

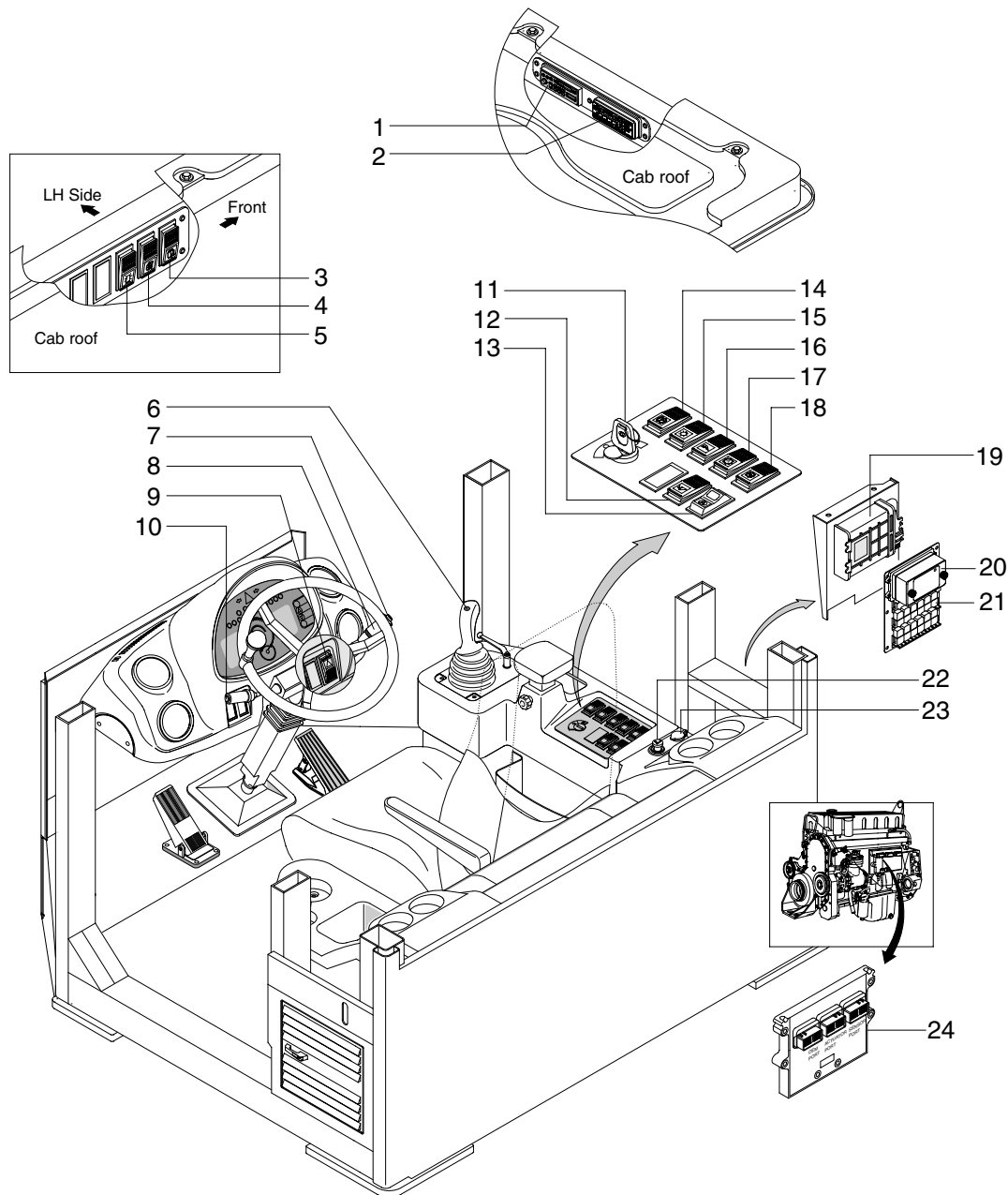
## SECTION 7 ELECTRICAL SYSTEM

Group 1 Component Location .....	7-1
Group 2 Electrical Circuit .....	7-3
Group 3 Monitoring System .....	7-22
Group 4 Electrical Component Specification .....	7-38
Group 5 Connectors .....	7-45
Group 6 Troubleshooting .....	7-62

