

Chapter 7

ELECTRICAL SYSTEM

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5. FUSE BLOCK, RELAY PANEL AND FUSIBLE LINK BLOCK
6. INSTALLATION OF ADDITIONAL SWITCHES
7. THE INSTRUCTIONS FOR TRAILER BRAKE CIRCUIT
8. ALTERNATOR OUTPUT CHARACTERISTIC
9. ELECTRICAL POWER SOURCES
10. BACK-UP ALARM
11. HARNESS WIRING

1. WARNING

Precaution for ABS

About noise

If you install the following parts near ABS-ECU integrated hydro unit (ABS-ECU), allow sufficient clearance more than 100mm (4.0in.) from ABS-ECU.

Radio transmitting and receiving apparatus such as two-way radio and related antenna or harness, motor, relay or other machinery which causes noise.

For wiring

Do not wire antenna wiring of two-way radio along with vehicle harness which goes through inside of the frame, as it may affect the wiring of ABS-ECU which is in the vehicle harness.

After completion of body mounting

- Check carefully if there is any damage to the piping or harness after body mounting.
- ABS needs the inspection after body mounting.
Please consult HMC or Hino authorized dealer for detailed information of inspection.
- If turn the ignition switch on under disconnecting the harness of rear combination lamp circuit, ABS warning lamp in combination meter is on by ABS diagnosis system with detecting abnormal condition (diag-codeC1425) of the harness of rear combination lamp circuit when mounting of body.
Reconnect the harness of rear combination lamp circuit, and turn the ignition switch on again, and then ABS warning lamp is off but the diag-codeC1425 is still remained in ABS computer, therefore, do not forget to delete diag-code from ABS computer.
Please consult HMC or Hino authorized dealer for detailed information of erasing diag-code.

Others to check

- If two-way radio or other electric device for use while moving is set, conduct ABS inspection with such device working.
- If electric device for use while parking is set, put it in action while ignition is on or engine is working and check if there is ABS glitch or warning light is on.

2. LAMPS, REFLECTIVE DEVICES AND ASSOCIATED EQUIPMENT

Requirements of CMVSS 108

The following devices are provided, located and/or wired by Hino Motors, Ltd.

Requirements of CMVSS 108.

Head lamps	Front side reflex reflectors
Front side marker lamps	Front turn signal lamps
Turn signal operating unit	Turn signal flasher
Front clearance and I.D. lamps	Parking lamps (if applicable)
Daytime running lamps (if applicable)	Rear reflex reflectors (Temporary loc.)
Tail lamps (Temporary loc.)	Stop lamps (Temporary loc.)
License plate lamps (Temporary loc.)	Back up lamps (Temporary loc.)
Rear turn signal lamps (Temporary loc.)	Vehicle hazard warning signal flasher
Vehicle hazard warning signal operating unit	

The following additional devices must be installed on the body and meet all the requirements of CMVSS 108.

Rear side marker lamps
Rear side reflex reflectors
Rear clearance lamps
Rear identification lamps

The following additional devices must be installed on the body and meet all the requirements of CMVSS 108 if the overall vehicle length is 30 feet or greater.

Intermediate side marker lamps
Intermediate side reflex reflector

Installation of Rear Combination Lamps

Rear combination lamps such as tail lamps, stop lamps, turn signal lamps, rear reflex reflectors and back up lamps are temporarily installed on the end of chassis frame at factory, they should be relocated by subsequent manufacturer to conform to CMVSS 108.

Install the rear combination lamp directly such that the turn signal lamp (umber) is outside and back up lamp (white) is inside of the vehicle.

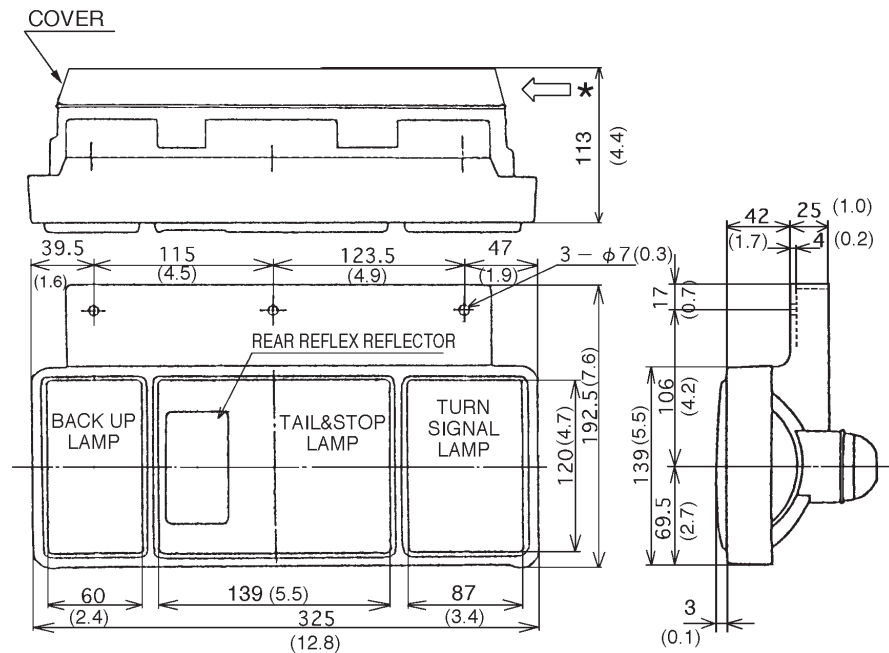
Notes for relocation of rear combination lamps:

- Tail lamp, stop lamp, turn signal lamp, back up lamp and rear reflex reflector are designed in one body as rear combination lamp. Do not install the rear combination lamps vertically or up side down not to affect the performance of and water drain holes.
- When installing the rear combination lamps to the rear body, be sure to prevent breakage, deflection and vibration of rear combination lamp body.
- Do not apply rust-proofing clear lacquer to lamp lens or body.

Detail of Rear Combination Lamp

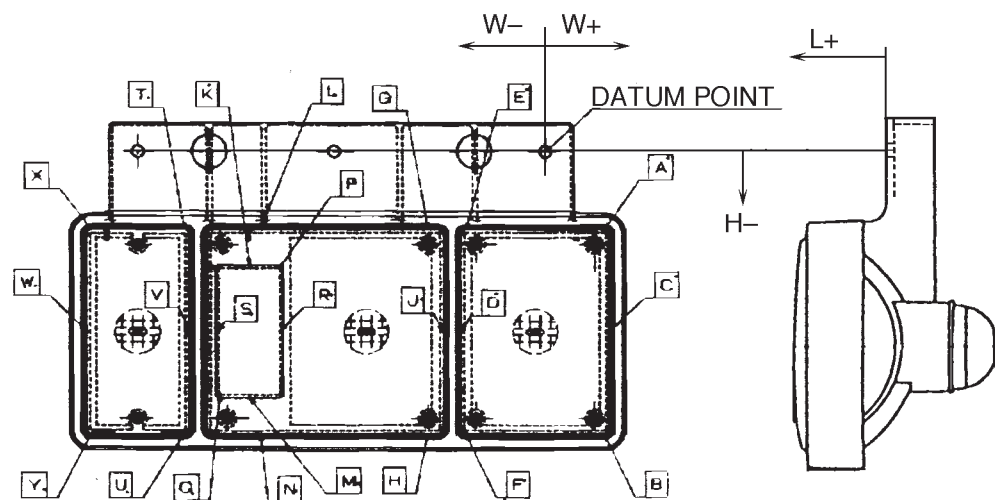
Figure below shows RH side lamp only. LH side lamp is symmetry.

Unit: mm (in.)



*When removed of the cover, it pushes from the direction of the arrow in the figure above (Turn signal lamp side), and the cover is removed.

Light emission portion of Rear combination lamp



Unit: mm (in.)

DIMENSION FROM DATUM POINT	PORTION	L	W	H
TURN SIGNAL (UPPER EDGE)	A	43.4 (1.71)	34.5 (1.36)	-46 (1.81)
TURN SIGNAL (LOWER EDGE)	B	43.4 (1.71)	34.5 (1.36)	-166 (6.54)
TURN SIGNAL (INNER EDGE)	C	46.3 (1.82)	37.5 (1.48)	-106 (4.17)
TURN SIGNAL (OUTER EDGE)	D	46.3 (1.82)	-49.5 (1.95)	-106 (4.17)
TURN SIGNAL (REFERENCE POINT)	E	43.4 (1.71)	-46.5 (1.83)	-46 (1.81)
TURN SIGNAL (REFERENCE POINT)	F	43.4 (1.71)	-46.5 (1.83)	-166 (6.54)
TAIL & STOP (UPPER EDGE)	G	43.4 (1.71)	-68.5 (2.70)	-46 (1.81)
TAIL & STOP (LOWER EDGE)	H	43.4 (1.71)	-68.5 (2.70)	-166 (6.54)
TAIL & STOP (INNER EDGE)	K	46.7 (1.84)	-173.5 (6.83)	-67 (2.64)
TAIL & STOP (OUTER EDGE)	J	46.3 (1.82)	-59.5 (2.34)	-106 (4.17)
TAIL & STOP (REFERENCE POINT)	L	43.4 (1.71)	-167.1 (6.58)	-46 (1.81)
TAIL & STOP (REFERENCE POINT)	M	46.7 (1.84)	-173.5 (6.83)	-145 (5.71)
TAIL & STOP (REFERENCE POINT)	N	43.4 (1.71)	-167.1 (6.58)	-166 (6.54)
Rr REFLECTOR (UPPER EDGE)	P	45.7 (1.80)	-156.0 (6.14)	-69 (2.72)
Rr REFLECTOR (LOWER EDGE)	Q	45.7 (1.80)	-191.0 (7.52)	-143 (5.63)
Rr REFLECTOR (INNER EDGE)	R	46.5 (1.83)	-155.5 (6.12)	-106 (4.17)
Rr REFLECTOR (OUTER EDGE)	S	46.5 (1.83)	-191.5 (7.54)	-106 (4.17)
BACK UP (UPPER EDGE)	T	43.4 (1.71)	-211.5 (8.33)	-46 (1.81)
BACK UP (LOWER EDGE)	U	43.4 (1.71)	-211.5 (8.33)	-166 (6.54)
BACK UP (INNER EDGE)	W	46.3 (1.82)	-268.5 (10.57)	-106 (4.17)
BACK UP (OUTER EDGE)	V	46.3 (1.82)	-208.5 (8.21)	-106 (4.17)
BACK UP (REFERENCE POINT)	X	43.4 (1.71)	-265.5 (10.45)	-46 (1.81)
BACK UP (REFERENCE POINT)	Y	43.4 (1.71)	-265.5 (10.45)	-166 (6.54)

Cautions Regarding Additional Turn Signal Lamps

This is to avoid a possible failure of flasher unit arising from excessive electrical loading due to the mounting of additional turn signal lamps to the flasher unit of the vehicle.

The flasher unit on each vehicle is designed to accommodate the total wattage of the turn signal lamps.

Must consider the function of the turn signal including the hazard warning for proper working when changing design of the turn signal lamps.

The turn signal lamps on each vehicle meet the CMVSS, and no additional lamp is needed in this regard so long as the vehicle is used as it was designed.

When you intend to add turn signal lamps, install them according to the NOTE of paragraph ELECTRICAL POWER SOURCES.

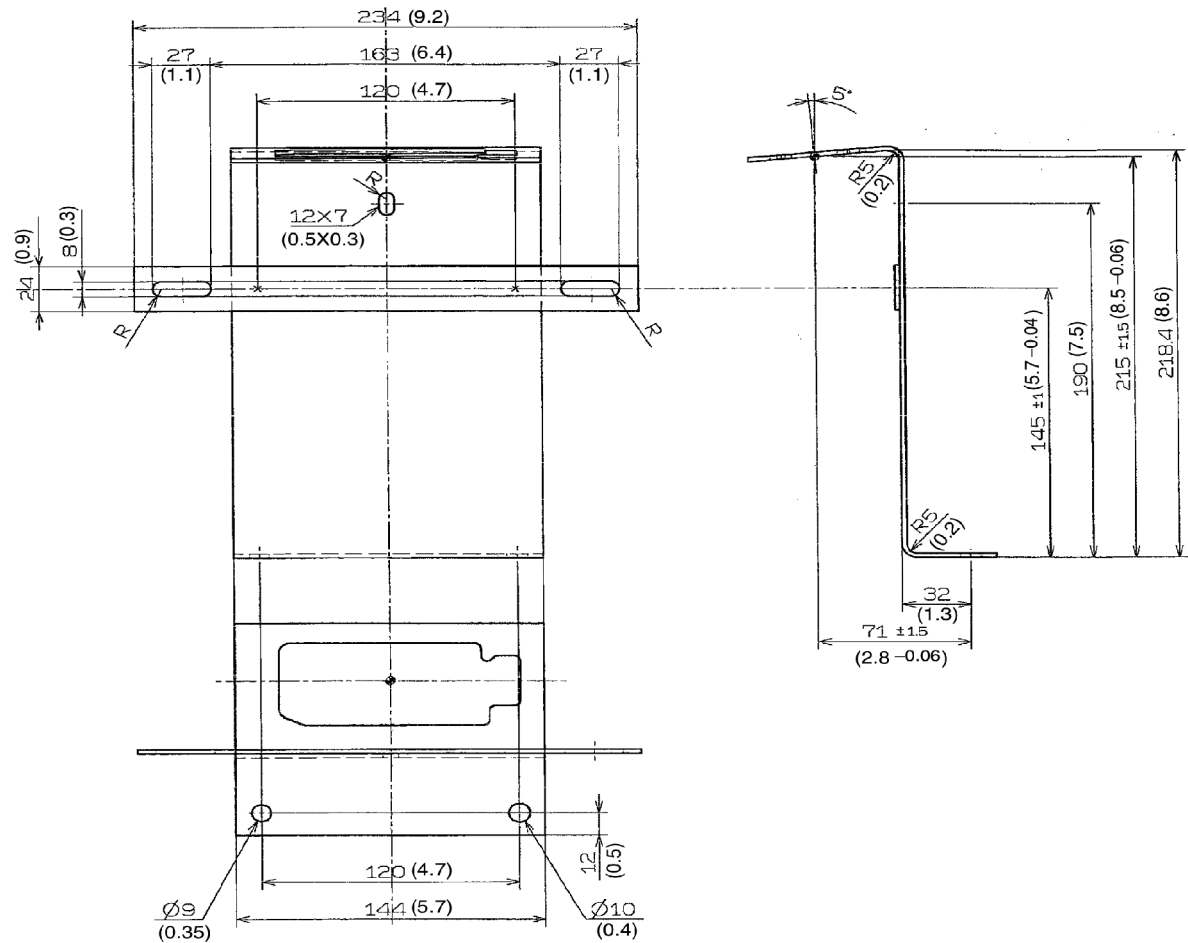
Installation of License Plate Bracket with License Plate Lamp

License plate bracket with license plate lamp is temporary installed on the end of chassis frame at factory.

It should be relocated by subsequent manufacturer to conform to CMVSS 108.

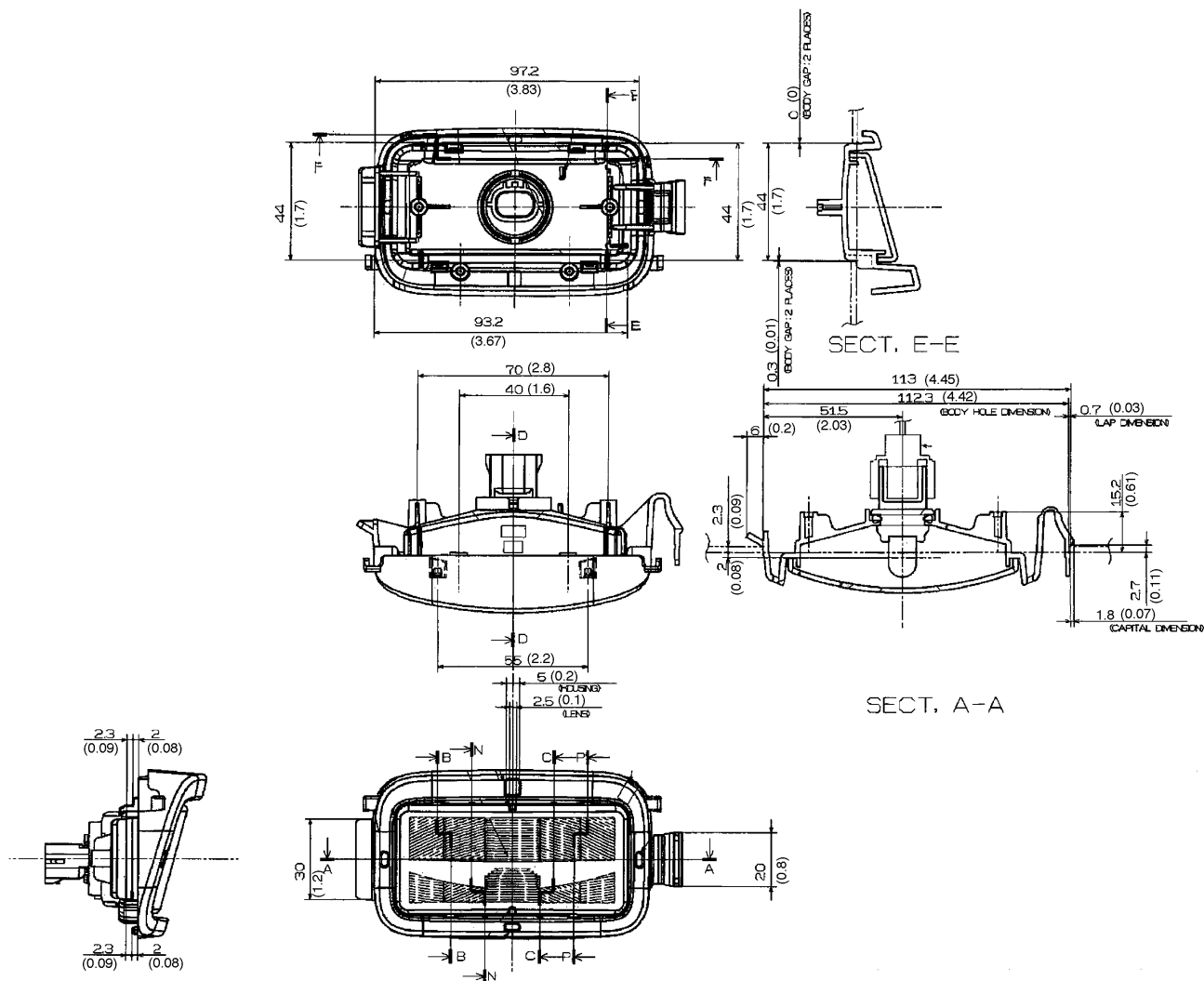
Detail of License Plate Bracket

Unit : mm (in.)



Detail of License Plate Lamp

Unit : mm (in.)



3. ADDITIONAL LAMP

The following instructions cannot be applied to install LED lamp.

When installing LED lamp for stop lamp, should follow "THE INSTRUCTION OF LED LAMP FOR STOP LAMP" in Chapter 7.

The lamps installed to the chassis has been complied with the laws or regulations.
Alteration and modification are strictly prohibited.

If you must install additional lamps, be sure to observe the following precautions.

- Installation of the additional lamps must be complied with the laws or regulations, and install the harness to be observed the precautions of wire harness described "HARNESS WIRING" in Chapter 7.
- Must be added relay in diagram of adding wiring for electric device such as lamp.

The instructions for adding tail lamp

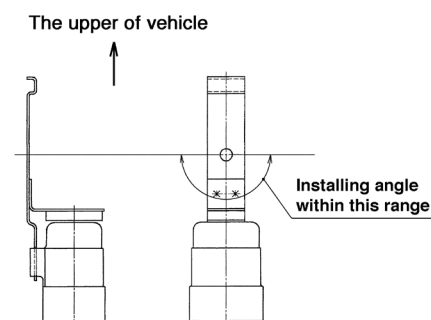
- A spare power terminal for additional lamp is provided in the tail lamp circuit.
- If need to adding wiring, use this circuit.
- The spare power terminal (Pole code : #87) is in spare power connector where back left side of crossmember No.2.
- Do not add more than one and 10 w per side of vehicle when adding tail lamp.
- Must check the functions for operating after adding lamp.

