

# Chapter 4

## TRUCK BODY AND SPECIAL EQUIPMENT INSTALLATION PROCEDURE AND PRECAUTIONS

1. GENERAL PRECAUTION
2. WEIGHT DISTRIBUTION AND CENTER OF GRAVITY
3. THE TILT HOOD
4. FUEL TANK
5. THE FUEL HOSE
6. CAUTION LABEL OF FUEL TANK
7. INSTALLATION OF FENDER AND MUDGUARD
8. WELDING WORK
9. MINIMUM CLEARANCE WITH REAR SPRING AND REAR SPRING HANGER
10. SYSTEM CONTROL COMPUTERS
11. THE ANTENNA POSITION
12. REMOVING THE INSTRUMENT PANEL
13. ADDITIONAL WIRING IN THE ENGINE COMPARTMENT
14. RESETTING OF VEHICLE SPEED SENSING PULSE CONVERTER
15. MAXIMUM VERTICAL TRAVEL RANGE OF LATERAL ROD (REAR AIR SUSPENSION MODEL)
16. LEVELING VALVE (REAR AIR SUSPENSION MODEL)
17. EXHAUST SYSTEM
18. DPR FILTER
19. DEF - SCR SYSTEM
20. VERTICAL EXHAUST TAIL PIPE
21. INSTALLING EQUIPMENT ON THE CAB ROOF
22. VEHICLE STORAGE

The following instructions are recommended for proper installing rear body or equipment on Hino chassis.  
Failure to follow these recommendations, it may be cause of serious damage to Hino chassis.

## 1. GENERAL PRECAUTION

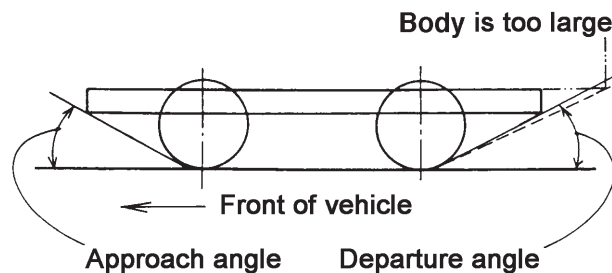
Any deviation from the original Hino chassis specifications will become the responsibility of the subsequent stage manufacturer or installer.

The final stage manufacturer has responsibility to certify that the completed vehicle conforms to all applicable CMVSS.

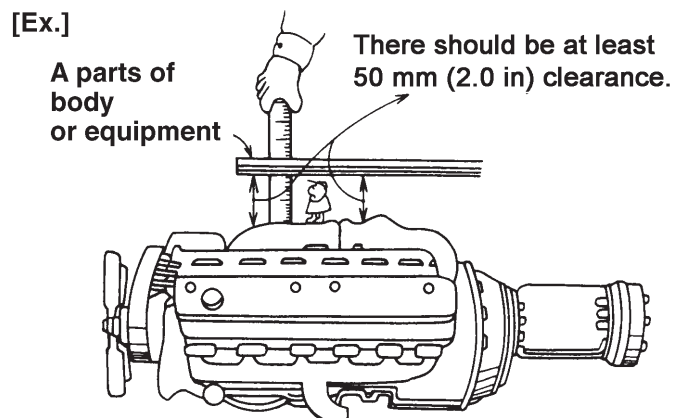
The body installed on chassis frame must have adequate strength. In order to prevent insufficient efficiency of brake or abnormal wear of tires, enough care is necessary to the weight distribution to be loaded as evenly as possible onto right and left wheels.

When installing the body, be sure that all the wheels are on the same horizontal plane so that the chassis frame is not inclined. (No difference in height from the ground on right and left sides.)

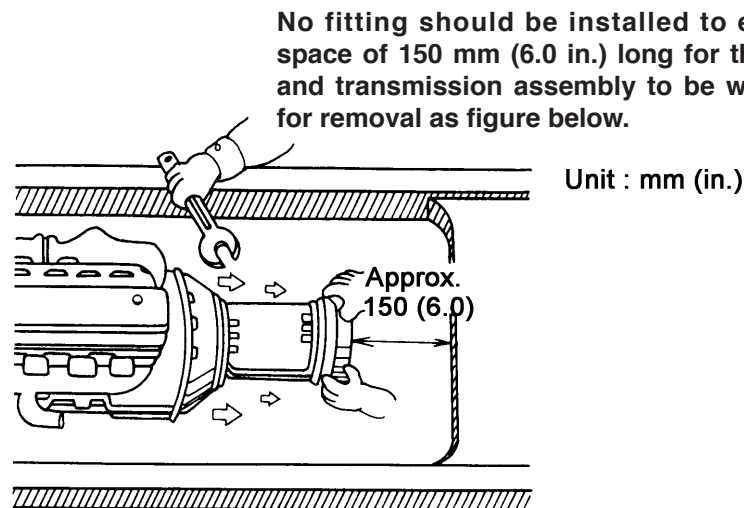
When rear body or equipment are mounted on the front or rear overhang, it is desirable that mounted position is not inside the approach and departure angle.



When installing rear body or equipment near the engine, clutch and transmission, allow a clearance at least 50 mm (2.0 in.).



When removing the transmission assembly from the engine, it is necessary to move the transmission assembly rearward about 150 mm (6.0 in.) in order to pull out the clutch spline. Therefore, proper consideration should be given to the arrangement of the fittings of body or equipment.



The fuel tank, battery and air tank supports should not be fitted with the side guard and anything like that which may give shock and external force to them.

When mounting the body, sufficient considerations are needed so that there will be no trouble in carrying out daily inspection and maintenance.

- Engine oil inspection, oil supply and discharge
- Cooling water inspection, water supply and discharge
- Air cleaner inspection
- Transmission oil inspection, oil supply and discharge (Special care is needed when installing P.T.O.)
- Differential oil inspection, oil supply and discharge (Care is needed when spare tire is mounted on the rear overhang.)
- Grease up (Special care is needed when shifting the fuel tank on vehicles.)
- Battery liquid inspection, water supply and discharge.
- Supply of fuel and DEF
- Air tank drain
- Attaching and detaching the spare tire
- Check valve and other valves relating to brake

When changing springs or installing additional spring leaves, check the wheelbase and the front wheel alignment and make adjustments if needed. (Tighten spring U-bolts and center bolts with the specified torques.)




After a vehicle has been properly fitted out, make sure that it is free from any defects such as the vibration of the cab and noise before delivering it.

When mounting all the required component parts on a vehicle, be careful not to damage to the Hino Chassis or impair its proper functioning. (For instance do not step on piping, wiring, air tank, fuel tank, air drier and other chassis frame component.)

Do not alter the component parts of the front axle and steering.

When using additional spring leaves, do not use more than we have provided for option for the excessively increased front spring leaves will cause interference with the position of the steering link and the excessively increased rear spring leaves will may cause the propeller shaft to be damaged by seizure or noises.

Be careful that the mounted body may not interfere with the front and rear field of vision.

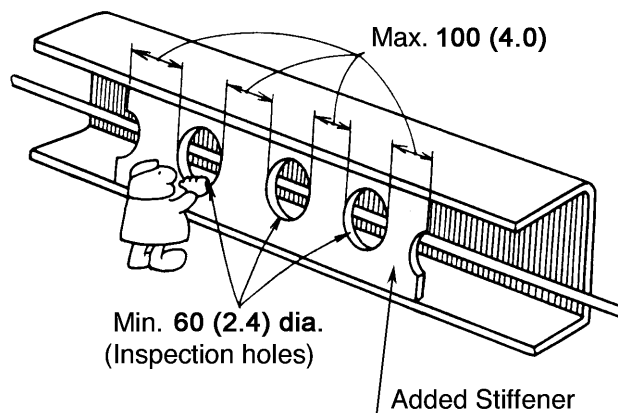
When a concentrated load is applied locally or the body is long, the amount of deflection may pose problems in some cases. So, it is advisable to use  or  or  shaped steel beams as the main sill, and joint them securely to the side members in order to obtain sufficient overall strength and rigidity.

When a body with a great rigidity is mounted as in the case of tank tanker and bulk cement carriers, please make reference to the paragraph devoted to the main sill to prevent a weak point appearing at the rear of the cab.

Cautions when mounting the body near brake units and brake pipe lines

- The valves shall be made serviceable and detachable.
- When a corrosive property is loaded on the body, use appropriate protective means to protect the pipe lines.
- Be careful to ensure sufficient clearance at least 30 mm (1.2 in.) between the brake pipe lines and the parts of body.
- Make the inspection and working holes if the side rail is stiffened as a closed section.

Unit : mm (in.)



Cautions needed when mounting the body above exhaust pipe

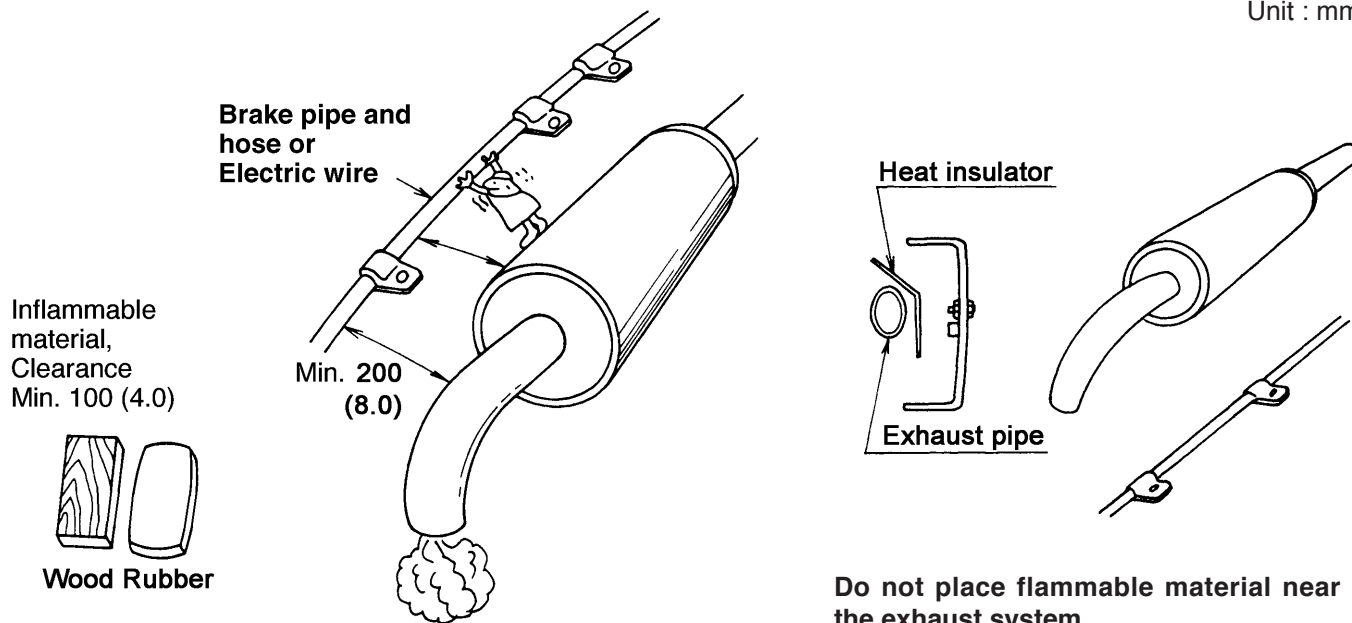
- There must be the following clearances between exhaust pipe and others to be mounted on the vehicle.

More than 100 mm (4.0 in.) from wood, rubber, cloth, resins and the like.

More than 200 mm (8.0 in.) from electric wire, brake hose or tube.

When it is impossible to provide the above clearances, use the heat insulator.

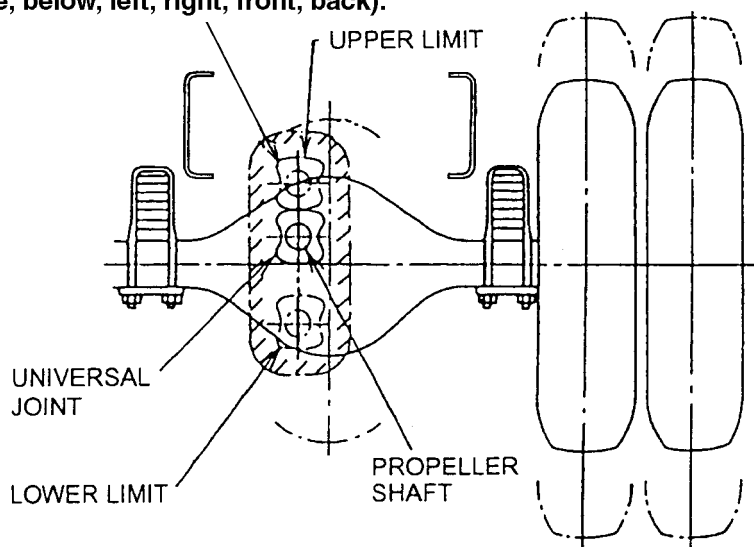
Unit : mm (in.)



- Care must be taken that there is no rope or sheet hanging close to the exhaust system. Do not place the rope hook near the exhaust system.

To prevent an interference of propeller shafts with the body parts due to the movement of propeller shafts, keep enough clearance at least 50 mm (2.0 in.) between propeller shaft (including joints) and body parts. (dump pump, brackets, etc.)

**Allow 50 mm (2.0 in) clearance from limit of displacement of the propeller shaft (above, below, left, right, front, back).**

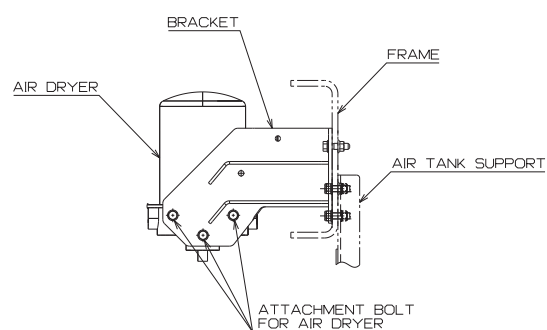
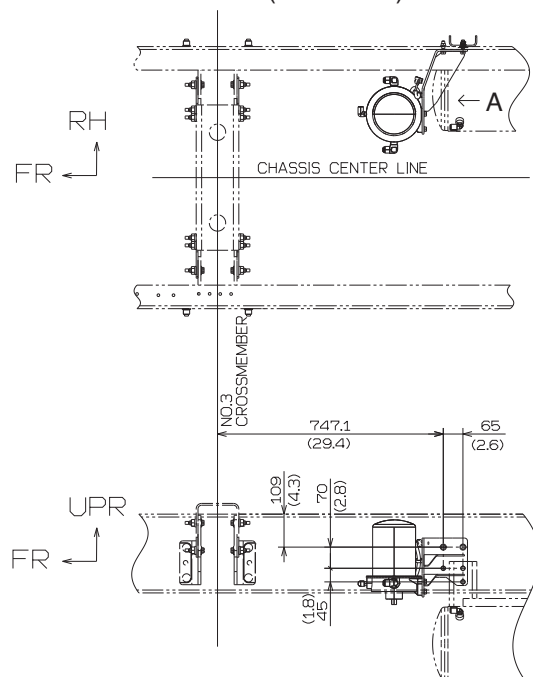


## Space for dismounting and mounting work of AIR DRYER

The air dryer contains a desiccant, which must be inspected and replaced at regular services. This work needs dismounting and mounting the air dryer. Make sure that allow sufficient working space for dismounting and mounting the air dryer.