# SECTION 7 ELECTRICAL SYSTEM

## GROUP 1 COMPONENT LOCATION

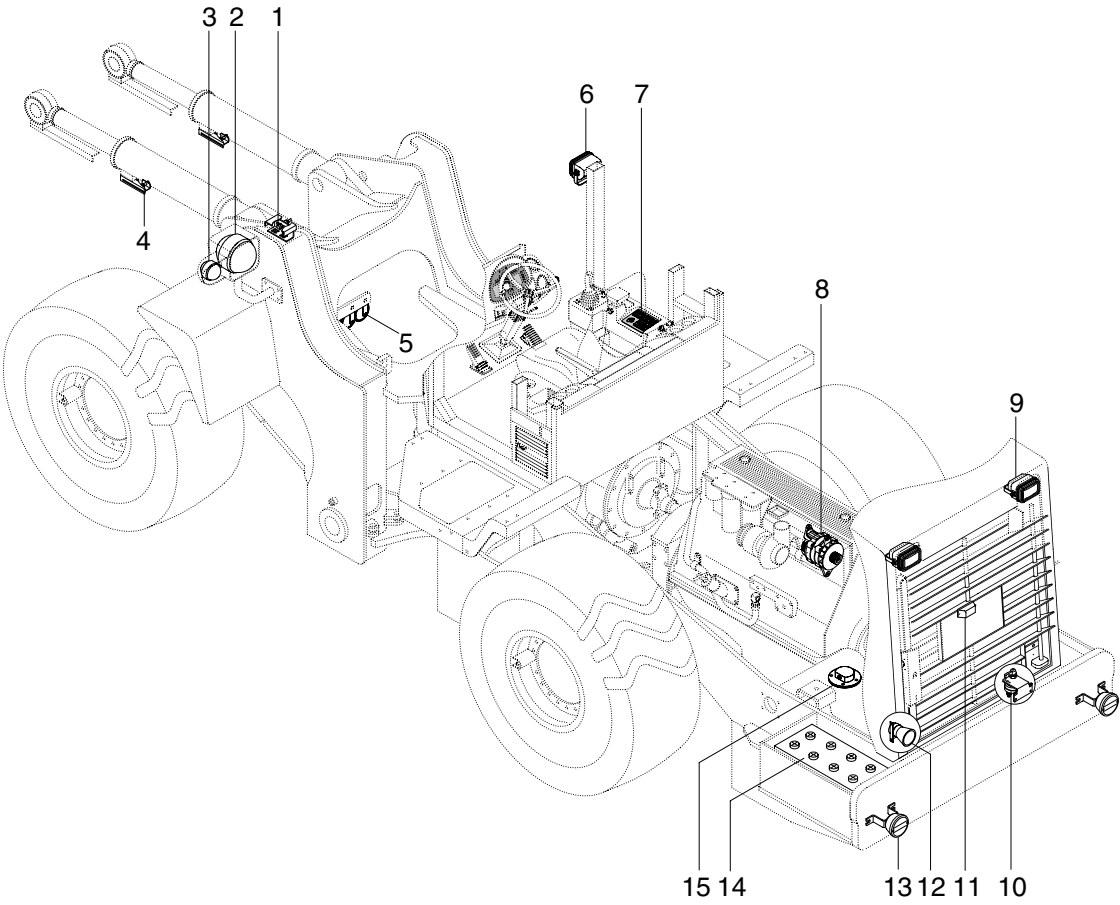
### 1. LOCATION 1



7807AEL02

- |   |   |    |                               |    |                                |
|---|---|----|-------------------------------|----|--------------------------------|
| 1 | Radio & cassette(STD)<br>Radio & CD player(OPT) | 9  | Hazard switch                 | 18 | Clutch cut off switch          |
| 2 | Aircon & heater switch                          | 10 | Kick down switch              | 19 | Transmission control unit(TCU) |
| 3 | Rear wiper/washer switch                        | 11 | Starting switch               | 20 | Fuse box                       |
| 4 | Mirror defrost switch(Optional)                 | 12 | Ride control switch(Optional) | 21 | Relay board                    |
| 5 | Beacon switch(Optional)                         | 13 | Pump motor switch(Optional)   | 22 | Cigar lighter                  |
| 6 | Kick down switch                                | 14 | Parking brake switch          | 23 | 12V socket                     |
| 7 | Horn button                                     | 15 | Main light switch             | 24 | Engine control module(ECM)     |
| 8 | Multi function switch                           | 16 | Work lamp switch              |    |                                |
|   |   | 17 | Auto select switch            |    |                                |

2. LOCATION 2

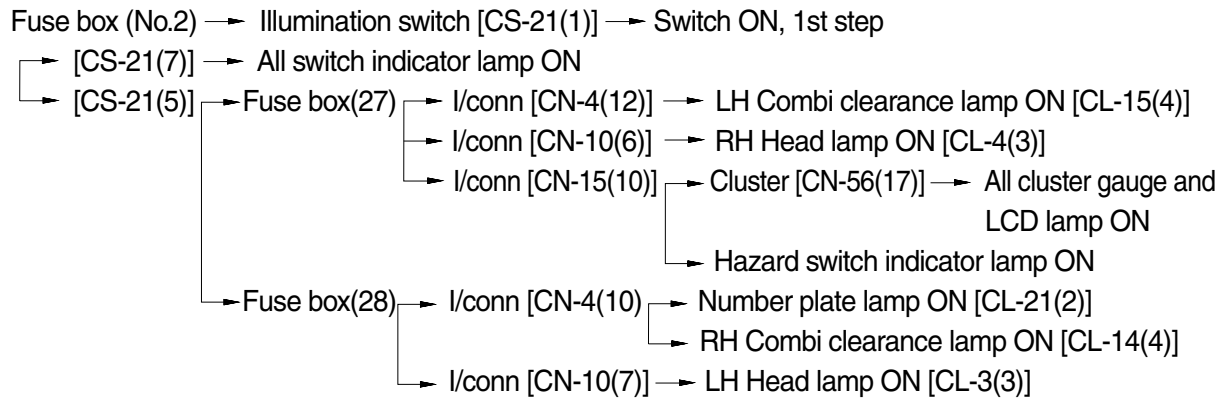


7807AEL23

- |                    |                  |                      |
|--------------------|------------------|----------------------|
| 1 Proximity switch | 6 Work lamp      | 11 Number plate lamp |
| 2 Head lamp        | 7 Switch panel   | 12 Back up buzzer    |
| 3 Front turn lamp  | 8 Alternator     | 13 Rear combi lamp   |
| 4 Proximity switch | 9 Work lamp      | 14 Battery           |
| 5 Horn             | 10 Master switch | 15 Fuel sender       |

