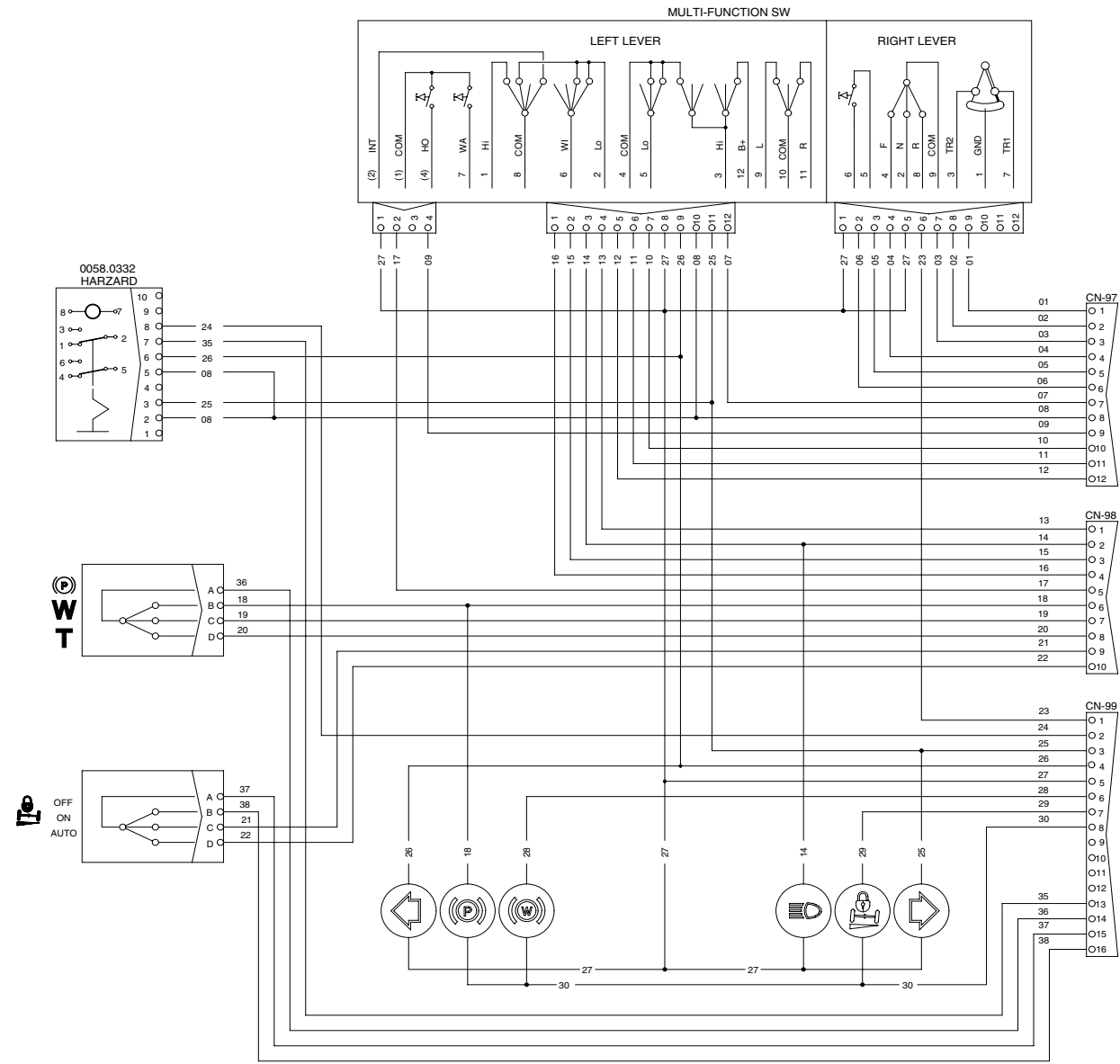






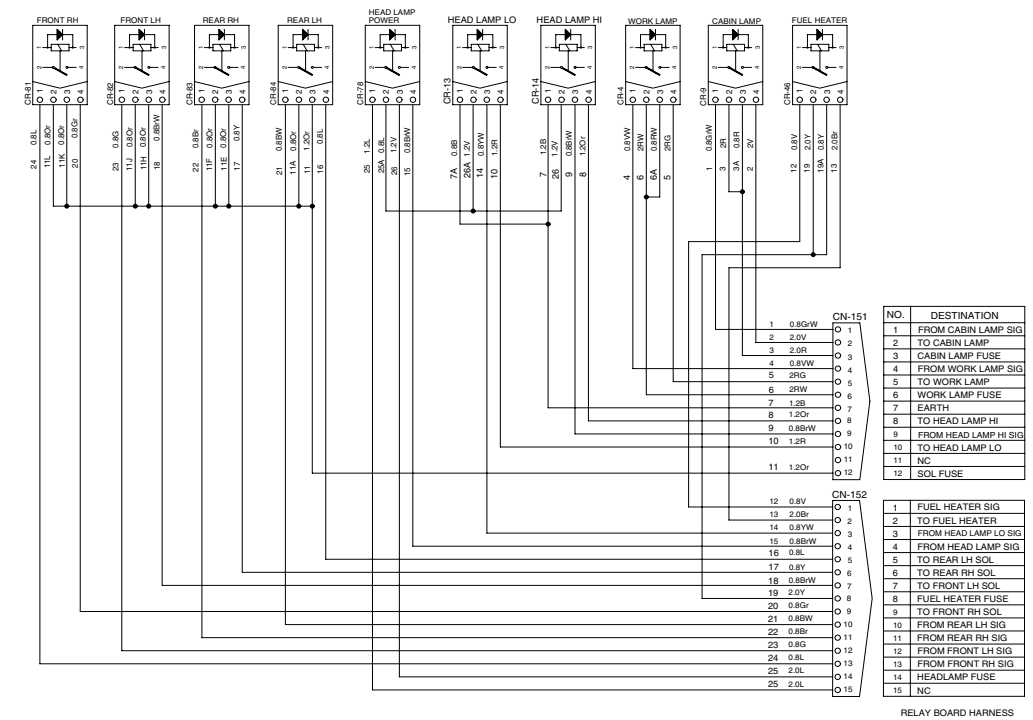
ELECTRIC CIRCUIT (3/3)



NO.	DESTINATION
1	GND
2	REV RY.
3	MCU CN-53
4	FWD RY.
5	TRAVEL SPEED RY.
6	MCU CN-53
7	FUSE 24V
8	FLASHER UNIT
9	HORN RY.
10	WIPER MOTOR CONTROLLER
11	NC
12	HEAD LAMP RY.

