (Strobe type)
24V, 0.56A (Xenon type)</td></tr>
<tr><td>9</td><td>Radio and USB player</td><td>1</td><td>DC 27.8V, 200Wx2</td></tr>
<tr><td>10</td><td>Cluster</td><td>1</td><td>24V, 10W</td></tr>
<tr><td>11</td><td>Rear view camera</td><td>1</td><td>24V, 2.5W, 120W</td></tr>
<tr><td>12</td><td>12V socket</td><td>1</td><td>12V, 10A</td></tr>
<tr><td>13</td><td>Cigar lighter</td><td>1</td><td>24V, 5A</td></tr>
<tr><td>14</td><td>SCR cleaning switch</td><td>1</td><td>24V, 15A</td></tr>
<tr><td>15</td><td>Relay (5P)</td><td>7</td><td>24V, 8A</td></tr>
<tr><td>16</td><td>Flasher unit</td><td>1</td><td>24V, 85±10 CM, (21W + 21W) × 2 + 3W × 2</td></tr>
<tr><td>17</td><td>Back buzzer</td><td>1</td><td>24V, 90±5 dB, 60±10 C/M</td></tr>
<tr><td>18</td><td>Horn</td><td>1</td><td>24V, 1.5 A, 100 ~ 115 dB</td></tr>
<tr><td>19</td><td>Fuel level sender</td><td>1</td><td>
<table>
<tr><td>Float indicator</td><td>E</td><td>4/8</td><td>F</td></tr>
<tr><td>Resistance (Ω)</td><td>-</td><td>350</td><td>50</td></tr>
<tr><td rowspan="2">Tolerance (Ω)</td><td>+5%</td><td rowspan="2">5%</td><td>+0</td></tr>
<tr><td>-0</td><td>-5%</td></tr>
</table>
</td></tr>
<tr><td>20</td><td>Master switch</td><td>1</td><td>24V, 180A</td></tr>
<tr><td>21</td><td>R/Working lamp switch</td><td>1</td><td>24V, 15A</td></tr>
<tr><td>22</td><td>Hazard switch</td><td>1</td><td>24V, 15A</td></tr>
<tr><td>23</td><td>Beacon switch</td><td>1</td><td>24V, 15A</td></tr>
<tr><td>24</td><td>Start switch</td><td>1</td><td>24V, 60A</td></tr>
<tr><td>25</td><td>Start relay</td><td>1</td><td>24V, 300A</td></tr>
<tr><td>26</td><td>Tilt switch (cabin)</td><td>1</td><td>24V, 15A</td></tr>
<tr><td>27</td><td>Warning buzzer</td><td>1</td><td>24V, 200 mA, 90±5 dB (ℓ m)</td></tr>
<tr><td>28</td><td>Auto/manual changeover switch</td><td>1</td><td>24V, 15A</td></tr>
<tr><td>29</td><td>Main light switch</td><td>1</td><td>24V, 15A</td></tr>
<tr><td>30</td><td>Fuel warmer switch</td><td>1</td><td>24V, 15A</td></tr>
<tr><td>31</td><td>Intermittent wiper relay</td><td>1</td><td>24V, 15A, operating time : 2.5±1 sec</td></tr>
<tr><td>32</td><td>OPSS unit</td><td>1</td><td>24V</td></tr>
<tr><td>33</td><td>Inhching switch</td><td>1</td><td>24V, 15A</td></tr>
<tr><td>34</td><td>In/decrement switch</td><td>1</td><td>24V, 15A</td></tr>
<tr><td>35</td><td>Cabin tilt switch</td><td>1</td><td>24V, 15A</td></tr>
<tr><td>36</td><td>Top wiper/washer switch</td><td>1</td><td>24V, 15A</td></tr>
</table>

GROUP 5 CONNECTOR DESTINATION

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-3	KET	1	I/conn (Frame harness-main harness)	MG640944-5	MG650943-5