The instructions for adding stop lamp

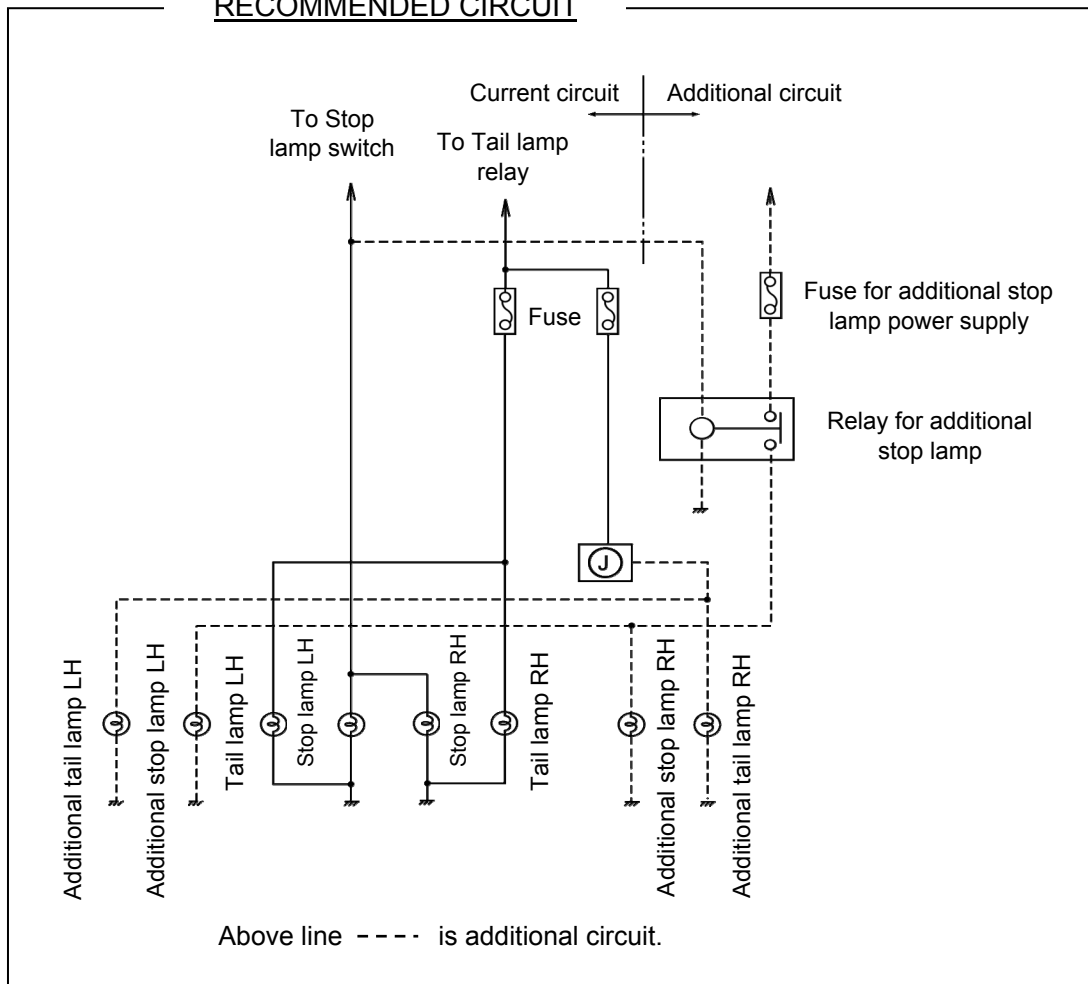
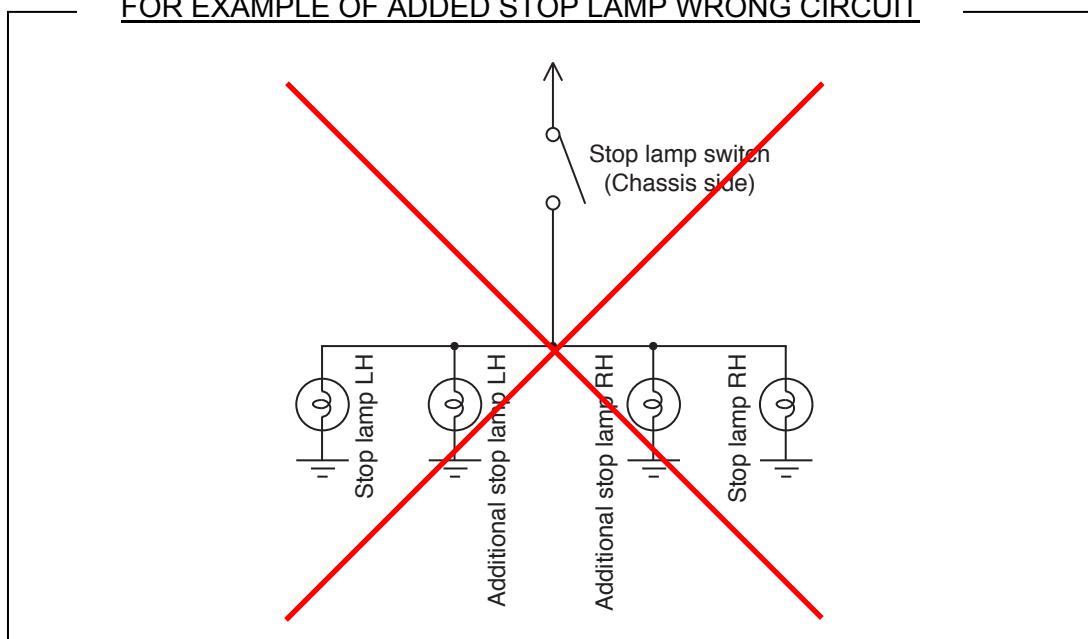
Should make circuit through a relay for protecting circuit.

- Add relay for adding stop lamp.
- Add relay at lamp side circuit. Do not add relay at engine ECU side circuit.
- Do not add more than one and 21 w per side of vehicle when adding stop lamp.
- Must check the functions for operating after adding stop lamp.
- Should install the relay the area where is not splashed water.
For example, inside of cab around instrument panel.
- See the figure below for detail of installing angle.
- Make sure that it is not vibrated during vehicle operation.
- The terminal is higher than the wire to prevent water from running along wire.

Part Name	Part No.	Coupling Connector Part No.
RELAY ASSY	88630-E0020	82560-3050A



The additional relay installing angle

RECOMMENDED CIRCUIT**FOR EXAMPLE OF ADDED STOP LAMP WRONG CIRCUIT**

4. THE INSTRUCTIONS OF LED LAMP FOR STOP LAMP

When changing the stop lamp from HINO's original lamp to LED lamp, should follow the instructions below by own responsibility of Body and Equipment manufacturers.

[CAUTION]

- It may damage the function of vehicle system such as ABS, Stop lamp and Cruise control, therefore, should follow this instructions when changing the stop lamp for LED type.
- Should determine system current as follows when installing LED lamp, otherwise it may be the cause of damage with additional relay unit.

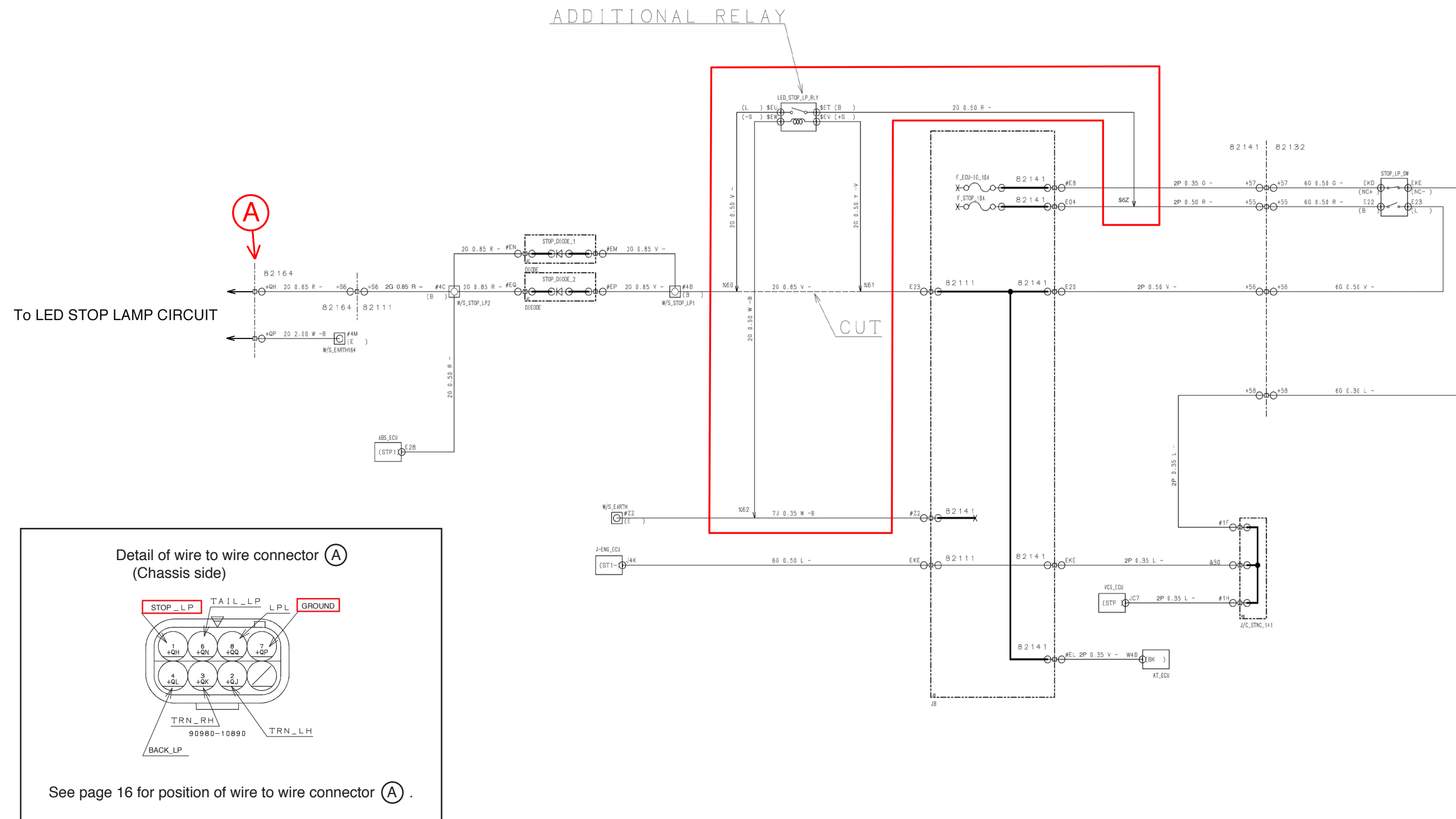
Rush current : lower than 5.9A
Constant current : lower than 1.5A

The necessary parts

Should use the following parts when changing the stop lamp for LED type.

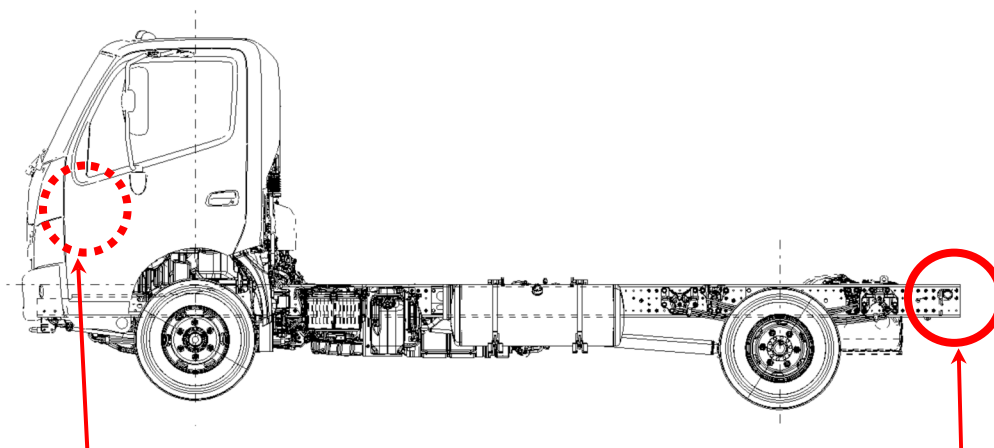
DESCRIPTION	PART NUMBER
RELAY ASSY	88630-E0130
WIRE, CONNECTING REPAIR	82989-37320

Wiring diagram of LED stop lamp



The instructions for installing

The outline of process.



- Alteration of the cab side (around Instrument panel)
 - a. Remove the lower cover of instrument panel in cab.
 - b. Disconnect the connector which is connected junction box (J/B) and remove the clamp which is fixed with instrument panel reinforce.
 - c. Joint the relay circuit.
 - d. Install the relay.
 - e. Fix the relay with vinyl tape to the main wire harness.

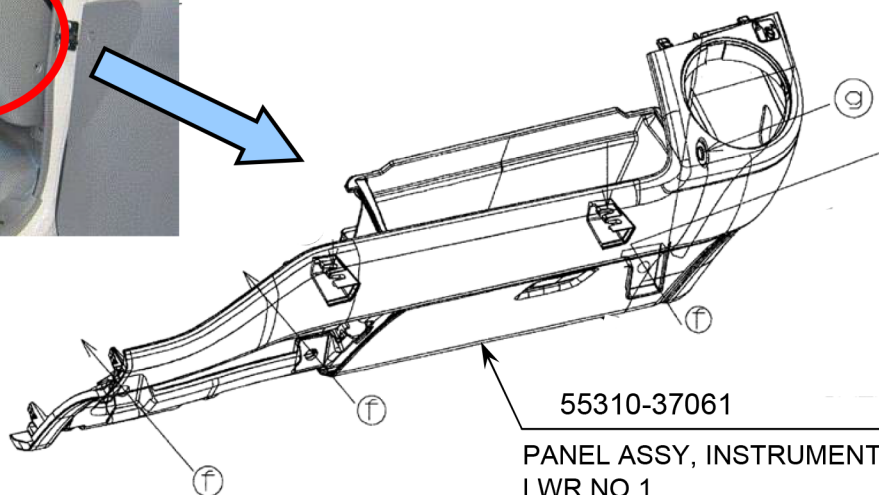
- Alteration of the chassis side (around Rear end cross)
 - a. Remove the wire, frame No.2 (82165-).
 - b. Connect a new wire harness* instead of wire frame No.2 which installed when shipping from manufacturer.

*Please contact HMC about a new wire harness.

- Refer to “HARNESS WIRING” in Chapter 7 for handling of joint and other related harness parts.

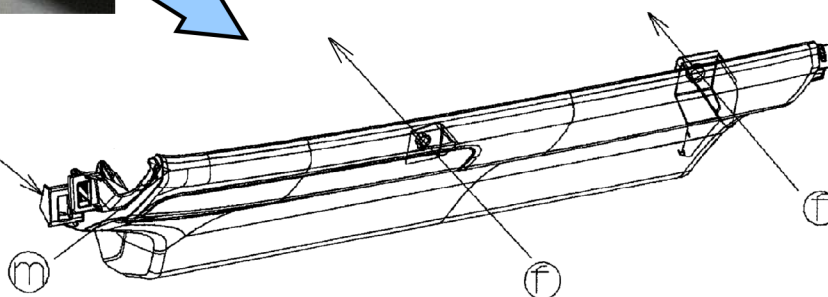
- Alteration of the cab side (around Instrument panel).

a. Remove the lower cover of instrument panel in cab.

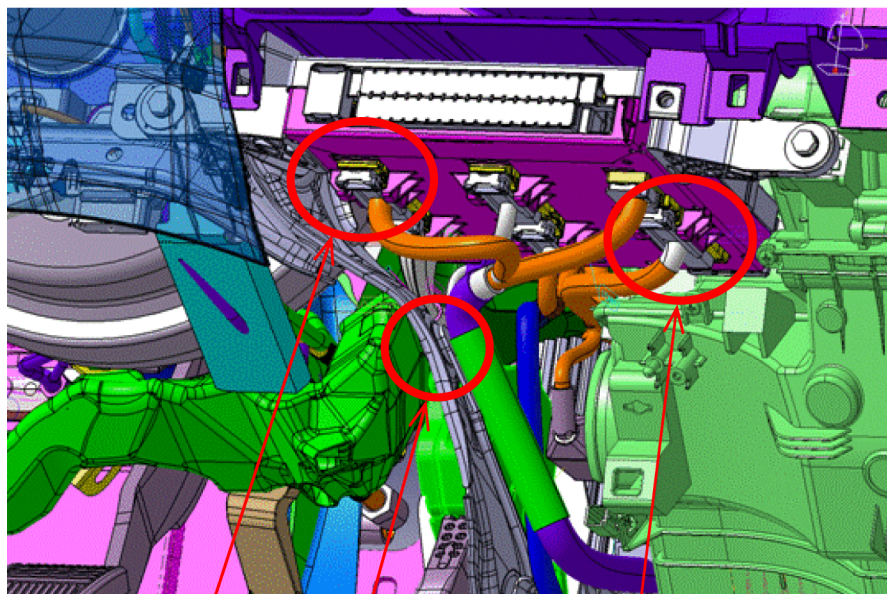


(f)	90159-60382	BOLT	
(g)	90467-07041	CLIP	
(m)	90467-07191	CLIP	

55320-37070
PANEL ASSY, INSTRUMENT,
LWR NO.2



- b. Disconnect the connector which is connected junction box (J/B) and remove the clamp which is fixed with instrument panel reinforce.

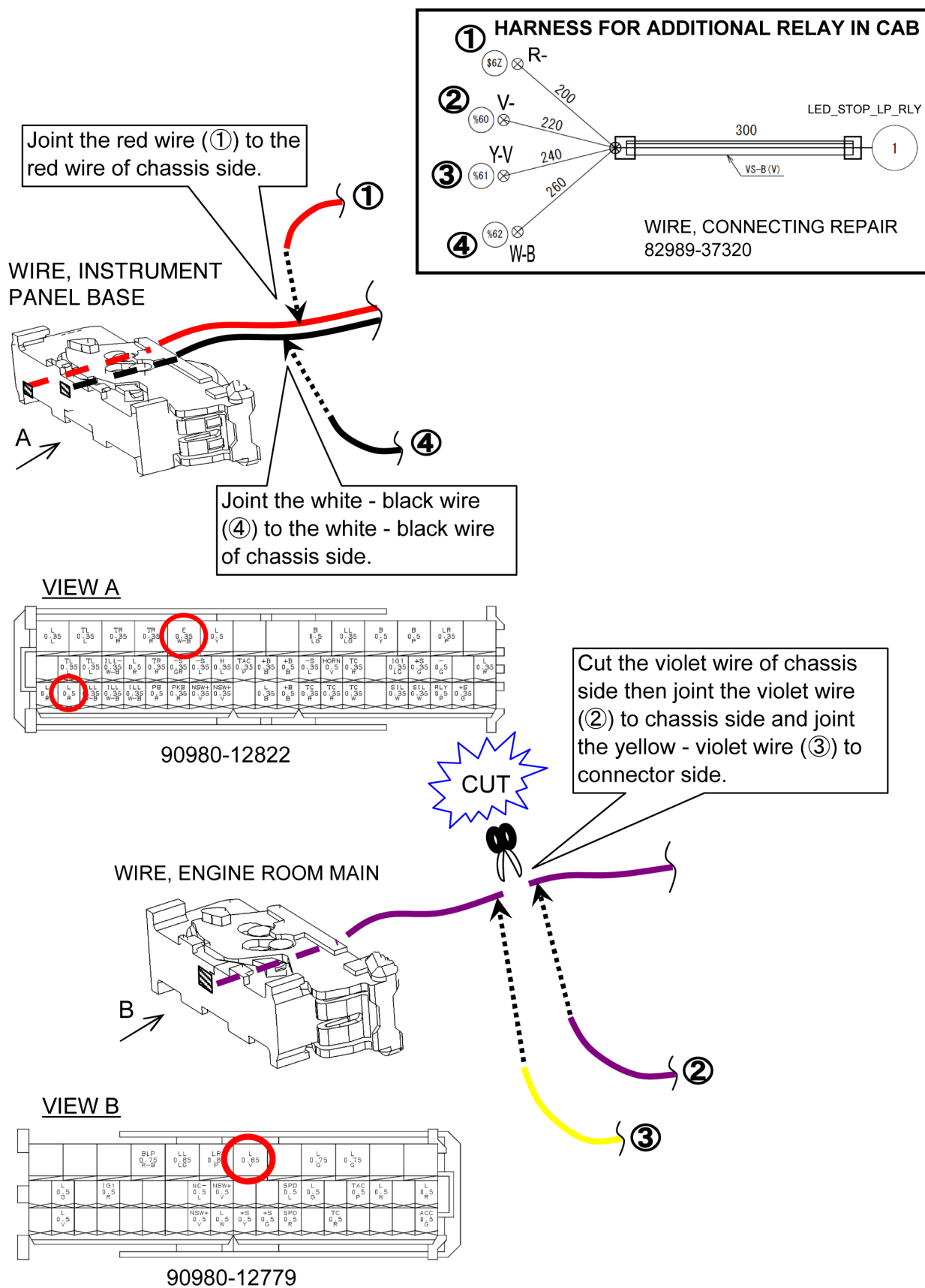


CLAMP

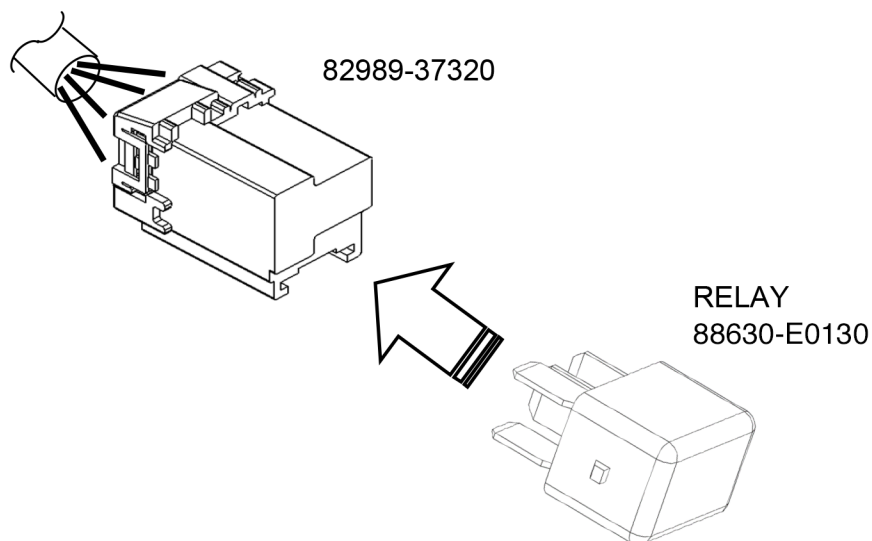
WIRE, INSTRUMENT PANEL
BASE

WIRE, ENGINE ROOM MAIN

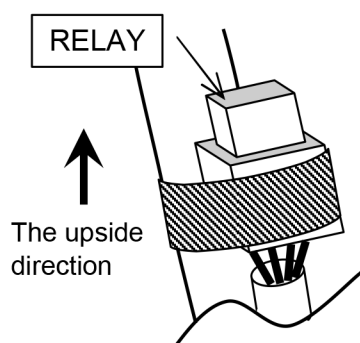
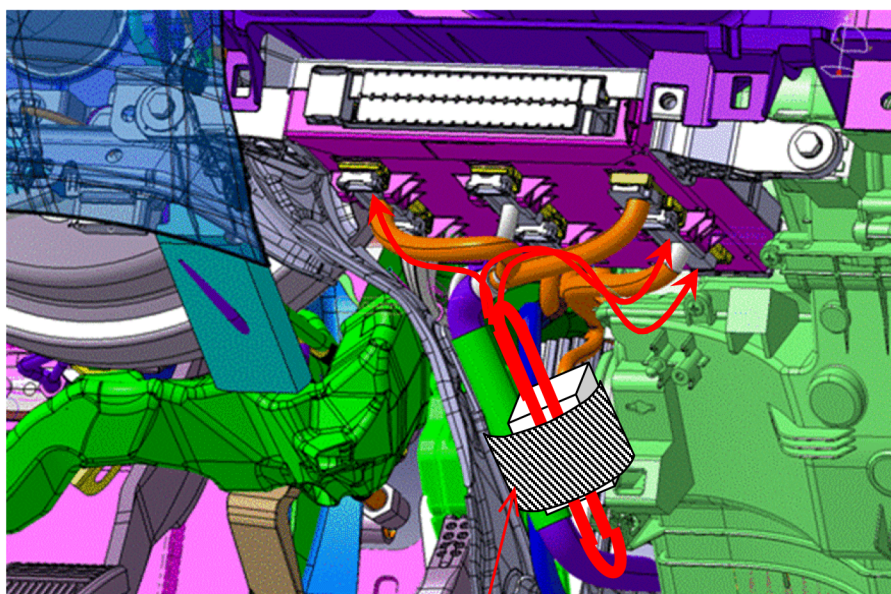
c. Joint the wire harness for additional relay.



d. Install the relay.



e. Fix the relay with vinyl tape to the main wire harness.