NO.	DESTINATION
1	HEAD LAMP POWER RY.
2	HEAD LAMP HI RY.
3	WIPER MOTOR CONTROLLER
4	WIPER MOTOR CONTROLLER
5	WIPER MOTOR CONTROLLER
6	MCU CN-53
7	MCU CN-53
8	MCU CN-53
9	MCU CN-53
10	MCU CN-53

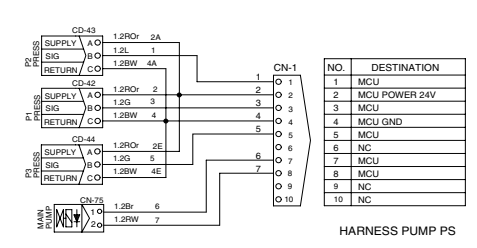
NO.	DESTINATION
1	MCU CN-53
2	FUSE 24V
3	REAR COMBI LAMP
4	REAR COMBI LAMP
5	GND
6	MCU CN-52
7	MCU CN-52
8	FUSE 24V
9	NC
10	NC
11	NC
12	NC
13	GND
14	GND
15	GND
16	MCU CN-53



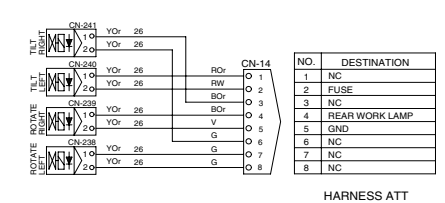
NO.	DESTINATION
1	FROM CABIN LAMP SIG
2	TO CABIN LAMP
3	CABIN LAMP FUSE
4	FROM WORK LAMP SIG
5	TO WORK LAMP
6	WORK LAMP FUSE
7	EAARTH
8	TO HEAD LAMP HI
9	FROM HEAD LAMP HI SIG
10	TO HEAD LAMP LO
11	NC
12	SIG. FUSE

NO.	DESTINATION
1	FUEL HEATER SIG
2	TO FUEL HEATER
3	FROM HEAD LAMP LO SIG
4	FROM HEAD LAMP LO SIG
5	TO REAR LH SOL
6	TO REAR RH SOL
7	TO FRONT LH SOL
8	FUEL HEATER FUSE
9	TO FRONT RH SOL
10	FROM REAR LH SIG
11	FROM REAR RH SIG
12	FROM FRONT LH SIG
13	FROM FRONT RH SIG
14	HEADLAMP FUSE
15	NC