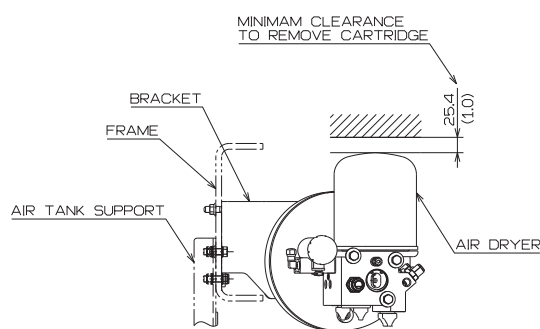
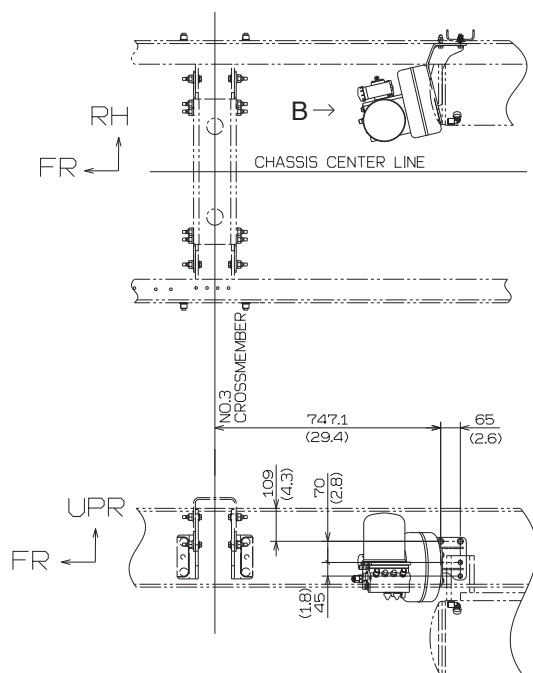
### HYDRAULIC BRAKE ( NE & NF )

Unit : mm (in.)



VIEW A

### FULL AIR BRAKE ( NJ, NV & NH )



VIEW B

## 2. WEIGHT DISTRIBUTION AND CENTER OF GRAVITY

### Recommended Weight Distribution on Front Axle

To ensure satisfactory steerability of the vehicle under all conditions, proper weight distribution on front axle must be considered at the planning of body mounting.

In the case of 2-axle vehicle, ensure a minimum of 30% of the gross vehicle weight is on the front axle.

The permissible front axle load must not be exceeded.

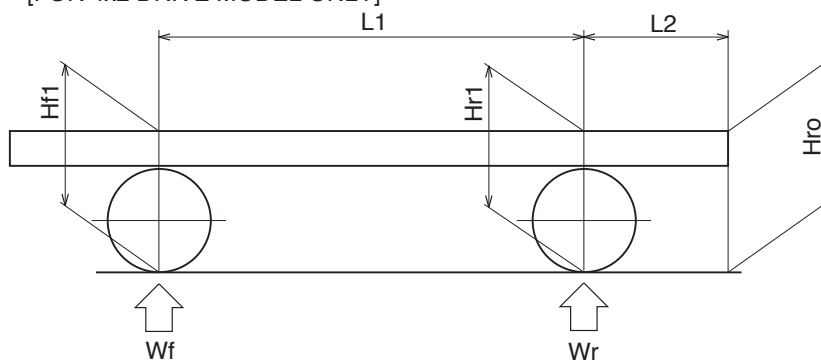
### Calculation for Height of Frame Upper Surface from Ground

Before mounting rear body or equipment on chassis, must calculate height of frame upper surface from ground.

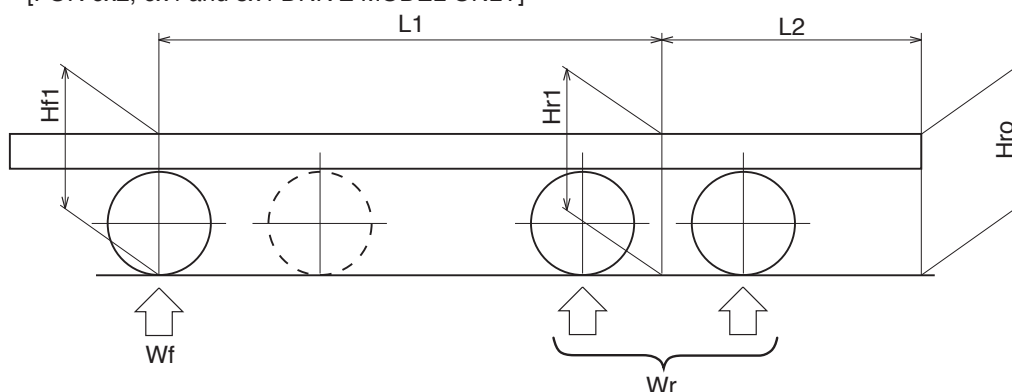
In order to confirm the vehicle posture as frame end upper surface from ground slightly higher than front end to ensure vehicle stability.

Following are as formula for how to calculate.

[FOR 4x2 DRIVE MODEL ONLY]



[FOR 6x2, 6x4 and 8x4 DRIVE MODEL ONLY]



- $W_f$  : Load on front axle (kg, lb.)  
 $W_r$  : Load on rear axle (kg, lb.)  
 $H_{f1}$  : Height of frame upper surface from ground on front axle datum line (mm, inc.)  
 $H_{r1}$  : Height of frame upper surface from ground on rear axle datum line (mm, inc.)  
 $H_{fo}$  : Height of frame upper surface from ground on frame end (mm, inc.)  
 $L_1$  : Distance from front axle datum line to rear axle loading center (mm, inc.)  
 $L_2$  : Frame rear overhung (mm, inc.) ··· From rear loading center to frame end.

$$H_{ro} = H_{r1} + \frac{H_{r1} - H_{f1}}{L_1} \times L_2$$

## NOTE

- Refer to the calculation formula below for how to calculate  $H_{f1}$  and  $H_{r1}$ .
- The calculation formula is not considered the deflection of tire.
- $H_{f1}$  and  $H_{r1}$  must add the deflection of tire based on local standards.

<CALCULATION FORMULA OF  $H_{f1}$  &  $H_{r1}$ >

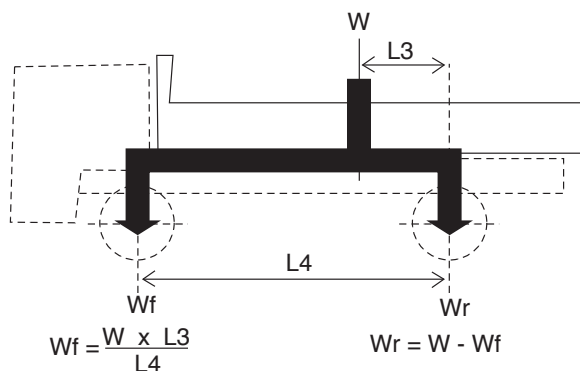
## &lt;CALCULATION DATA TO BE REFERED&gt;

ITEM	CHAPTER TO BE REFERED		ELEMENT	
	CHAPTER	NAME OF SECTION	FRONT	REAR
SPRING CONSTANT (kgf/mm, lb/in.)	12	SUSPENSION DEFLECTION CHART	$T_f$	$T_r$
HIGHT OF FRAME UPPER SURFACE FROM GROUND (mm, inc.)	9	CHASSIS DRAWINGS	$H_f$	$H_r$

## &lt;CALCULATION DATA TO BE PROVIDED&gt;

ITEM	ELEMENT	
	FRONT	REAR
MASS DISTRIBUTION OF BODY OR EQUIPMENT (kg, lb.) *Mass of payload must calculate mass distribution, Front and Rear, if need.	$W_f$	$W_r$

## CALCULATION FORMULA OF MASS DISTRIBUTION



- $W$  : BODY (EQUIPMENT) MASS  
 $W_f$  : FRONT DISTRIBUTION MASS OF BODY (EQUIPMENT)  
 $W_r$  : REAR DISTRIBUTION MASS OF BODY (EQUIPMENT)  
 $L_3$  : GRAVITY CENTER OF BODY (EQUIPMENT) MASS  
 $L_4$  : WHEELBASE

<CALCULATION FORMULA OF  $H_{f1}$ >

$$H_{f1} = H_f - \left( \frac{W_f}{2} \div T_f \right)$$

<CALCULATION FORMULA OF  $H_{r1}$ >

$$H_{r1} = H_r - \left( \frac{W_r}{2} \div T_r \right)$$



### Permissible Height of Center of Gravity of the Completed Vehicle with Payload

The height of center of gravity of the completed vehicle must be considered at the planning of body mounting.

The height of center of gravity from the ground to the completed vehicle with payload should not exceed the guidelines as shown in the table.

If the body is mounted in such a way that the height of center of gravity exceeds the guideline, the directional stability at braking and roll stability at cornering or rolling will be adversely affected.

GUIDELINE

Unit: mm (in.)

Model	Height of center of gravity from ground
ALL	Less than 1778 (70)

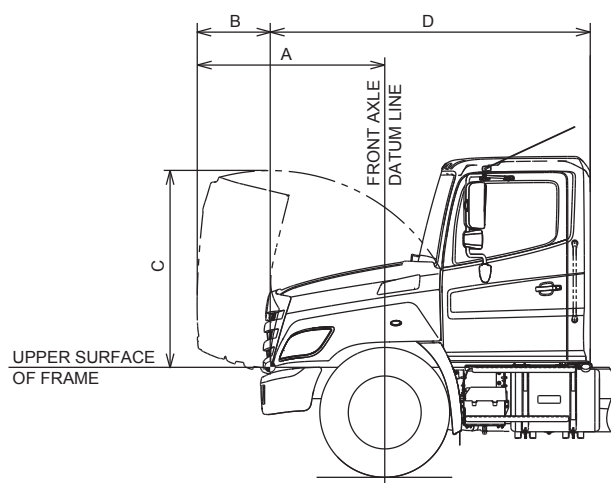
[NOTE]

This guideline is applied to the truck body only.

### 3. THE TILT HOOD

Since the Hino truck has the tilt hood in front of the cab.

Be sure that not to obstruct the tilting range of the hood in described following figure when perform to mount the body or equipment.



Unit: mm (in.)

Model	A	B	C	D
ALL	1,620 (63.78)	610 (24.02)	1,635 (64.37)	2,680 (105.51)

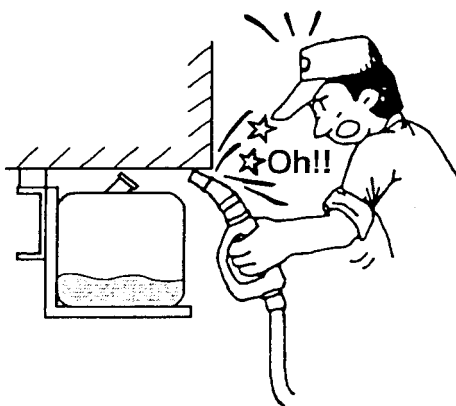
[NOTE] • Refer to chassis drawing for more detailed dimensions of engine hood tilting range.

## 4. FUEL TANK

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### Fuel Filler for Fuel Tank

When mounting body or equipment, make sure that allow sufficient clearance with fuel filler, and enough working space for filling the fuel.



**Allow space to open the  
filler cap and fill fuel.**

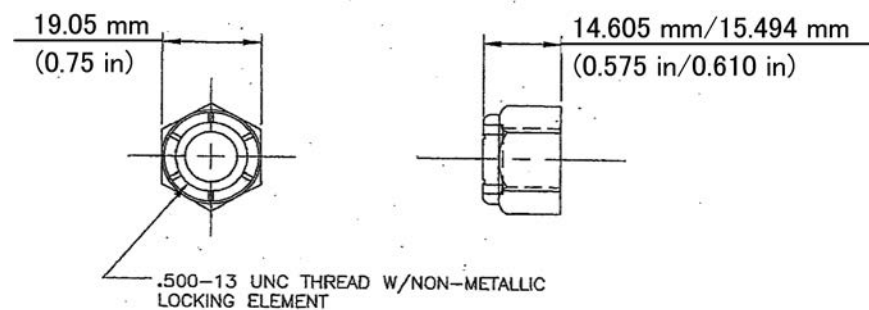
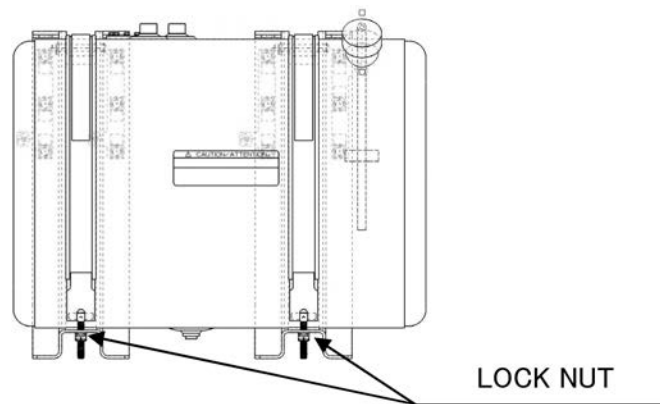
## Handling of Fuel Tank Lock Nut

The lock nut has been provided with plastic locking element.  
Therefore, the lock nut should be changed with new genuine one when the lock nut is loosen.

Part No. SZ177-12005

It is strictly prohibited that the loosen lock nut is re-used.  
Be sure to tighten the lock nut with satisfied torque when installing new one.

Tightening torque :  $265 \pm 31$  kgf·cm ( $19 \pm 2.2$  lb·ft)



Detail of Lock Nut

## 5. THE FUEL HOSE

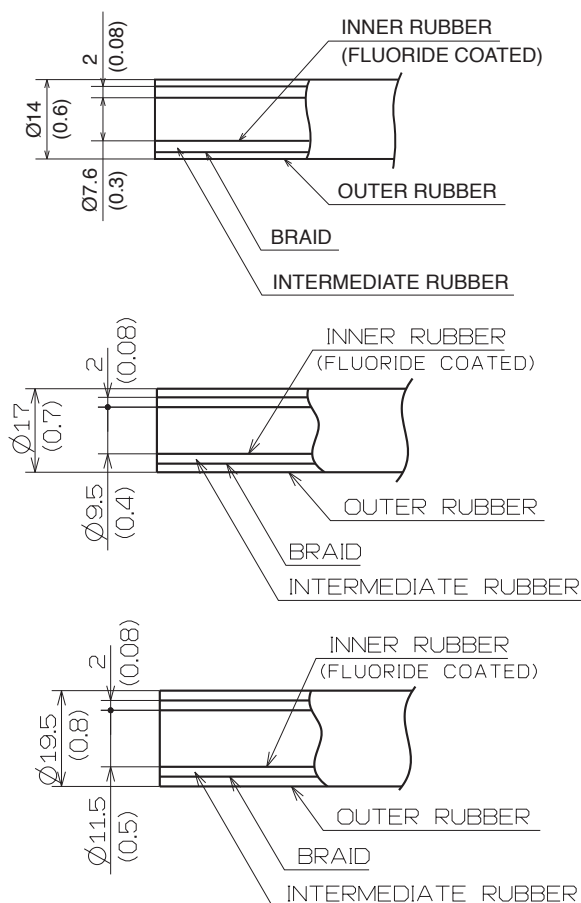
Be sure to observe the following instructions, if it will be changed a fuel hose by a movement or an addition of a fuel tank.

Always use the fuel hose which is same diameter as original and the HINO genuine parts.

The following figure is an example of genuine parts.

(The material and quality of each component are based on the standard of HINO.)

Unit : mm (in.)



If HINO genuine parts cannot be obtained, please procure the following rubber hoses as a substitute.

- A rubber hoses which dose not contain a metal interior liner.  
or
- A rubber hose greater than or equal to original equipment and contain Fluoride coated interior.

Use of unsuitable rubber hose may cause engine damage.

For more detailed information, please contact HMC or Hino authorized dealer.

## 6. CAUTION LABEL OF FUEL TANK

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Instruction to use ultra low sulfur diesel fuel is requirement of Part 86 of Title 40, Code of Federal Regulations (40 CFR 86).

The Caution Label is stuck near the filling port of fuel tank.

Be sure to observe the following instructions when installing body or equipment.

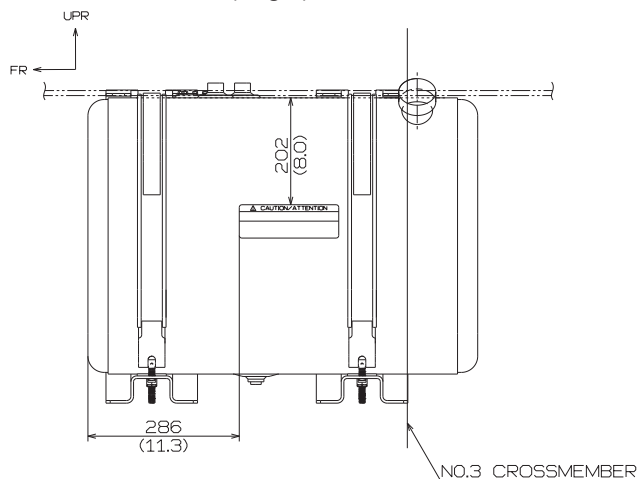
- Do not remove the caution label.
- Do not block the caution label by body or equipment.
  - The caution label must remain visible at all time.
- Mask the caution label completely when painting.
- Do not use thinner or solvent when wiping off the caution label.
- If the caution label becomes dirty or scratched, replace with a new caution label.