# 1. ILLUMINATION CIRCUIT

## 1) OPERATING FLOW

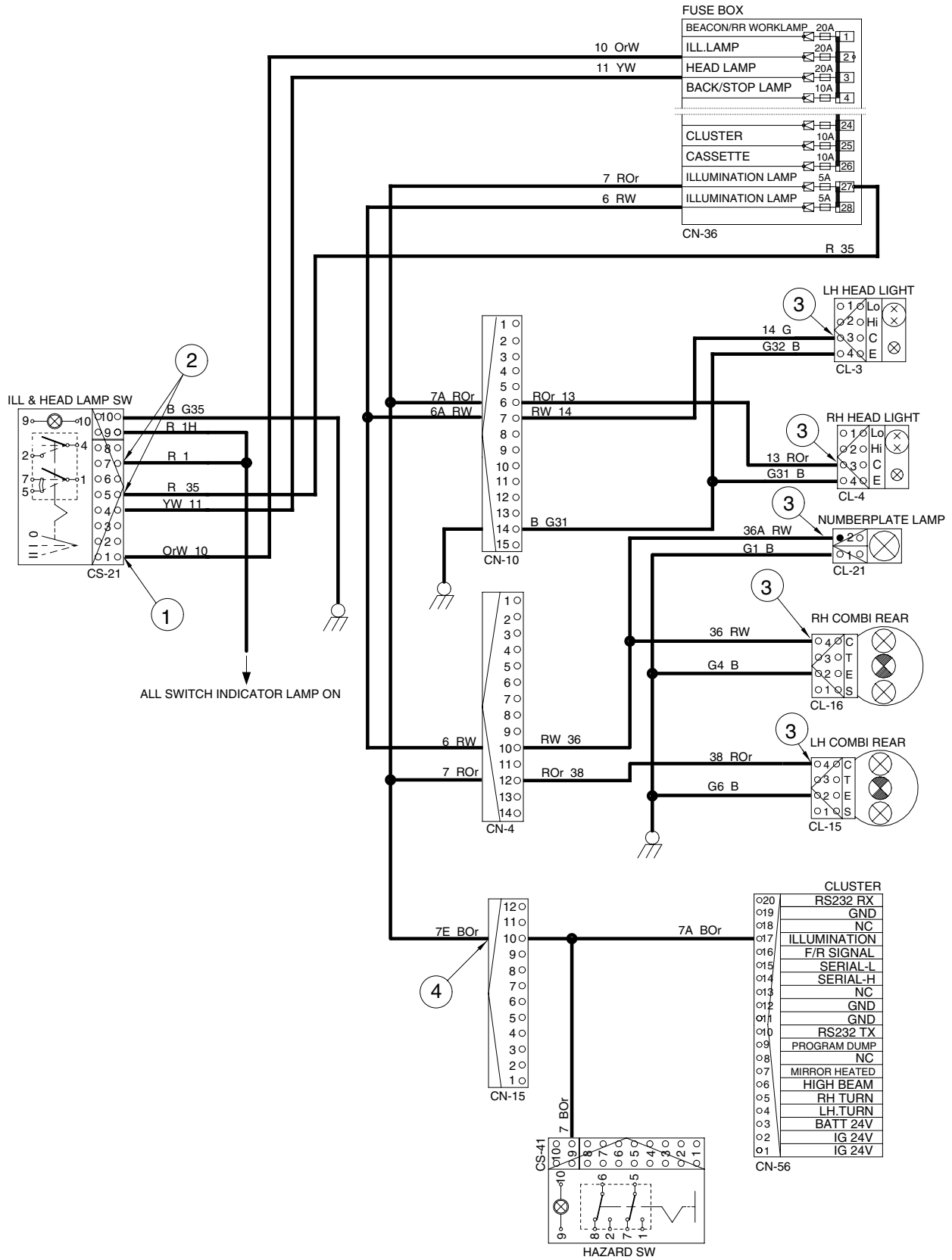


## 2) CHECK POINT

Engine	Key switch	Check point	Voltage
OFF	ON	① - GND (Switch input) ② - GND (Switch output) ③ - GND (To light) ④ - GND (To cluster)	20~25V