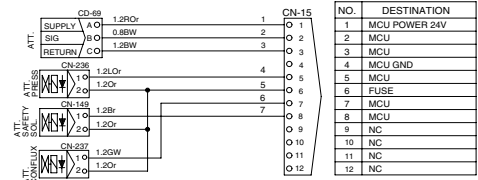
RELAY BOARD HARNESS



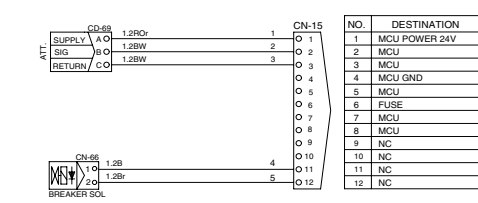
HARNESS PUMP PS



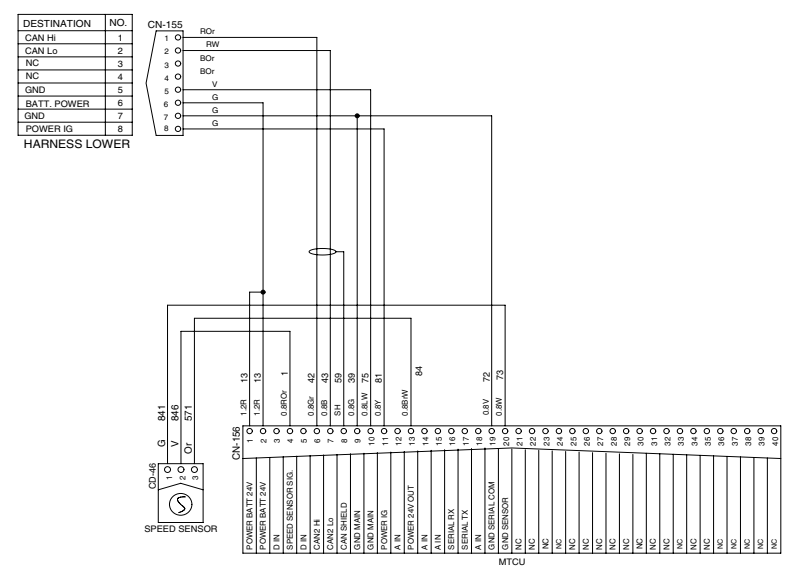
HARNESS ATT



HARNESS TWO-WAY



HARNESS BREAKER



DESTINATION	NO.
CAN HI	1
CAN LO	2
NC	3
NC	4
GND	5
BATT POWER	6
GND	7
POWER IG	8

HARNESS LOWER

NO.	DESTINATION
1	MCU POWER 24V
2	MCU
3	MCU
4	MCU GND
5	MCU
6	FUSE
7	MCU
8	MCU
9	NC
10	NC
11	NC
12	NC

SPEED SENSOR

MEMORANDUM

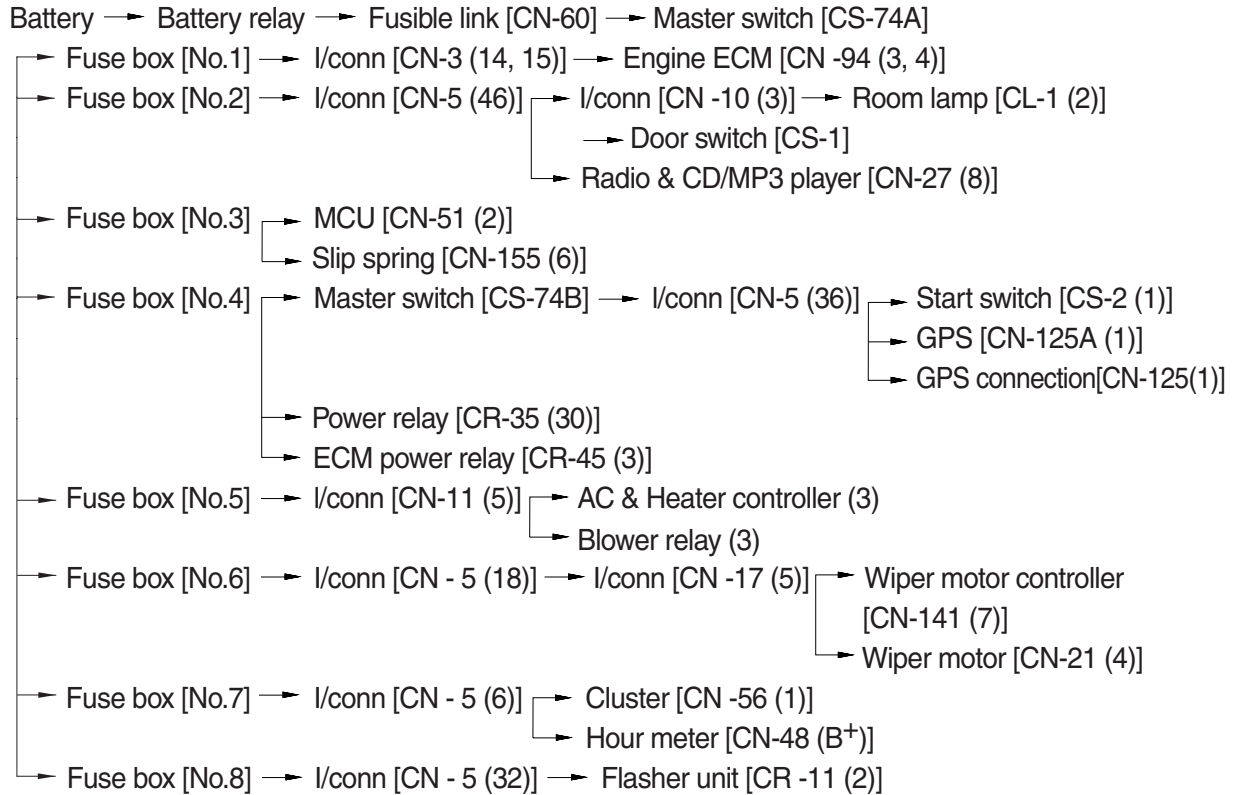
HYUNDAI HEAVY INDUSTRIES CO., LTD  
CONSTRUCTION EQUIPMENT DIV.