Please contact HMC or Hino authorized dealer if a new caution label is required.

Refer to “FUEL TANK” in Chapter 10 for installing position of Fuel Tank.

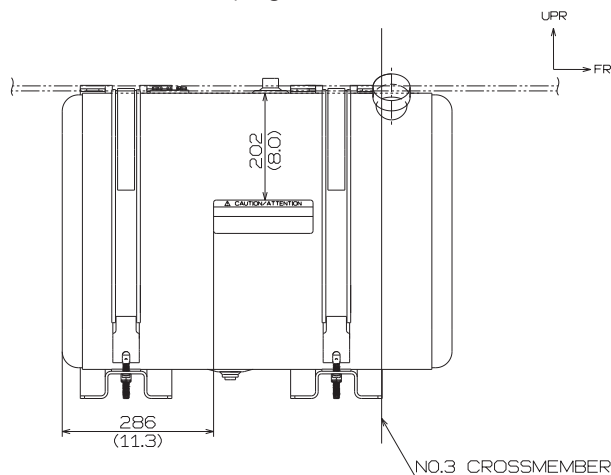
- Location of Caution Label

CAPACITY : 190L (50gal)



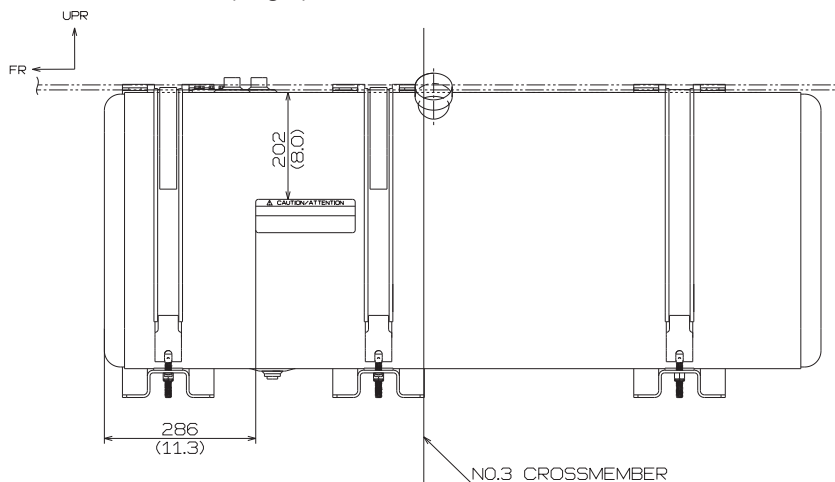
LH SIDE VIEW

CAPACITY : 190L (50gal, ADDITIONAL TANK : OPT)



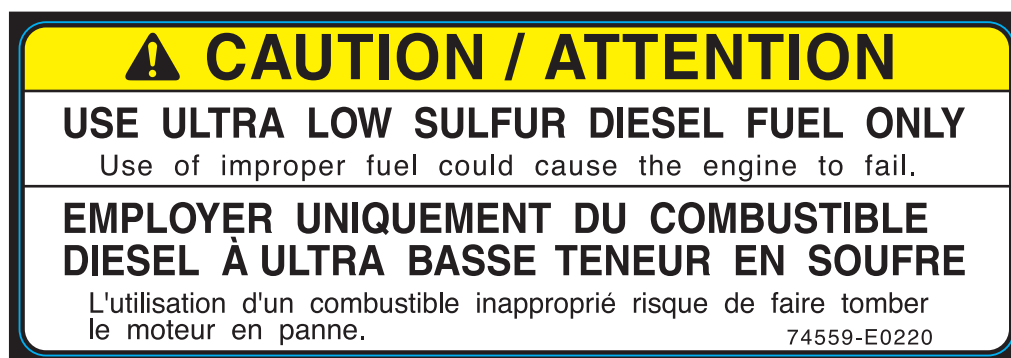
RH SIDE VIEW

CAPACITY : 341L (90gal)



LH SIDE VIEW

- Detail of Caution Label



PART No. 74559 - E0220

## 7. INSTALLATION OF FENDER AND MUDGUARD

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Refer to “MOUNTING OF REAR FENDER AND MUDGUARD” in Chapter 6, determine the dimensions of the fender and the underside of the floor so that the fender will not contact the tires.

The use of tire chains also should be taken into consideration.

The mudguards also should be installed by referring to the above-mentioned chapter.



## 8. WELDING WORK

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Turn the starter switch to “LOCK” position, wait at least 10 minutes, and disconnect the negative terminal of battery before start welding work.

Electric equipments such as ABS-ECU and Engine control computer and other electric parts which always need electric power are connected directly to the battery and the ground.

If the welding is performed in this condition, an electric current of welding may flow reversely into the electric parts from their ground circuit resulting in damage to the electric parts.

Since welded parts becomes extremely hot and sparks are present, dismount the fuel tank or batteries when welding near those units. Make sure that there are no items present such as harnesses, nylon tubes, pipes, resin clips for piping, suspension components such as spring brackets and spring leaves which may be damaged.

Do not arc strike on the chassis frame flanges.

Do not weld any components such as engine, transmission, axle, spring, propeller shaft, or steering. Do not weld any body parts or mounting brackets on the chassis frame for mounting of the rear body.

Avoid welding additional parts onto the chassis frame except for parts used for the purpose of reinforcement.

The ground of the arc welding machine must be connected to a low resistance parts such as the side rail.

Never connect the ground to plated parts such as fuel pipes, brake pipes or exhaust pipe.

When ground to the side rail, be sure to scrape off the paint and apply under coat paint after work.

Welding processing to avoid damaging of Hino chassis electric parts.  
Be sure to observe the following precautions when operating electric welding

## Welding Process

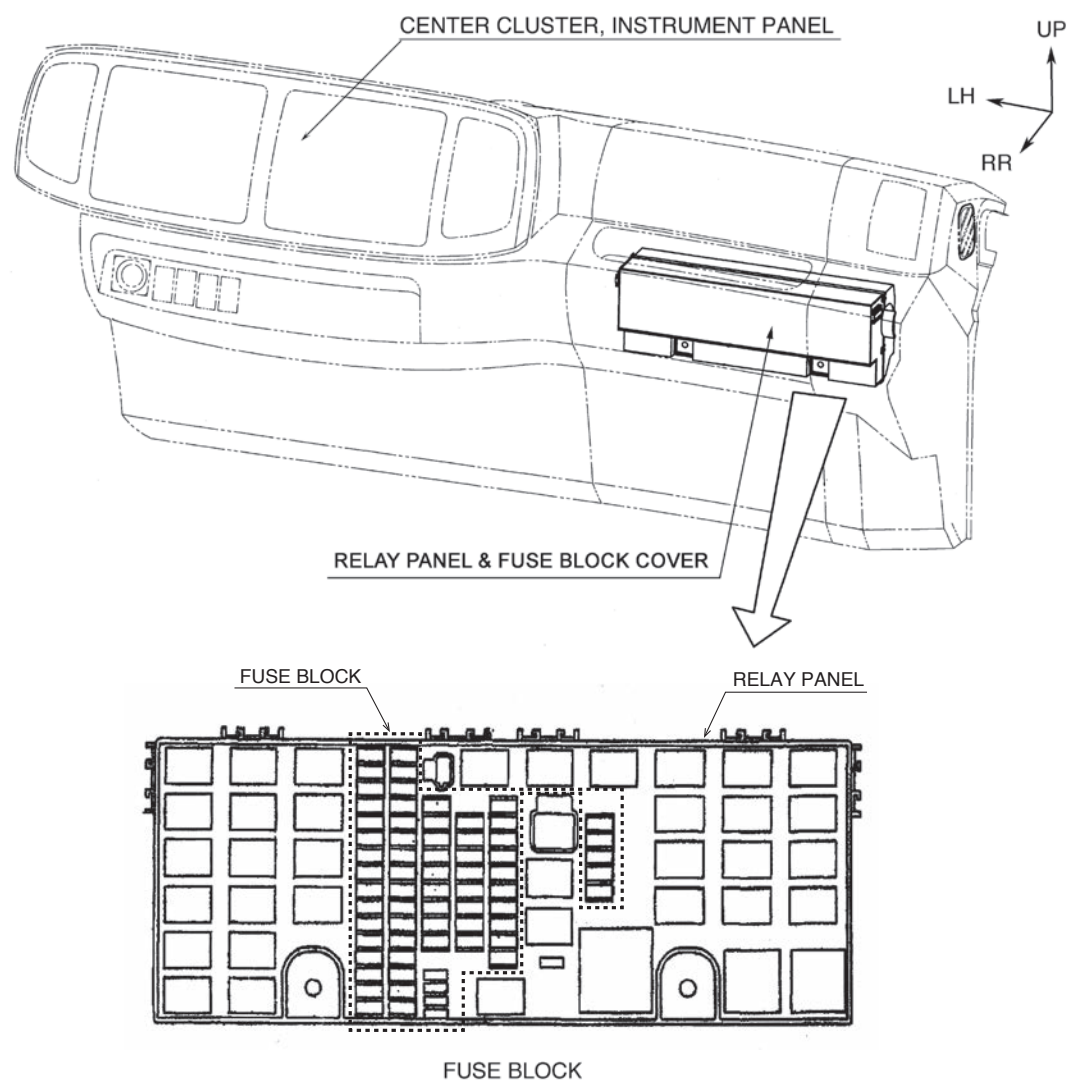
### Procedure before Welding

- Turn the starter switch to “LOCK” position.
- Wait 10 minutes.
- Disconnect the negative terminal of the battery.
- Disconnect the ABS-ECU connector.
- Disconnect fuse of ECU of each electric equipment.

See the figure below for the detail of position of fuse block.

### Location of fuse block

The fuse block is located inside the instrument panel as shown below.



See the “FUSE BLOCK, RELAY PANEL AND FUSIBLE LINK BLOCK” in Chapter 7 for detail of position of fuse.

### Ground of the Welding Equipment

Connect the ground of the welding equipment near the location to be welded.

#### Welding to the chassis frame

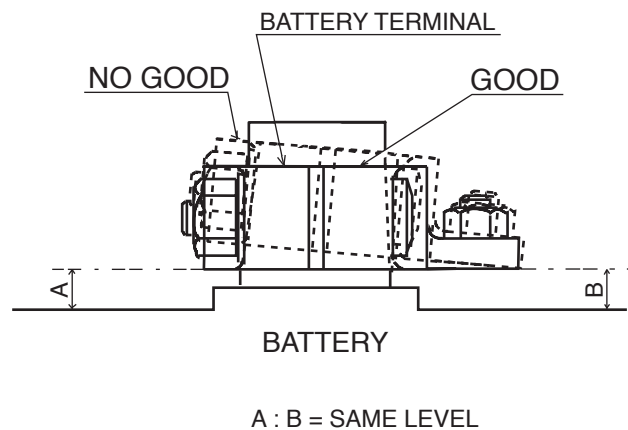
- Connect the ground to the bolt (plating bolt) or chassis frame near the place where to be welded.
- Remove component finish to be welded.
- Do not connect the ground to the chassis spring to prevent damage of spring.

### Other Precautions

- To protect ancillary equipment from sparks during welding, place fire-resistant covers over the rubber hoses, wire harness, pipes, chassis spring and tires, etc.
- Weld under proper conditions.  
Minimize the heat generation of the work area as much as possible to maintain the weld integrity.

### After Welding

- Reinstall fuses (s).
- Be sure to connect the negative terminal of the battery, and the terminal should be horizontal.



- Replace finish carried out in previous step where welding work was carried out. Finish should be of equal or greater quality and remain the same color.

### Final Inspection after Welding

- Reinstall each electronic equipment to original place.
- Inspect the operation and function of all electronic equipment.
- For the detail of inspection's procedure, please consult HMC or Hino authorized dealer.

## Summary of the TE system for Engine Control

The TE system (Total Electronic system) is installed in this vehicle.

This is a total electric control system developed for the purpose of totally controlling running condition of the engine and of developing the power of the engine to the maximum extent. The type of the system used on this vehicle is named “Common-rail Type Fuel Injection System”. As you will notice from this name, it uses a computer. Therefore, you are kindly requested to observe the above when welding.

See the following diagram for the outline of the system.

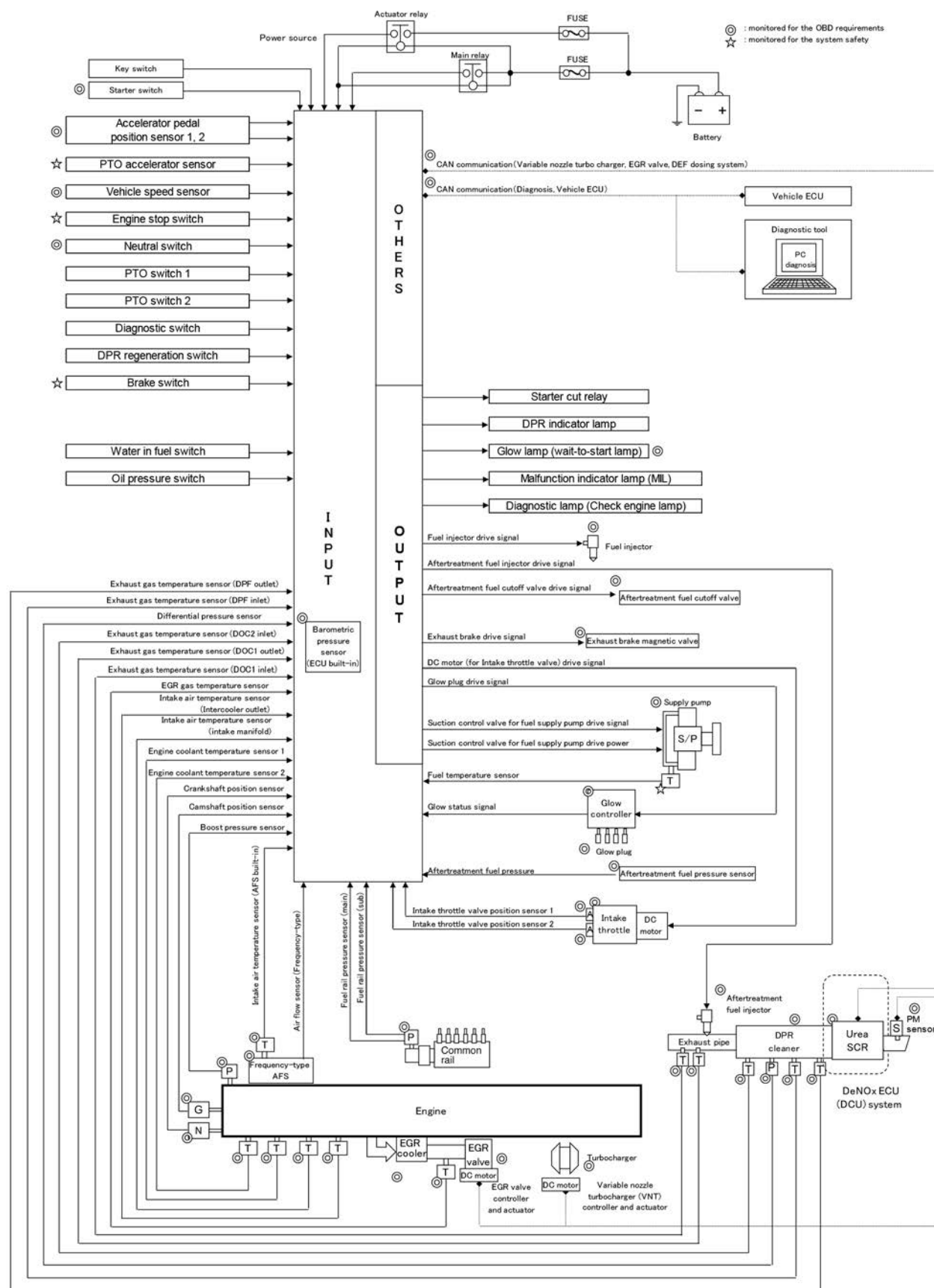
FEATURE COMBINATION TABLE

MODEL	ENGINE	COMMON-RAIL FUEL INJECTION	TACHOMETER DRIVE PULSE
ALL MODEL	J08E-WU & J08E-VB	●	●

When executing inspection services and repair works of your vehicle, be sure to observe the following instructions in order to protect the computer, harness wires, sensors, etc. of the TE system.