※ GND : Ground

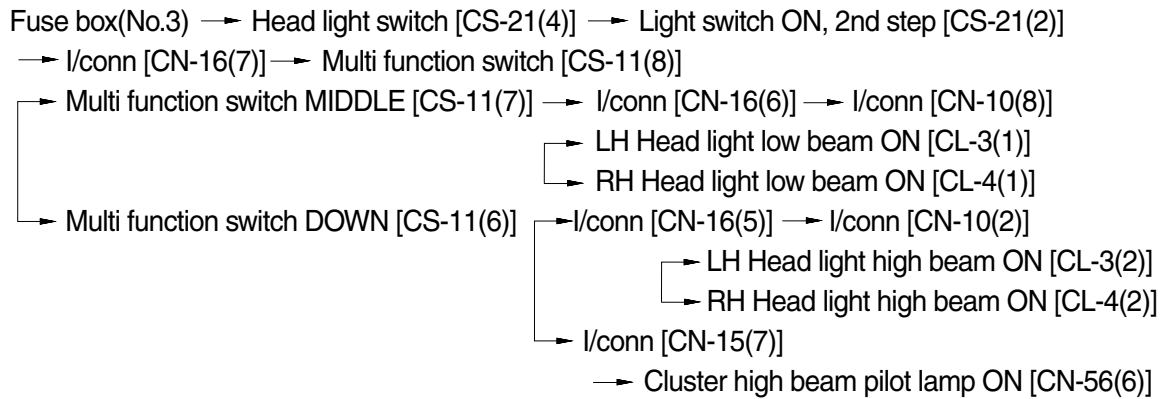
# ILLUMINATION CIRCUIT



7807AEL03

## 2. HEAD LIGHT CIRCUIT

### 1) OPERATING FLOW

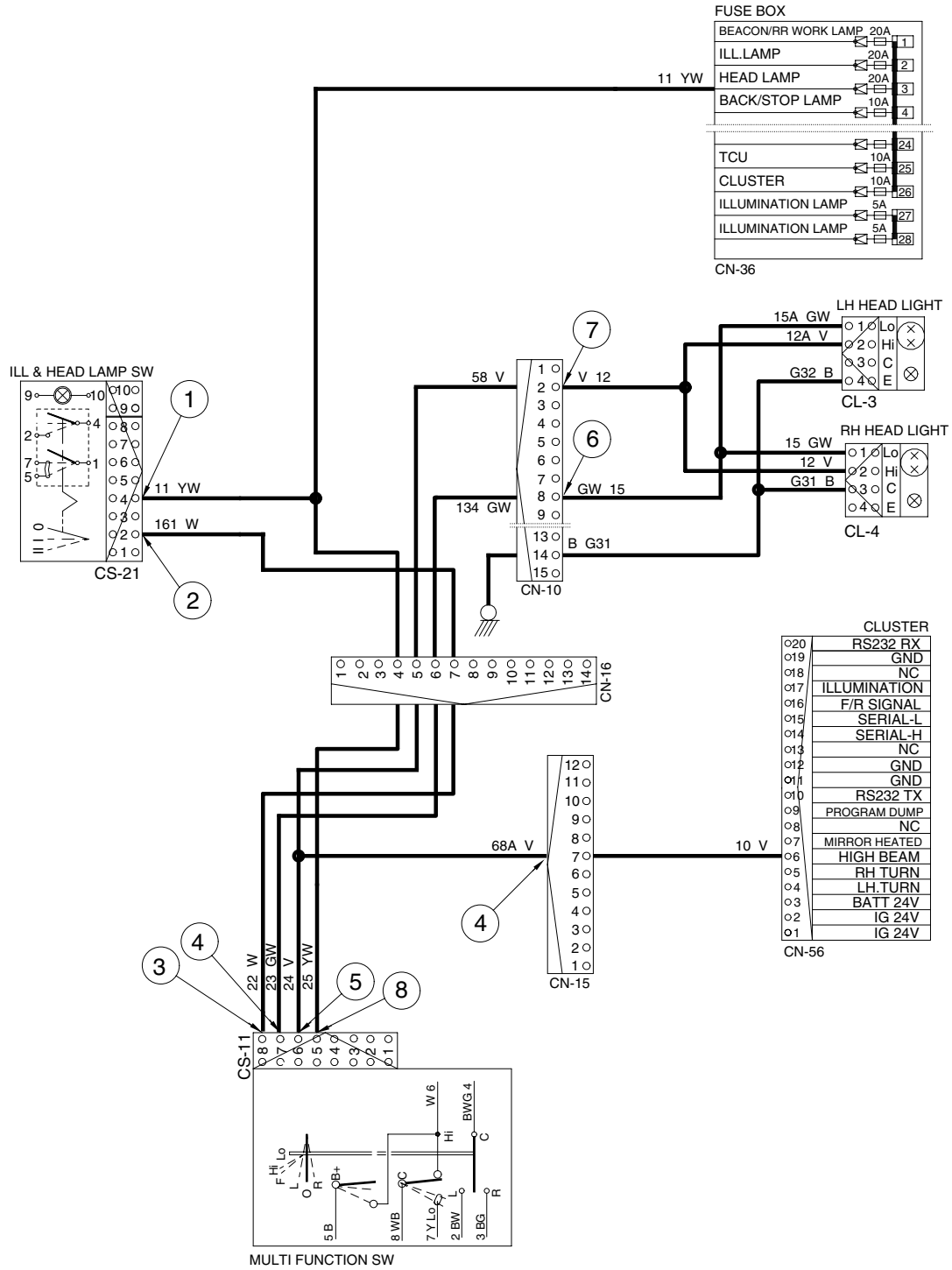


### 2) CHECK POINT

Engine	Key switch	Check point	Voltage
OFF	ON	① - GND (Switch input) ② - GND (Switch output) ③ - GND (Multi function input) ④ - GND (Multi function output) ⑤ - GND (Multi function output) ⑥ - GND (Low beam) ⑦ - GND (High beam) ⑧ - GND (Passing B+)	20~25V

※ GND : Ground

# HEAD LIGHT CIRCUIT



7807AEL04

### 3. WORK LIGHT SWITCH

#### 1) OPERATING FLOW

※ Illumination switch : ON position

##### (1) Work lamp switch ON (1st step)

ILL & head lamp switch [CS-21(7)] → Work lamp switch indicate lamp ON  
 → Work lamp switch [CS-36(1)→(7)] →  
 Front work lamp relay[CR-3(30)→(87)] → I/conn [CN-7(2)]  
 → RH Front work lamp ON [CL-5(2)]  
 → LH Front work lamp ON [CL-6(2)]

##### (2) Work lamp switch (2nd step)

Work lamp switch [CS-36(4)→(2)] → Rear work lamp relay [CR-55(30)→(87)] →  
 I/conn [CN-4(14)] → LH Rear work lamp ON [CL-22(2)]  
 → RH Rear work lamp ON [CN-23(2)]

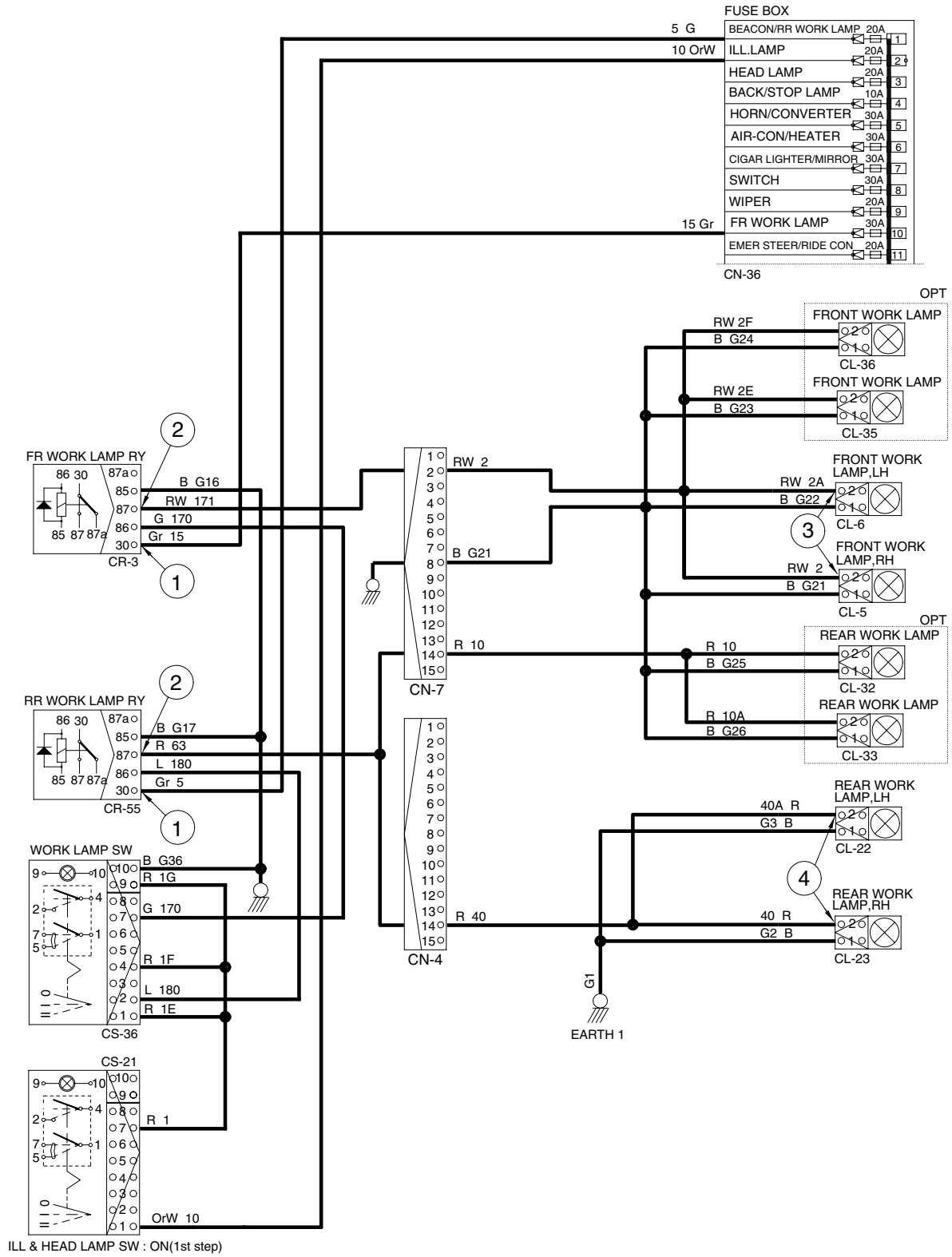
#### 2) CHECK POINT

Engine	Key switch	Check point	Voltage
OFF	ON	① - GND (Work lamp power input) ② - GND (Work lamp power output) ③ - GND (Front work lamp) ④ - GND (Rear work lamp)	20~25V