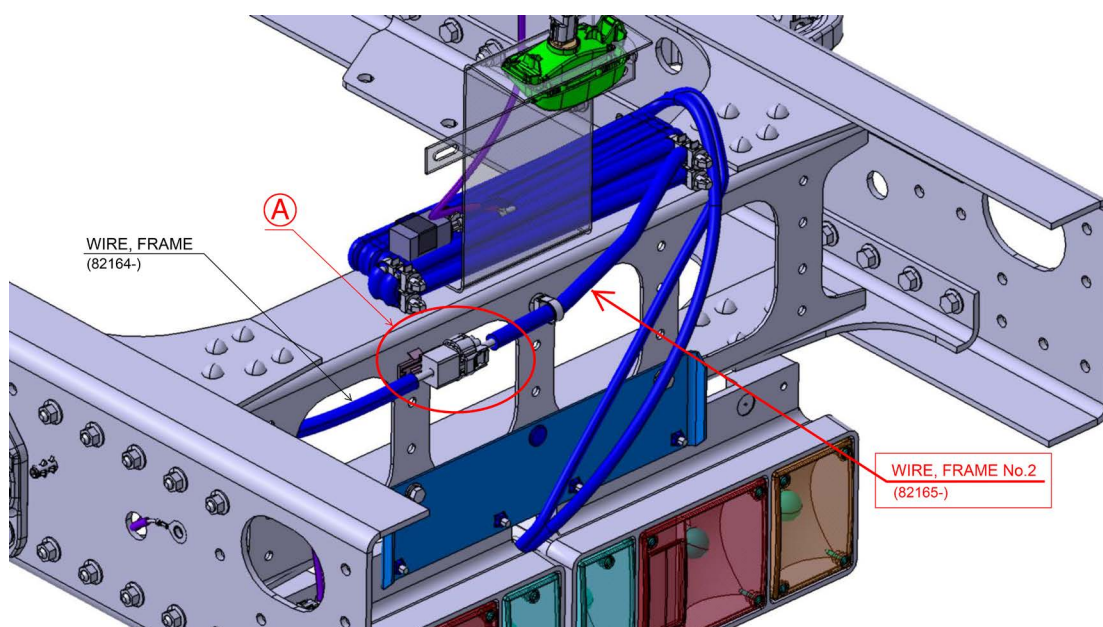
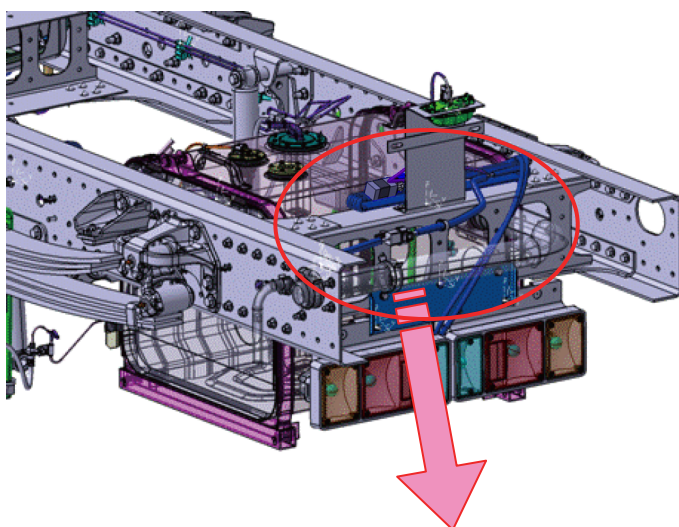
Fix the relay and the additional wire with vinyl tape to the main wire harness.

*The fixing direction of relay is on upside direction of vehicle.

- Alteration of the chassis side (around Rear end cross).

- Remove the wire, frame No.2 (82165-)
(Disconnect wire to wire (A))
- Connect a new wire harness* instead of wire frame No.2 which installed when shipping from manufacturer.

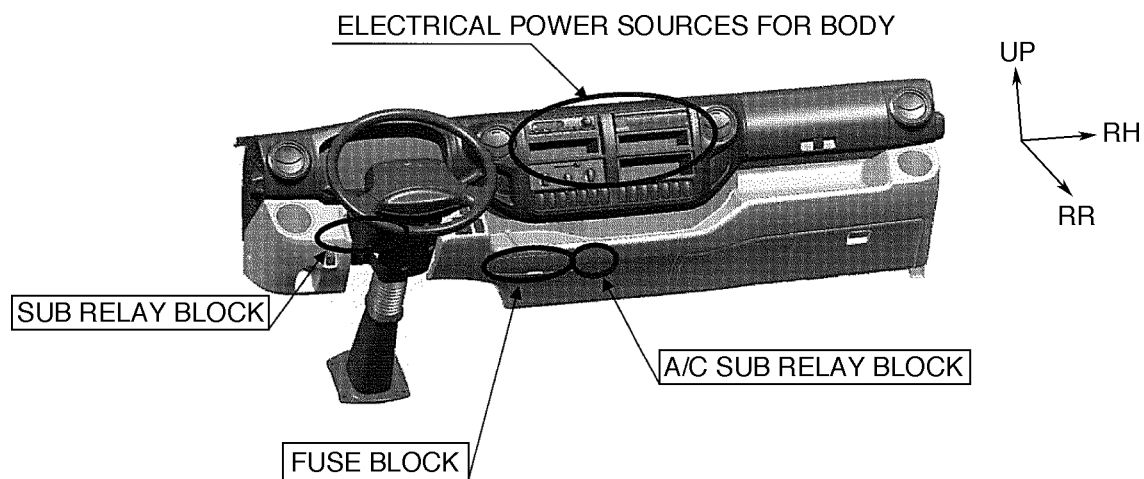
*Please contact HMC about a new wire harness.



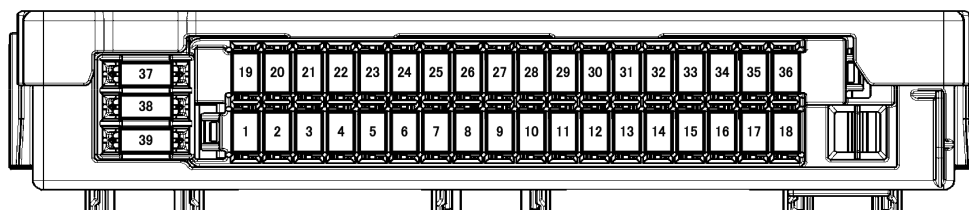
5. FUSE BLOCK, RELAY PANEL AND FUSIBLE LINK BLOCK

Location of the Cab Side

The fuse block and the relay block are located inside the instrument panel as shown below.



DETAIL OF FUSE BLOCK



FUSE LAYOUT

NO.	DESCRIPTION	CAPACITY
1	SPARE	30A
2	ACC	10A
3	-	
4	H-LP LH HI	10A
5	H-LP RH HI	10A
6	ECU-IG NO.1	10A
7	GAUGE	10A
8	POWER WINDOW	30A
9	VCS-B	10A
10	HEATER RR	10A
11	ECU-B	10A
12	STOP LAMP	10A
13	-	
14	AM1	10A
15	AM2	10A
16	AIR BAG	20A
17	ECU-IG NO.2	10A
18	P/W RR	30A
19	SPARE	25A
20	CIG	15A

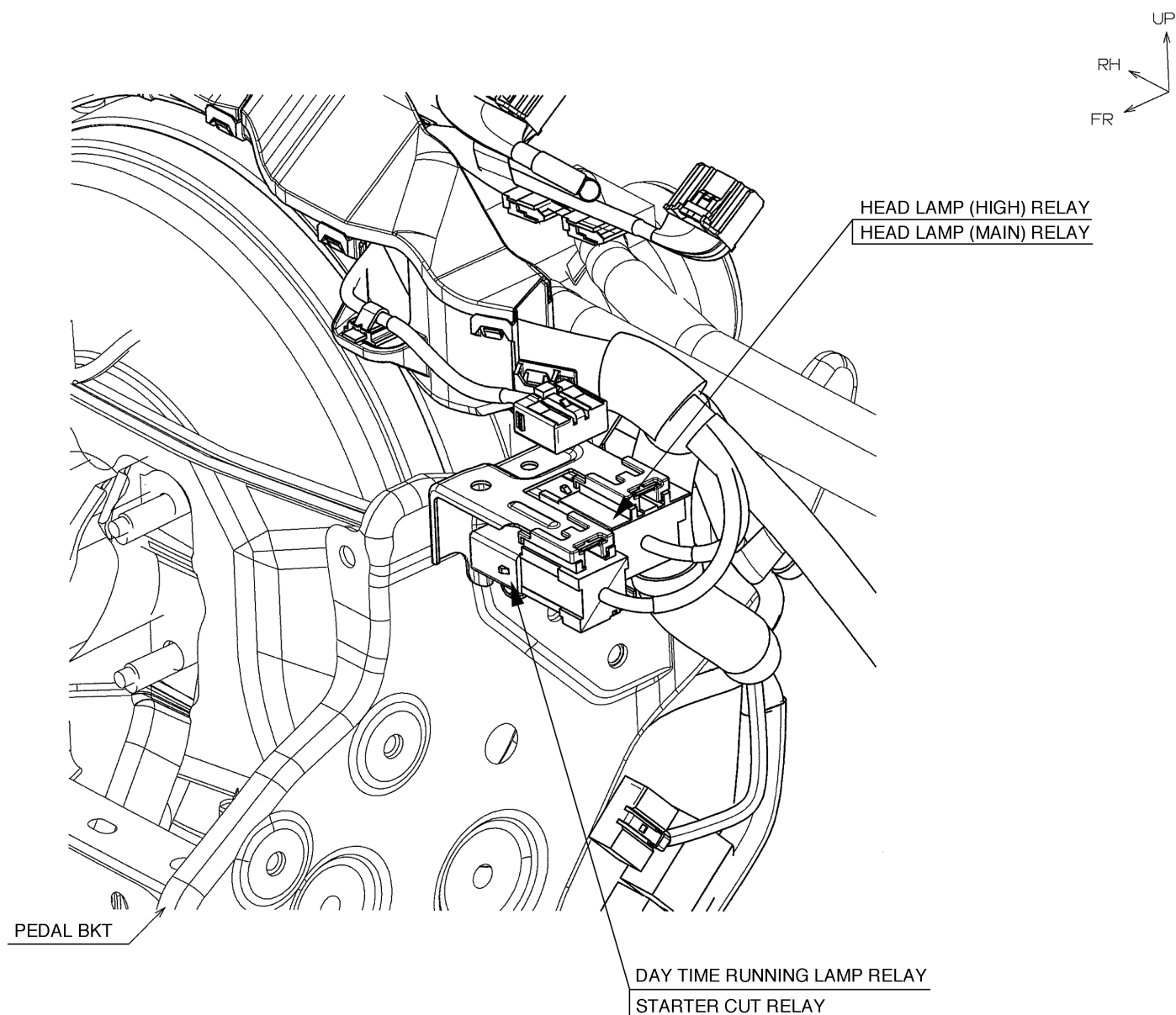
NO.	DESCRIPTION	CAPACITY
21	-	
22	H-LP LH LO	10A
23	H-LP RH LO	10A
24	DRL	10A
25	TAIL LAMP	10A
26	DRL No.2	20A
27	IG1	10A
28	A/C	10A
29	M/HEAT	20A
30	DOOR LOCK	25A
31	HAZ	20A
32	HORN	15A
33	RADIO	10A
34	DOMELAMP	10A
35	WASHER	10A
36	WIPER	30A
37	SPARE FUSE	10A
38		15A
39		20A

[NOTE]

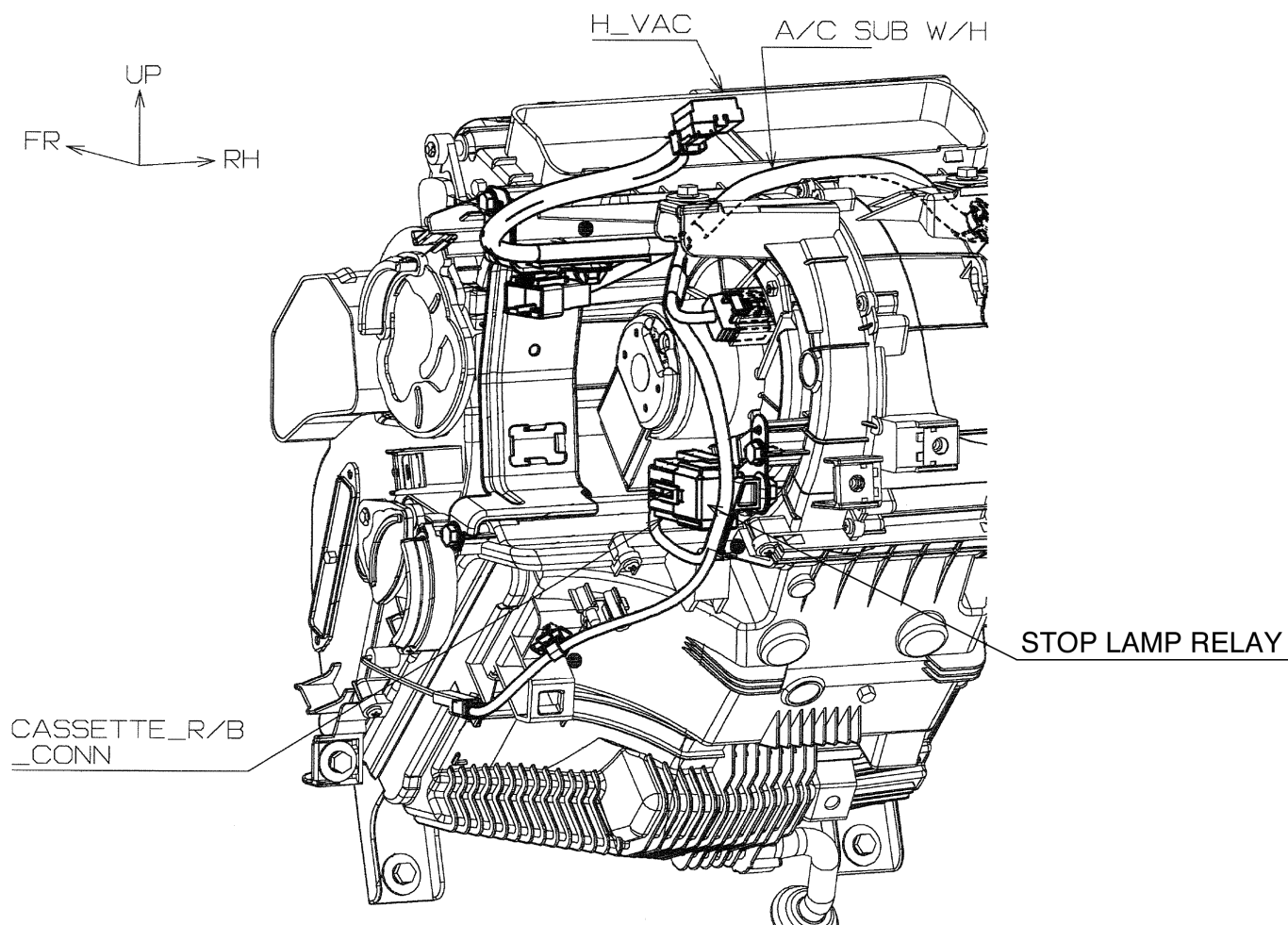
Be sure to use each capacity fuse designated in the above table.

Never use the capacity fuse exceeding the designated one in the above, otherwise over current may damage the harness wires and fusible linkage wires.