- Be sure to follow the all instruction to be described to “WELDING WORK” in Chapter 4 before performing any electric welding.
- Be sure to turn the starter switch to “LOCK” position before taking out or putting in a connector when proceeding to the said operation.
- Do not apply any modification to the computer, harness wires and sensors.
- Do not equip your vehicle with any illegal appliances such as a high-output wireless.

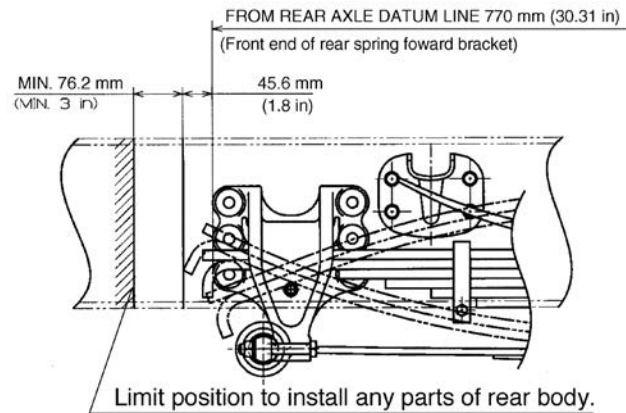
## TE SYSTEM DIAGRAM (FOR ALL MODEL)



## 9. MINIMUM CLEARANCE WITH REAR SPRING AND REAR SPRING HANGER

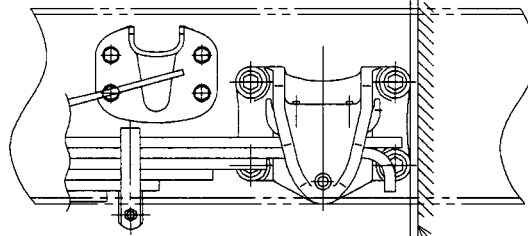
For Spring Suspension

Model : ALL



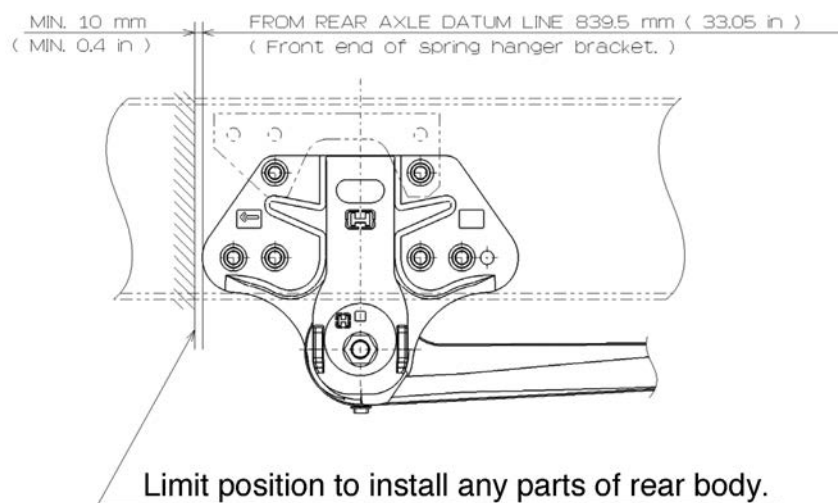
FROM REAR AXLE DATUM LINE 765.0 mm (30.12 in) (Rear end of rear spring rearward bracket.)

MIN. 10mm (MIN. 0.4 in)

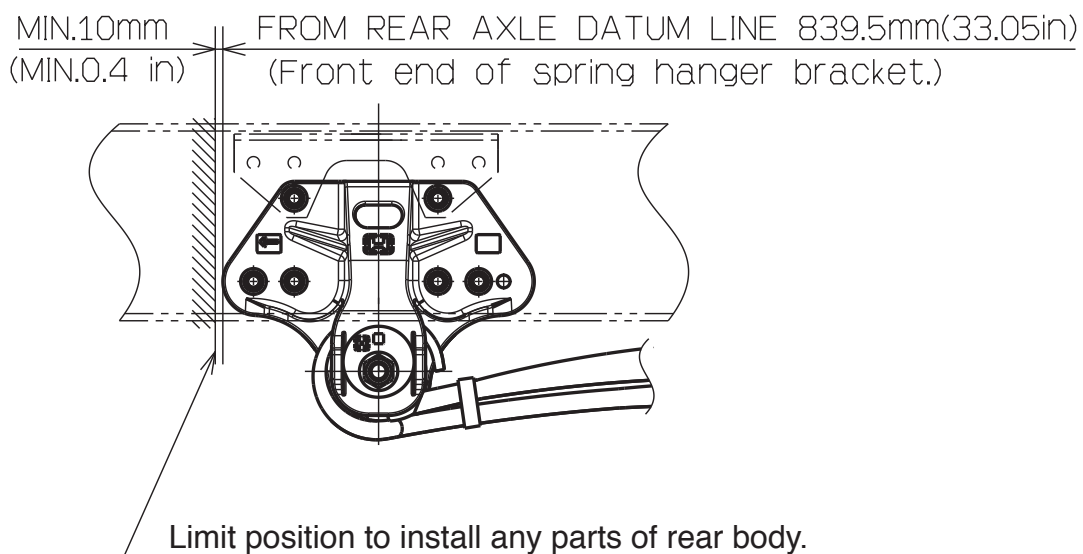


For Rear Air Suspension

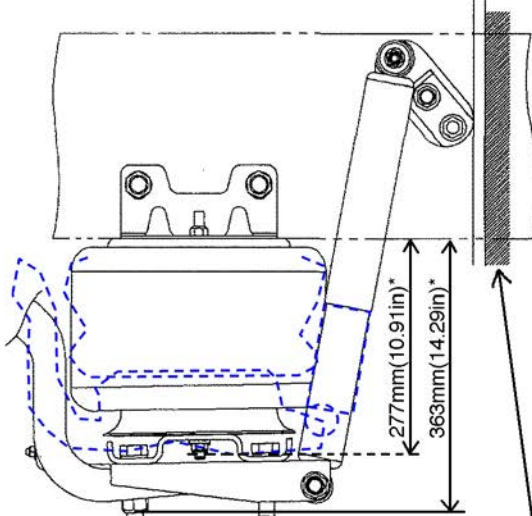
Model : NE, NJ, NF, NV &amp; NH



## • OPT : REINFORCED AIR SUSPENSION FOR MODEL NV &amp; NH



FROM REAR AXLE DATUM LINE 720.5mm (28.37 in)  
(Rear end of rear shock absorber bracket.) MIN. 15mm  
(MIN. 0.6 in)



Limit position to install any parts of rear body.

\*Design value

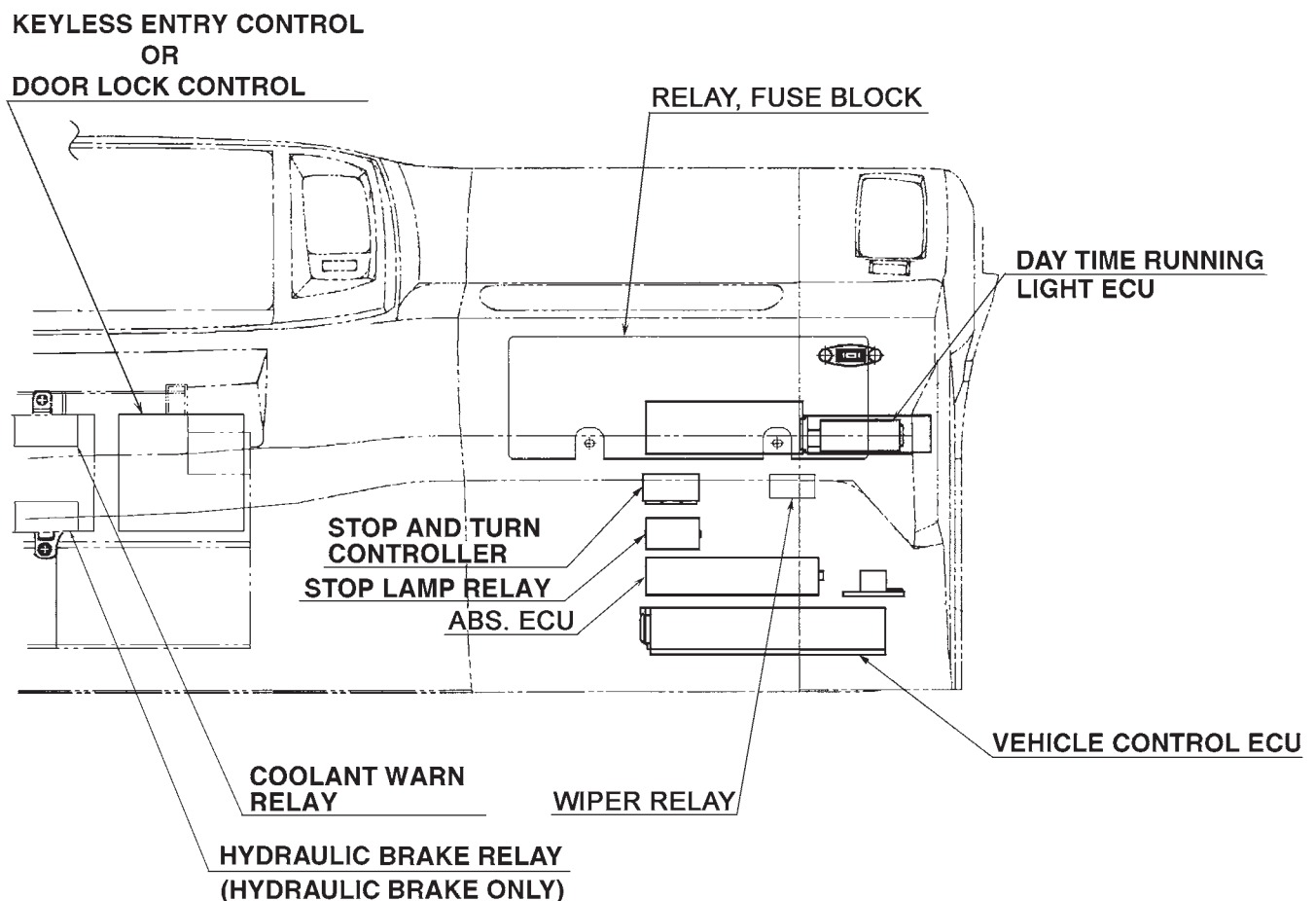


## 10. SYSTEM CONTROL COMPUTERS

Vehicle control, brake ABS and other control computers are installed on the right side of the instrument panel as described following figure.

Therefore, give great care to the computer when performing any body mounting work or modification as following points.

- Be sure to cover the computer to protect from water penetration when performing cleaning up the inside of cab.
- When installing such device as radiophone and wireless communication device, must use the device that built-in noise-killer such as condenser or diode, and install it on the place where from the computers and its harness as far as possible.  
Do not install any high output (over 50W) device.  
Be sure to check that no abnormal electric wave or electromagnetic wave is found, after having installed the device, which affects on the electronic signals passing through in computer harness.
- Do not alter the computer, harness wire and sensors (ex. acceleration sensor).
- As you will see on the following figure, various kind of computers are installed inside the cab, when fitting and modifying the inside of the cab, be careful not to give any shock to the vicinity of the computer.



## Engine control unit

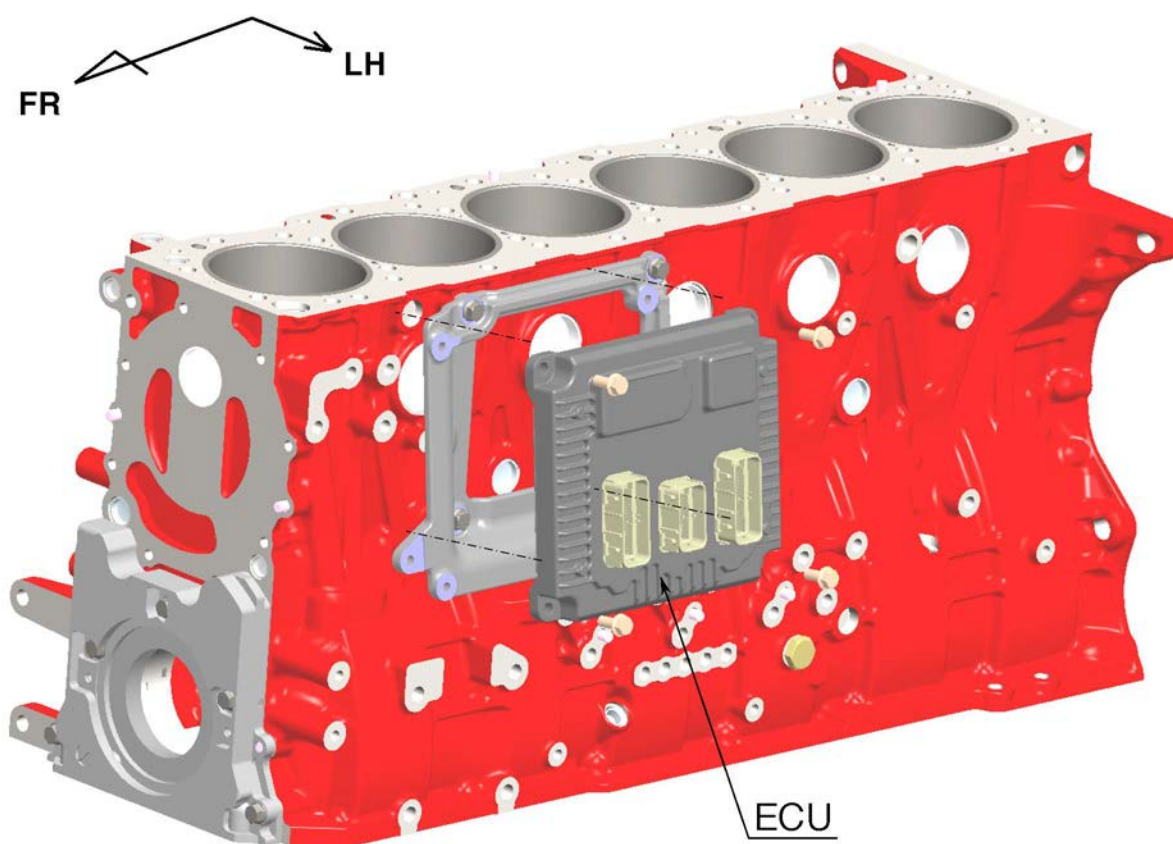
The engine control unit ( hereinafter termed ECU ), the connector and harness are installed in the left side of the cylinder block.

Never do the following work to the ECU, connector and harness.

- Alteration
- Remove
- Movement
- Paint

Be sure to observe the following instructions when mounting body or equipment.

- Do not give any shock to the ECU.
- Should put a cover on the ECU and connector to avoid a paint adhere to it when painting the engine.
- Do not put a cover around of the ECU to prevent deteriorating function by heat.
- Should put a cover on the ECU and connector to protect from water when washing the engine with water.