CN-4	KET	1	Battery (B+)	-	MG650943-5
CN-6	AMP	15	I/conn (Main harness-A/C harness)	2-85262-1	368050-1
CN-7	AMP	4	Fuel heater	2-967325-3	-
CN-10	AMP	8	I/conn (T/M harness-console harness)	S816-008002	S816-108002
CN-11	AMP	16	I/conn (T/M harness-console harness)	368047-1	S816-116002
CN-12	TYCO	8	I/conn (Console harness-frame harness)	174982-2	S816-108002
CN-13	AMP	42	I/conn (Engine harness-frame harness)	936421	936429
CN-14	AMP	2	I/conn (Console harness-frame harness)	174352-2	174354-2
		42	I/conn (Frame harness-engine harness)	936421	936429
CN-15	KET	-	ECU body ground	S820-308000	-
CN-15A	AMP	3	Rear combi lamp (ill/stop)-LH	282087-1	-
CN-15B	AMP	3	Rear combi lamp (turn/back up)-LH	282087-2	-
CN-16A	AMP	2	Rear combi lamp (ill/stop)-RH	282087-1	-
CN-16B	AMP	3	Rear combi lamp (turn/back up)-RH	282087-2	-
CN-17	AMP	12	Harness-to load sensor	174357-2	174359-2
CN-19	KET	2	Output check	MG610320	MG640322
CN-20	KET	4	Aircon harness	MG641744-5	-
	AMP	6	Diagnostic	480704-0	-
CN-21	DEUTSCH	8	Wiper motor-front	DT06-8S	-
CN-22	KET	2	Washer pump-front	MG610320	-
CN-23	KET	2	LH speaker	MG610070	-
CN-24	KET	2	RH speaker	MG610070	-
CN-25	MOLEX	2	Horn	35825-0211	-
CN-26	KET	1	Tilt alarm	S822-014000	S822-114000
CN-27	KUM	16	Radio/USB player	PK145-16017	-
CN-29	KET	2	Receive dryer	MG640795	-
CN-30	KET	1	A/C compressor (50/60/70D-9)	ST730018-3	-
	KUM	1	A/C compressor (80D-9)	PB625-01027	-
CN-37	QPL	-	Fuse box	-	-
CN-45	TYCO	1	Start motor	S820-205000(M) S820-310000(B+) S820-310000(G)	-
CN-50	AMP	68	Transmission control unit	963598-1	-
CN-51	AMP	6	TCU service tool	480704-0	926682-3
CN-52	KET	4	Cigar lighter	MG610331	21FT-36150
CN-54	AMP	36	Load indicator control unit	344111-1	-
CN-55	KET	14	OPS unit	S814-014100	-
CN-56	AMP	20	Cluster	174047-2	-
CN-57	AMP	20	Cluster	175967-2	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CN-59M	AMP	34	MCU	4-1437290-0	-
CN-59N	AMP	34	MCU	4-1437290-1	-
CN-65	KET	2	Back buzzer	ST730018-3	ST750036-3
CN-70	-	4	Top wiper motor	180900	-
CN-71	DEUTSCH	2	Parking solenoid	DT06-2S	-
		6	Seat switch	DT06-6S	21HN-52080
CN-74	KET	1	Alternator	S820-105000(L) S820-308000(B+)	-
CN-83	KUM	2	Condenser fan	PB625-02027	-
CN-90	AMP	42	I/conn (Cabin harness-main harness)	936421	936429
CN-91	KET	14	I/conn (Monitor harness-main harness)	MG610350	MG640352
CN-92	AMP	4	Camera	174257-2	-
CN-93	AMP	4	Load sensor	174257-2	174259-2
CN-95	KET	2	Fusible link	-	MG620558
CN-97	YAZAKI	2	Fuel feed pump	7123-8520-40	-
CN-98	DEUTSCH	3	Resistor	DT06-3S-EP06	DT04-3P-EP10
CN-101	DELPHI	4	Engine sub harness	-	54200415
CN-102	-	4	Rear wiper motor	180900	-