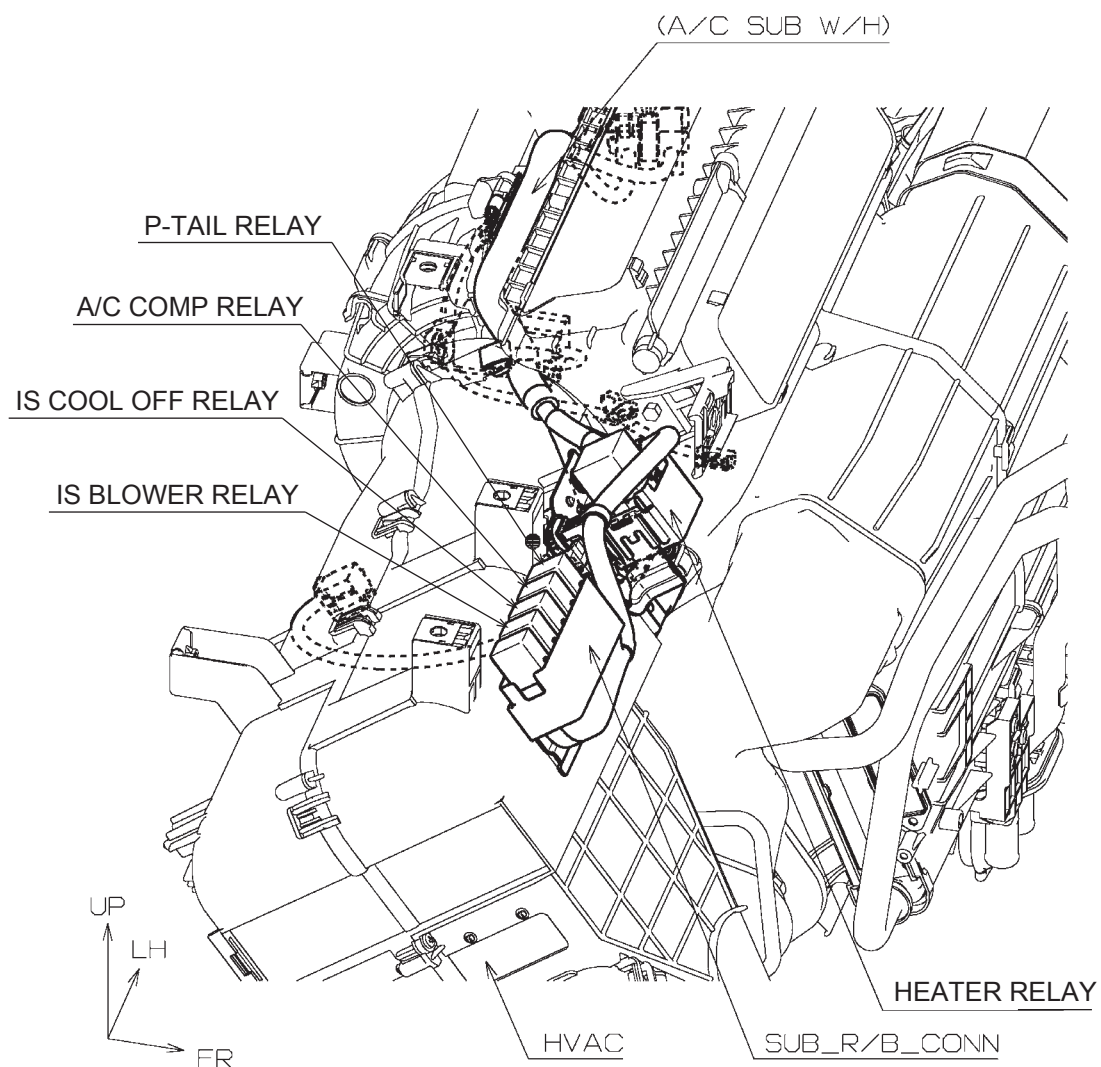
LAYOUT OF SUB RELAY BLOCK



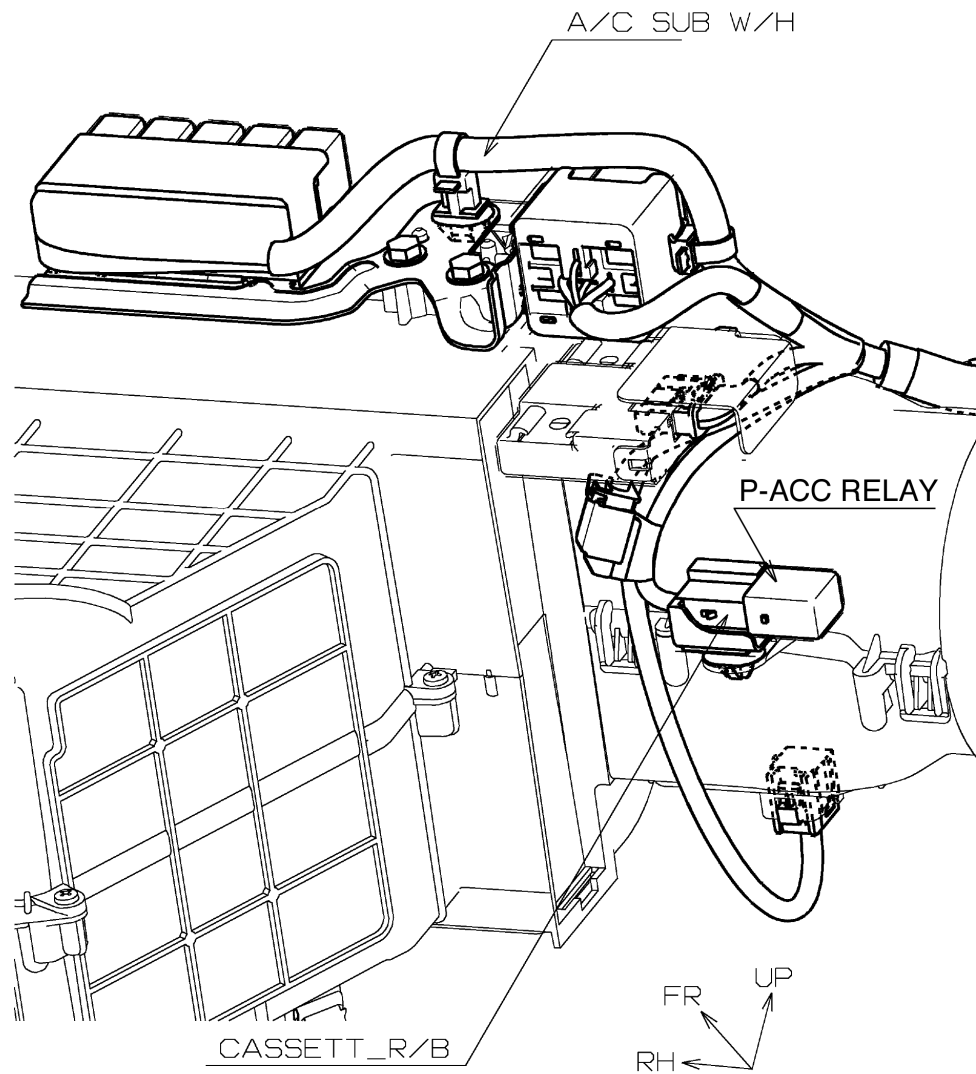
LAYOUT OF A/C SUB RELAY BLOCK 1



LAYOUT OF A/C SUB RELAY BLOCK 2

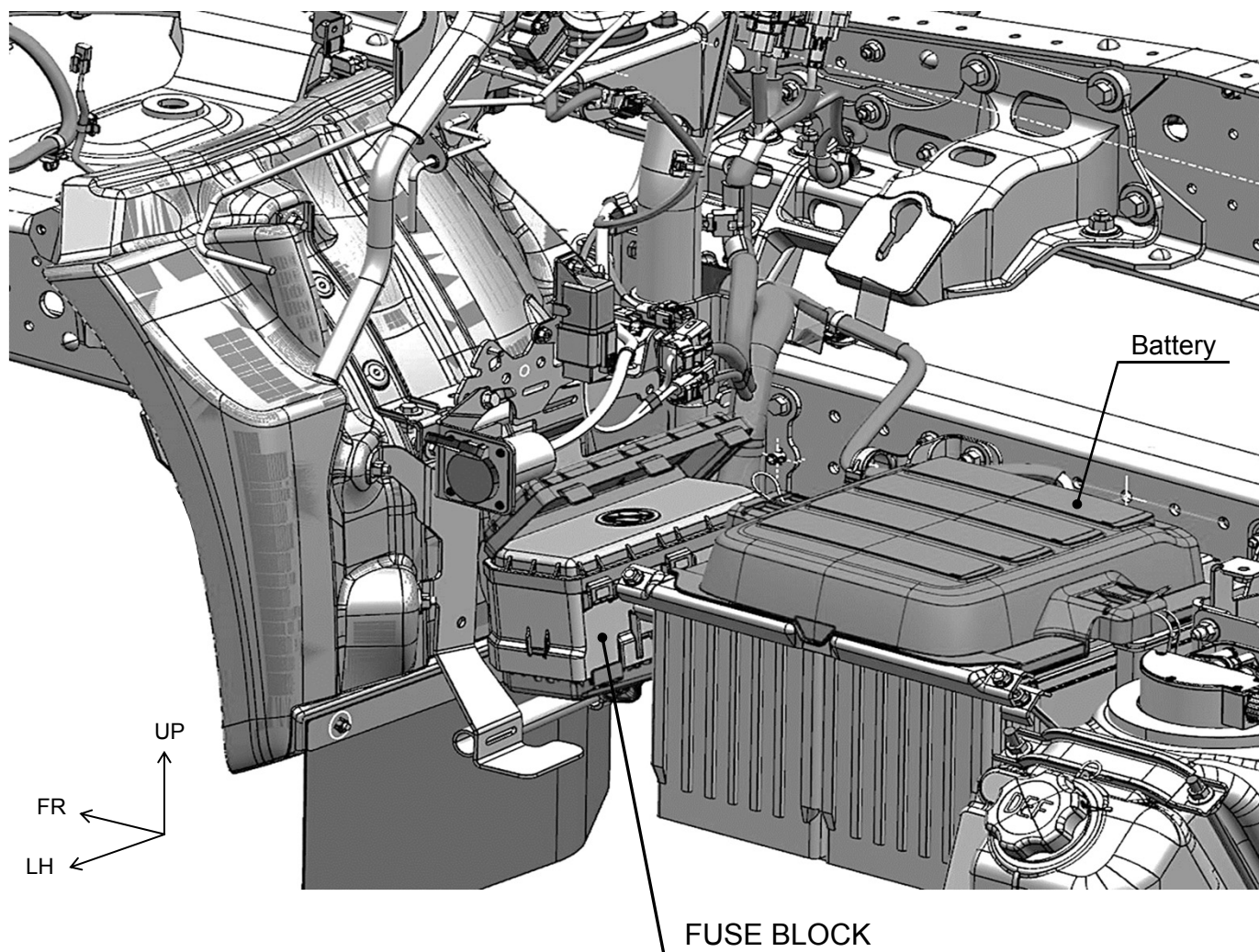


LAYOUT OF A/C SUB RELAY BLOCK 3

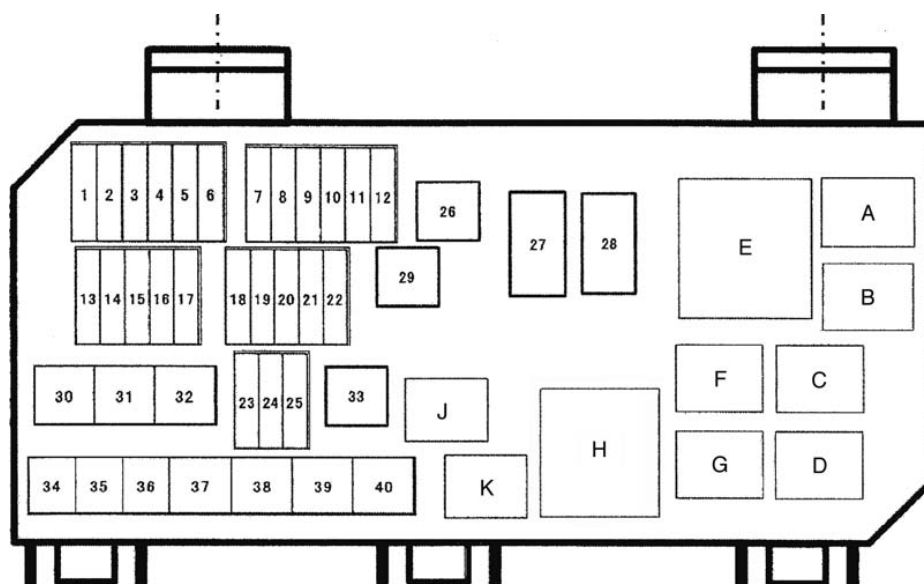


Location of the Chassis Side

The relay and fuse are located on left side of the cab back parts as shown below.



DETAIL OF RELAY AND FUSE



FUSE

No.	DESCRIPTION	CAPACITY	NOTE	No.	DESCRIPTION	CAPACITY	NOTE
1	DEF HTR	20A		26	GLOW	60A	
2	ENG NO.3	15A		27	ALT1	120A	
3	FUEL HTR	30A		28	ALT2	120A	
4	PM SSR	10A		29	E-VCM	30A	
5	PCV B2	20A		30	PWR1	50A	
6	ECU-B NO.2	10A		31	PWR3	50A	
7	P-ACC	10A		32	ST	50A	
8	A/C COMP	10A		33	CLT-E-OP	30A	HV
9	P-TAIL	10A		34	ABS SOL	50A	
10	E-FAN	20A		35	HTR	30A	
11	VAN LIGHT	15A		36	ABS MTR	50A	
12	P-BATT	15A		37	PWR2	50A	
13	HV	10A		38	PWR4	50A	
14	A/C S/W	10A		39	RR COOLER	20A	
15	P-IGN	15A		40	HEAD	30A	
16	TOWING STOP	15A					
17	NOX SSR	10A					
18	ENG NO.1	30A					
19	DCU NO.1	30A					
20	TOWING LAMP	30A					
21	PCU B1	20A					
22	FR FOG	15A					
23	TOWING CONT	30A					
24	CLUTCH ECU	15A					
25	ENG NO.2	30A					

RELAY

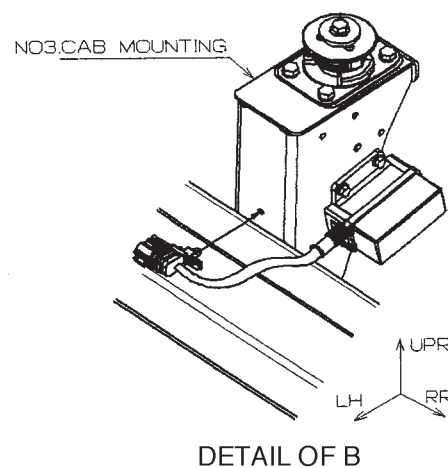
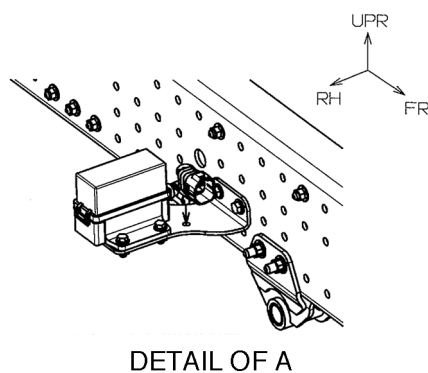
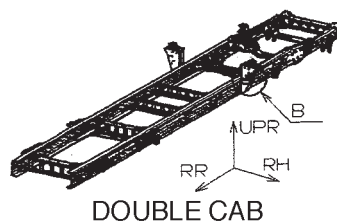
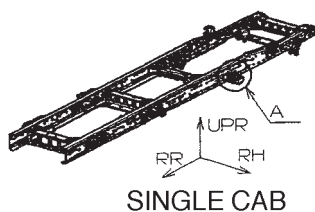
	DESCRIPTION		DESCRIPTION
A	EDU RELAY	G	IG1-5 RELAY
B	E-FAN RELAY	H	STARTER RELAY
C	FUEL HTR RELAY	J	DEF HTR RELAY
D	IG1-4 RELAY	K	NOx SSR RELAY
E	-		
F	ENG ACT PWR RELAY		

SUB RELAY BLOCK

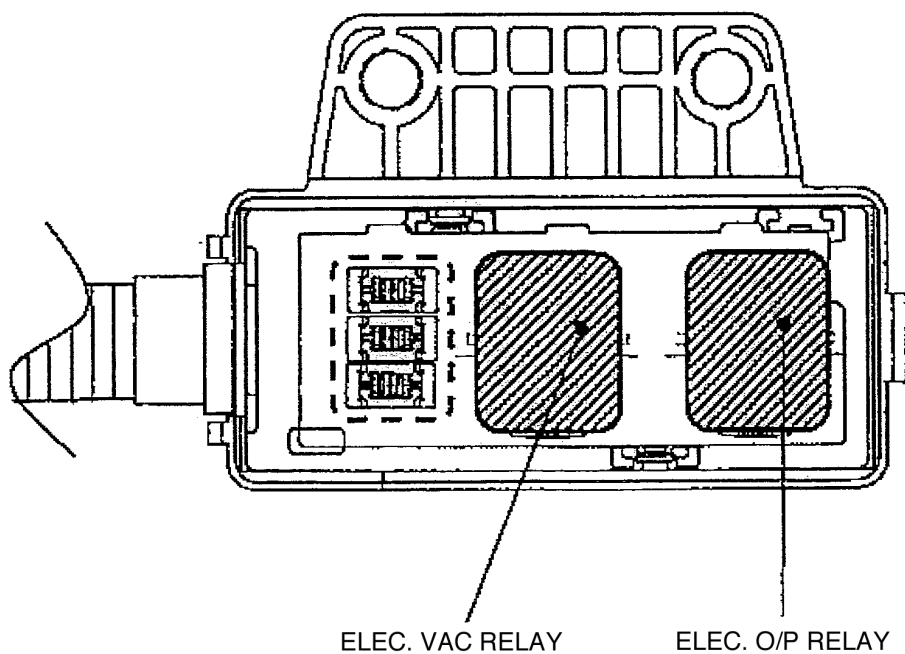
MODEL : XJC700L, 710L, 720L, 730L and 740L (GVWR : 19,500 lb.)

XFC710L, 720L, 730L and 740L

Location



Detail of SUB RELAY BLOCK



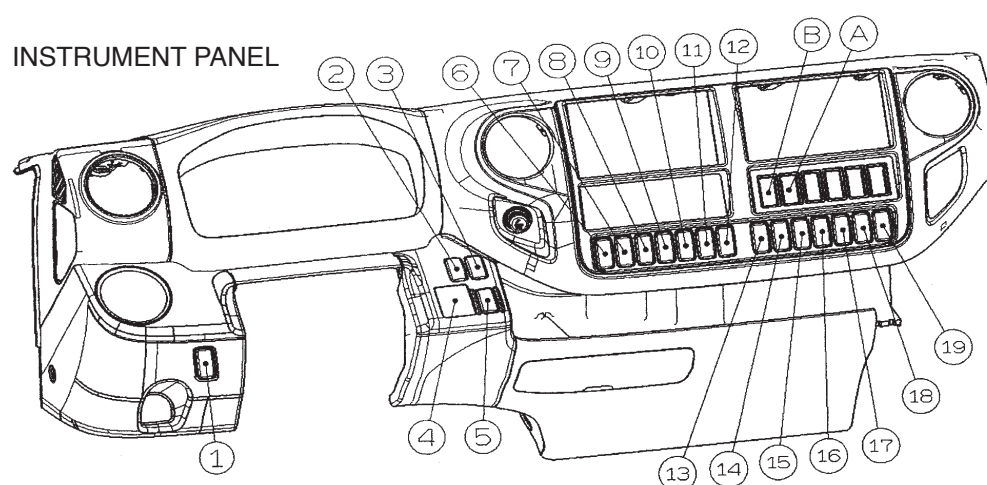
6. INSTALLATION OF ADDITIONAL SWITCHES

Installing space of additional equipment

- Have been provided the installing space (H:150mm (5.9in.) x W:180mm (7.1in.)) at the center cluster which can be installed three kind of additional equipment as a wireless radio, electrical equipment and etc.

Layout of switches

- Standard layout of switches include option equipment are as following figure.
- If you intend to install additional switches at instrument panel for the convenience of body mounting, be sure to install it at available space after confirmation of original condition on the actual vehicle.
- If you install additional switches, install labels indicating the purpose of each switches to prevent wrong operation or confirmation.



No.	DESCRIPTION
1	RHEOSTAT SWITCH
2	HEATER MIRROR SWITCH
3	
4	REMOTE CONTROL MIRROR SWITCH
5	
6	HAZARD SWITCH
7	
8	
9	
10	ECO MODE SWITCH
11	DPR SWITCH
12	
13	LDW OFF SWITCH
14	
15	HINO STOP & START CANCEL SWITCH
16	
17	
18	
19	
A	REAR POWER WINDOW (RH)
B	REAR POWER WINDOW (LH)

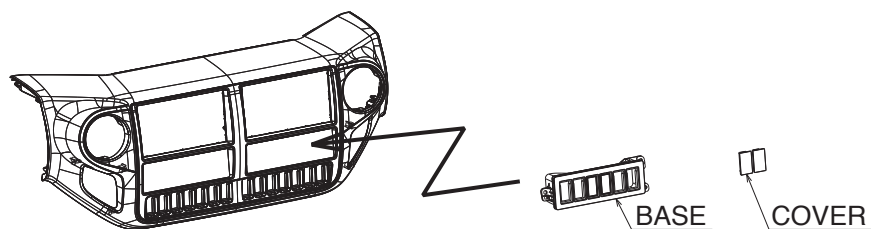
Additional Switch

If you need additional switches which install on the instrument panel, please purchase the following switches and connector (with extension) for the switches, then use them.

Part No.	Description	Rated load
84270-37350	GENERAL USE	24V 1A, 12V 1A
84270-37360		
84690-37060	PTO	
84270-37430	VAN LIGHT	

*Should order switch hole base and switch hole cover for installing additional switch (Part No. 84270-37350) with single cab.

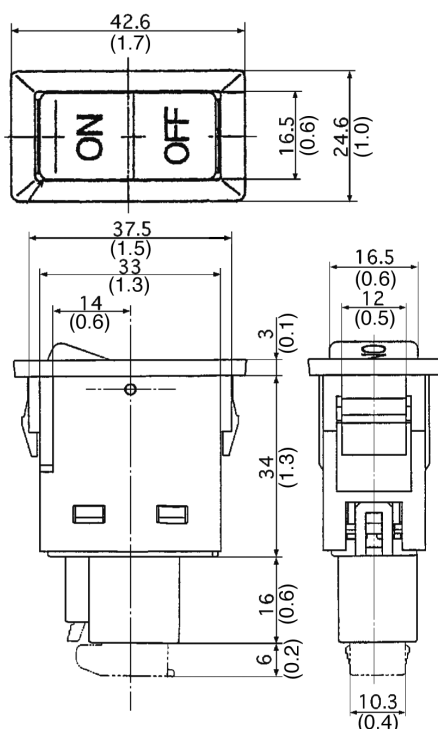
Part No.	QTY per vehicle	Description
55446-37010	1	BASE, SWITCH HOLE
55539-32010	5	COVER, SPARE SWITCH HOLE



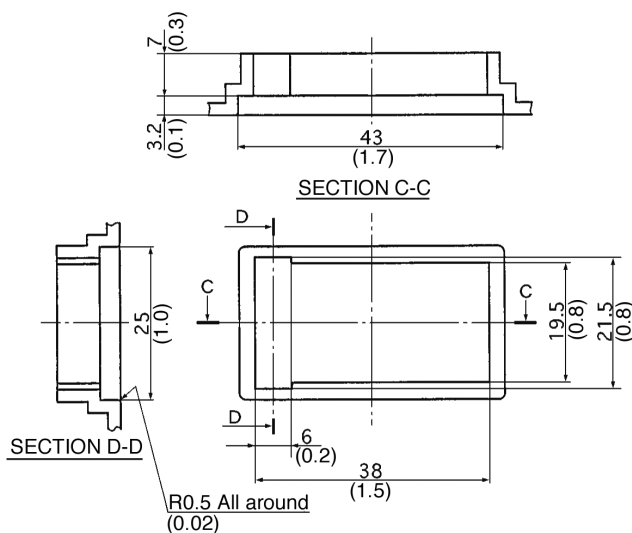
Part No. 84270-37350

Unit : mm (in.)

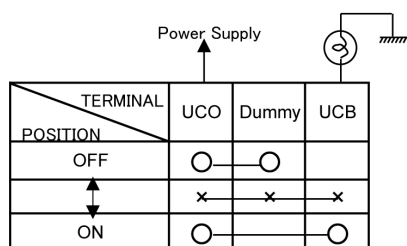
Detail of switch



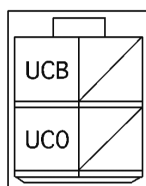
Detail of installation hole



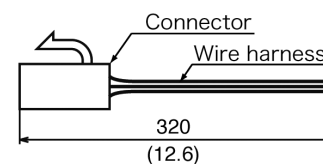
Switch diagram



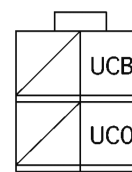
The terminal for switch side



Matching connector side
(with extension harness)
Supply part No.82989-37280



The terminal for matching connector side

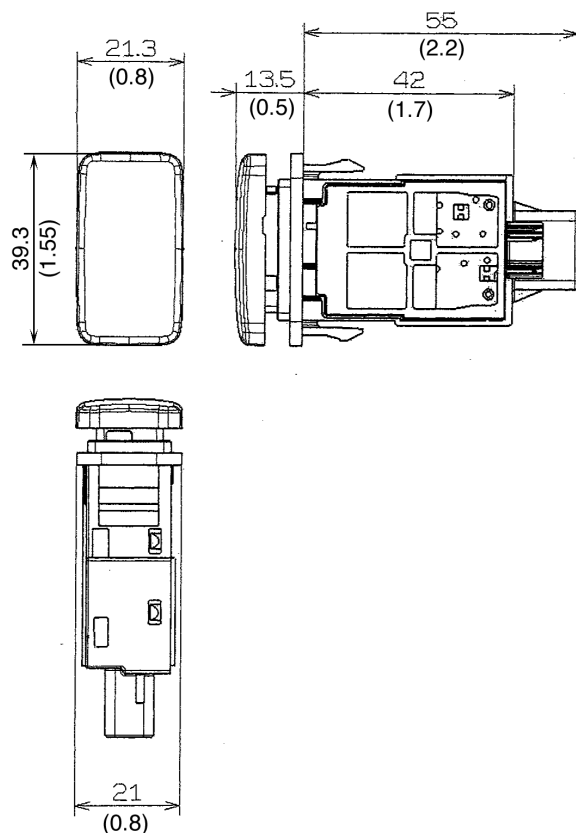


Note : Should use the relay if rated load is more than 1A.