## 1. POWER CIRCUIT

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

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

### 1) OPERATING FLOW



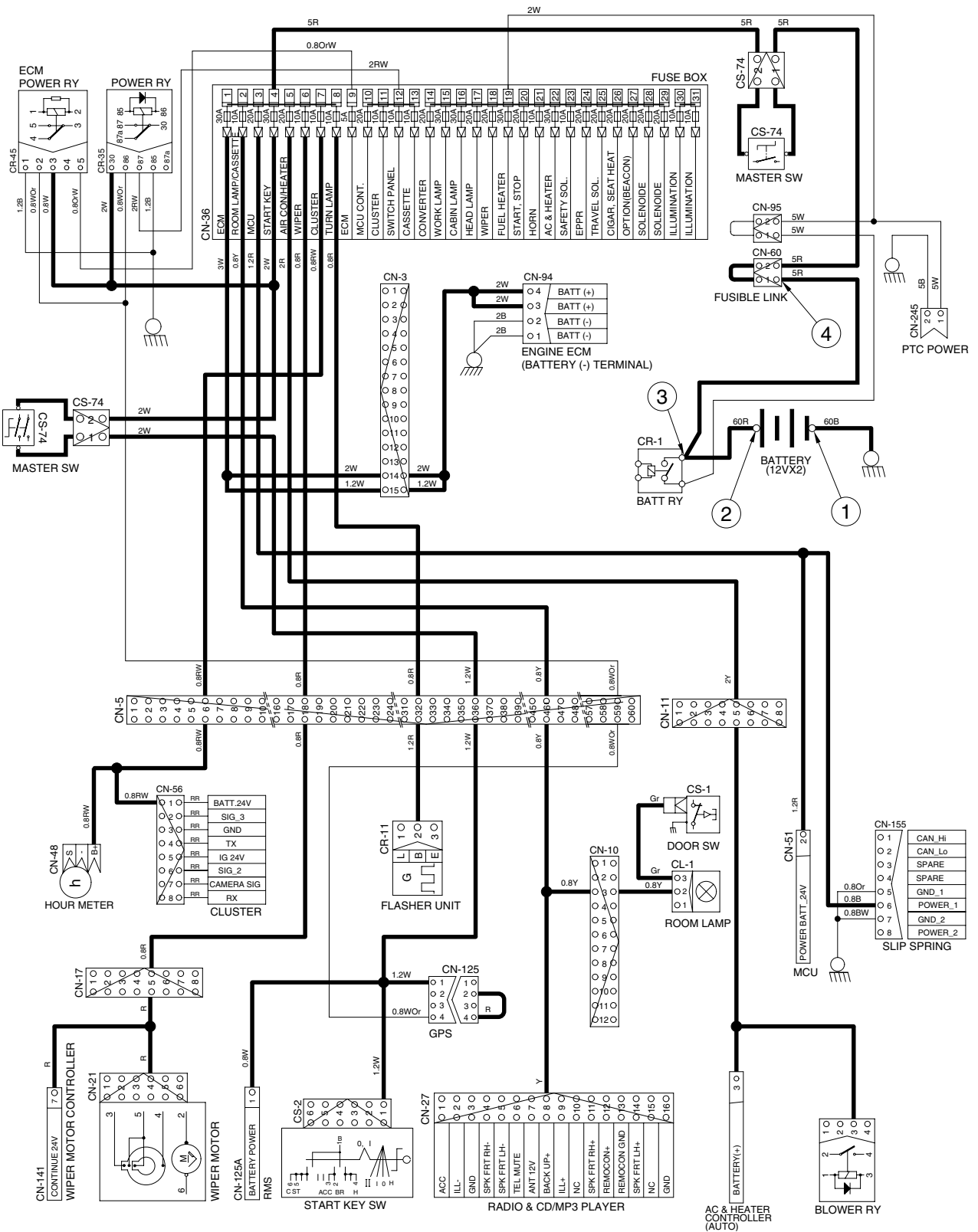
I/conn : Intermediate connector

### 2) CHECK POINT

Engine	Start switch	Check point	Voltage
OFF	OFF	① - GND (battery 1EA)	10~12.5 V
		② - GND (battery 2EA)	20~25 V
		③ - GND (battery 2EA)	20~25 V
		④ - GND (fusible link)	20~25 V

※ GND : Ground

# POWER CIRCUIT



20W94EL04

## 2. STARTING CIRCUIT

### 1) OPERATING FLOW

Battery(+) terminal → Battery relay [CR-1] → Fusible link [CN-60] → Master switch [CS-74A]  
 → Fuse box [No.4] → Master switch [CS-74B] → I/conn [CN-5(36)] → Start switch [CS-2(1)]

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

→ Start switch ON [CS-2 (2)] → I/conn [CN-5 (60)] → Battery relay [CR-1]  
 → Battery relay operating (all power is supplied with the electric component)  
 → Start switch ON [CS-2 (3)] → GPS conn [CN-125 (2)→(4)] → I/conn [CN-5 (59)]  
 → Power relay [CR-35 (86) → (87)] → Fuse box [No.10]  
 → ECM power relay [CR-45 (2) → (5)] → Fuse box [No.8]

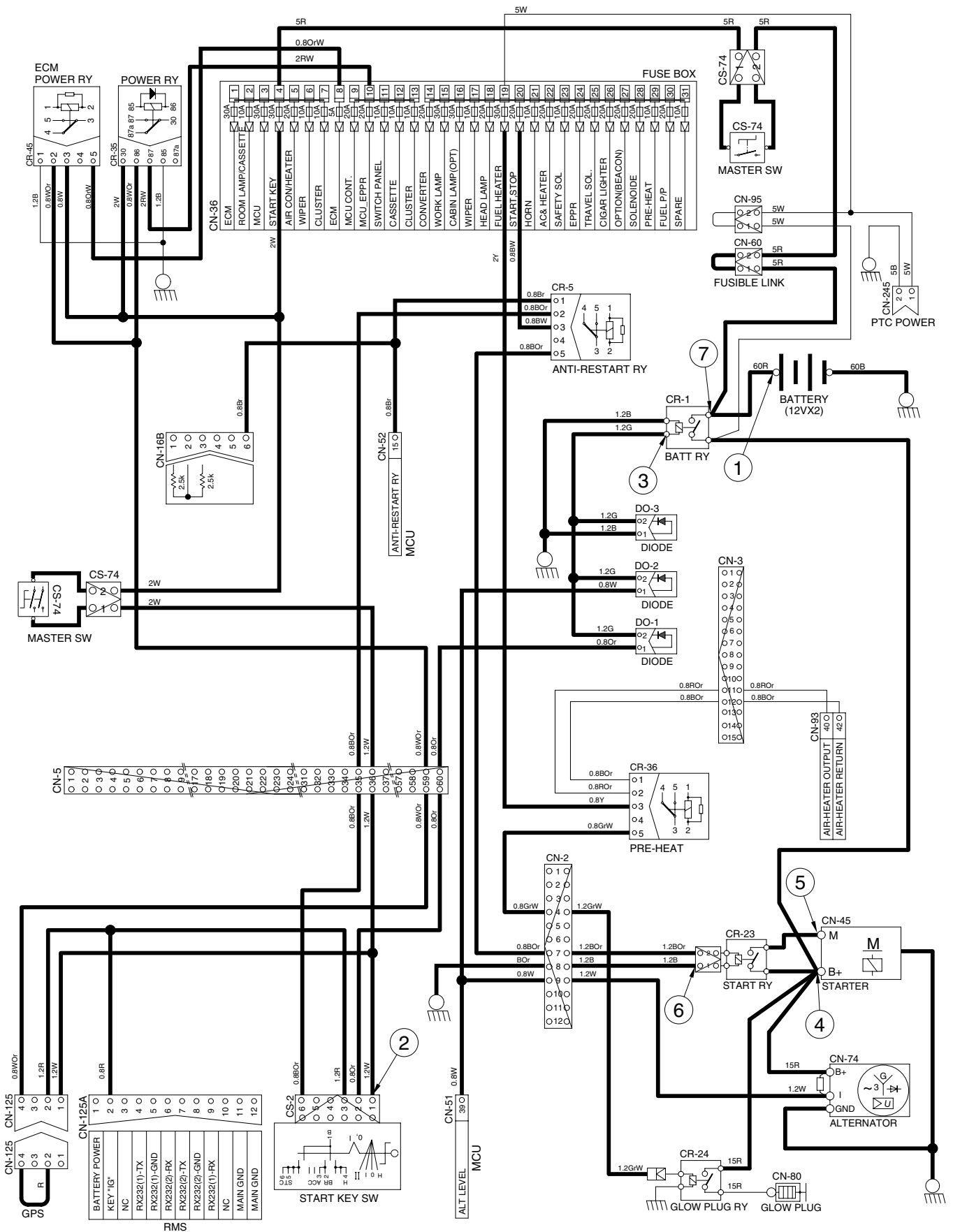
#### (2) When start key switch is in START position