※ GND : Ground



# WORK LIGHT SWITCH



7807AEL5

## 4. STARTING CIRCUIT

### 1) OPERATING FLOW

Battery(+) terminal → Fusible link [CN-60(1)→(2)] → Master switch [CS-74]  
 → I/conn [CN-1(1)] → Fuse box (No.15) → Start switch [CS-2(1)]  
 → ECM power relay [CR-25(30)]  
 → Power relay [CR-35(30)]

※ The gear selector lever is neutral position. It is necessary condition before the starting.  
 The gear selector has an output signal which is activated whenever the shift lever is in the neutral position. This signal can be used to control a relay and prevent engine from starting whenever the shift lever is not in the neutral position.

#### (1) When start key switch is in ON position

Start switch ON → Start switch [CS-2(2)] → I/conn [CN-3(9)] → Battery relay [CR-1]  
 → Battery relay operating(All power is supplied with the electric component)  
 → Start switch [CS-2(3)] → ECM power relay [CR-25(30)→(87)] → Fuse box[No.21]  
 → I/conn [CN-2(6)] → I/conn [CN-12(10)] → OEM port 50P[CN-93(38)]  
 → Power relay[CR-35(30)→(87)] → Fuse box[No.23]  
 → MCU[CN-58(12)]

#### (2) When start key switch is in START position

Start switch START [CS-2(5)] → Start safety relay [CR-5(30)→(87)] → I/conn [CN-3(4)]  
 → [CN-13(8)] → Start relay [CR-23] → Starter(Terminal B<sup>+</sup> and M connector of start motor)

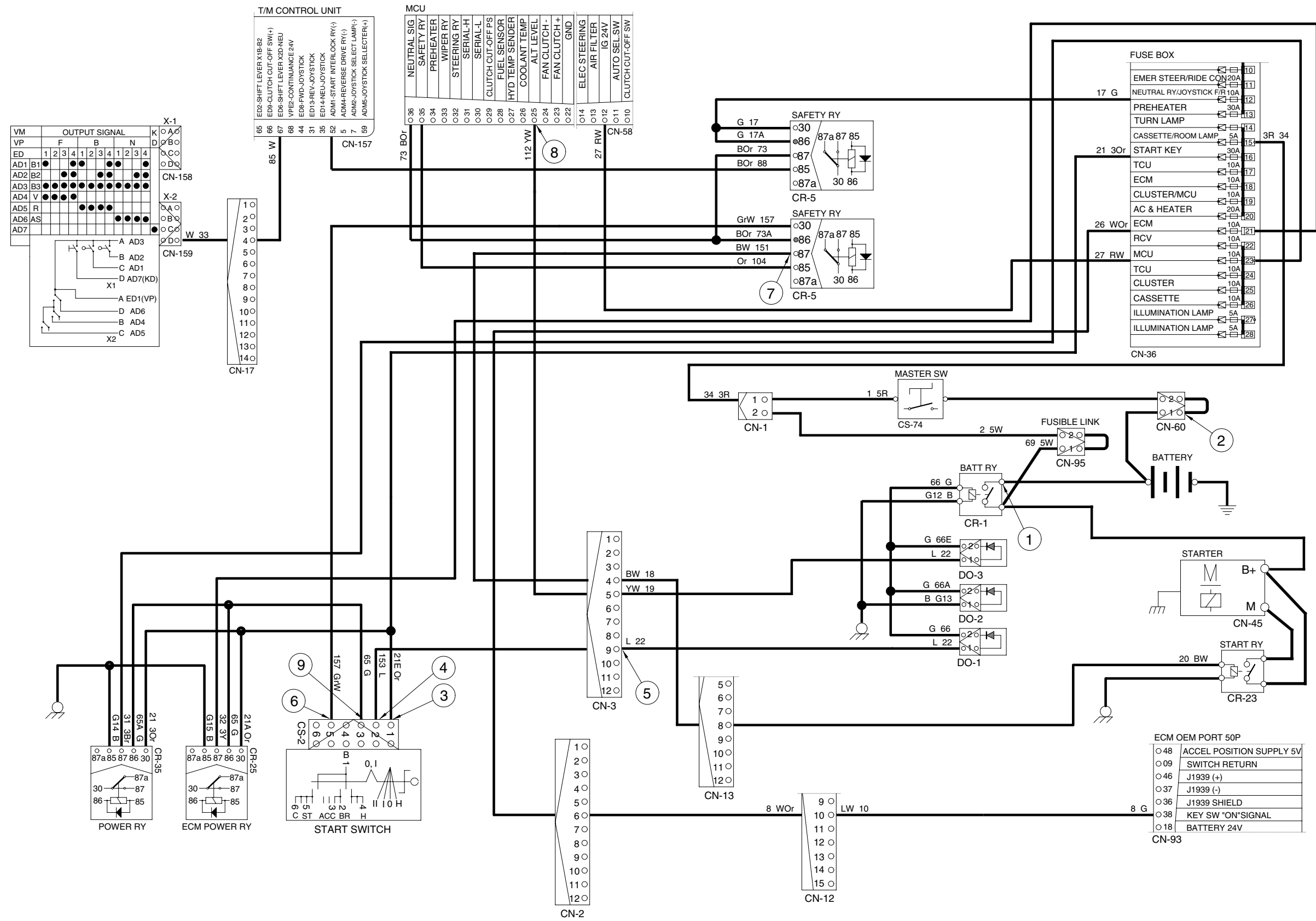
### 2) CHECK POINT

Engine	Key switch	Check point	Voltage
Running	ON	① - GND (Battery B <sup>+</sup> ) ② - GND (Fusible link) ③ - GND (Start key B terminal) ④ - GND (Start key BR terminal) ⑤ - GND (I/conn CN-3(9)) ⑥ - GND (Start key ST terminal) ⑦ - GND (Start safety relay output) ⑧ - GND (MCU) ⑨ - GND (Start key ACC terminal)	20~25V

※ GND : Ground

※ ECM : Electronic control module

# STARTING CIRCUIT



## 5. 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 alternator flows into the battery through the battery relay(CR-1).