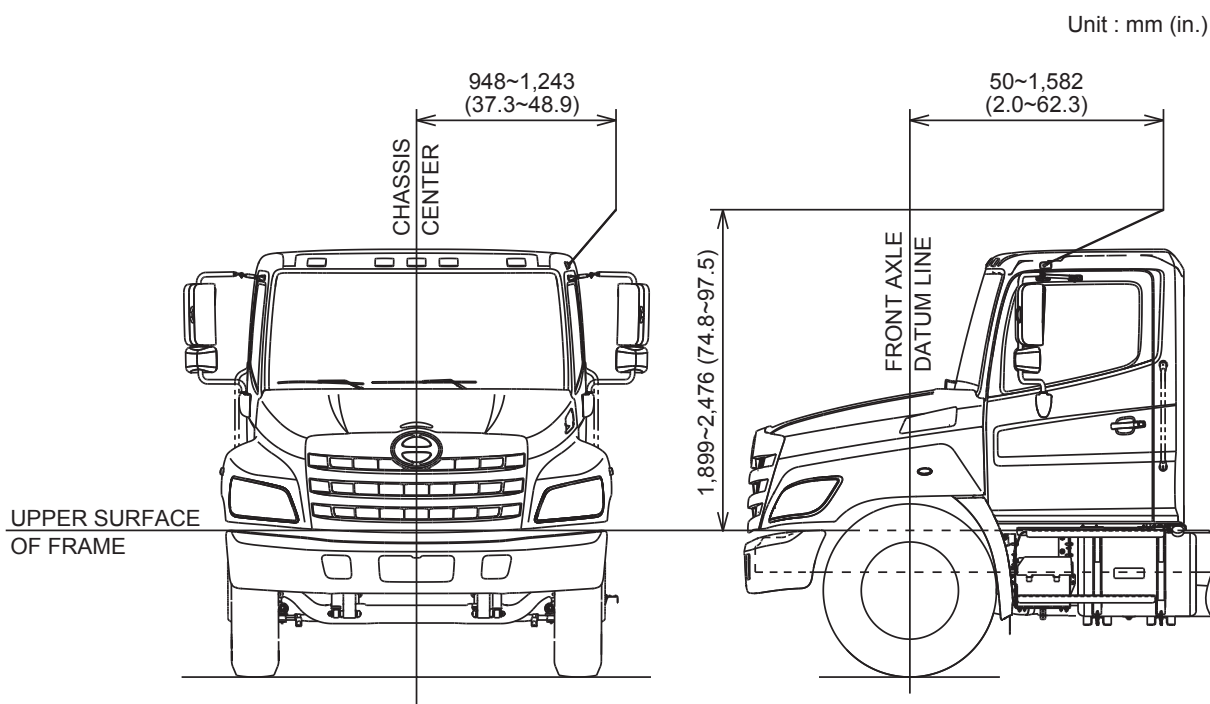


## 11. THE ANTENNA POSITION

The antenna which is installed on left corner top of the cab roof use right angle position in normal operation.

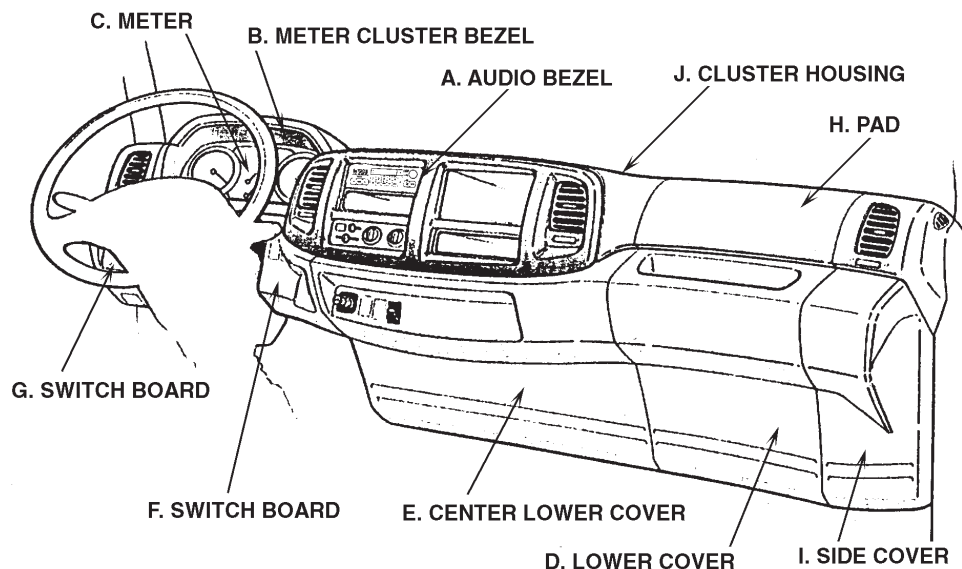
Make sure that do not obstruct the moving range of the antenna in described following figure when mounting rear body or equipment.

It may be cause of the noise or poor receiving of the radio if occur an interference with the antenna and rear body or equipment parts.

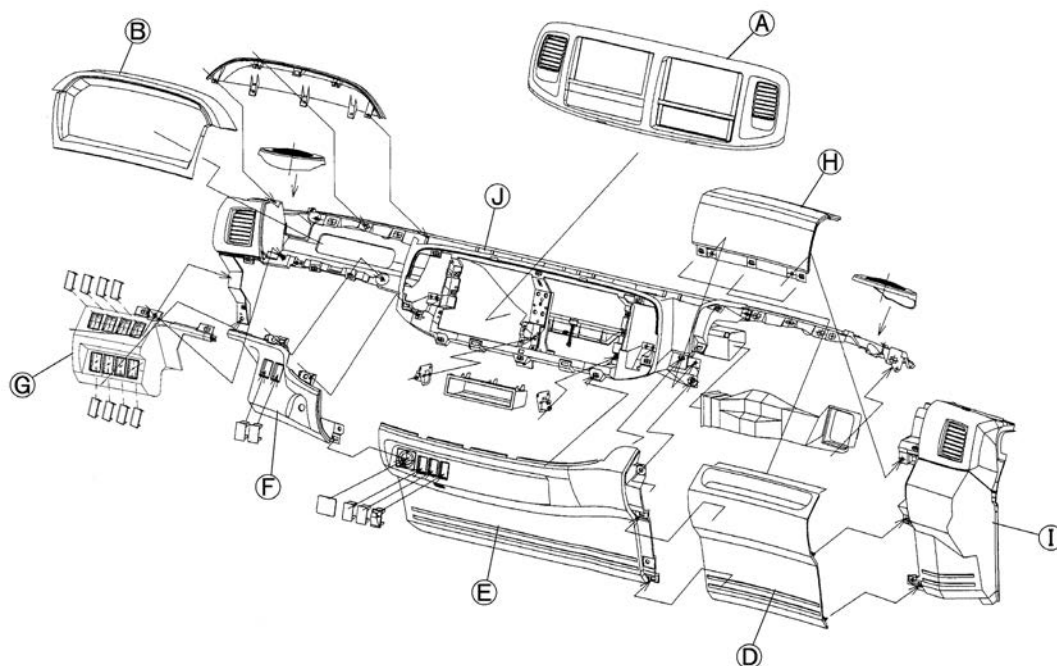


## 12. REMOVING THE INSTRUMENT PANEL

When removing the instrument panel for installation of electric parts such as relay fuse and etc. which are related with a mounted body, refer to the instructions mentioned below.



- “A” “B” “D” are to be removed individually.
- When removing “E” “F” “G”, be sure to remove all switches, cigarette lighter and throttle control before proceeding.
- When removing “H” “I”, can be done individually if “D” has been removed before proceeding.
- When removing “D”, pull at lower both end of the panel.
- For removing cluster housing (“J”) completely, be sure to remove “A” ~ “H” and following parts before proceeding.
  - \* Heater control
  - \* Audio
  - \* DIN pocket and installed parts of body in DIN pocket.



## 13. ADDITIONAL WIRING IN THE ENGINE COMPARTMENT

---

Since the engines in HINO chassis are covered with sound arrest plates, the engine compartment tends to heat up.

Avoid wiring in the engine compartment in the hood if possible.

Additional wiring harness or cable(s) should be kept away from heated elements, and should be routed along the original chassis harness.

## 14. RESETTING OF VEHICLE SPEED SENSING PULSE CONVERTER

---

In addition to the engine control etc., Hino chassis are equipped with such device as ABS that are obligatorily required by the CMVSS.

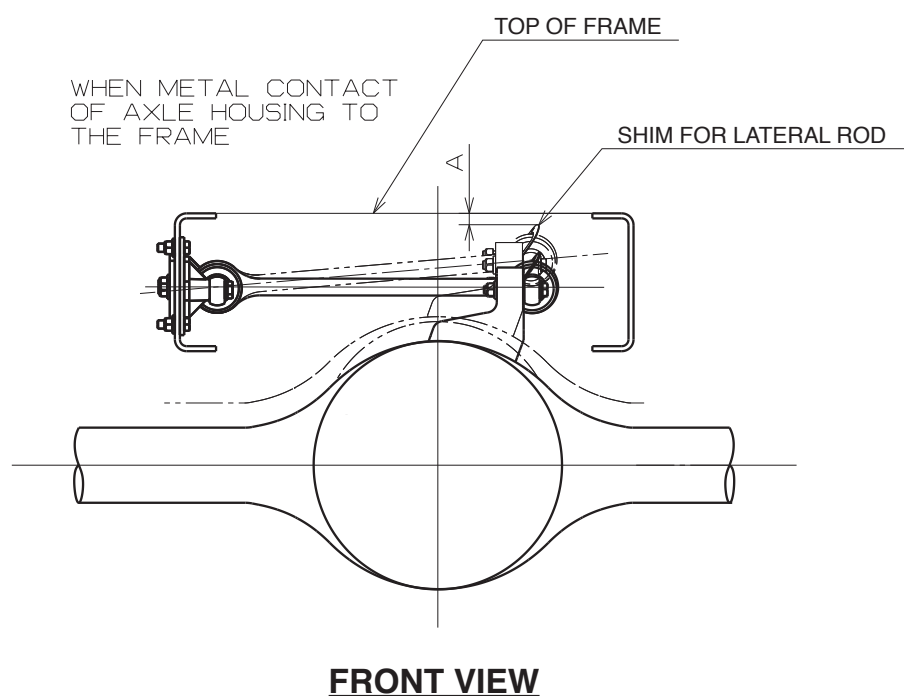
Never attempt to apply such modification as would be altered the vehicle speed conditions, as changing of rear axle ratios or tire sizes.

In the event that, you are obliged to apply those modification, please consult with HMC or Hino authorized dealer for any appropriate advice and, at the same time, don't forget to reset the PULSE CONVERTER for vehicle speed sensing.

## 15. MAXIMUM VERTICAL TRAVEL RANGE OF LATERAL ROD (REAR AIR SUSPENSION MODEL)

Measurement for maximum vertical travel range of the rear lateral rod is shown below.  
When mounting body or equipment, allow a clearance at least 30mm (1.2in.) between shim for lateral rod and body or equipment.

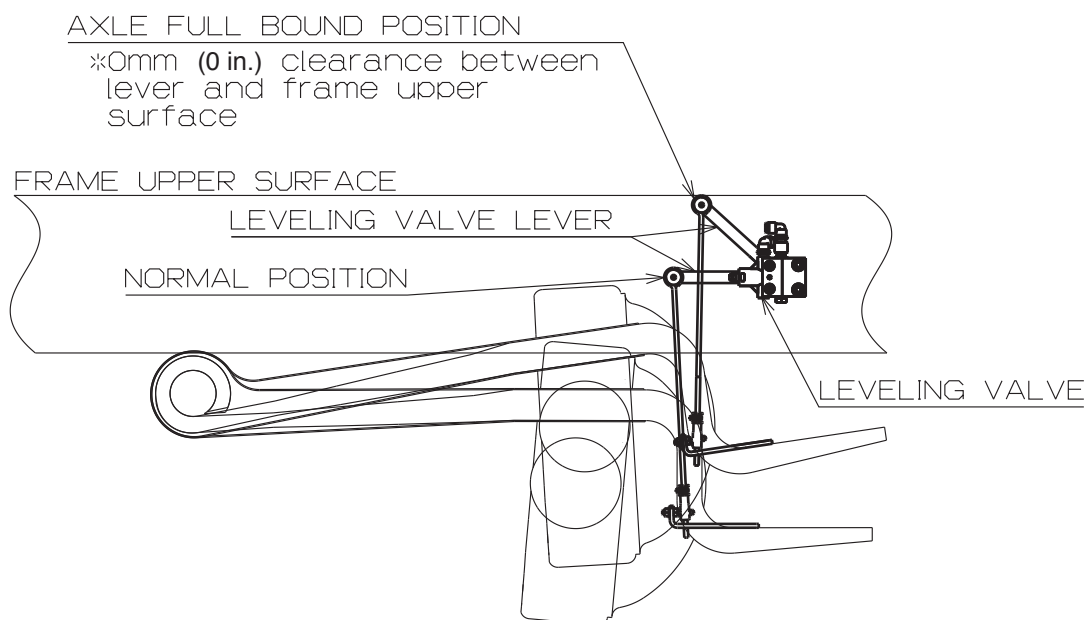
### VERTICAL TRAVEL RANGE OF REAR LATERAL ROD



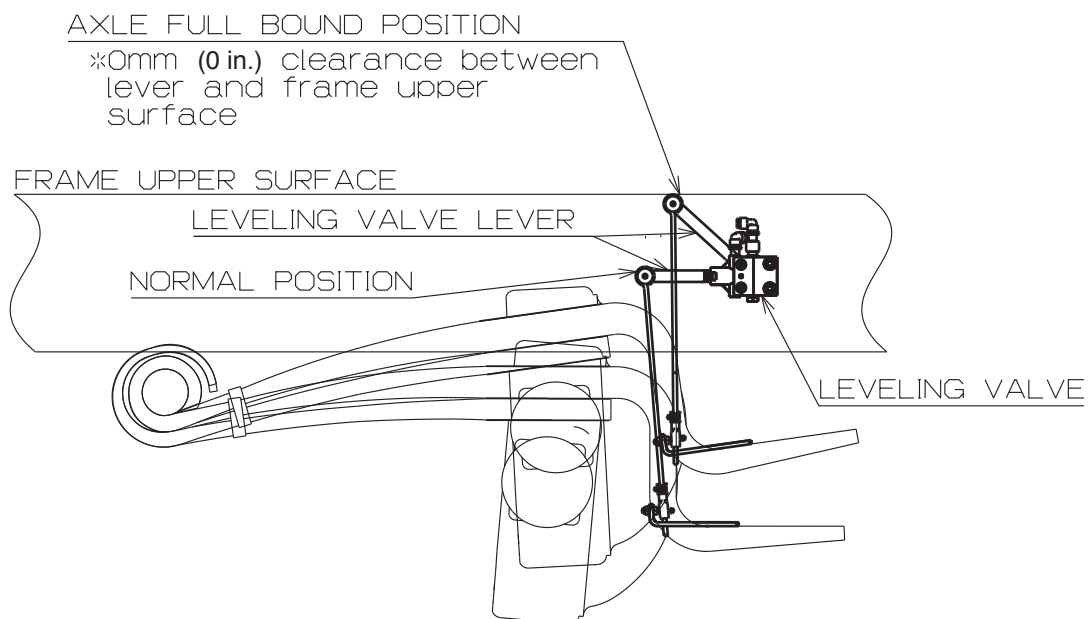
Model	Susp. Rating	A mm(in.)
NE / NJ	19000 lbs	9.8 (0.39)
NF / NV	21000 lbs	14 (0.55)
NV / NH	23000 lbs	9.6 (0.38)
NV / NH	23000 lbs (Reinforced air susp.)	27.9 (1.1)

## 16. LEVELING VALVE (REAR AIR SUSPENSION MODEL)

The leveling valve is installed with rear air suspension model to keep vehicle height. When mounting body or equipment, allow a clearance at least 30mm (1.2in.) between lever and body or equipment.