CN-103	KET	2	Washer pump - rear	MG610320	-
CN-113	KET	2	OPSS buzzer	S814-002100	-
CN-124	AMP	6	Accelerator pedal	174262-2	-
CN-125	DEUTSCH	12	RMCU	DT06-12S	-
	-	1	ORBCOMM	-	TNC-C-58
	-	1	GPS	-	SMA-C-316R/V
CN-131	DEUTSCH	2	Attach cut solenoid	DT06-2S	-
CN-134	DEUTSCH	9	ECU service tool	-	HD10-9-96P
CN-135	DEUTSCH	9	Cluster/monitor service tool	-	HD10-9-96P
CN-136	DEUTSCH	9	MCU/RMCU service tool	-	HD10-9-96P
CN-138	KET	3	Converter	MG610045	-
CN-139	KET	2	12V socket	MG610043	-
CN-144	KET	20	Handsfree	MG610240	-
CN-147	KET	2	Cabin tilting relay switch	MG640188-4	-
CN-151	DELPHI	96	ECU	13964577	-
CN-169	DEUTSCH	4	RS232C	DT06-4S-EP06	DT04-4P-E005
CN-191	AMP	4	Harness-to G sensor	174257-2	174259-2
CN-202	KET	2	Washer pump-top	MG610043	-
CN-210	AMP	2	Rear work lamp-LH	174352-2	174354-2
CN-211	AMP	2	Rear work lamp-RH	174352-2	174354-2
CN-245	AMP	34	Remote controller	4-1437290-0	-
CN-246	AMP	12	USB socket	174045-2	-
CN-249	AMP	4	Rear view camera	174257-2	-
CN-251	-	1	RMS antenna (ORBCOMM)	FME J1505-58	-
	-	1	RMS antenna (GPS)	-	FME P1505-316

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
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-J1	DELPHI	24	Crossover connector	F934000	-
CN-J6	DEUTSCH	4	DEF quality sensor	DT06-4S	-
CN-J7A	AMP	4	NOx sensor (DRT Nox)	2-1418390-1	-
CN-J7B	AMP	4	NOx sensor (SCR)	1-1418390-1	-
CN-J10	AMP	4	SCR thermo cont	3-1418390-1	-
CN-J26	AMP	12	DEF supply module	2-1703639-1	-
CN-J27	AMP	4	DEF tank heater vlave	1-967325-1	-
CN-J28	DEUTSCH	2	DEF line heater 1	DT06-2S-W2SB	-
CN-J29	DEUTSCH	2	DEF line heater 2	DT06-2S-W2SB	-
CN-J30	DEUTSCH	2	DEF line heater 3	DT06-2S-W2SB	-
CN-J31	AMP	2	DEF dosing module	936059-1	-
Switch					
CS-2	KET	2	Start switch	MG610281	MG620282
CS-3	CARLING	10	Rear wiper switch	21HN-56300	-
CS-5	KET	2	Horn switch	-	MG640322
CS-5A	KET	2	Center horn	MG610320	-
CS-5B	-	-	Center horn	S820-105000	-
CS-10	CARLING	10	Fuel warmer switch	21HN-56300	-
CS-11	KET	8	Multifunction switch	MG610339	-
CS-12	KET	6	Multifunction switch	MG610335	-
CS-13	PACKARD	4	Gear selector switch	12015797	-
CS-14	PACKARD	4	Gear selector switch	-	12010974
CS-15	KET	1	Center horn	ST730018-3	-
CS-17	CARLING	10	Parking brake switch	21HN-56300	-
CS-21	CARLING	10	Rear/work lamp switch	21HN-56300	-
CS-23	CARLING	10	Beacon 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 manual switch	21HN-56300	-
CS-64	CARLING	10	Inc/dec switch	21HN-56300	-
CS-74	AMP	3	Tilting switch	282087-2	-
CS-77	CARLING	10	Cabin tilting switch	21HN-56300	-
CS-100	CARLING	10	SCR switch	21HN-56300	-
CS-103	CARLING	10	Top wiper switch	21HN-56300	-
Lamp					