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(2)] → I/conn [CN-13(9)] → I/conn [CN-3(5)] → MCU[CN-58(25)]  
 → Cluster charge warning lamp ON

#### (2) Charging flow

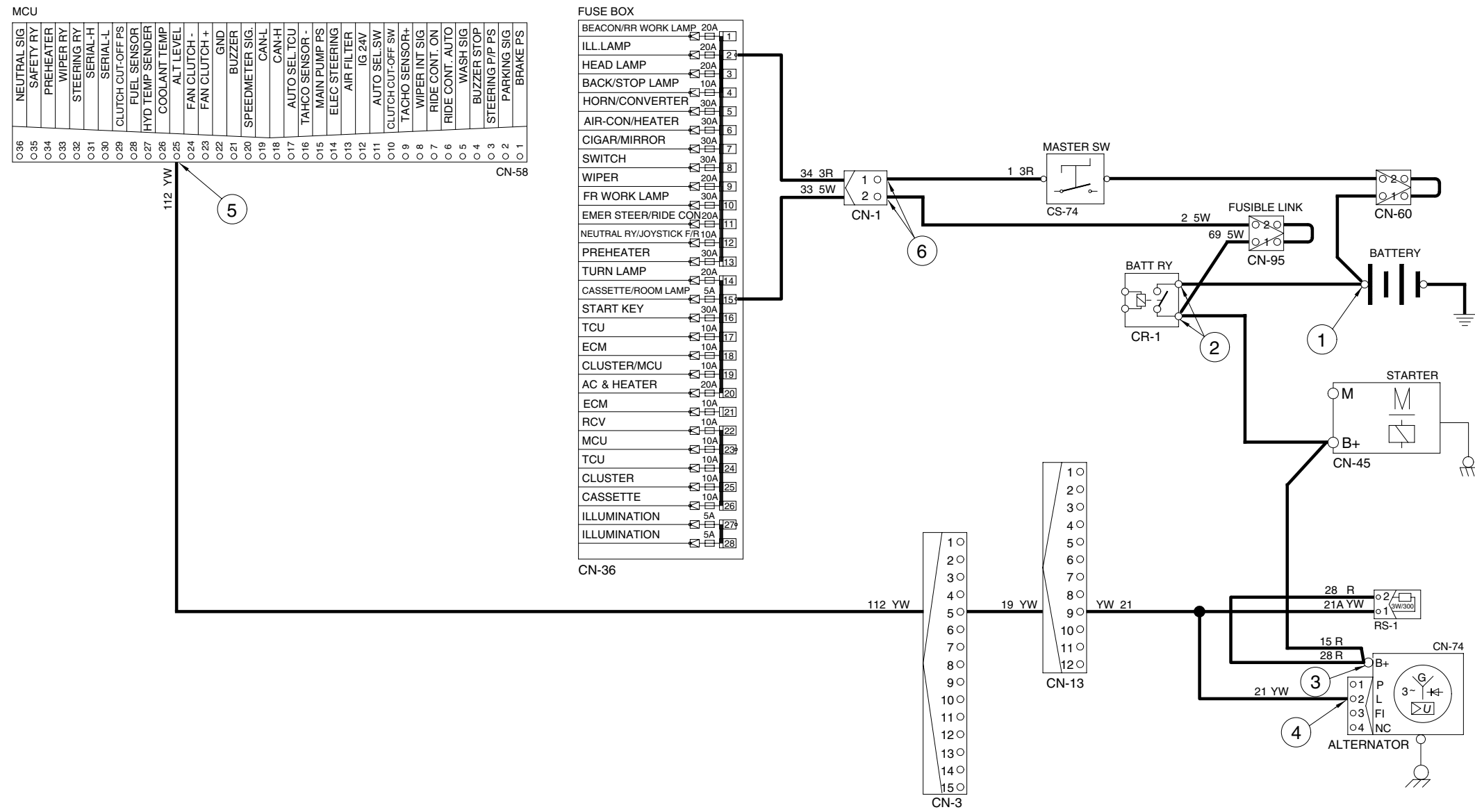
Alternator → Starter [CN-45(B<sup>+</sup>)] → Battery relay [CR-1]  
 → Battery(+) terminal → Charging  
 → Fusible link [CN-95(1)→(2)] → I/conn [CN-1(2)] → Fuse box

### 2) CHECK POINT

Engine	Key switch	Check point	Voltage
Running	ON	① - GND (Battery) ② - GND (Battery relay) ③ - GND (ALT B <sup>+</sup> ) ④ - GND (ALT 2) ⑤ - GND (MCU) ⑥ - GND (Fuse box)	20~28V

※ GND : Ground

# CHARGING CIRCUIT



## 6. ELECTRIC PARKING, DECLUTCH CIRCUIT

### 1) OPERATING FLOW

#### (1) Parking OFF

Fuse box (No.8) → Parking switch OFF [CS-17(6)→(8)] → Parking solenoid ON (Activated)  
 → Parking brake released (By hydraulic pressure)

#### (2) Parking ON

Fuse box (No.8) → Parking switch ON

- Parking solenoid [CN-71] OFF  
 → Parking brake applied [By spring force]
- [CS-17(5)→(7)] → T/M control unit [CN-157(21)]  
 → T/M declutch