Start switch START [CS-2 (6)] → I/conn [CN-5 (35)] → Anti-restart relay [CR-5 (2) → (5)]  
 → I/conn [CN-2 (7)] → Start relay [CR-23]

### 2) CHECK POINT

Engine	Start switch	Check point	Voltage
OPERATING	START	① - GND (battery) ② - GND (start key) ③ - GND (battery relay M4) ④ - GND (starter B <sup>+</sup> ) ⑤ - GND (starter M) ⑥ - GND (start relay) ⑦ - GND (battery relay M8)	20~25V

# STARTING CIRCUIT



20W94EL05

### 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 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 "I" terminal → I/conn [CN-2 (9)] → MCU alternator level [CN-51 (39)]  
 → Cluster charging warning lamp (Via serial interface)

##### (2) Charging flow

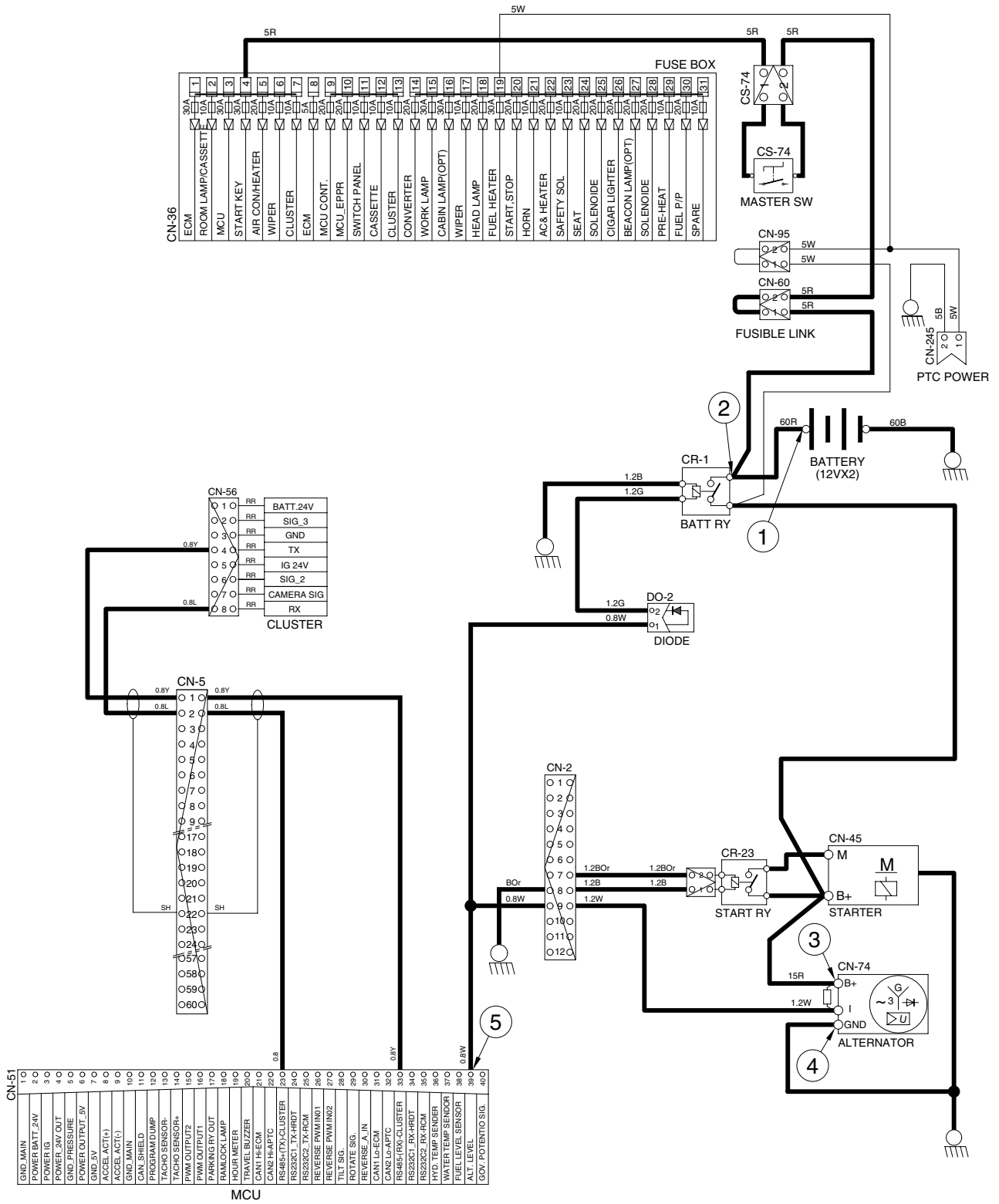
Alternator "B+" terminal → Battery relay(M8) → Battery(+) terminal  
 → Fusible link [CN-60] → Master switch [CS-74A]  
 → Fuse box