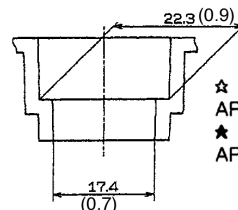
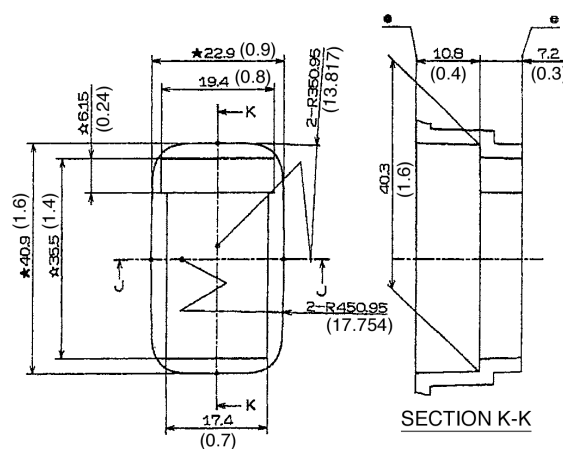
Part No. 84270-37360

Unit : mm (in.)

Detail of switch



Detail of installation hole

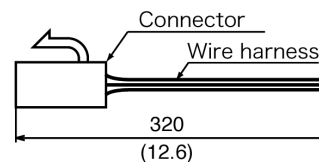


☆ MARKED DIMENSIONS SHOULD BE APPLIED ON ● MARKED SURFACE.
★ MARKED DIMENSIONS SHOULD BE APPLIED ON ● MARKED SURFACE.

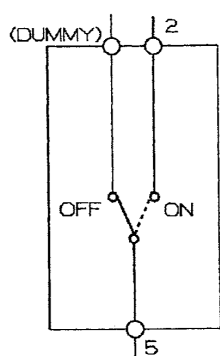
SECTION J-J

Matching connector side
(with extension harness)

Supply part No.82989-37260

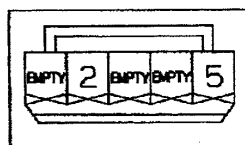


Switch diagram

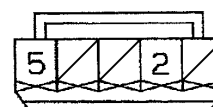


The terminal for switch side

2 : ON
5 : GND



The terminal for matching connector side

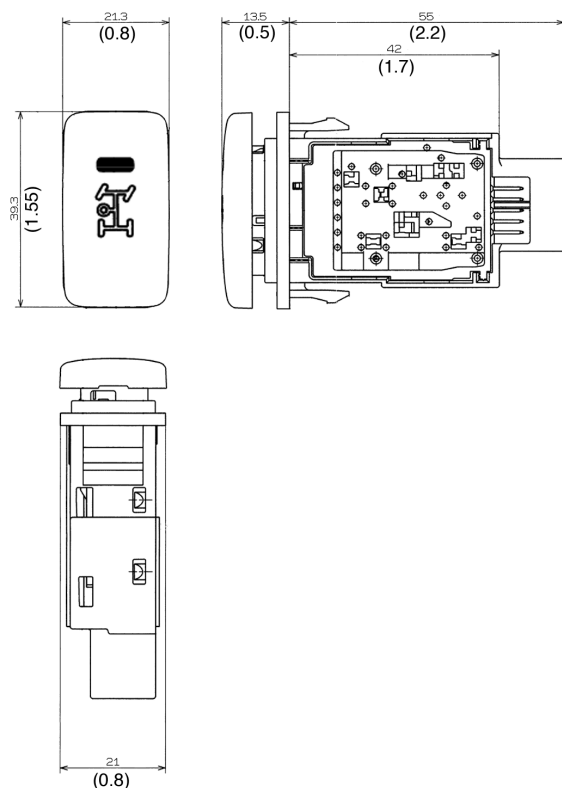


Note : Should use the relay if rated load is more than 1A.

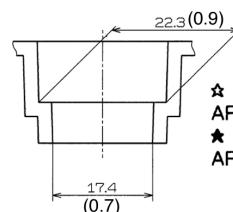
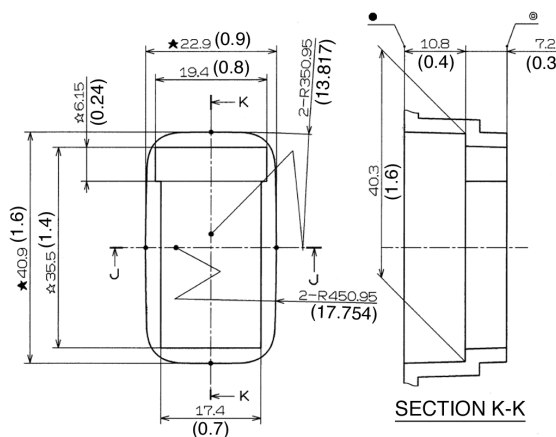
Part No. 84690-37060

Unit : mm (in.)

Detail of switch



Detail of installation hole

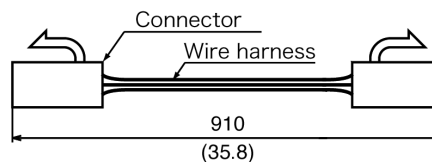


★ MARKED DIMENSIONS SHOULD BE APPLIED ON ● MARKED SURFACE.
★ MARKED DIMENSIONS SHOULD BE APPLIED ON ● MARKED SURFACE.

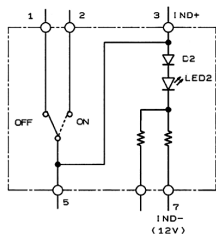
SECTION J-J

Matching connector side
(with extension harness)

Supply part No.82989-37510

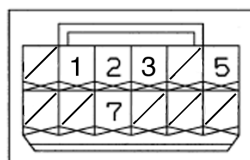


Switch diagram

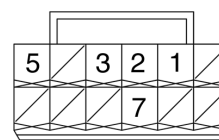


The terminal for switch side

- 1 : OFF
- 2 : ON
- 3 : IND+
- 5 : GND
- 7 : IND-



The terminal for matching connector side

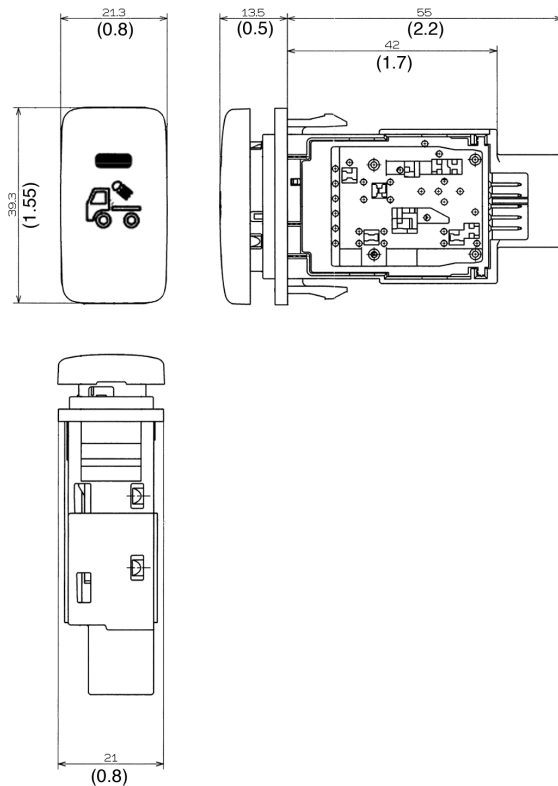


Note : Should use the relay if rated load is more than 1A.

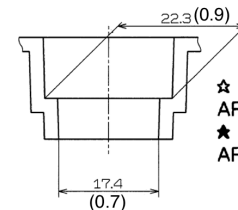
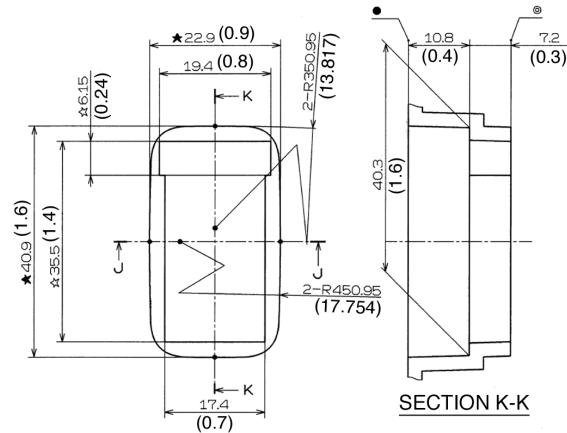
Part No. 84270-37430

Unit : mm (in.)

Detail of switch



Detail of installation hole



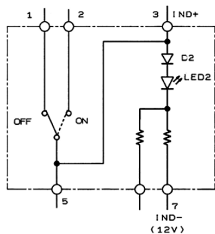
☆ MARKED DIMENSIONS SHOULD BE APPLIED ON ● MARKED SURFACE.
★ MARKED DIMENSIONS SHOULD BE APPLIED ON ● MARKED SURFACE.

SECTION J-J

Matching connector side

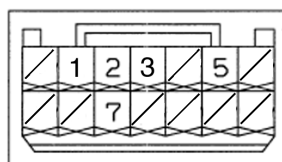
Supply part No.90980-12290

Switch diagram

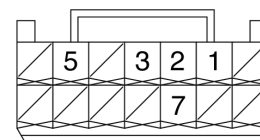


The terminal for switch side

- 1 : OFF
- 2 : ON
- 3 : IND+
- 5 : GND
- 7 : IND-



The terminal for matching connector side



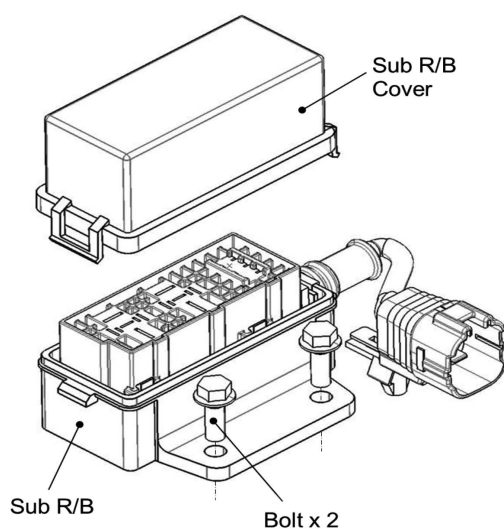
Note : Should use the relay if rated load is more than 1A.

7. THE INSTRUCTIONS FOR TRAILER BRAKE CIRCUIT

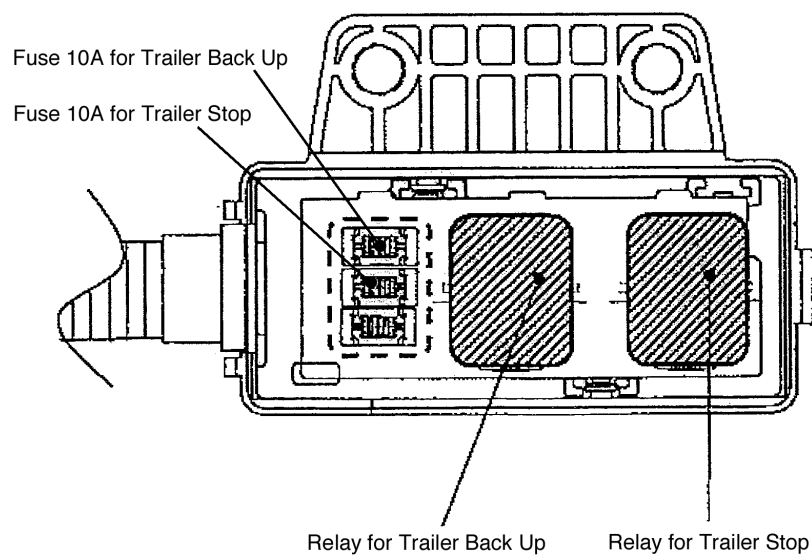
Be sure to observe the following instructions when setting the trailer brake circuit.

- Please purchase the following parts to complete the trailer brake circuit.

Part No.	QTY per vehicle	Description
82241-37120	1	Sub Relay Block
82622-37070	1	Relay Block Upper Cover
91551-80820	2	Bolt
90987-02025	2	Relay for Back up and Stop

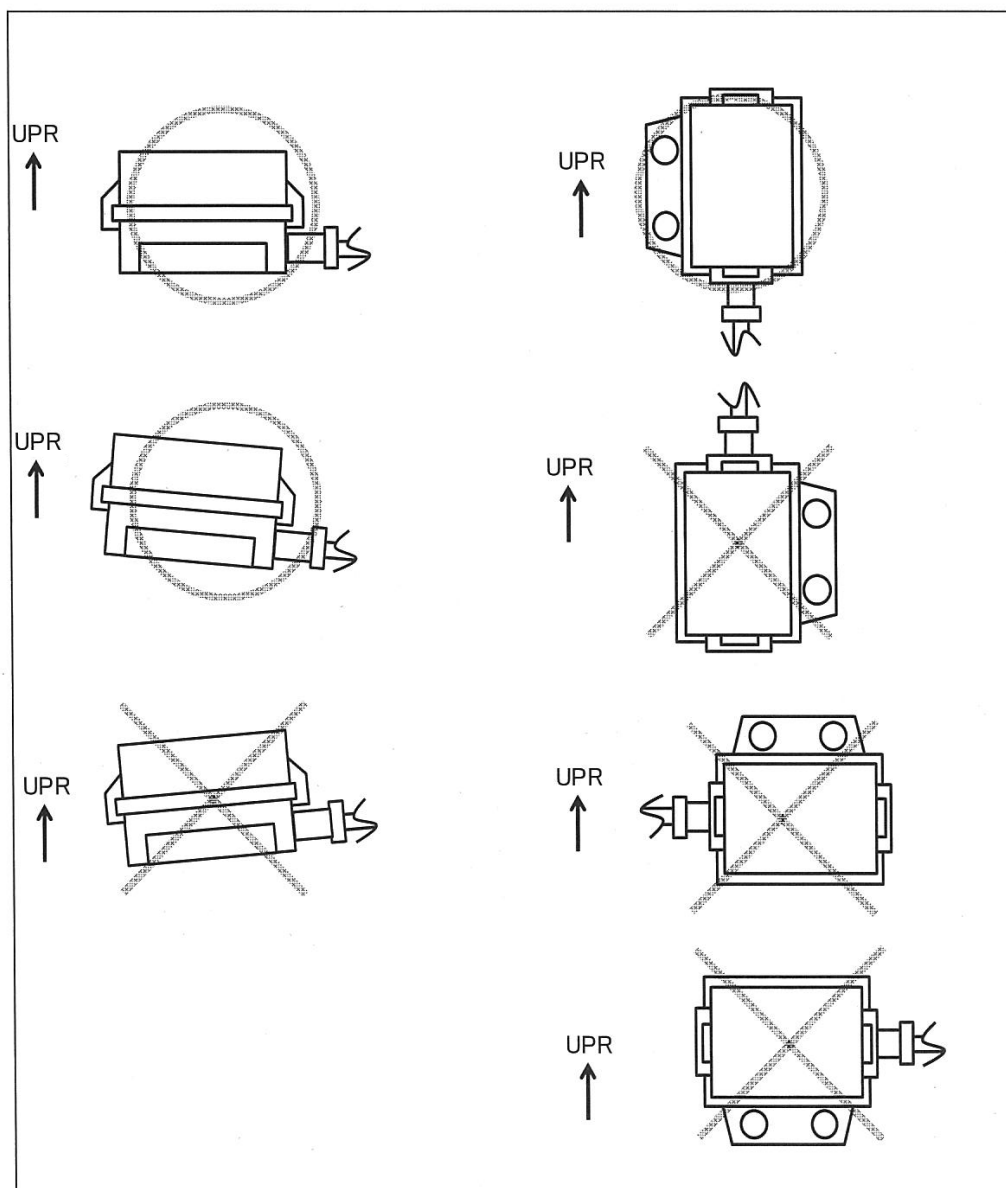


Detail of Sub Relay Block



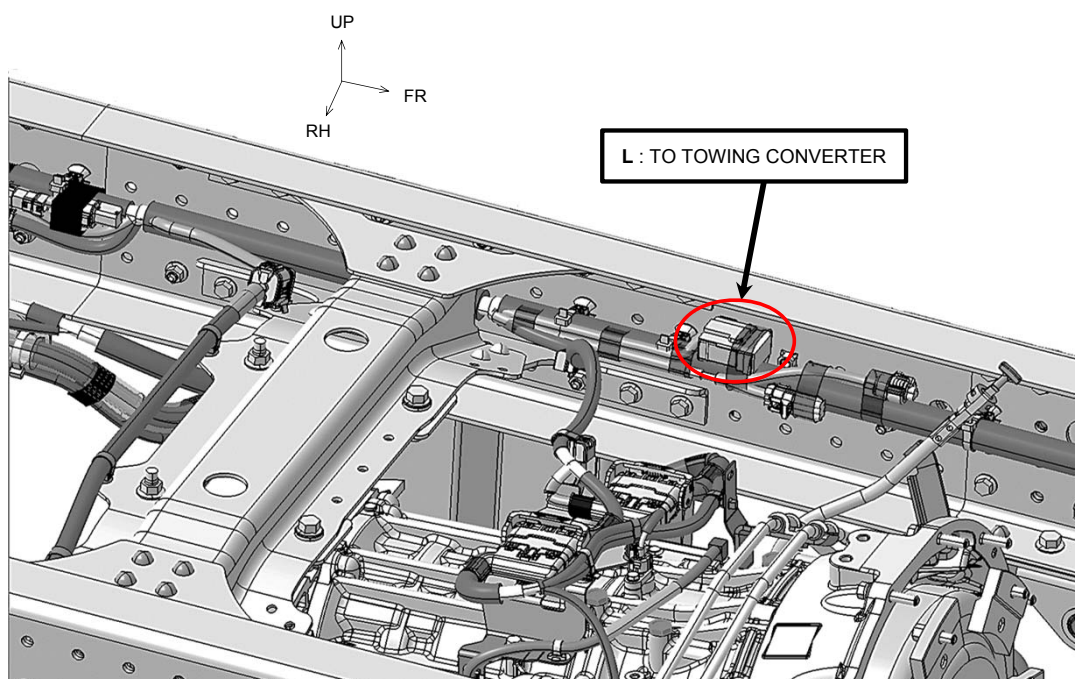
Precaution for Installing Sub Relay Block

Should install Sub R/B in the place where water dose not splash.
Do not install Sub R/B in the high temperature place such as around the muffler.
Installing position of Sub R/B as follows.
Body and Equipment manufacturers should install it by their own responsibility.



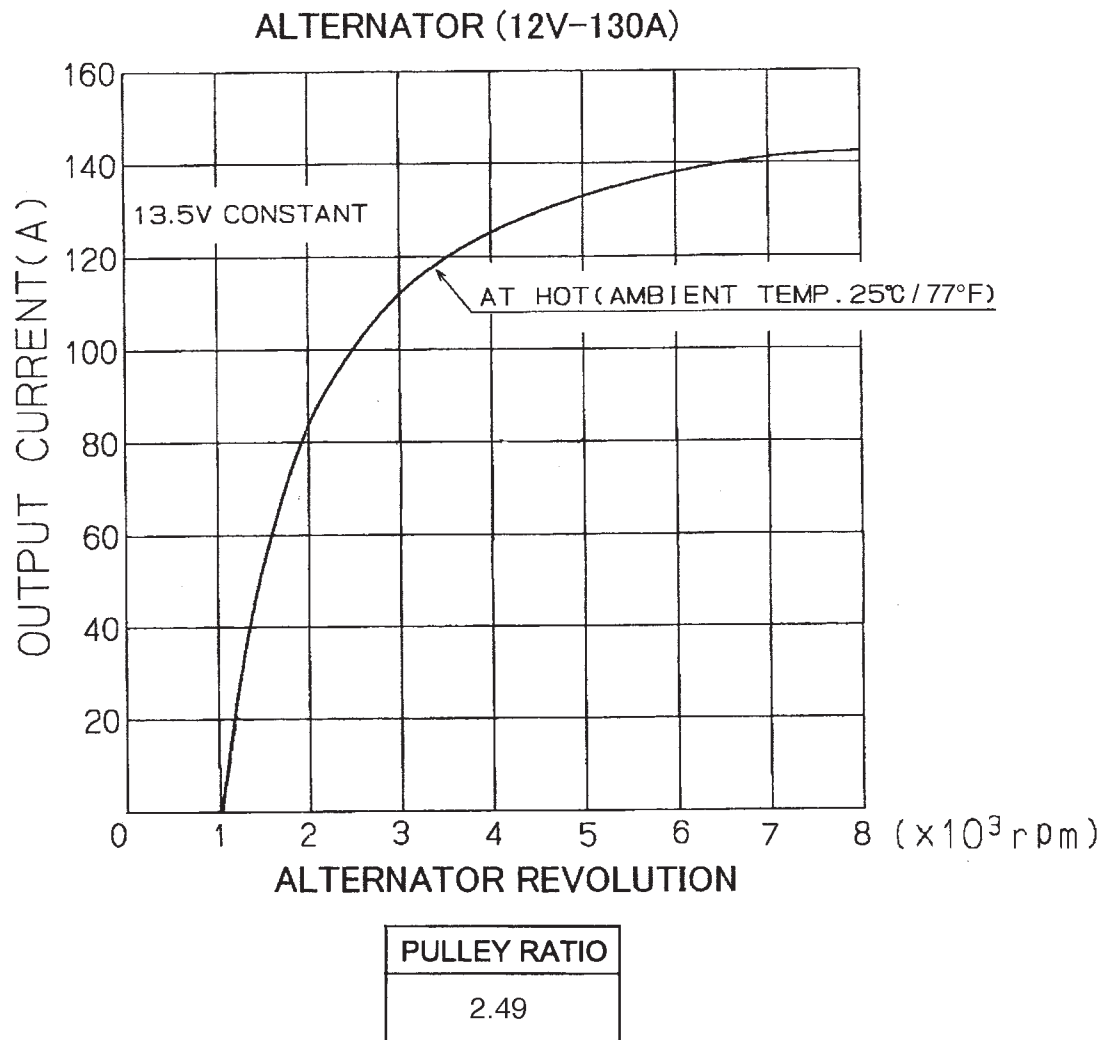
Detail of Provided Connectors (Chassis Side)

The figure below shows position of connectors.