#### (3) Declutch ON

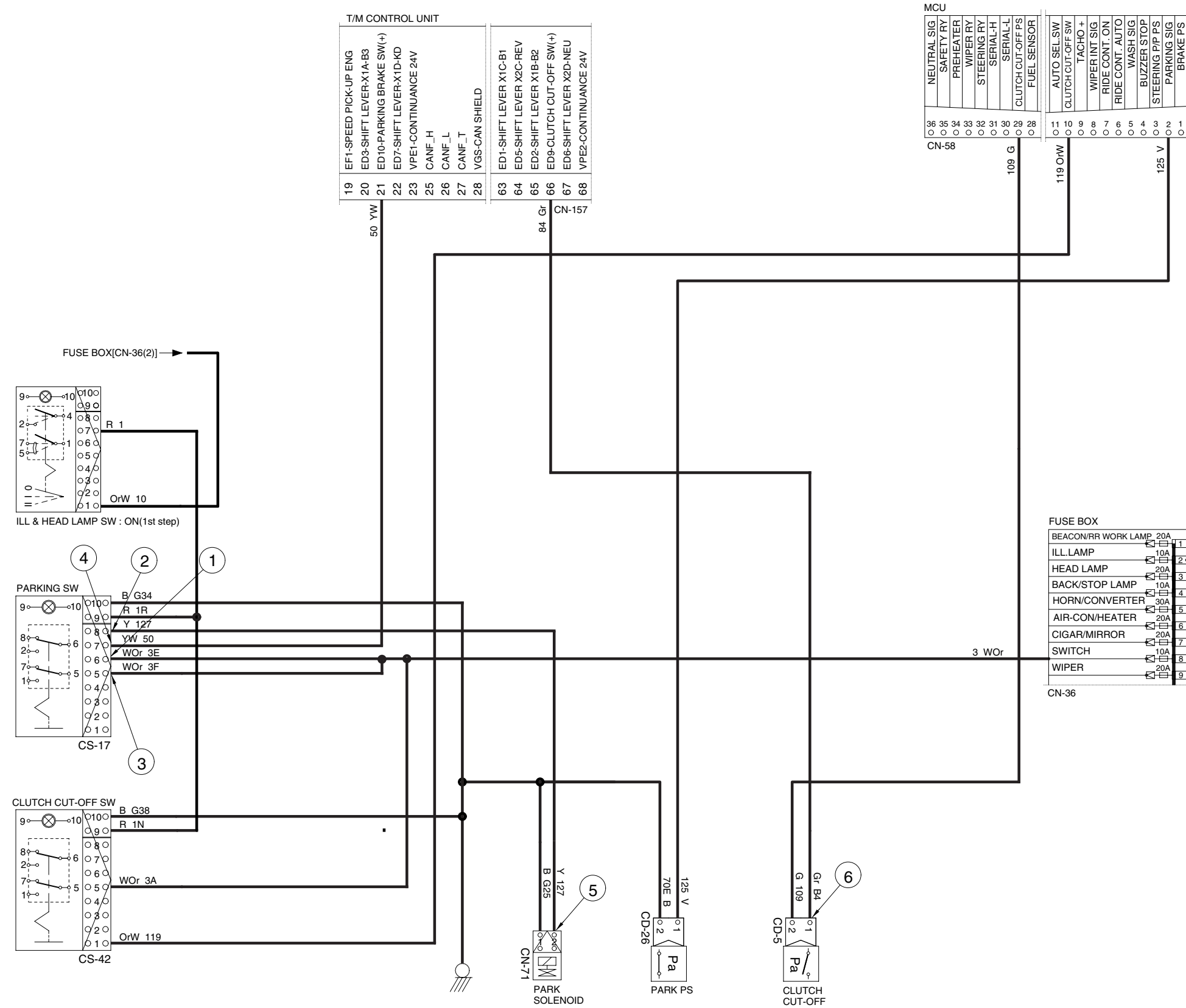
Fuse box (No.8) → Clutch cut-off switch ON → Clutch cut-off switch [CS-42(5)→(1)]  
 → MCU [CN-58(10)→(29)] → Service brake applied → Service brake pressure switch  
 ON [CD-5] → T/M control unit [CN-157(66)] → Declutch

### 2) CHECK POINT

Engine	Key switch	Check point	Voltage
Running	ON	① - GND (Parking switch input) ② - GND (Parking switch output) ③ - GND (Parking switch input) ④ - GND (Parking switch output) ⑤ - GND (Parking solenoid) ⑥ - GND (Pressure switch clutch cut-off)	20~25V