#### 2) CHECK POINT

Engine	Start switch	Check point	Voltage
Run	ON	① - GND (battery voltage) ② - GND (battery relay) ③ - GND (alternator B <sup>+</sup> terminal) ④ - GND (alternator I terminal) ⑤ - GND (MCU)	20~25V

※ GND : Ground

# CHARGING CIRCUIT



## 4. HEAD AND WORK LIGHT CIRCUIT

### 1) OPERATING FLOW

Fuse box (No.17) → Head light relay [CN-152 (14)→(4)] → I/conn [CN-98 (1)]  
 → Multifunction sw left lever [(4)→(5)] → I/conn [CN-97 (12)] → Head light relay [CN-152 (3)]  
 Fuse box (No.15) → Work light relay [CN-151 (6)]

#### (1) Head light switch ON

Head light switch ON [CN-116 (2)] → I/conn [CN-5 (49)]  
 → Head light power relay [CN-152 (15) → CN-151 (10)] → Head light ON [CL-3 (1), CL-4 (1)]

#### (2) Work light switch ON

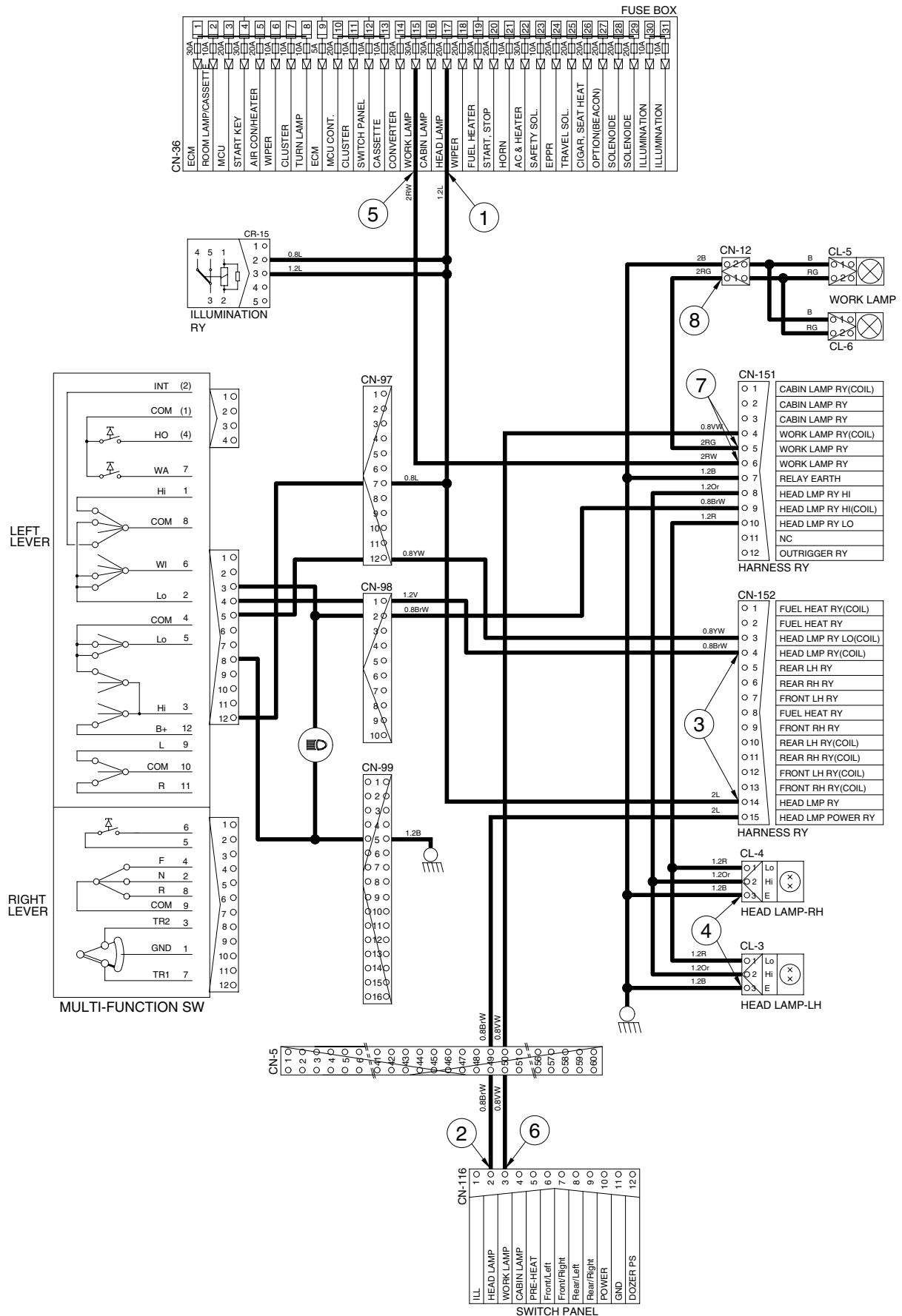
Work light switch ON [CN-116 (3)] → I/conn [CN-5 (50)] → Work light relay [CN-151 (4) → (5)]  
 → I/conn [CN-12 (1)] → Work light ON [CL-5 (2), CL-6 (2)]

### 2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	ON	① - GND (fuse box) ② - GND (switch power output) ③ - GND (head light relay) ④ - GND (head light) ⑤ - GND (fuse box) ⑥ - GND (switch power output) ⑦ - GND (work light relay) ⑧ - GND (work light)	20~30 V