See Section 9 (page 38 and 40) for connector information.

8. ALTERNATOR OUTPUT CHARACTERISTIC



- The maximum power available for the whole vehicle is defined by the capacity of the alternator.
Therefore, the electric power that is not consumed by electrical equipments such as head lamps can be available for the body side.
- Pay attention not to exceed the capacity of the alternator equipped on the vehicle.
- In the event that you are obliged to carry out the body mounting exceeding the capacity of the alternator, select the one available as an option or consult HMC or Hino authorized dealer.

9. ELECTRICAL POWER SOURCES

If you must take an electrical power supply for the rear body or equipment from the chassis, take it from the electrical power supply connector.

Power Supply Connectors and Positions

Detail of power supply connectors as shown in the table below.

	Connector Mark	Pole Code	Circuit (Main Application)	Max. Permissible Current (A)	Wire Size & Color	Connector Part No.	Coupling Connector (Spare Parts) Part No.	Applicable Model	Description
CAB SIDE	A	#81	Power supply BAT	10	0.85 Y	82824-37Y50	82824-37Y10	All	
		#82	Power supply ACC	10	0.85 R				10A (Total current with Pole Code #86)
		#83	Power supply lighting	7	0.5 G				7A (Total current with Pole Code #87 and #PX)
		#84	Power supply starter switch ON	10	0.85 L				
		%8H	PTO SW 1	6.5 mA	0.3 R				Input 12V positive signal to ECU for activation of customized PTO preset 1.
		%8J	PTO SW 2	6.5 mA	0.3 L				
		%8K	Engine stop switch	6.4 mA	0.3 W				Engine control for superstructure
		%8L	PTO cut relay	0.1 mA	0.3 B				
	B	#KV	Electronic brake controller (Power supply stop lamp)	12 (Less than 30 sec.)	2 B	90980-10795	90980-10794	All	For Trailer brake
		#KW	Electronic brake controller (Ground)	1	0.75 W-B				
		#KX	Electronic brake controller in put (Stop lamp signal)	1	0.75 Y				
		#KY	Electronic brake controller out put (Stop lamp)	12 (Less than 30 sec.)	2 L				
	C	&R0	Parking brake signal	0.01	0.5 P	82824-37Y50	82824-37Y10	All	
		&R1	Stop lamp signal	0.01	0.5 R				
		&R2	Speed sensor signal	0.02	0.5 R				
		&R3	Neutral signal	0.01	0.5 B				
		&R4	Reverse signal	0.01	0.5 Y				
		&R5	Turn lamp signal RH	0.1	0.5 R				If Turn hazard switch is ON, both Pole Code&R5 and &R6 are ON.
		&R6	Turn lamp signal LH	0.1	0.5 L				

- [NOTE]
- The permissible current be taken from spare power connector is determined from the capacity of the fuse and wire size. Make sure that the maximum load (current) of the installed equipment must be kept lower current than the permissible capacity to be able to take from spare power connector.
 - Be sure to keep the lower current value than the alternator generated capacity when switched on the original and additional equipment same time to avoid over discharging electricity of the battery.

•PTO Governor setting conditions
[Activation conditions : All AND conditions]

Engien status	ON
Starting of engine operation	OFF
System action	OFF
Vehicle speed	≤20km/h (12.43mph)
Engine speed	≤4000r/min.
Coolant temperture of engine	≤110°C (230°F)
Position of transmission gear	NEUTRAL
Throttle lever angle of body side	≤5%

[Deactivation conditions : All OR conditions]

Engien status	OFF
Starting of engine operation	ON
System action	ON
Engine speed	> 4000r/min.
Coolant temperture of engine	> 110°C (230°F)
Position of transmission gear	IN

Please contact to HMC for more details.

- About “Speed sensor signal”
<Current capacity of connection mate>
The current capacity of the connection part should be 15mA or less.
If connected external device which current capacity more than 15mA, it occur problem such as malfunction of engine system.

<Waveform characteristic>
At vehicle speed of 60MPH : 8200Pulse/min.
= 136.7Hz
At vehicle speed of 60Km/h : 8096Pulse/min.
= 84.9Hz

	Connector Mark	Pole Code	Circuit (Main Application)	Max. Permissible Current (A)	Wire Size & Color	Connector Part No.	Coupling Connector (Spare Parts) Part No.	Applicable Model	Description
CAB SIDE	D	&W0	Sub Harness	7	0.5 B	82824-37Y50	82824-37Y10	All	For Cab and chassis through harness
		&W1		7	0.5 L				
		&W2		7	0.5 R				
		&W3		7	0.5 G				
		&W4		7	0.5 W				
		&W5		7	0.5 V				
	E	#KR	Towing stop relay (Power supply stop lamp)	2	0.75 L	90980-10795	90980-10794	All	For Trailer brake
		#KS	Towing stop relay (Stop lamp)	2	0.75 Y				
		#KT	Towing stop relay (Stop lamp signal)	0.2	0.5 V				
		#KU	Towing stop relay (Ground)	0.2	0.5 W-B				
	F	CJG	Ground	-	0.5 W-B	90980-12370	90980-12369	All	For Van lamp
		CJJ	Van lamp relay	0.1	0.5 G				
		CJK	Power supply Van lamp	7	0.5 L				
	G	\$N0	Power supply BAT	2	0.5 B	82824-37Y50	82824-37Y10	All	For Telematics
		\$N1	Power supply ACC	2	0.5 GR				
		\$N3	Engine control Diag CAN (Hi)	0.5	0.3 R				
		\$N5	VCS CAN (Hi)	0.5	0.3 L				
		\$N7	Ground	2	0.5 W-B				
		\$N2	Power supply Starter switch ON	2	0.5 V				
		\$N4	Engine control Diag CAN (Lo)	0.5	0.3 G				
		\$N6	VCS CAN (Lo)	0.5	0.3 G				

- [NOTE]
- The permissible current be taken from spare power connector is determined from the capacity of the fuse and wire size. Make sure that the maximum load (current) of the installed equipment must be kept lower current than the permissible capacity to be able to take from spare power connector.
 - Be sure to keep the lower current value than the alternator generated capacity when switched on the original and additional equipment same time to avoid over discharging electricity of the battery.

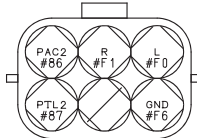
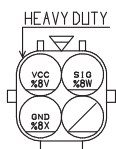
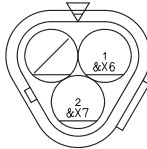
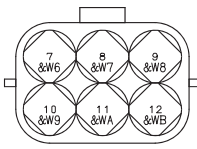
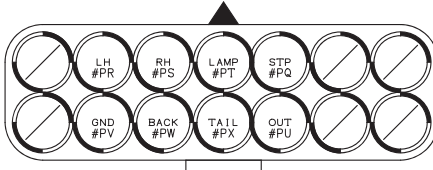
	Connector Mark	Pole Code	Circuit (Main Application)	Max. Permissible Current (A)	Wire Size & Color	Connector Part No.	Coupling Connector (Spare Parts) Part No.	Applicable Model	Description
CHASSIS SIDE	H	#86	Power supply ACC	10	0.75 R	S8281-E0D80	S8281-E0D40	All	7A (Total current with Pole Code #82)
		#F1	Turn lamp signal RH	0.1	0.75 L				For Side turn lamp RH
		#F0	Turn lamp signal LH	0.1	0.75 G				For Side turn lamp LH
		#87	Power supply Lighting	7	0.75 G				7A (Total current with Pole Code #83 and #PX)
		#F6	Turn lamp signal Ground	0.1	0.75 W-B				For Side turn ground
	I	&X6	Van lamp	7	0.85 B	90980-11015	90980-11016	All	For Van lamp
		&X7	Ground	7	0.85 W-B				
	J	%8V	Power supply	-	0.5 L	90980-11930	90980-11929	All	External engine control device of engine control for superstructure (Connect with HINO genuine parts only)
		%8W	Accel sensor	-	0.75 G				
		%8X	Ground	-	0.5 V				
	K	&W6	Sub Harness	7	0.5 B	S8281-E0D80	S8281-E0D40	All	For Cab and chassis through harness
		&W7		7	0.5 L				
		&W8		7	0.5 R				
		&W9		7	0.5 G				
		&WA		7	0.5 W				
		&WB		7	0.5 V				
	L	#PR	Turn lamp signal LH	2	0.75 B	S8281-E0M70	S8281-E0M80	All	For Trailer brake
		#PS	Turn lamp signal RH	2	0.75 L				
		#PT	Towing Lamp	7	2 W				
		#PQ	Stop lamp signal	1	0.75 Y				
		#PV	Ground	20	2 W-B				
		#PW	Back up lamp	1	0.75 R				
		#PX	Power supply Lighting	2	0.75 G				
		#PU	Stop Lamp	12 (Less than 30 sec.)	2 L				

- [NOTE]
- The permissible current be taken from spare power connector is determined from the capacity of the fuse and wire size. Make sure that the maximum load (current) of the installed equipment must be kept lower current than the permissible capacity to be able to take from spare power connector.
 - Be sure to keep the lower current value than the alternator generated capacity when switched on the original and additional equipment same time to avoid over discharging electricity of the battery.
 - The current value of pole code #F1, #F0 and #F6 in connector H must be lower than 0.1A.
 - The Connector H should be used for operating circuit of the relay which operate added side turn signal lamps.

DETAIL OF POWER SUPPLY CONNECTORS

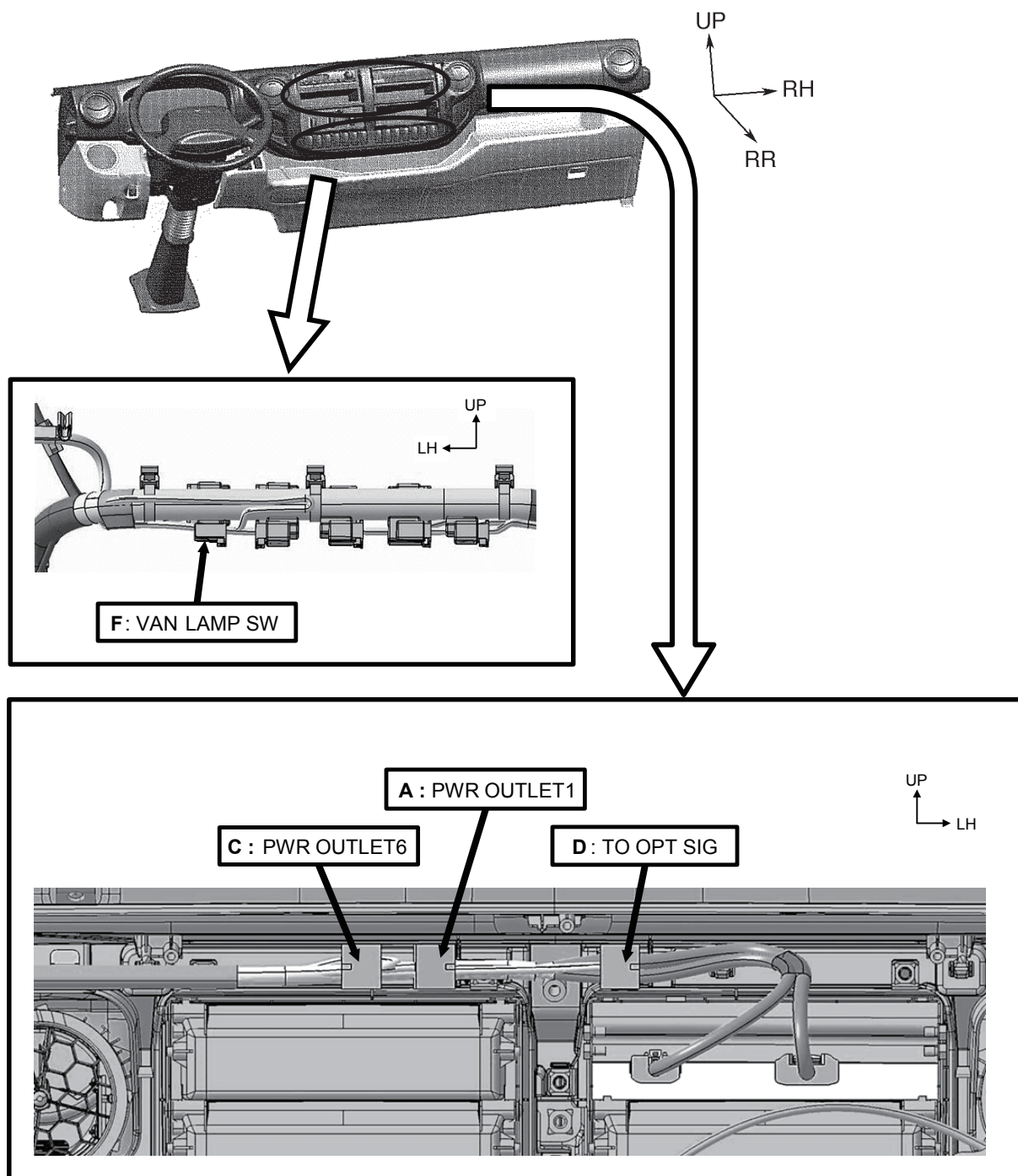
CAB SIDE	A	<p>82824-37Y50 ★(82824-37Y10)</p>	E	<p>90980-10795 ★(90980-10794)</p>
	B	<p>90980-10795 ★(90980-10794)</p>	F	<p>90980-12370 ★(90980-12369)</p>
	C	<p>82824-37Y50 ★(82824-37Y10)</p>	G	<p>82824-37Y50 ★(82824-37Y10)</p>
	D	<p>82824-37Y50 ★(82824-37Y10)</p>		

★() shows spare part No. of coupling connector.

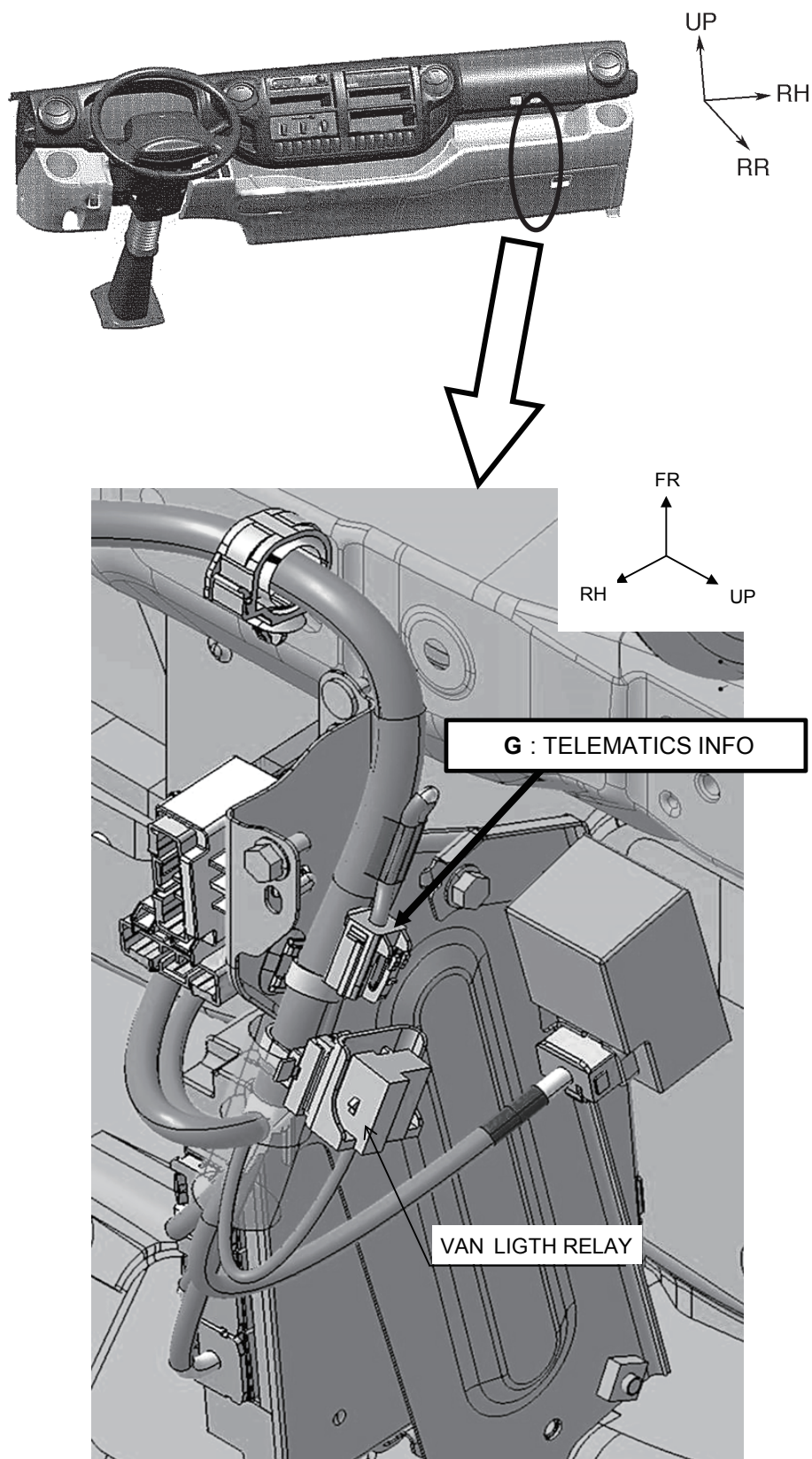
CHASSIS SIDE	H	 <p>S8281-E0D80 ★(S8281-E0D40)</p>	J	 <p>90980-11930 ★(90980-11929)</p>
	I	 <p>90980-11015 ★(90980-11016)</p>	K	 <p>S8281-E0D80 ★(S8281-E0D40)</p>
	L	 <p>S8281-E0M70 ★(S8281-E0M80)</p>		

★() shows spare part No. of coupling connector.