CL-1	KET	2	Room lamp-LH	MG610392	-
CL-2	KET	1	Cigar light	ST730018-3	ST750036-3
	AMP	1	Cigar light	172128-1	-
CL-3	DEUTSCH	6	Head lamp-LH	DT06-6S	-
CL-4	DEUTSCH	6	Head lamp-RH	DT06-6S	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CL-7	DEUTSCH	1	Beacon lamp	DT06-2S	DT04-2P
CL-15	DAEDONG	6	Combination lamp-LH	110-6PR	-
CL-16	DAEDONG	6	Combination lamp-RH	110-6PR	-
CL-21	KET	1	License lamp	ST730018-3	ST750036-3
CL-23	KET	1	Rear work lamp	S822-014000	S822-114000
CL-24	KET	1	Work lamp-LH	S822-014000	S822-114000
CL-25	KET	1	Work lamp-RH	S822-014000	S822-114000
CL-51	KET	2	Room lamp-RH	MG610392	-
Relay					
CR-4	KET	5	Wiper relay	MG640927	-
CR-6	KET	4	Intermittent wiper relay	MG610047	-
CR-11	TYCO	3	Flasher unit relay	21LM-01600	-
CR-23	KET	2	Start relay	MG610047	S814-102100
CR-24	KET	1	Air heater relay	S820-106000 ST730018-3	- -
CR-26	KET	5	Wiper pump relay	MG640927	-
CR-34	OMRON	5	Travel cut relay	24L1-05100	-
CR-35	OMRON	5	Back up relay	24L1-05100	-
CR-36	KET	5	Anti restart relay	MG640927	-
CR-43	KET	5	ECU power relay	MG640927	-
CR-44	AMP	2	Cabin tilting relay coil	174352-2	-
CR-50	KET	5	Tilt cut-off relay	MG640927	-
CR-51	KET	5	Regeneration safety relay	MG640927	-
CR-53	KET	5	Neutral signal relay	MG640927	-
CR-52	OMRON	5	Attach cut relay	21L1-05100	-
CR-58	OMRON	5	DEF supply module relay	21L1-05100	-
CR-59	OMRON	5	DEF & sensor relay	21L1-05100	-
Sensor and pressure switch					
CD-2	KET	3	Fuel sendor	MG610045	-
CD-3	DEUTSCH	2	Brake fail pressure switch	-	DT04-2P
CD-4	AMP	2	Stop lamp switch	171809-2	-
CD-10	KET	1	Air cleaner switch	ST730057-2	-
CD-26	DEUTSCH	2	Parking switch	-	DT04-2P
CD-27	AMP	2	Turbine speed input	963040-3	-
CD-38	DEUTSCH	2	WIF switch	DT06-2S	-
CD-63	TYCO	3	Differential pressure sendor	1813271-1	-
CD-64	SUMITOMO	5	Air flow sensor	6189-1046	-
CD-70	DEUTSCH	3	Load sensor	DTM06-3S	-
CD-71	AMP	6	Inching sensor	1-967616-1	-
CD-72	AMP	2	Gear train speed sensor	963040-3	-
CD-73	AMP	3	Output speed sensor	282087	-

Connector number	Type	No. of pin	Destination	Connector part No.	
				Female	Male
CD-74	AMP	2	Engine speed sensor	963040-3	-
CD-75	AMP	2	Oil filter switch	282080-1	-
CD-80	DELPHI	2	KV Solenoid	12162197	-
CD-81	DELPHI	2	KR Solenoid	12162197	-
CD-82	DELPHI	2	KD Solenoid	12162197	-
CD-83	DELPHI	2	KE Solenoid	12162197	-
CD-84	DELPHI	2	KC Solenoid	12162197	-
CD-90	AMP	2	Temp sensor (to TCU)	963040-3	-
CD-102	SUMITOMO	4	TBAP sensor	6098-0144	-
CD-J22	DELPHI	3	Coolant level	12110293	-
DO-01	AMP	2	Diode	174352-2	21EA-50550
DO-02	AMP	2	Diode	174352-2	21EA-50550
DO-03	AMP	2	Diode	174352-2	21EA-50550

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