※ GND : Ground

# HEAD AND WORK LIGHT CIRCUIT



## 5. BEACON LAMP AND CAB LIGHT CIRCUIT

### 1) OPERATING FLOW

Fuse box (No.27) → I/conn [CN-5 (33)] → Beacon lamp switch [CN-23 (8)]

Fuse box (No.16) → Cab light relay [CR-9 (30, 86)]

#### (1) Beacon lamp switch ON

Beacon lamp switch ON [CS-23 (4)] → Switch indicator lamp ON [CS-23 (11)]  
 → I/conn [CN-10 (10)] → Beacon lamp ON [CL-7]

#### (2) Cab light switch ON

Cab light switch ON [CN-116 (4)] → I/conn [CN-5 (55)] → Cab lamp relay [CN-151 (1) → (2)]

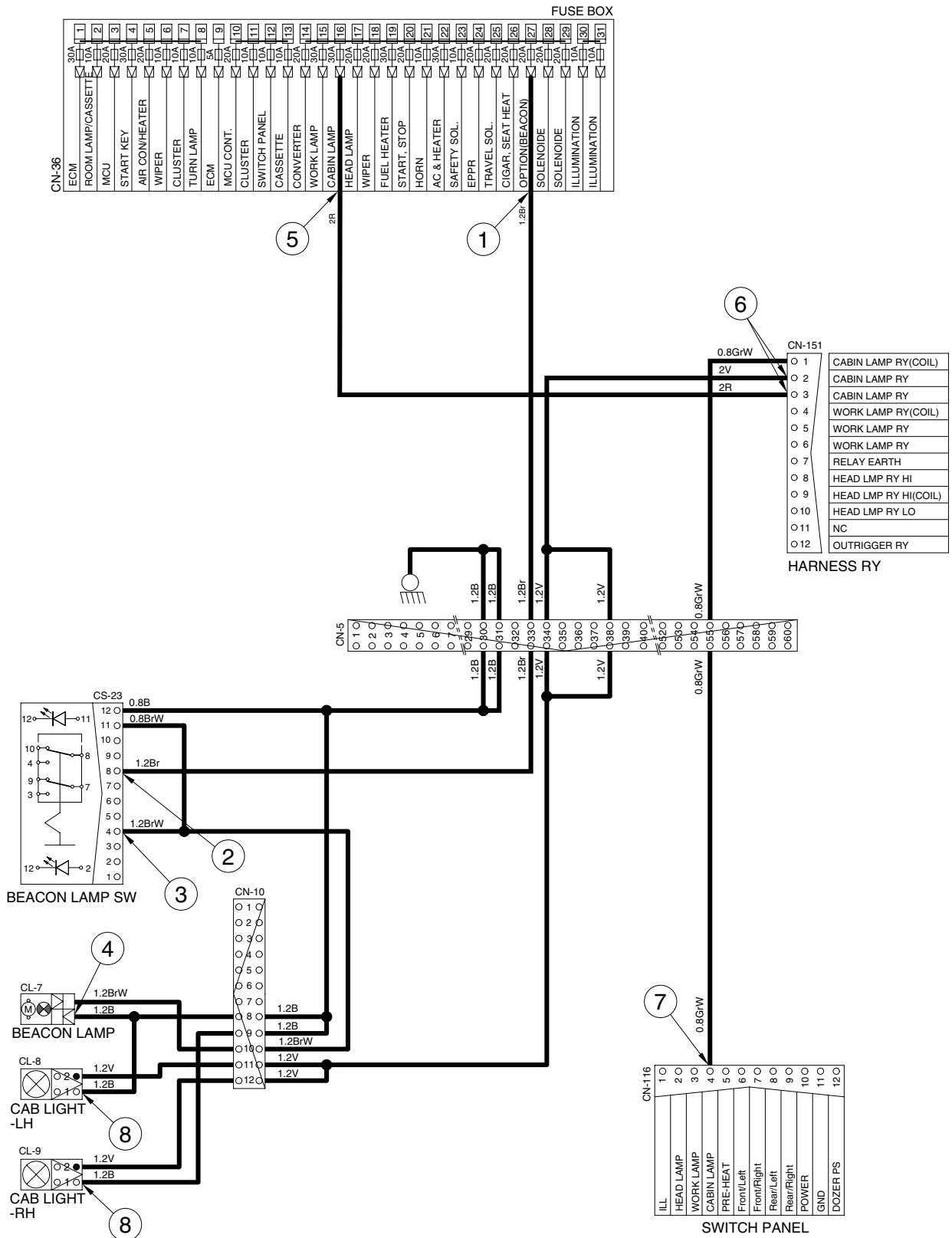
→ I/conn [CN-5 (34, 38)] → I/conn [CN-10 (11)] → Cab light ON [CL-8 (2)]  
 → I/conn [CN-10 (12)] → Cab light ON [CL-9 (2)]

### 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) ⑤ - GND (fuse box) ⑥ - GND (cabin light relay) ⑦ - GND (switch power output) ⑧ - GND (cab light)	20~25V

※ GND : Ground

# BEACON LIGHT AND CAB LIGHT CIRCUIT



## 6. WIPER AND WASHER CIRCUIT

### 1) OPERATING FLOW

#### (1) Key switch ON

Fuse box (No.17) → I/conn [CN-97 (7)] → Multifunction sw left lever [12]

Fuse box (No.6) → I/conn [CN-5 (18)] → I/conn [CN-17 (5)] → Wiper motor controller [CN-141(7)]  
 → Wiper motor [CN-21(4)]

Fuse box (No.18) → I/conn [CN-5 (24)] → I/conn [CN-17 (4)] → Wiper motor controller [CN-141 (6)]  
 → Washer pump [CN-22 (2)]

#### (2) Wiper switch ON : 1st step (Intermittent)

Wiper switch ON [Multifunction sw left lever (2)] → I/conn [CN-98 (5)] → I/conn [CN-5 (43)]