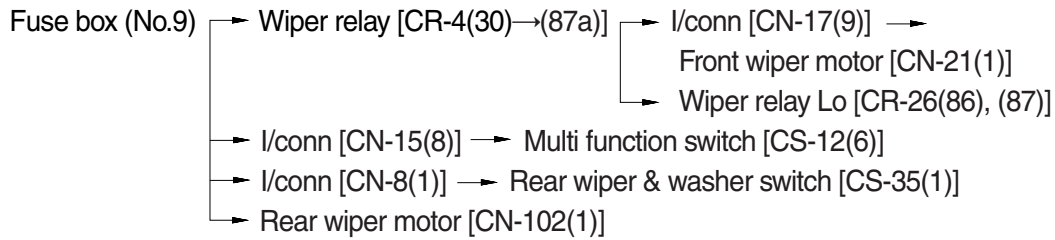
※ GND : Ground

# ELECTRIC PARKING, DECLUTCH CIRCUIT

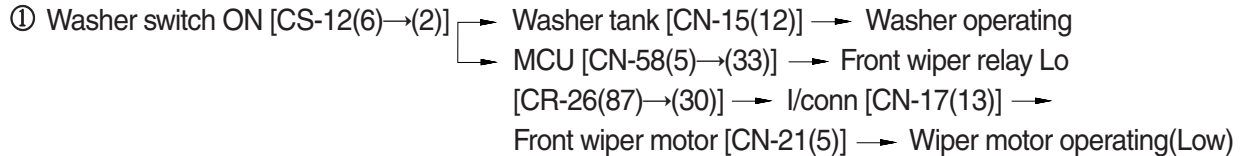


## 7. WIPER AND WASHER CIRCUIT

### 1) OPERATING FLOW

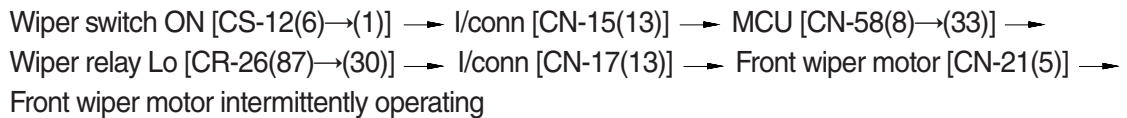


#### (1) Front washer switch ON

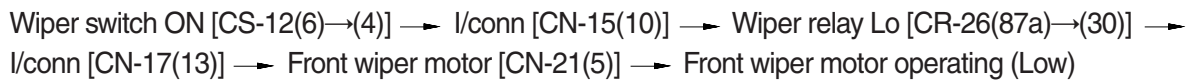


#### (2) Front wiper switch ON

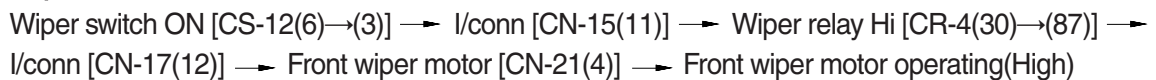
##### ① INT position



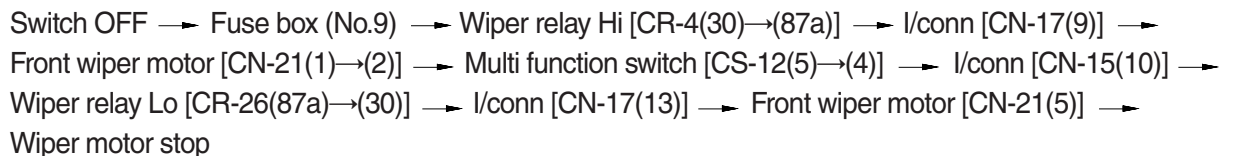
##### ② Lo position



##### ③ Hi position

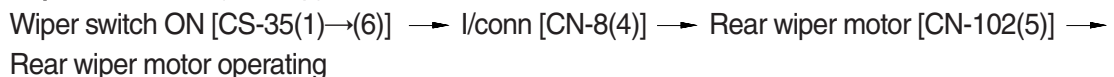


#### (3) Auto-parking(When switch OFF)

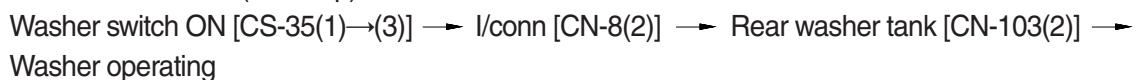


#### (4) Rear wiper and washer switch

##### ① Wiper switch ON(1st step)



##### ② Washer switch ON(2nd step)



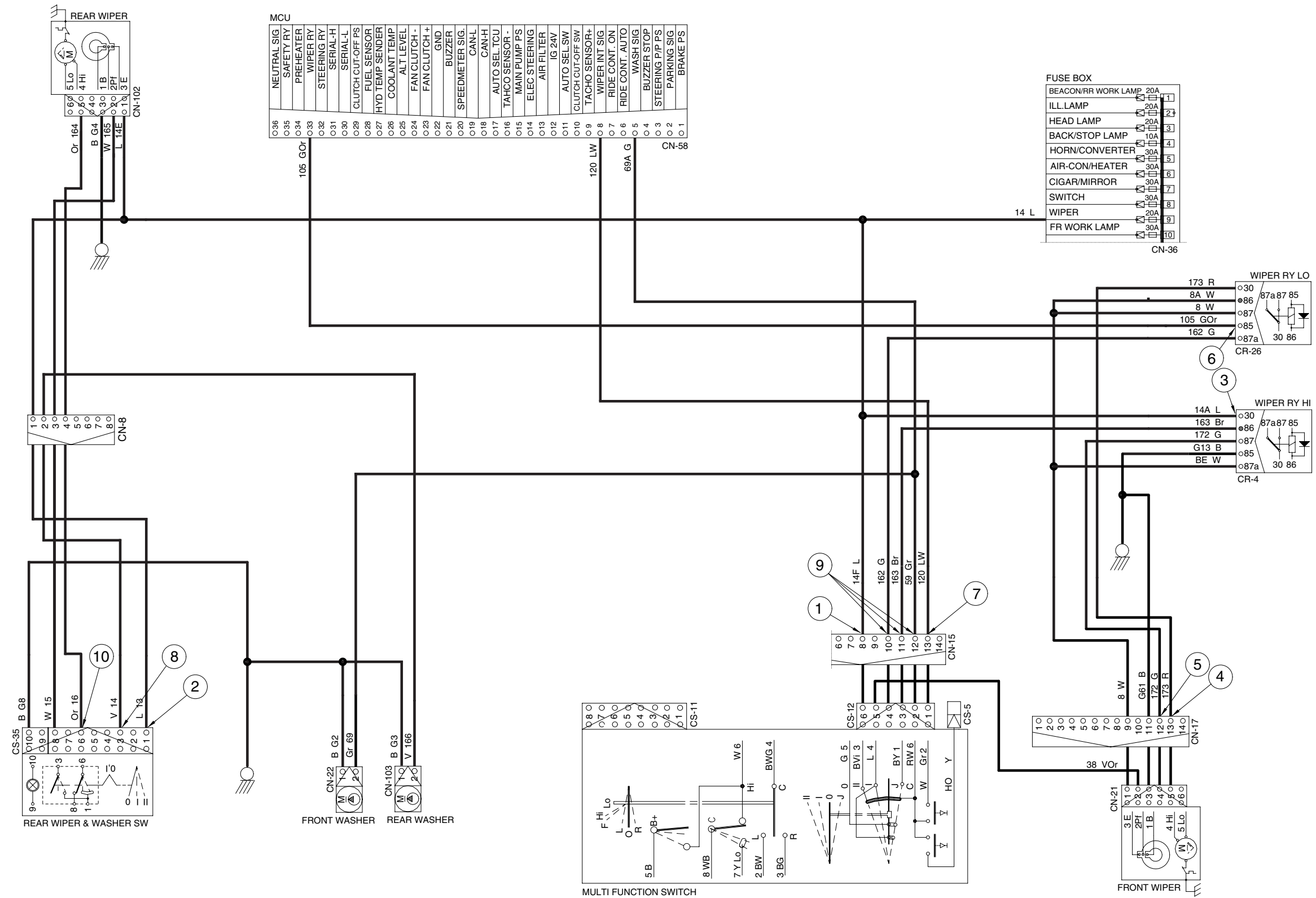


## 2) CHECK POINT

Engine	Key switch	Check point	Voltage
Stop	ON	① - GND (Front wiper switch power input) ② - GND (Rear wiper switch power input) ③ - GND (Wiper relay power input) ④ - GND (Front wiper motor Lo power input) ⑤ - GND (Front wiper motor High power input) ⑥ - GND (Wiper relay power input) ⑦ - GND (Front washer power output) ⑧ - GND (Rear washer power output) ⑨ - GND (Front wiper motor power output) ⑩ - GND (Rear wiper motor power output)	20~25V

※ GND : Ground

# WIPER AND WASHER CIRCUIT



# HAZARD, TURN AND ROTARY CIRCUIT