- OPT : REINFORCED AIR SUSPENSION FOR MODEL NF, NV & NH

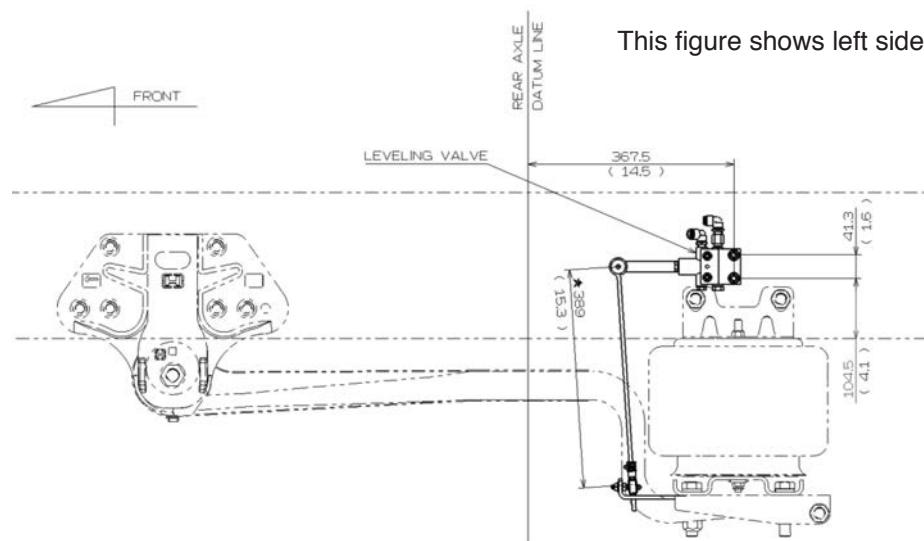




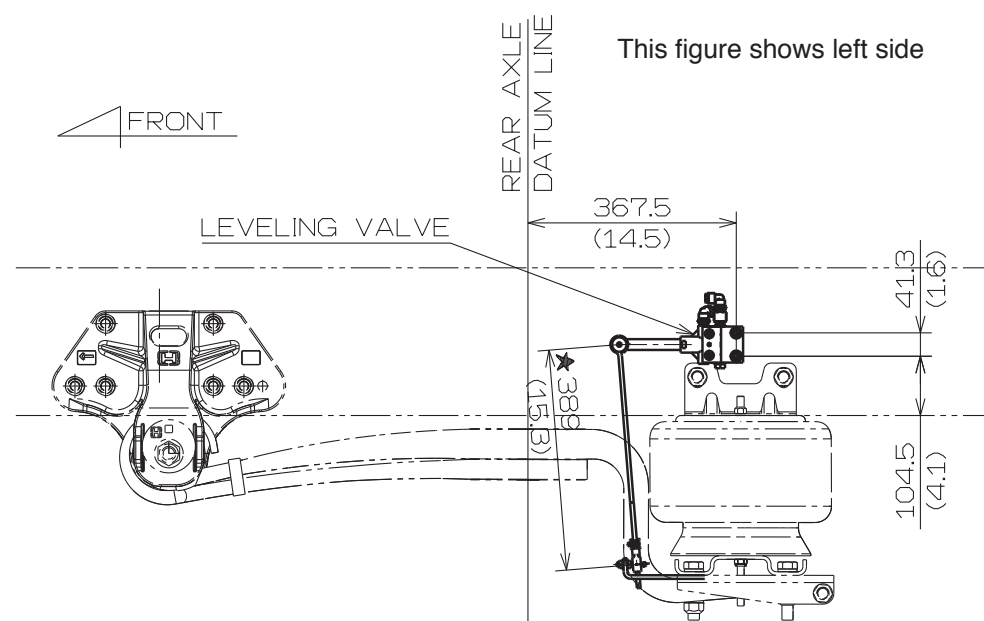
- The adjustment of Leveling Valve has already been made under the chassis condition before deliver the chassis to body or equipment manufacturer.  
Therefore, do not re-adjust and disassembly the Leveling Valve at the time or after rear body mounted.  
Should more detailed data or information regarding adjustment of Leveling Valve be needed, please contact HMC or Hino authorized dealer.
- Do not change the length of link rod.  
(Marked ★ as following figure)

Unit : mm (in.)

- STD : SINGLE LEVELING VALVE



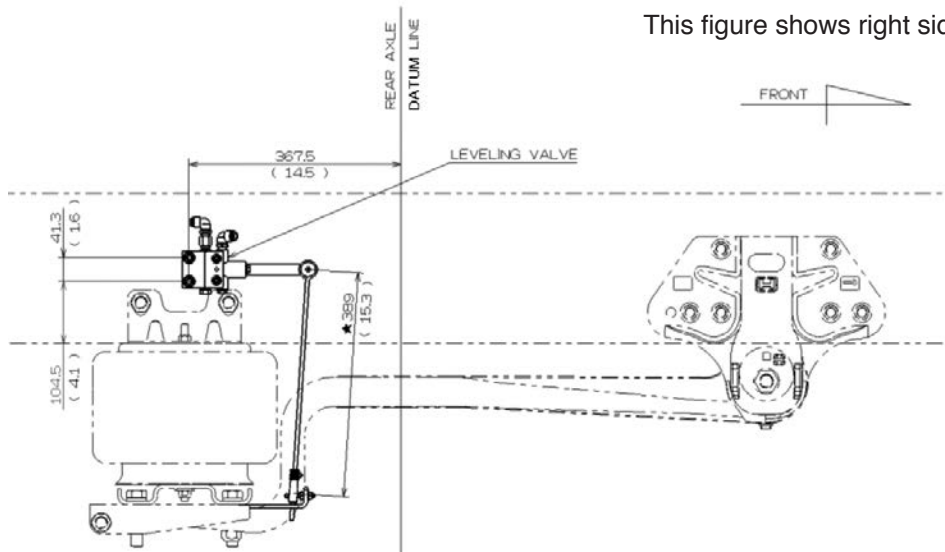
- OPT : REINFORCED AIR SUSPENSION  
& SINGLE LEVELING VALVE FOR MODEL NF, NV & NH



Unit : mm (in.)

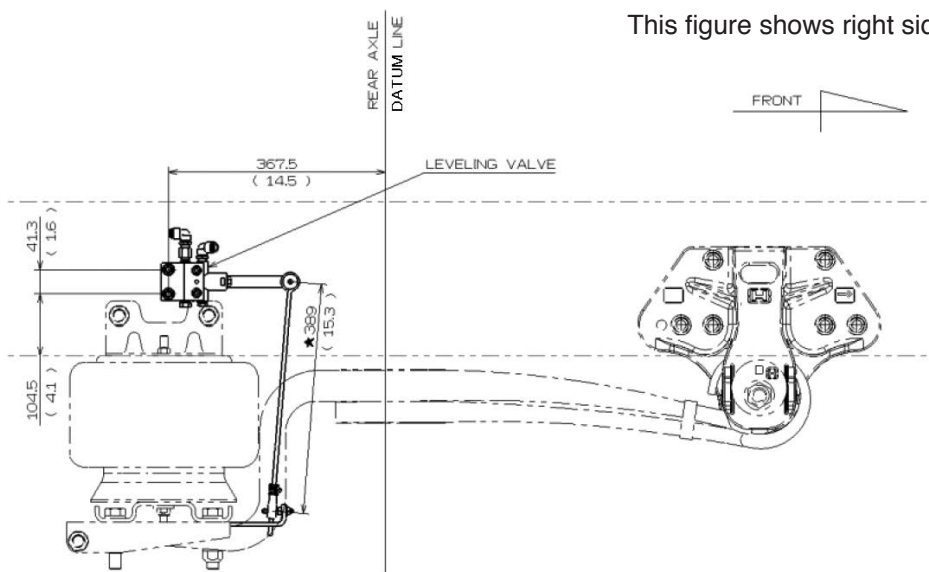
- OPT : DUAL LEVELING VALVE

This figure shows right side



- OPT : REINFORCED AIR SUSPENSION  
& DUAL LEVELING VALVE FOR MODEL NF, NV & NH

This figure shows right side



## 17. EXHAUST SYSTEM

The effect and interference of the heat from the exhaust system have a significant influence to safety. Maintain adequate clearances between component of the exhaust system and a body or equipment, measure the temperature of the component as necessary to check for safe operation.

### Clearances between Exhaust System Parts and Other Parts

The exhaust system become very hot during operation, therefore, be sure to observe the following instructions to prevent a unexpected problem.

- Clearances from a body or equipment  
Observe the precautions for mounting a body or equipment described here and when stated later.
- Clearances from fuel system parts  
Maintain a clearance at least 200mm (8.0 in.) between the fuel tank, fuel pipes and hot components of the exhaust system. If you cannot maintain the clearance 200mm (8.0 in.), fit heat shields or insulators to protect the fuel tank and fuel pipes. When arranging fuel piping, make sure that even if a fuel line ruptures and fuel leaks out, no fuel will come into contact with the hot components of the exhaust system.  
Never install connectors of the fuel pipes at the hot components or above of the exhaust system.
- Clearances from chassis parts other than fuel system parts  
If you cannot maintain the clearances described below, fit with heat insulators or heat shields.

CLEARANCE mm (in.)	CHASSIS PARTS
Min. 100 (4.0)	Air pipes, oil pipes
Min. 200 (8.0)	Electrical cables, rubber parts (rubber hoses, etc.), nylon tubes, resin parts, cables

## Precautions for Mounting a Body or Equipment

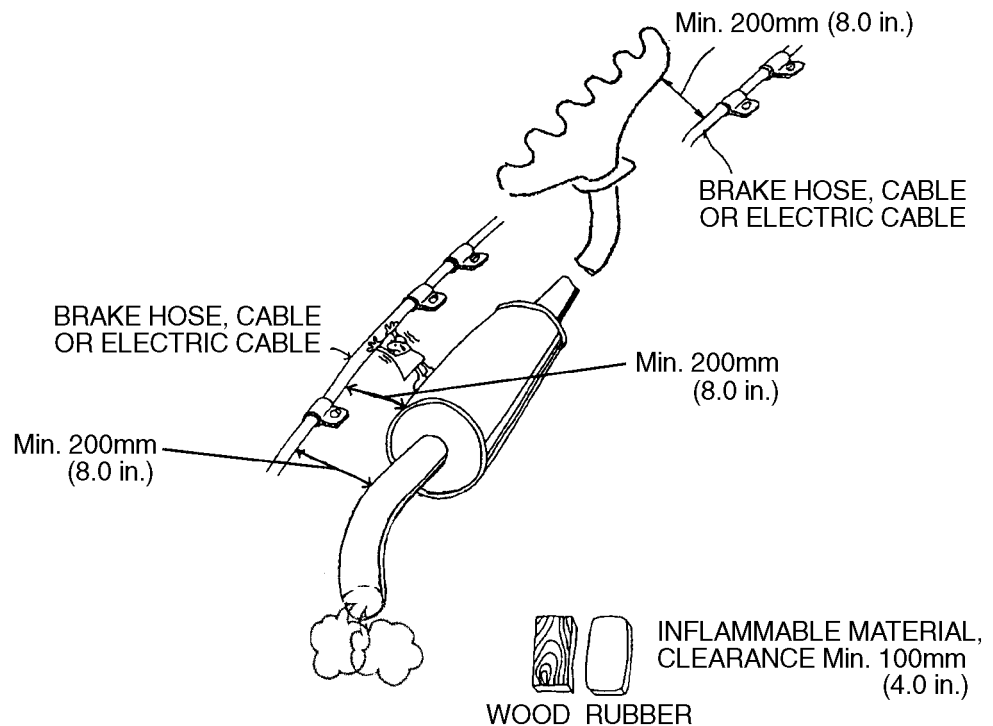
- When mounting a body or equipment, maintain the following clearances from the exhaust system.

For wood, rubber, and cloth maintain a clearance at least 100mm (4.0 in.).

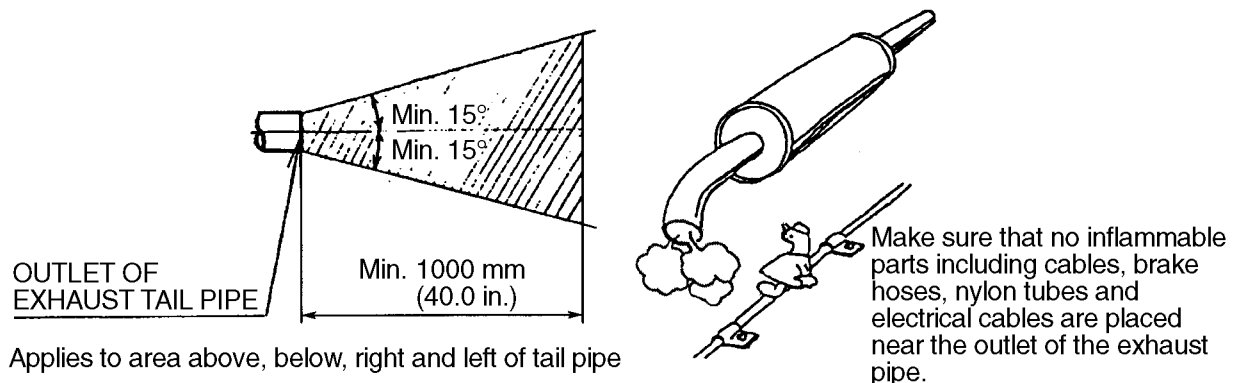
For cables, brake hoses, nylon tubes, electrical harness, and resin parts maintain a clearance at least 200mm (8.0 in.).

If it is impossible to maintain the above clearances, fit heat insulators or heat shields between the relevant parts, or measure the temperature of the exhaust system to ensure safe operation.

When the heat insulators are removed during installation, be sure to reinstall the heat insulators or heat shields to their original position. Never paint the heat insulators or heat shields.

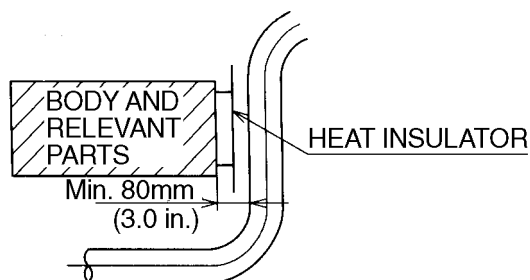


- When mounting equipment (tool box, etc.) or flammable objects behind the outlet of the tail pipe, avoid the shaded area shown below.



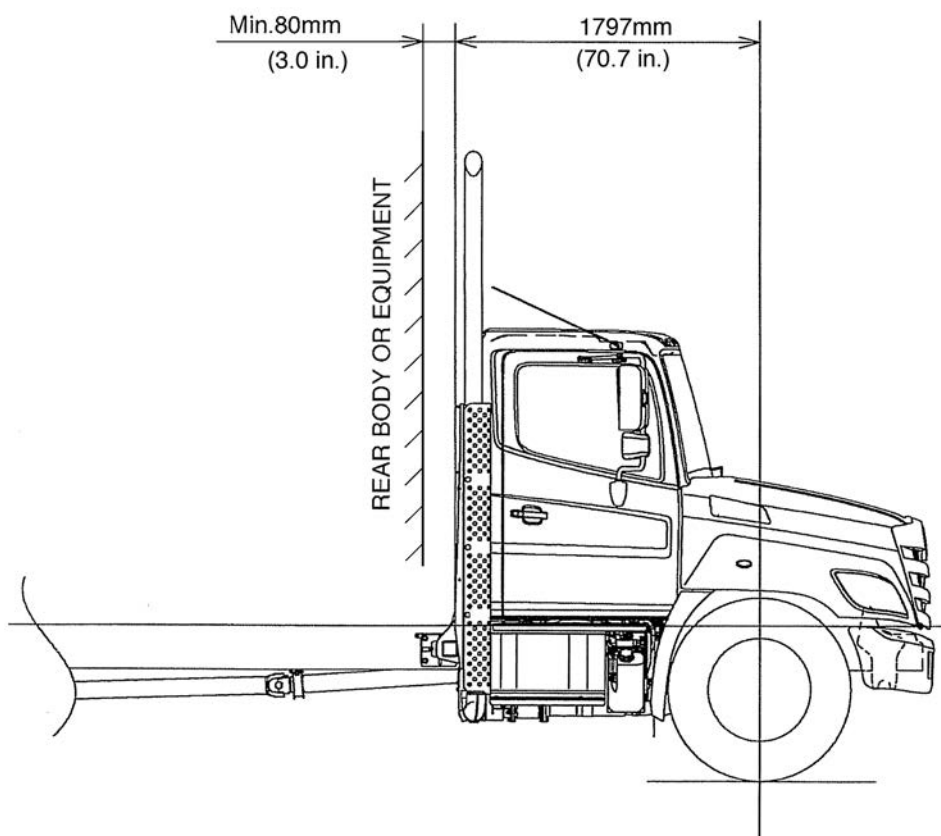
### When mounting a body or equipment above and ahead of the outlet of exhaust system

When mounting a body and relevant parts near the pipe, maintain a clearance at least 80mm (3.0 in.) from the pipe as shown in figure below. If it is impossible to maintain the clearance at least 80mm (3.0 in.), fit a heat insulator or heat shield between the relevant parts.



### Minimum Clearance with Vertical Exhaust Tail Pipe

When mounting the rear body or equipment, allow clearance at least 80mm (3.0 in.) with vertical exhaust tail pipe.