→ I/conn [CN-17 (8)] → Wiper motor controller [CN-141 (10)→ (3)]

→ Wiper motor intermittently operating [CN-21 (6)]

#### (3) Wiper switch ON : 2nd step (continual)

Wiper switch ON [Multifunction sw left lever (1, 2)] → I/conn [CN-98 (3, 4)] → I/conn [CN-5 (23)]

→ I/conn[CN-17(2)] → Wiper motor controller [CN-141(2)→ (4)] → Wiper motor operating [CN-21(2)]

#### (4) Washer switch ON

Washer switch ON [Multifunction sw left lever (7)] → I/conn [CN-97 (10)] → I/conn [CN-5 (37)]

→ I/conn [CN-17 (7)] → Wiper motor controller [CN-141 (9)→ (8)]

→ I/conn [CN-17 (6)] → I/conn [CN-5 (19)] → Washer pump [CN-22 (1)] → Washer operating

→ Wiper switch ON [Multifunction sw left lever (1, 2)] → I/conn [CN-98 (3, 4)]

→ I/conn [CN-5 (23)] → I/conn[CN-17 (2)] → Wiper motor controller [CN-141 (2)→ (4)]

→ Wiper motor operating [CN-21 (2)]

#### (5) Auto parking (when switch OFF)

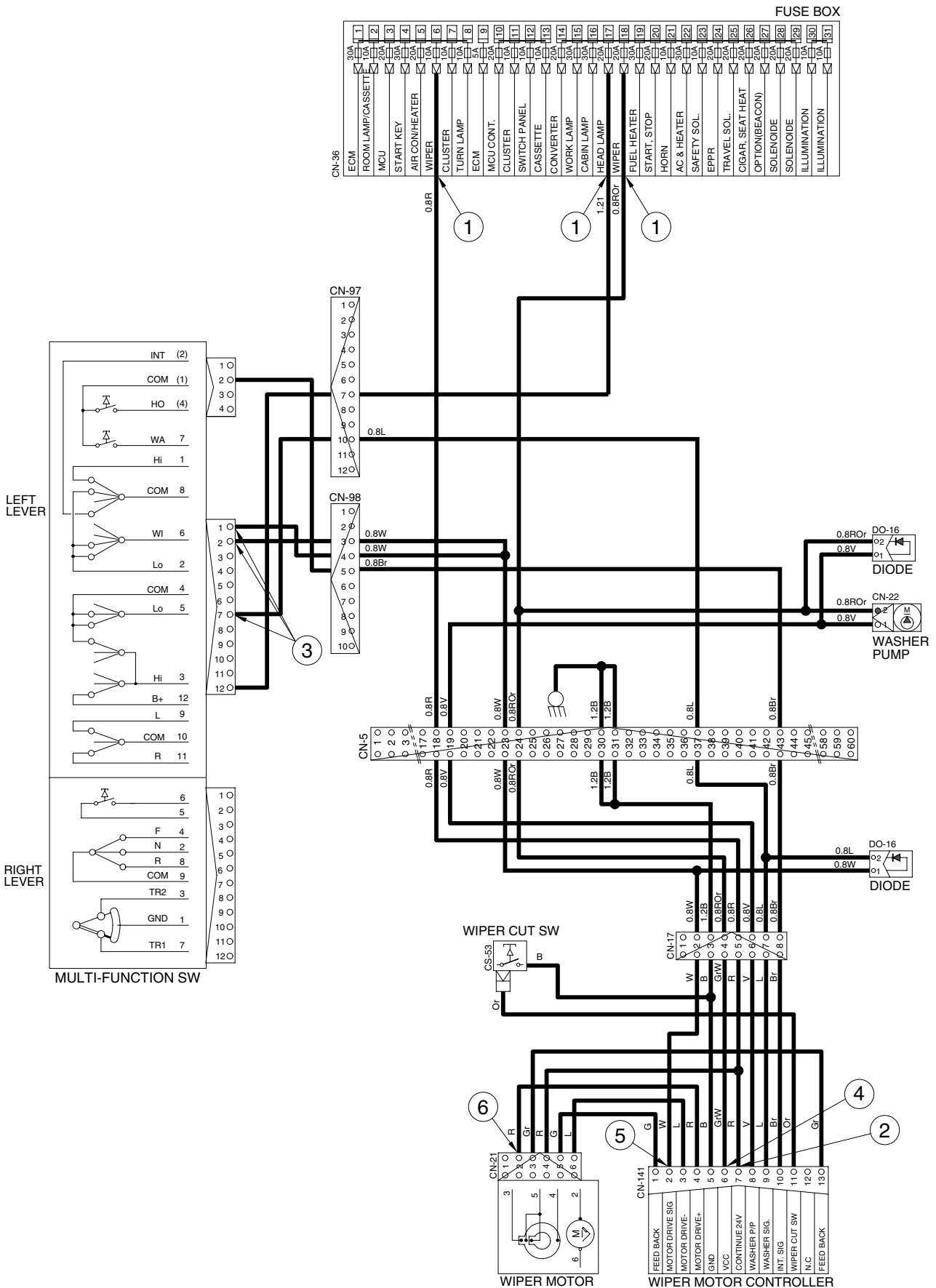
Switch OFF [Multifunction sw left lever OFF position] → Wiper motor parking position by wiper motor controller

### 2) CHECK POINT

Engine	Start switch	Check point	Voltage
STOP	ON	① - GND (fuse box)	24 V
		② - GND (switch power input)	
		③ - GND (switch power output)	0~5 V
		④ - GND (wiper power output)	
		⑤ - GND (wiper power input)	24 V
		⑥ - GND (wiper motor)	0 or 24 V

※ GND : Ground

# WIPER AND WASHER CIRCUIT



20W94EL09









# ELECTRIC CIRCUIT FOR HYDRAULIC