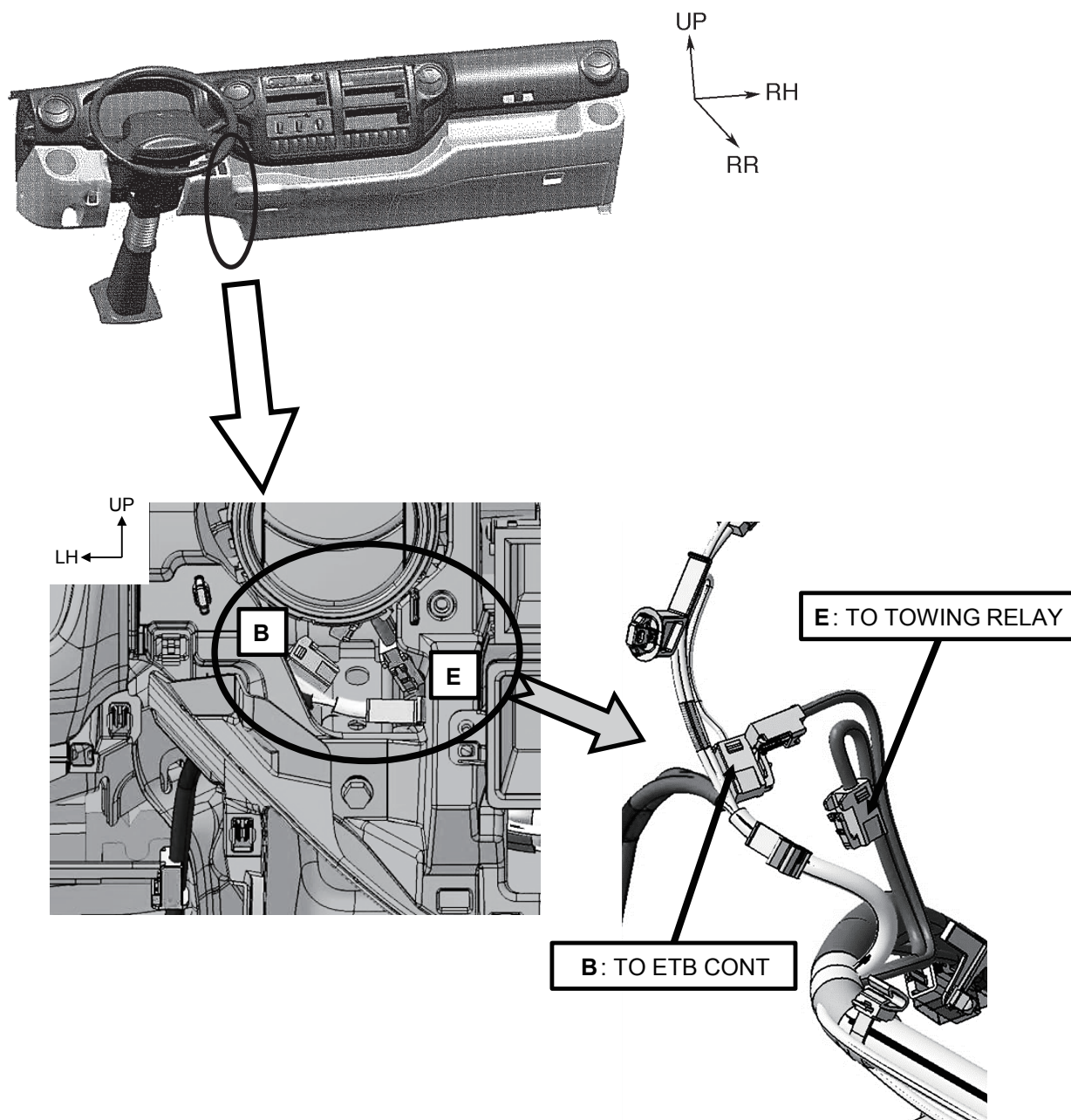
PROVIDED POSITION INSIDE CAB 1



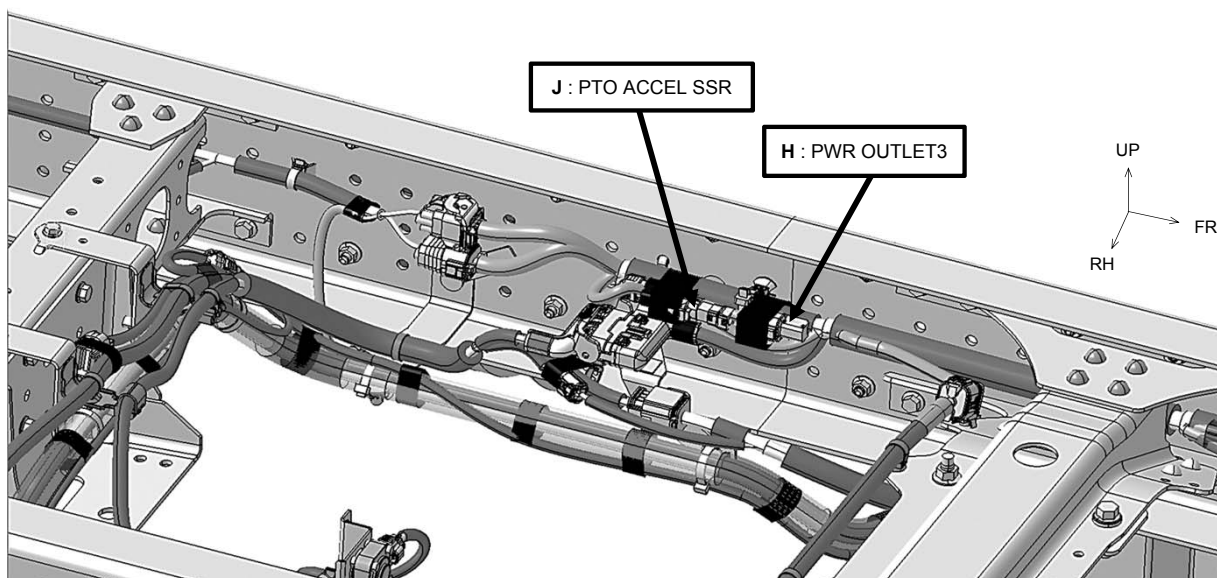
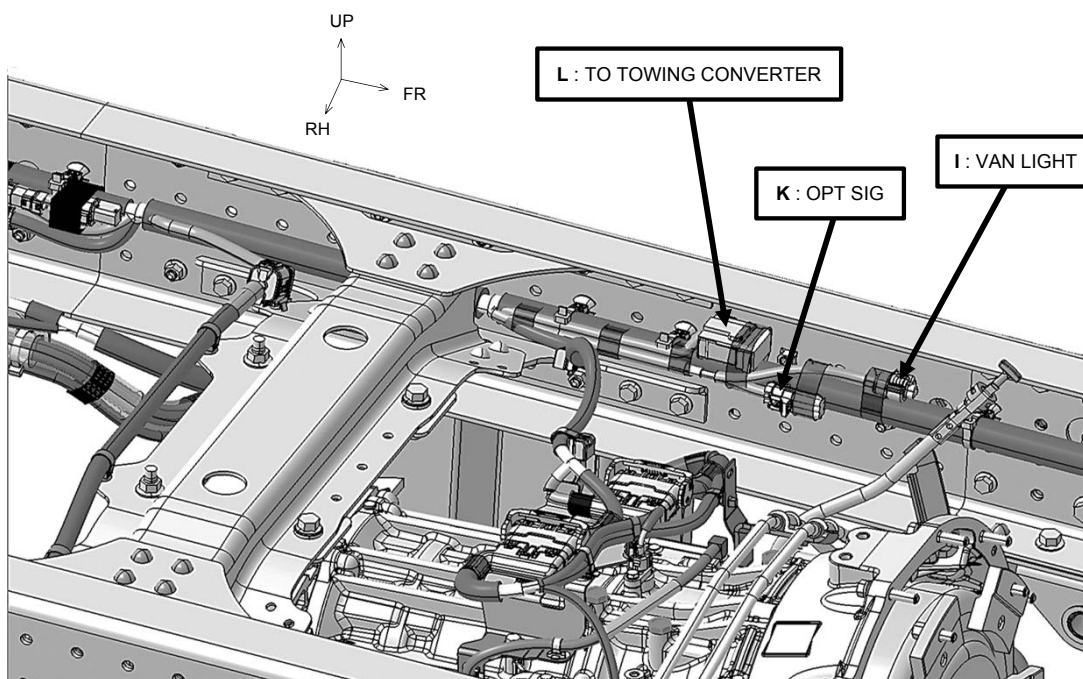
PROVIDED POSITION INSIDE CAB 2



PROVIDED POSITION INSIDE CAB 3

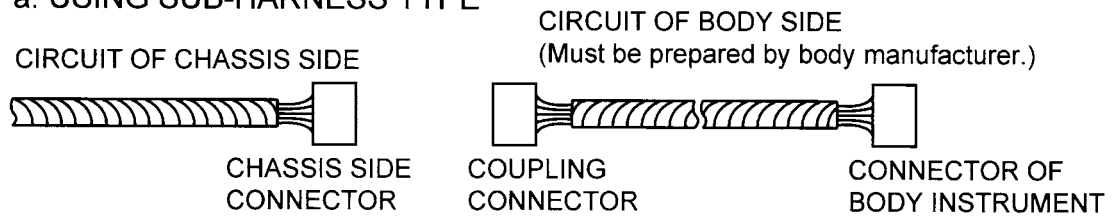


PROVIDED POSITION CHASSIS SIDE

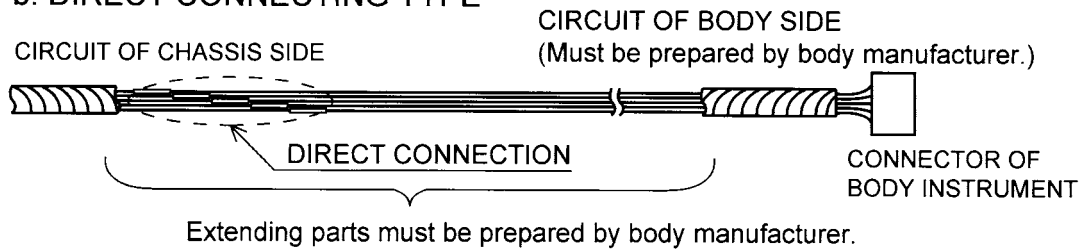


HOW TO TAKE ELECTRICITY FROM POWER SUPPLY CONNECTOR

a. USING SUB-HARNESS TYPE



b. DIRECT CONNECTING TYPE



[NOTE]

- We recommend sub-harness type.
- If you must take power using direct connecting type, be sure to observe the precautions described here in after section "HARNESS WIRING".

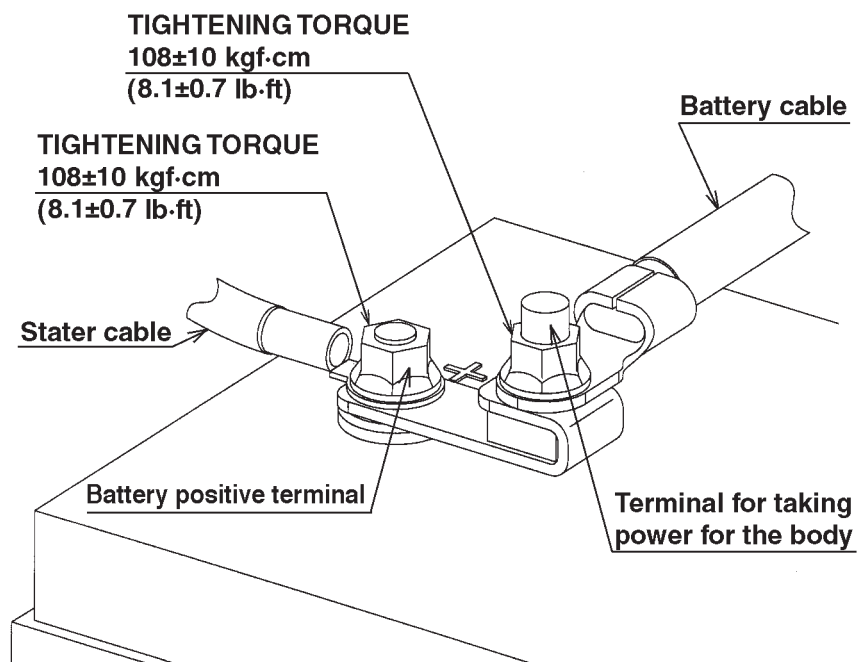
Taking Power Directly from the Battery

If you intend to take power for the body directly from the battery, secure the battery cable and the body power supply terminal together with the same nut.
For details, see the following figure.

In this case, you must install a fuse at a suitable point in the circuit and take precautions to prevent short circuits as these may lead vehicle fires.

When securing the cable and power terminal, make sure you tighten the nut properly.

- Battery model : GR31



Precaution for Installing Wires to Cab

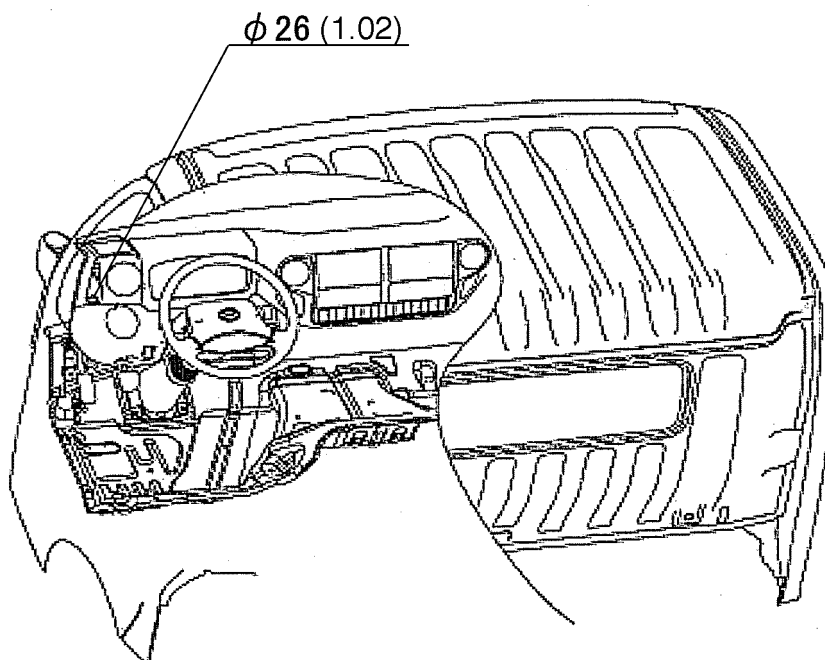
Penetration Hole for Wire Harness

- The penetration hole to draw the wire harness into the cab is provided at the dash panel of cab as following figure.
- When draw the wire harness, replace the grommet and draw it into the cab.

[NOTES]

- Make sure that the management should be taken such as disposing the sharp edge of the penetration hole and fixing the corrugated tube on the harness to prevent damage to the wire and potential short circuit.
- Make sure that the clearance between wire and penetration hole should be properly sealed by sealant to prevent water coming in and abnormal noise.
- Using the chassis harness grommet together for drawing the additional wire is strictly prohibited to prevent damage of chassis harness when processing the grommet.

Unit : mm (in.)



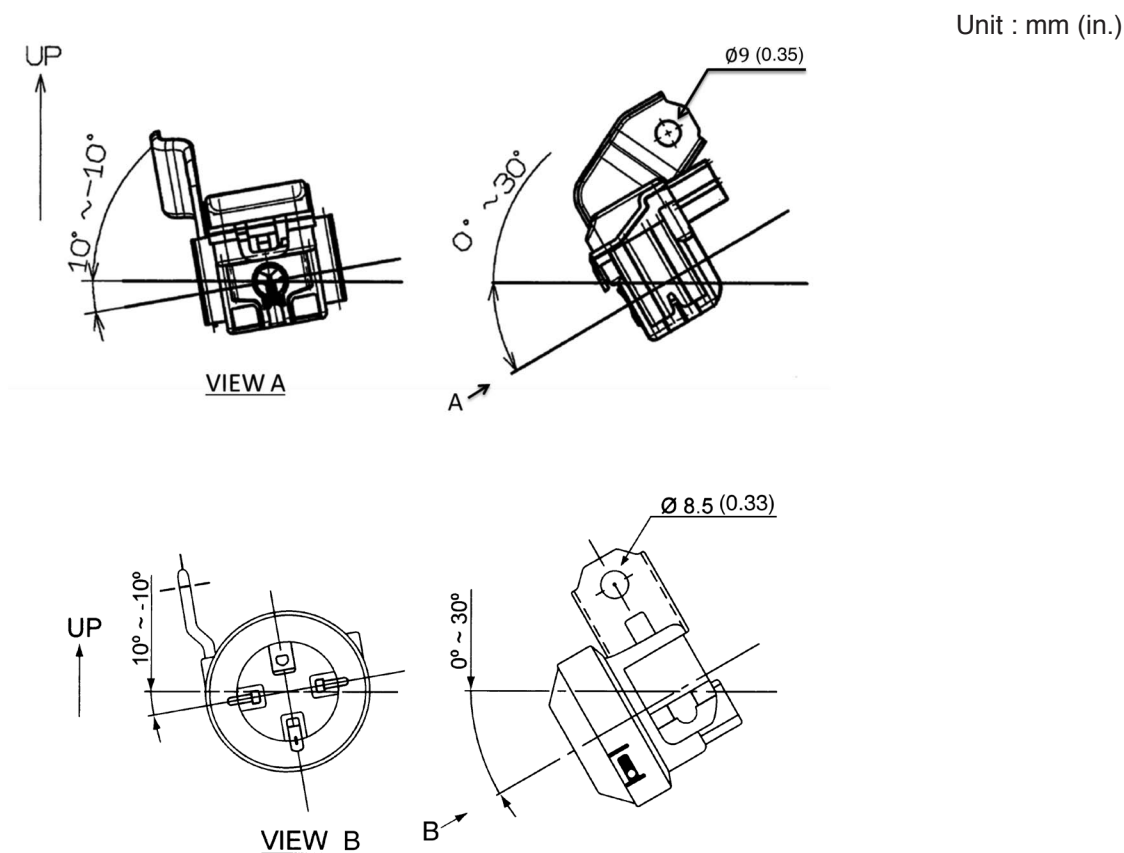
10. BACK-UP ALARM

When Hino Chassis are shipped, the back-up alarm is installed onto the end of the frame.

- If move the back-up alarm or modify the around parts of back-up alarm on the chassis, be sure to observe the following precautions.

Installation angle

- Must be kept the permissible range of installing angles shown in the figure below.
- If the installing angle is not within range, water will accumulate inside the alarm and may lead to failure.



The buzzer's type is different depending on the vehicle.

Installation area

- Should install the alarm the area which is the muddy water, rainwater and stone do not splash.

Precaution for painting

- Make sure that the alarm is covered during painting to protect the paint coming into alarm from sound emitting hole for avoiding failure of no sound.

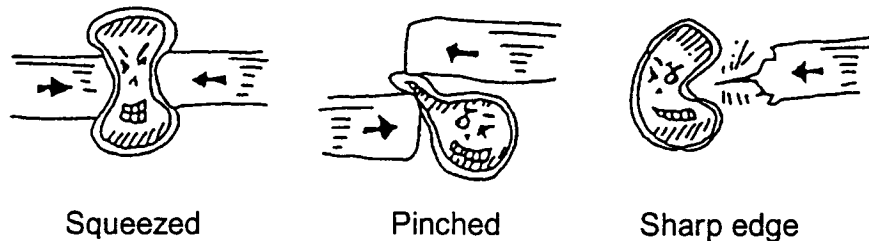
11. HARNESS WIRING

- If a mistake is made in the harness wiring while mounting a rear body or equipment, the harness may be damaged by vehicle vibration while the vehicle is driving, or water, dust, or mud entering into the harness. If these occur, a short-circuit or fire may result causing a serious accident.
- Accordingly, be sure to observe the procedures given below for modifications or alterations of the harness wiring involved with the rear body mounting or other actions.

Important Points in Installing Electrical Equipment and Wiring

Cautions needed when mounting the rear body or equipment

When installing U-bolts or related parts of rear body to chassis frame, be careful that the harness wires are not squeezed, pinched or forced into contact with sharp edges.

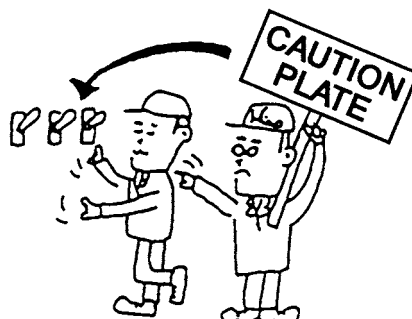


Harness wires, battery cables, terminals and electrical equipments (switches, joints) must be easily inspected and serviced after mounting rear body.

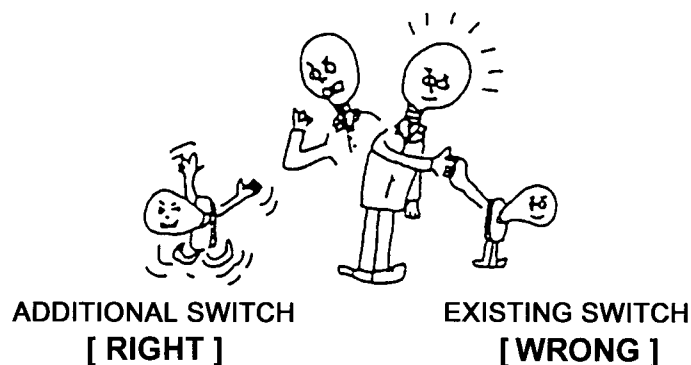


When installing switches or lamps for a rear body, observe the following precautions.

- To prevent accidental operation or confirmation, install a caution plate showing the purpose of each switch or lamps.



- Common use of switches which are already installed on the Hino Chassis for control of lamps installed on the rear body side or other electrical equipment is prohibited. An overload will occur resulting in burning of the switch contacts or harness. The control of the electrical equipment on the body side should be done using a separately installed switch.

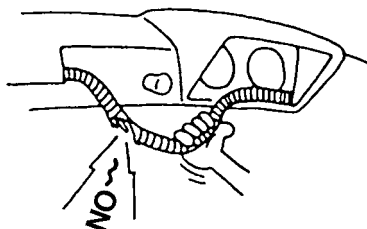


When installing a alarm for the rear body, make sure that its sound is clearly different from that of the existing alarm around the driver's seat of chassis.

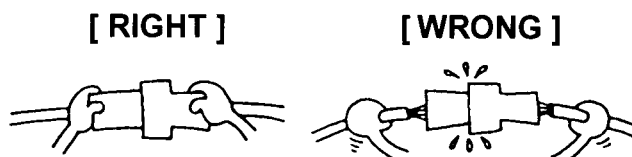
[SPECIFICATION OF EXISTING ALARM AROUND DRIVER'S SEAT]

ALARM TYPE	SPECIFICATIONS
• Low brake pressure warning alarm	• Sound pressure : 90 to 105 dB (A) {At a distance of 1m (3.28ft)} • Frequency : 400 to 600 Hz

Do not pull forcibly the harness wiring when handling it.

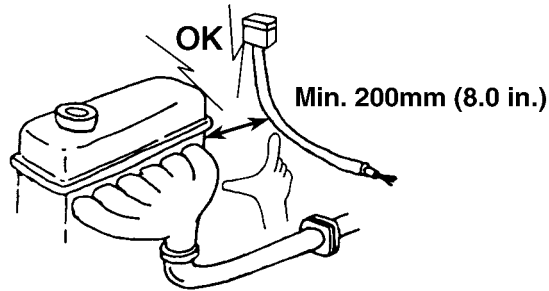


When removing the connector, be sure to hold the male and female parts of the connector by housing.
Do not remove the connector by holding harness wire.



Secure sufficient clearance with the high-temperature parts.
Measure the temperature whenever required to prevent problems for the safety.

- Do not install a harness wire in the vicinity of the exhaust pipe or muffler or where the wiring is exposed directly to the exhaust gas.
- Clearance against heat-generating parts; Minimum 200mm (8.0 in.).



- When the clearance is less than 200mm (8.0 in.) with heat-generating parts, provide an insulator to protect wire from heat.

[NOTE] The allowable temperature of vinyl coating harness wire is 20°C (48°F) to 60°C (140°F).

Addition or Modification of wiring

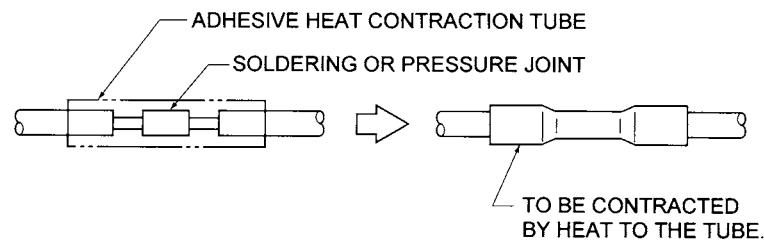
If you intend to extend wiring, make sure that you use the same size and color of wire as the original.

Make all joint secure by soldering or pressure joints. After connecting, remove burrs and cover completely with insulation material.

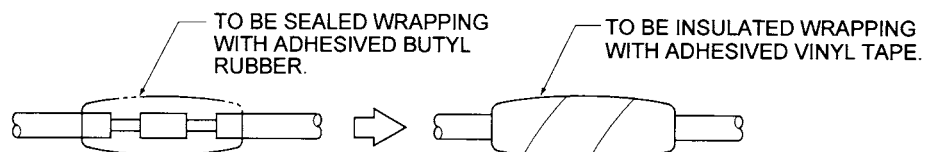
When making joint parts in chassis side wiring, cover joint parts with waterproof sealant, then cover fully with insulating material.

[EXAMPLE FOR WATERPROOFING AND INSULATION]

- Cover joint parts with adhesive heat contraction tube.



- Cover joint parts with butyl rubber.



When soldering, do not use chlorine.