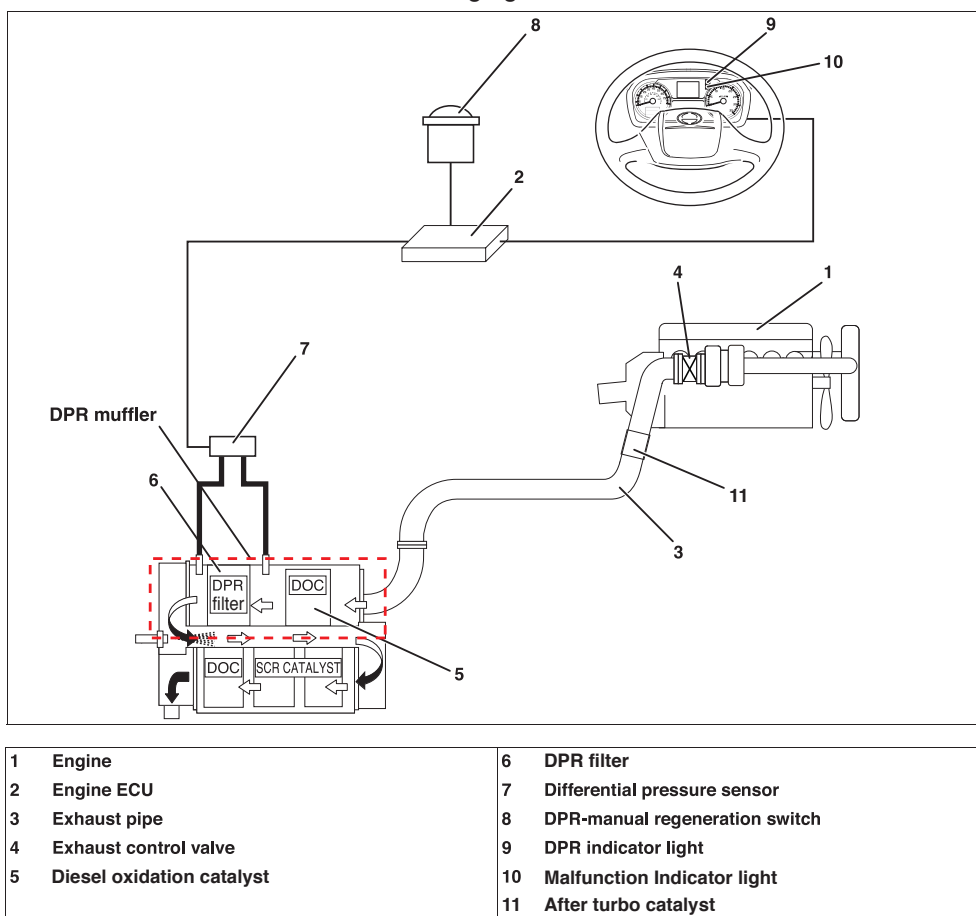
## 18. DPR FILTER

### DPR FILTER

(DPR = Diesel Particulate active Reduction system)

Outline of DPR Filter

Structure of DPR filter is shown following figure.



The DPR filter collects particulate matter found in exhaust gas and automatically burns them.

Be extra careful when refueling, refer to the “Fuel Caution Plate” attached on the instrument panel in the cab and on the fuel tank.

Working condition during driving.

The DPR automatically purifies particulate matter during normal operation.

This system is not negatively effect of vehicle operation.

Working condition during under operation.

- The purification of particulate matter.

When vehicle stops for traffic signal, the DPR may enter filter mode.

At this time, the engine idle speed may temporarily increase causing the exhaust brake to actuate.

- When idling for a long time.

To prevent emission of white smoke, idling speed will increase causing the exhaust brake to actuate if leave vehicle with idling for certain time. (approx. 1 hour.)

### Precautions

The DPR filter incorporate a catalyst that may be broken by mishandling or dropping. Take extra care when handling the DPR filter during mounting of a body or equipment. An exhaust gas differential pressure sensor and an exhaust temperature sensor are installed on muffler and a harness is attached to the sensor. When mounting the body, take extra care with these system.

If these parts are damaged, purification of particulate matter may not be performed sufficiently.

Filter may be removed and remounted for maintenance.

Place the parts of the body so that it is easy to remove and mount the filter.

Depending on how vehicle is operated, DPR indicator light may be flashing.

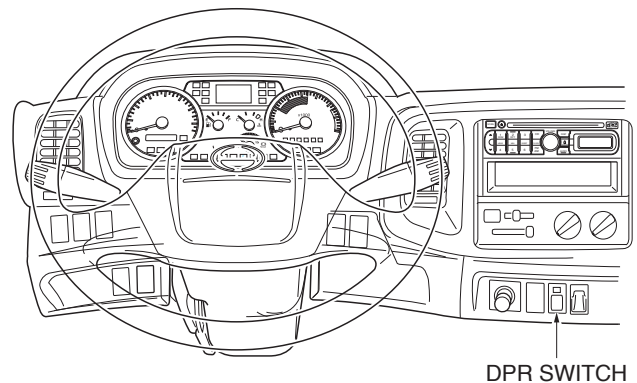
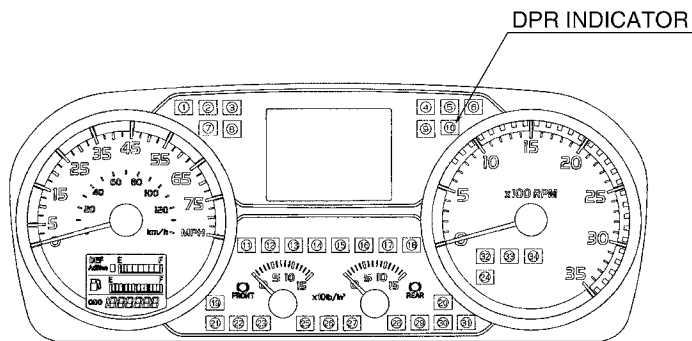
If the DPR indicator light is flashing, follow the instruction below within 150km (93miles).

To prevent fire, make sure there is no flammable matter near the exhaust pipe.

- Park vehicle in safe place.
- Do not stop the engine.
- Press the DPR switch shown below.

Confirm that the flashing DPR indicator light turns on and idle speed increases, wait for 15 to 30 minutes.

When the DPR indicator light goes off and the idle speed returns to normal, you can drive normally.



This instruction is to reproduce the function of DPR filter and it does not mean there is a problem.

However, if the vehicle is left with the flashing DPR indicator light on and engine runs long time, the check engine light will turn on and output power will be restricted in order to prevent damage to the DPR. If vehicle is used in one spot for body operation for a long time, it is necessary to make sure the DPR indicator light does not turn on.

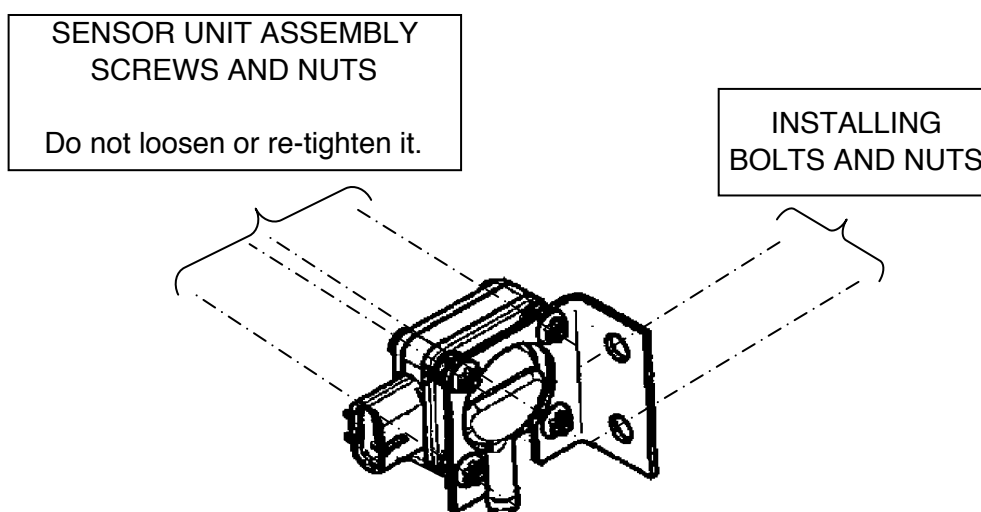
### Painting

Never paint the filter (DPR) and pressure sensor.

## PRESSURE SENSOR OF DPR FILTER

It is a precision instrument parts, therefore, be sure to observe the following precautions for mounted body or equipment.

- Do not shock to the sensor.
- Use hand tools to tighten or loosen the installing bolt and nut, do not use impact wrenches.
- Do not drop the sensor unit.
- Do not disassembly the sensor unit.

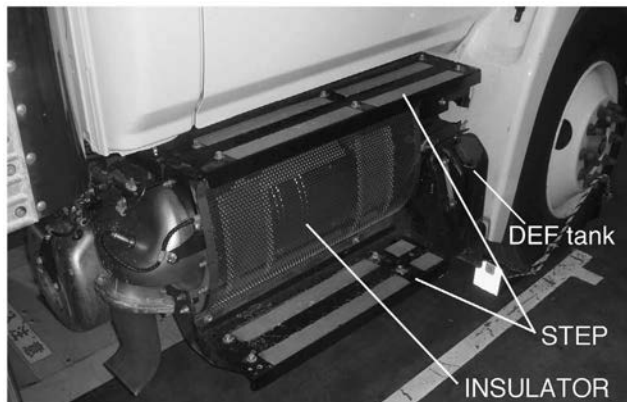


Do not use the sensor which is not handled according to these precautions above.



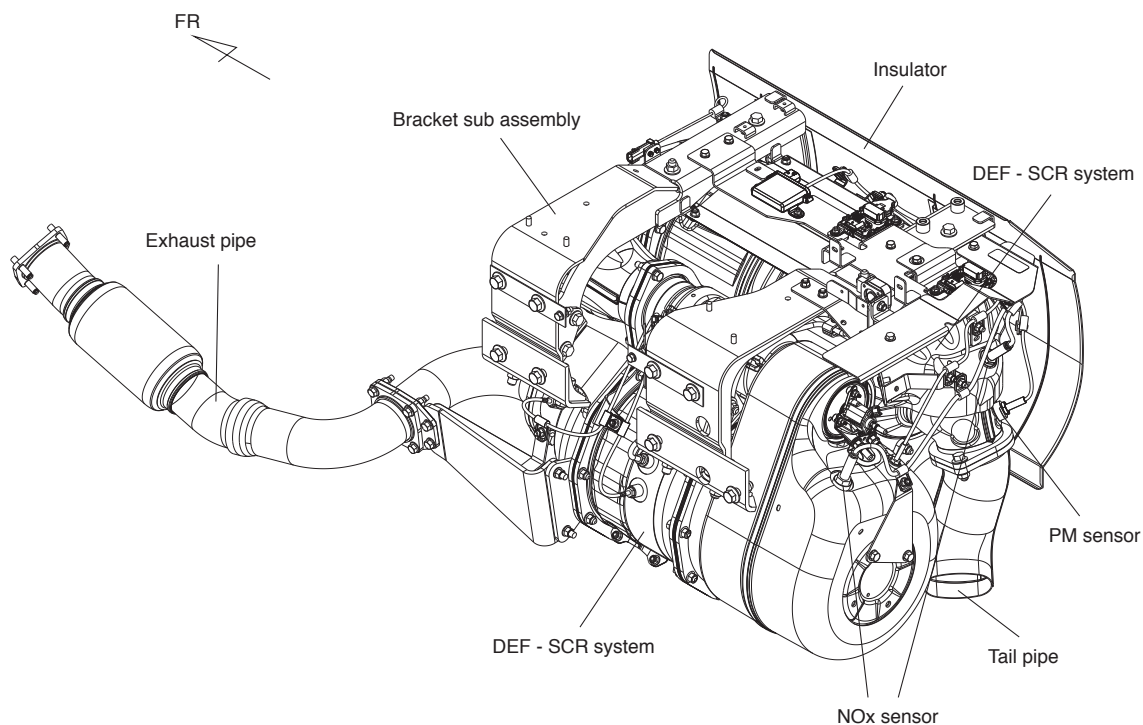
## 19. DEF - SCR SYSTEM

Be sure to observe the following instructions when mounting body or equipment.  
The DEF (Diesel Exhaust Fluid) - SCR (Selective Catalytic Reduction) system is installed for reducing NOx (nitrogen oxide) emission.  
DEF - SCR system is installed under the passenger side chassis step.  
See the picture below.



The state installed in vehicle

Detail of DEF - SCR system



## Precautions when body mounting and welding

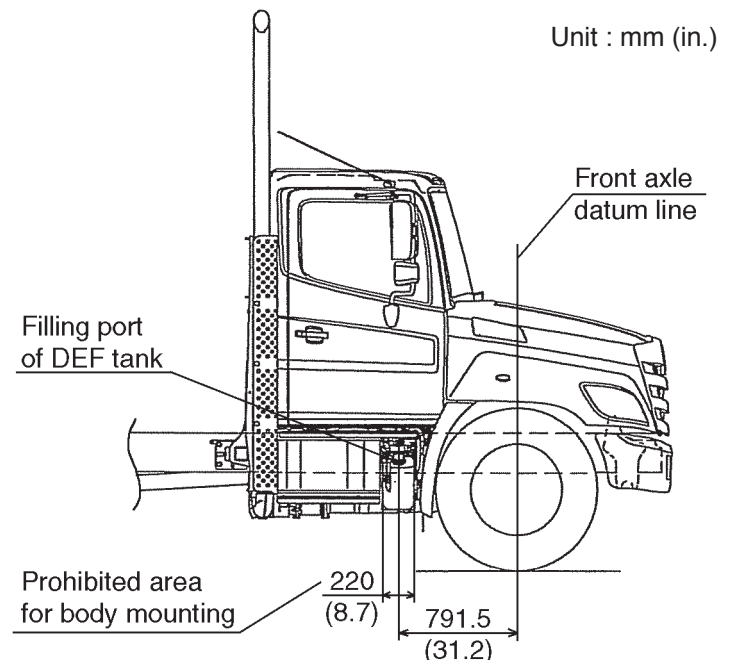
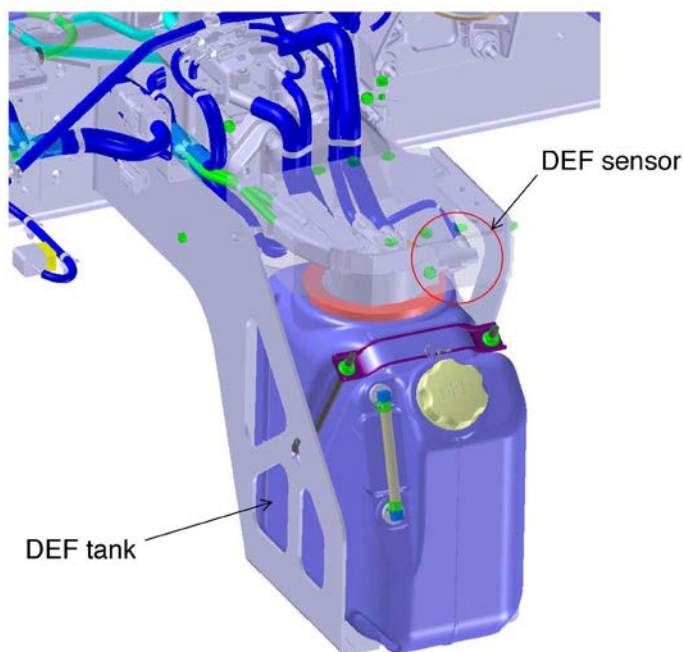
### WARNING

Removal, installing on different place, painting and modification of any parts of DEF - SCR system is prohibited.

- When mounting body and equipment, cover the whole system not to damage system parts, especially the sensor connectors of DEF, NOx and PM.
- Do not impact each system parts. Be careful not to impact the DEF tank because it is made of resin.
- When welding work, cover whole system with nonflammable material to avoid the damage by welding spatter, and the influence by heat.  
Before welding, turn the starter switch to "LOCK" position, wait at least 10 minutes, and disconnect the negative terminal of battery.
- Be sure to wait for at least ten minutes after the starter switch is turned to "LOCK" position before you disconnect the battery terminals from the battery, as DCU starts working for "After Run" after the starter switch is turned to "LOCK" position.  
Otherwise, DCU will not complete working properly (the DEF still remains in the exhaust gas after treatment system), which may result in the malfunction of DEF-SCR system.