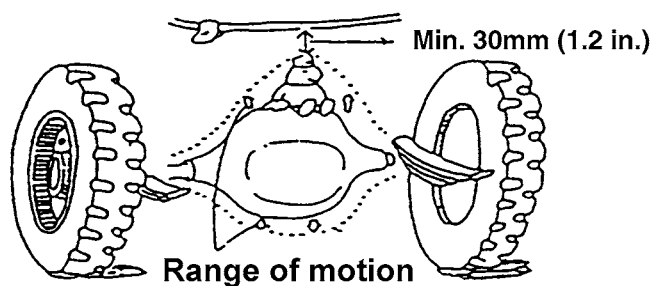
If you intend to move the battery or modify the battery cable layout, do not extend or shorten the battery cable.

In areas where the battery cables are subject to movement due to relative motion of the starter and the side rail, do not modify the clamping method, positions of clamps, or the amount of slack in the cables.

Clamp electric wiring firmly to prevent it from contacting the moving or vibrating parts of the chassis or rear body, and any sharp edges or corners.

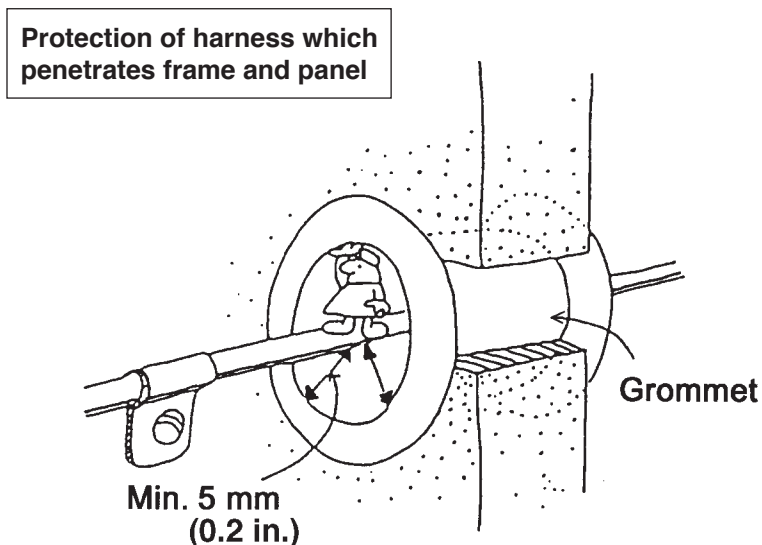
[CLEARANCES FOR WIRE]

POSITION	CLEARANCES
• Between moving parts and wiring.	At the close point : min. 30mm (1.2 in.)
• Between sharp edges or comers and wiring.	Minimum clearance : min. 10mm (0.4 in.)



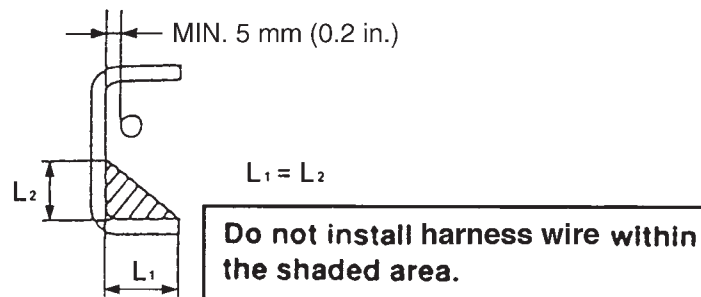
Where wiring passes through the chassis frame or a panel, always use a grommet to prevent damage to the wire and potential short circuits.

EXAMPLE OF USING GROMMET



Do not install harness wire where it may be damaged by accumulation of mud or snow, by freezing, or by road debris.
If you must install harness wire in such positions, protect it with metal plates.

Harness wires should be installed where there is no danger of damage from accumulation of mud, sand, or snow.



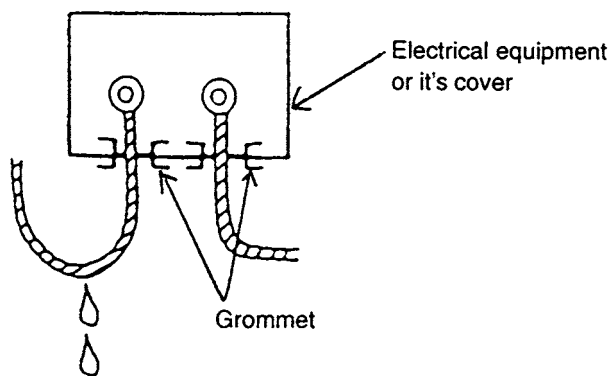
When installing a harness wire inside the chassis frame, place the harness wire along already installed harness wire and do not wire independently along empty spaces.

Also, when wiring under the floor of the body or inside the roof construction, be sure to place the harness wire along the structure frame, use a clip following the indicated interval, carry out water proofing measures and observe the harness wiring rules.

Do not make connections by cutting open the coating of a wire and pulling out the bare wire. This procedure is very dangerous and may damage to other wires.

Plug up the passage hole of a harness wire with a grommet so that water dose not pour in electrical equipment along with a harness wire.

Make a terminal parts higher than the entrance of a harness wire.



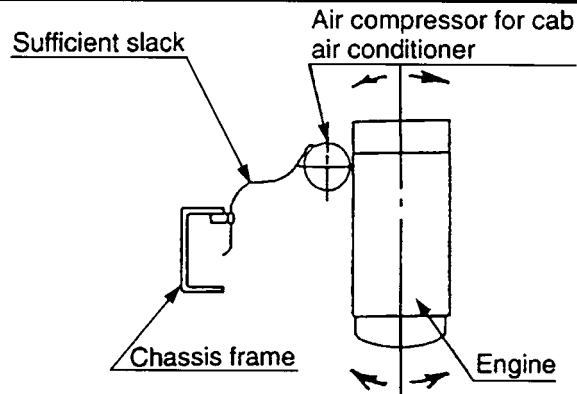
Install harness wire where they are not exposed to dust or water.

Do not install the harness wire on the top or outer side of the chassis frame. In such positions, they may be damaged by being stepped on during body mounting, or by road debris during vehicle operation.

If there is a harness for the chassis already installed close to the wiring area when wiring is done inside the chassis frame, the wiring and taping should be done along this harness.

When installing harness wire for parts of the engine, transmission, etc., install the harness wire in parallel to existing harness wire, and be sure to allow sufficient slack to adsorb any relative movement. Make sure that the harness wire does not touch any other parts.

When installing the harness wire to connect to the power unit, make sure that harness wire has sufficient slack to absorb relative movement.

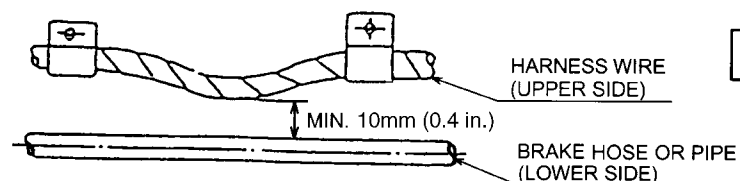
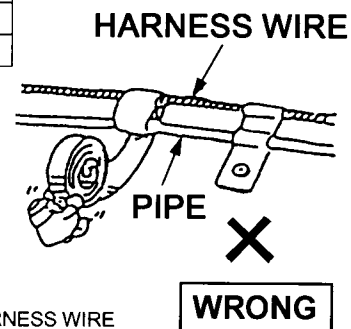


Where harness wire runs parallel to pipes (including rubber hoses, vinyl hoses, and steel pipes) or brake system pipes (including brake hoses and brake pipes), never clamp the harness wire together with these pipes.

[CLEARANCES BETWEEN HARNESS WIRES AND PIPES]

WIRING METHOD	CLEARANCE
Pipe and parallel wire	min. 10mm (0.4 in.)
Crossing point of wire and pipe	min. 20mm (0.8 in.)

Never secure harness wires together with pipes or link rods.



If you move the battery, you may have to temporarily remove the battery cables from the terminals of the battery.

When reinstalling the battery cables, observe the specified torque to avoid damaging the battery terminal.

Unit: kgf·cm (lb·ft)

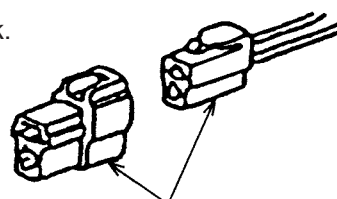
SIZE OF BOLT & NUT	TIGHTENING TORQUE
M8	77±19 (5.8±1.4)
M10	108±10 (8.1±0.7)

If a terminal is damaged, replace it with a new parts.

If you move the battery, make sure it is positioned at least 200 mm (8.0 in.) away from the exhaust system such as muffler and tail pipe.

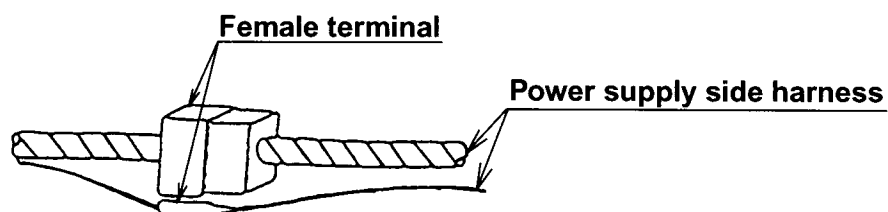
If you must install the battery within 200 mm (8.0 in.) of the exhaust system, protect it with insulating panels.

Always use a connector with lock.



Connector with lock

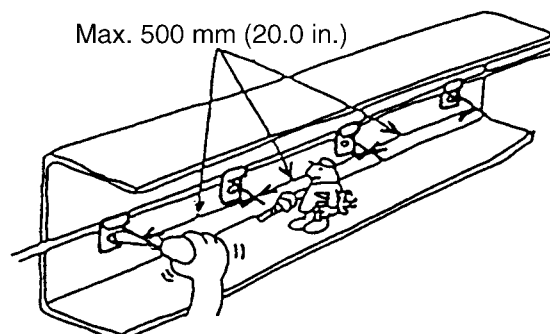
If you use a plug-type connecting terminal, fit the female terminal into the power supply side. This is due to the connecting terminal detaching which does not allow a short-circuit to occur even if the chassis or rear body construction make contact.



To prevent sagging, contact with other parts or contact with sharp edges or corners, secure all wiring with clips.

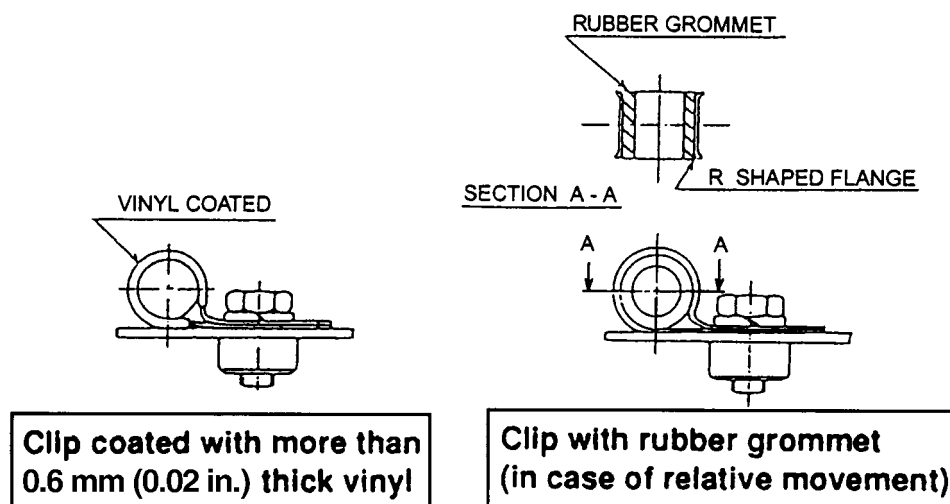
The clips should be spaced at a standard interval of 300~500 mm (12.0~20.0 in.). This interval should be shorter where conditions dictate.

Clipping interval



All clips should use resin coating or attached grommets.

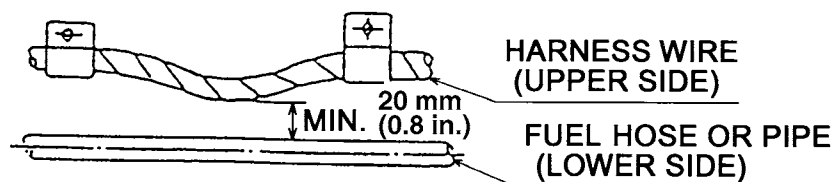
[RECOMMENDED CLIP TYPES]



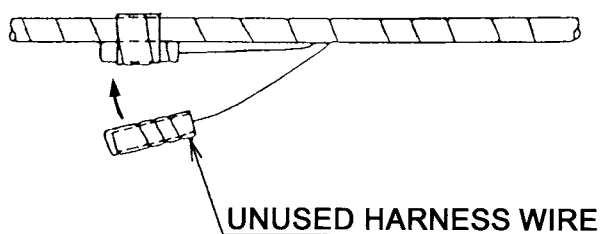
Crocodile clips and adhesive clips should only be used for temporary installation.

Harness wires should be installed above fuel hoses or pipes to avoid fuel dripping onto the harness wire in the event that a fuel leak occurs.

Keep a clearance at least 20 mm (0.8 in.) between the harness wire and fuel hose.

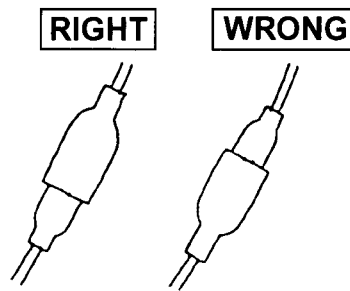


Bundle unused harness wires and their terminals should be bundled with other harness wires and covered with vinyl tape to prevent water from penetrating the terminal.



Mount a cover or a protector to prevent water entry along the wiring.

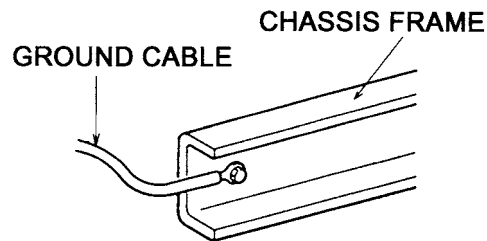
- A water-proof boot should be installed facing down.



A connector, if used at a position exposed to water, should always use water-proof type.

The circuit must be designed that the ground cable of the additional power supply is connected to the negative terminal of the battery.

Install the ground for an additional power supply always on the engine or frame.



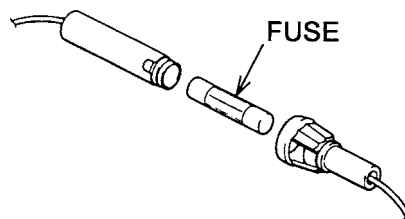
Mount the ground terminal securely in the front of a circular plate terminal.

Fuses of optimum capacity must be used for vehicles considering the operating load and the operating frequency.

Don't add any load from accessories to the existing fuses.

Be sure to insert a fuse in an added wiring circuit all the time.

Use a vinyl-coated clamp, taking adequate care against short circuit.



- The fuse capacity should be about 1.4 times the load current.

Ex : For the load current of 3A,
 $3 \times 1.4 = 4.2 \text{ A}$

Therefore, the standard fuse capacity of 5A is the best choice.

FUSE RATED CURRENT AGAINST LOAD (Automobile Standard JASO D610-75)

LOAD CURRENT, A	BELOW 7	7 MIN. AND BELOW 11	11 MIN. AND BELOW 14	14 MIN. AND BELOW 21
Fuse rated current, A	10	15	20	30

Ex : 5A fuse can be used for the load current of 3.5A maximum.

When installing additional electronic machine, the circuit must be wired through the fusible link and to be grounded direct to the frame.

- Be sure to not flow the dormant current in the circuit.

Make sure that the clamp of the harness wire should be added to install as occasion demands to prevent the resonance oscillation of the harness wiring due to engine vibration and vehicle's running.

- Take special attention for the clamping that the case to be used harness wiring with fusible link.

When installing electric motor consumed bigger load, be sure to use the appropriate size of harness wire.

- If over capacity of spare power circuit, take the power direct from the battery.

Electric Wire Size and Permissible Currents

Wire Size and Currents

When wiring the harness wire together with the rear body mounting operations, select an appropriate type of wire harness taking into consideration the power consumption capacity (A) of the electrical equipment such will be mounted and the condition of the installation location referring as following table.

CONNECTING FUSE CAPACITY (A)	WIRE TYPE		WIRE SIZE AND LENGTH						
		AMBIENT TEMPERATURE	0.5mm ² (0.0008 in. ²)	0.85mm ² (0.0013 in. ²)	1.25mm ² (0.002 in. ²)	2mm ² (0.0031 in. ²)	3mm ² (0.005 in. ²)	5mm ² (0.008 in. ²)	8mm ² (0.012 in. ²)
5	AV	80°C (176°F)	MAX. 30m (MAX. 98 ft)	—	—	—	—	—	—
	AVX	100°C (212°F)							
	AEX	120°C (248°F)							
10	AV	80°C (176°F)	MAX. 15m (MAX. 49 ft)	MAX. 20m (MAX. 66 ft)	MAX. 30m (MAX. 98 ft)	—	—	—	—
	AVX	100°C (212°F)							
	AEX	120°C (248°F)							
15	AV	80°C (176°F)	X	MAX. 15m (MAX. 49 ft)	MAX. 20m (MAX. 66 ft)	MAX. 35m (MAX. 115 ft)	—	—	—
	AVX	100°C (212°F)							
	AEX	120°C (248°F)							
20	AV	80°C (176°F)	X	X	MAX. 15m (MAX. 49 ft)	MAX. 25m (MAX. 82 ft)	MAX. 40m (MAX. 131 ft)	—	—
	AVX	100°C (212°F)							
	AEX	120°C (248°F)							
30	AV	80°C (176°F)	X	X	X	MAX. 5m (MAX. 16 ft)	MAX. 10m (MAX. 33 ft)	MAX. 15m (MAX. 49 ft)	MAX. 25m (MAX. 82 ft)
	AVX	100°C (212°F)							
	AEX	120°C (248°F)							
40	AV	80°C (176°F)	X	X	X	MAX. 5m (MAX. 16 ft)	MAX. 9m (MAX. 30 ft)	MAX. 20m (MAX. 66 ft)	MAX. 20m (MAX. 66 ft)
	AVX	100°C (212°F)							
	AEX	120°C (248°F)							
50	AV	80°C (176°F)	X	X	X	X	MAX. 7m (MAX. 23 ft)	MAX. 10m (MAX. 33 ft)	MAX. 15m (MAX. 49 ft)
	AVX	100°C (212°F)							
	AEX	120°C (248°F)							
60	AV	80°C (176°F)	X	X	X	X	X	MAX. 5m (MAX. 16 ft)	MAX. 10m (MAX. 33 ft)
	AVX	100°C (212°F)							
	AEX	120°C (248°F)							
80	AV	80°C (176°F)	X	X	X	X	X	X	MAX. 10m (MAX. 33 ft)
	AVX	100°C (212°F)							
	AEX	120°C (248°F)							
	WIRE TYPE		WIRE SIZE AND PERMISSIBLE CURRENT						
		AMBIENT TEMPERATURE	0.5mm ² (0.0008 in. ²)	0.85mm ² (0.0013 in. ²)	1.25mm ² (0.002 in. ²)	2mm ² (0.0031 in. ²)	3mm ² (0.005 in. ²)	5mm ² (0.008 in. ²)	8mm ² (0.012 in. ²)
	AV	80°C (176°F)	9A	11A	14A	20A	27A	36A	47A
	AVX	100°C (212°F)	8A	10A	13A	17A	24A	33A	43A
	AEX	120°C (248°F)	7A	9A	12A	17A	23A	32A	42A

[NOTE]

- Marked “X” can not be used.
- Marked “—” shows the wire length maximum 50 m (164 ft).

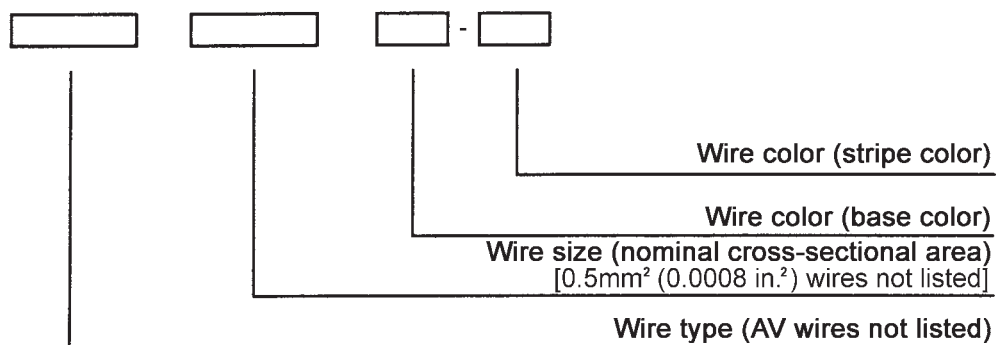
[NOTE]

- Select wires size to suit the power consumption current.
- If you intend to use AEX wire, make sure that you also use heat resistant protective tubing, tape, and clips.
- Where the wire is subject to movement caused by relative motion, use wire of 0.85 mm² (0.0013 in.²) cross section or larger.
- Characteristic of wire.

Wire type	Permissible ambient temperature	Notes
AV wire (low-voltage wire for vehicles.)	max. 80°C (176°F)	Use for nomal wiring.
AVX wire (cross-lined vinyl) (heat-resistant low-voltage wire for vehicles.)	max. 100°C (212°F)	Use for wiring in engine room and other areas with high ambient temperature.
AEX wire (cross-lined polyethylene) (heat-resistant low-voltage wire for vehicles.)	max. 120°C (248°F)	

Coding for Electrical Wires

Wire codes represent size and color



COLOR CODE

Wire color codes	Wire color
B	BLACK
GR	GRAY
DG	DARK GRAY
R	RED
W	WHITE
G	GREEN
L	BLUE
Y	YELLOW
O	ORANGE
V	VIOLET
BR	BROWN
LG	LIGHT GREEN
SB	SKY BLUE
S	SILVER
P	PINK
TR	TRANSPARENCY
BE	BEIGE

For example