### What is the meaning of After Run

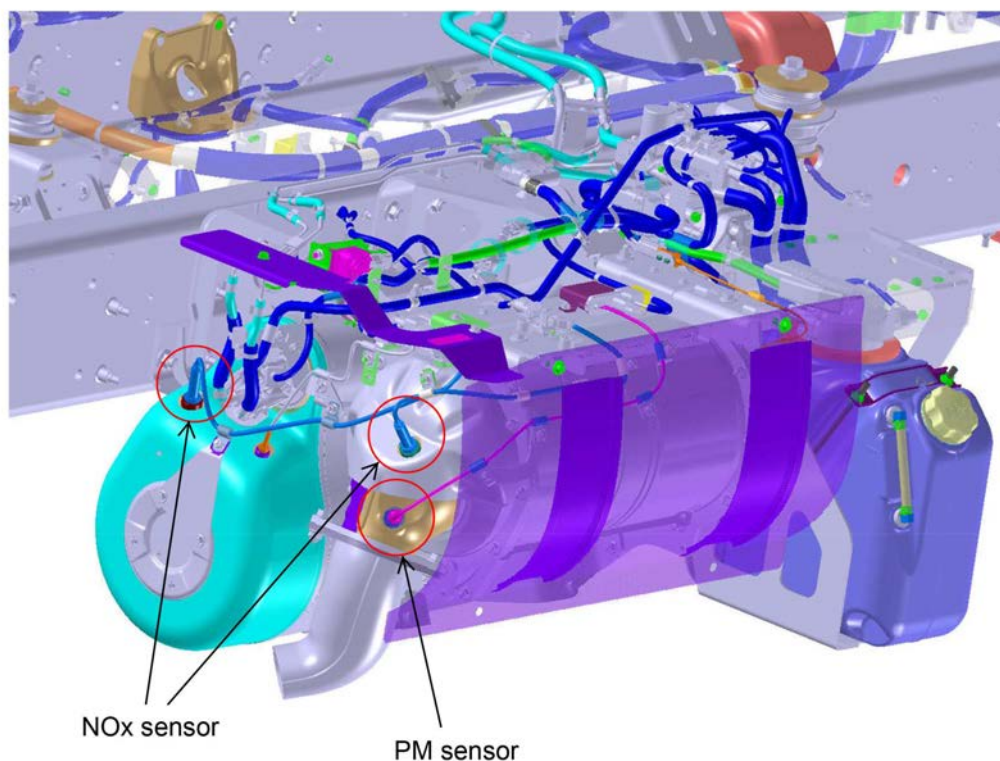
- After you turn the starter switch to "LOCK" position.
  - To avoid crystallizing of the DEF that remains in the DEF pump, injection and pipes, the exhaust gas after treatment system automatically returns the DEF to the DEF tank.
  - You can hear the sound of the DEF pump after you turn the starter switch to the "LOCK" position is proper actuation.
  - The time when the sound of the DEF pump can be heard may vary.
- If remove the DEF tank temporary when mounting body, should protect DEF sensor connector from water.
  - Around the filling port of DEF tank, body mounting or installing parts should not be done in a way to obstruct replenishing DEF.  
See the figure below.
  - If you need to replace any parts related to DEF- SCR system, use of Hino genuine parts is required for the proper function of DEF-SCR system.



## Precaution for NOx sensor and PM sensor

Do not disconnect the connectors of wire harness for DEF-SCR system when electric welding.  
If disconnect the connectors, it may be the cause of DEF-SCR system malfunction.

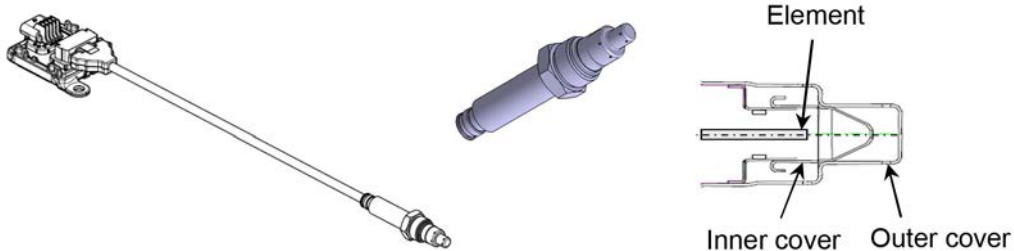
Detail for each position of sensor



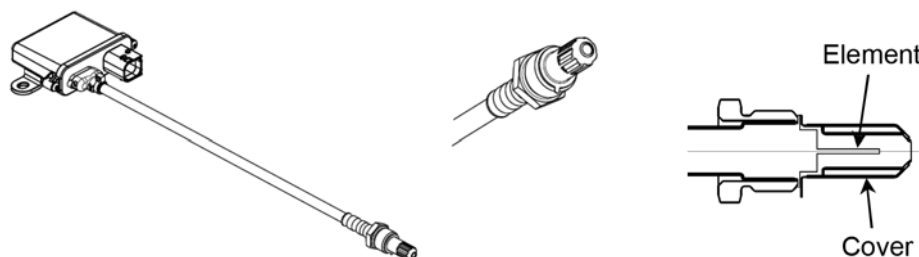
A sensor is precision instrument parts, therefore, do not shock and strong vibration to the sensor when mounting body.

The following figure shows detail of each sensor.

NOx sensor



PM sensor



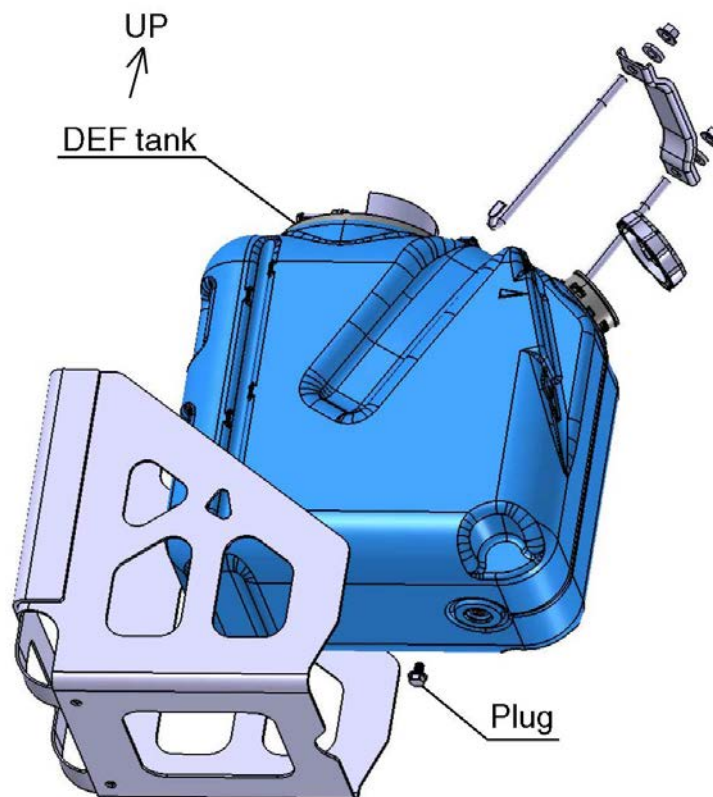
### Precautions when painting

In the case of natural drying, in order to prevent adhesion of a paint, cover the whole system.  
In the case of forced drying such as drying in dry oven, drying temperature must be under 80°C (176°F) because allowable heat limit of the DEF tank is 80°C (176°F).  
Also, extract DEF completely from the DEF tank and cover whole system with heat-resistant material.

### Precautions when extract DEF

Extract DEF after finishing After Run.  
Do not re-use the extracted DEF.  
Caution should be exercised during fluid extraction. If particulate matter is dislodged from the tank during extraction, the particulate matter needs to be removed from the tank. Failure to remove the particulate matter could cause damage other components.  
Always use API certified DEF for replenishment of the DEF tank.

See the figure below for detail of DEF tank.



## Precautions for DEF

Always use API certified DEF for replenishment of the DEF tank.

Don't replenish the tank with DEF diluted even if it was API certified DEF.

Never replenish the tank with diesel fuel, kerosene, gasoline or other fluid than API certified DEF.

Use of the abovementioned unsuitable fluid causes not only the fall of an exhaust gas purification function but failure of each parts of DEF-SCR system.

If you replenish the tank with the fluid other than API certified DEF by mistake, extract the fluid completely and replenish the tank with API certified DEF before starting engine.

Never heat, dilute and never mix with non-approved or other fluids.

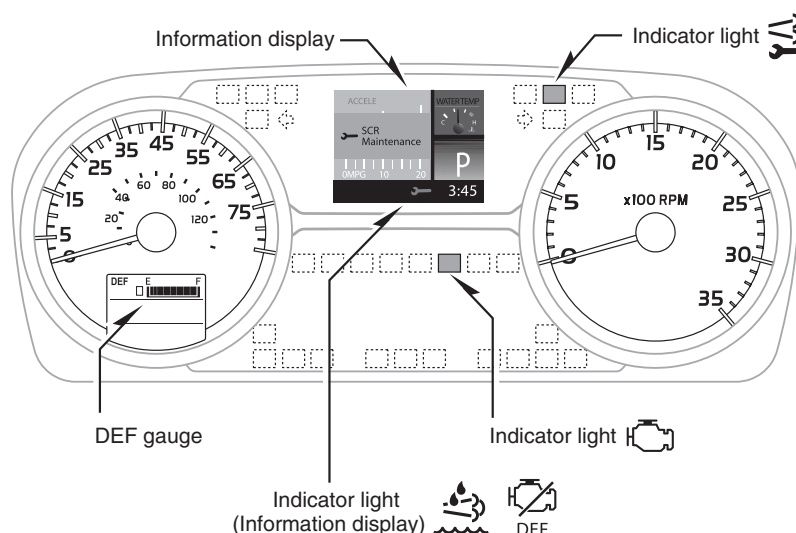
## Precautions when handling DEF

Observe the following precautions when handling DEF.

- Put on the appropriate protective equipment (ex. safety goggles, rubber gloves and etc.).
- If DEF goes into eyes or adheres to the skin, wash 15 minutes or more with a lot of effluent immediately, and receive diagnosis of a doctor.
- Although there may be a smell like ammonia in DEF, there is no inconvenience in use.
- Wipe off DEF adhering to the floor, the body, a container, etc. with a rag securely. DEF is dried and crystallized. Crystallized DEF corrodes the metal side where it is not painted if it adheres.
- Do not drain DEF into the environment and it should be treated like an industrial waste.

## Indicator light on the meter panel

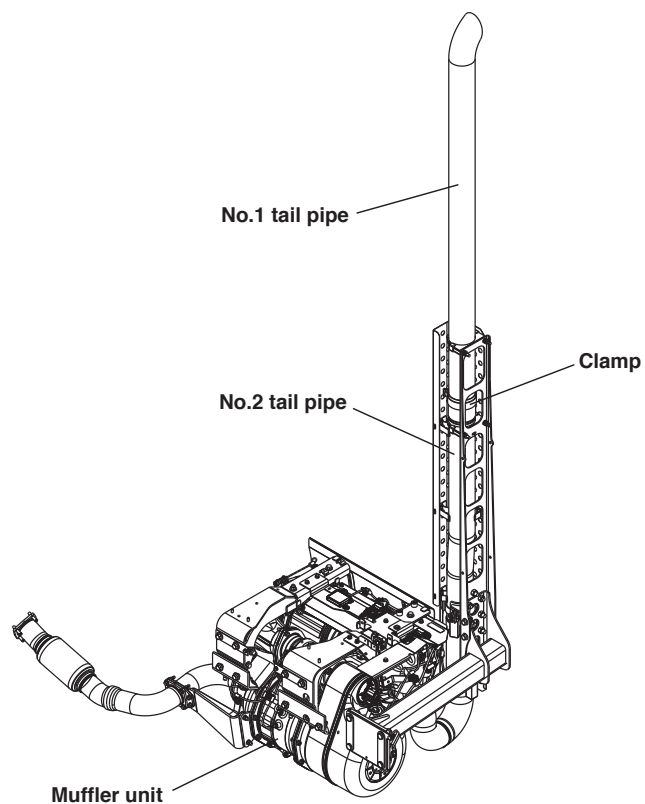
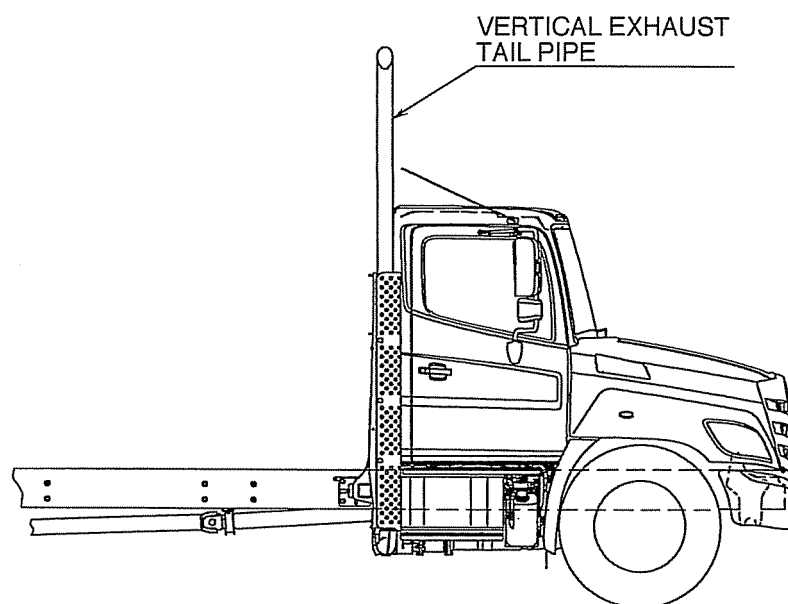
After finishing body mounting and when starting the engine, if following indicator light on the meter panel goes on do as the instruction of safety label which is attached on the cover of overhead console or contact HMC or Hino authorized dealer.





## 20. VERTICAL EXHAUST TAIL PIPE

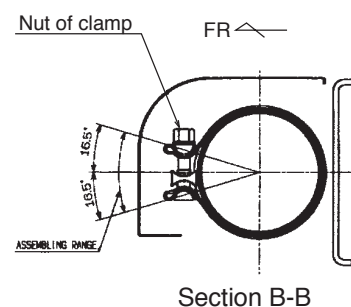
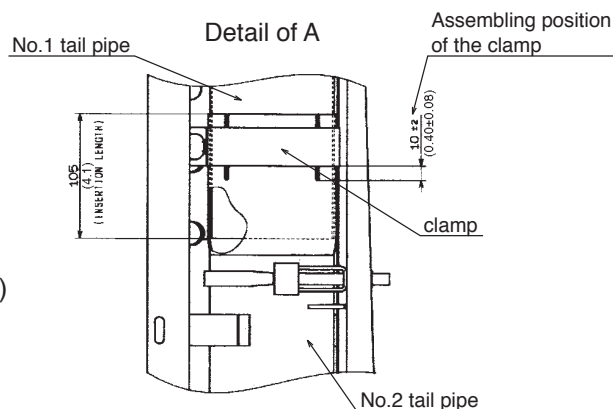
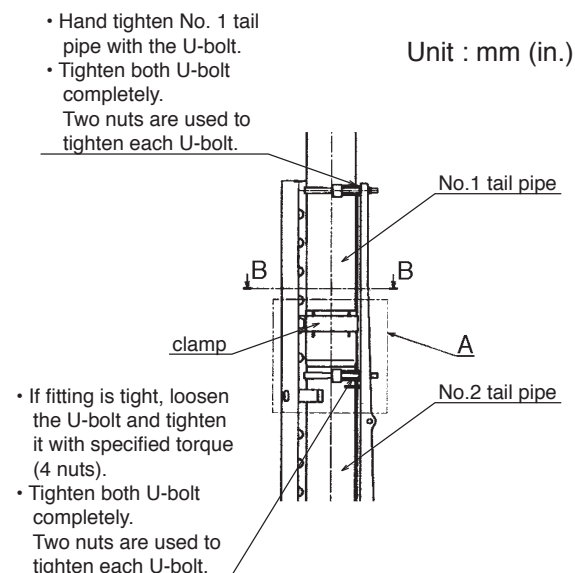
Prior to delivering the vehicle, assemble the vertical exhaust tail pipe as outlined in the following procedure.



## Assembly Procedure

Park the vehicle, apply the parking brake, and apply wheel chocks at the front or rear tires. After stopped the engine, wait until the tail pipe cools adequately before starting the work. Make sure to be careful, for the location of tail to install is in a high position. If you drop foreign matter inside the tail pipe, contact a Hino dealer and have the foreign matter removed by taking off the lower tail pipe.

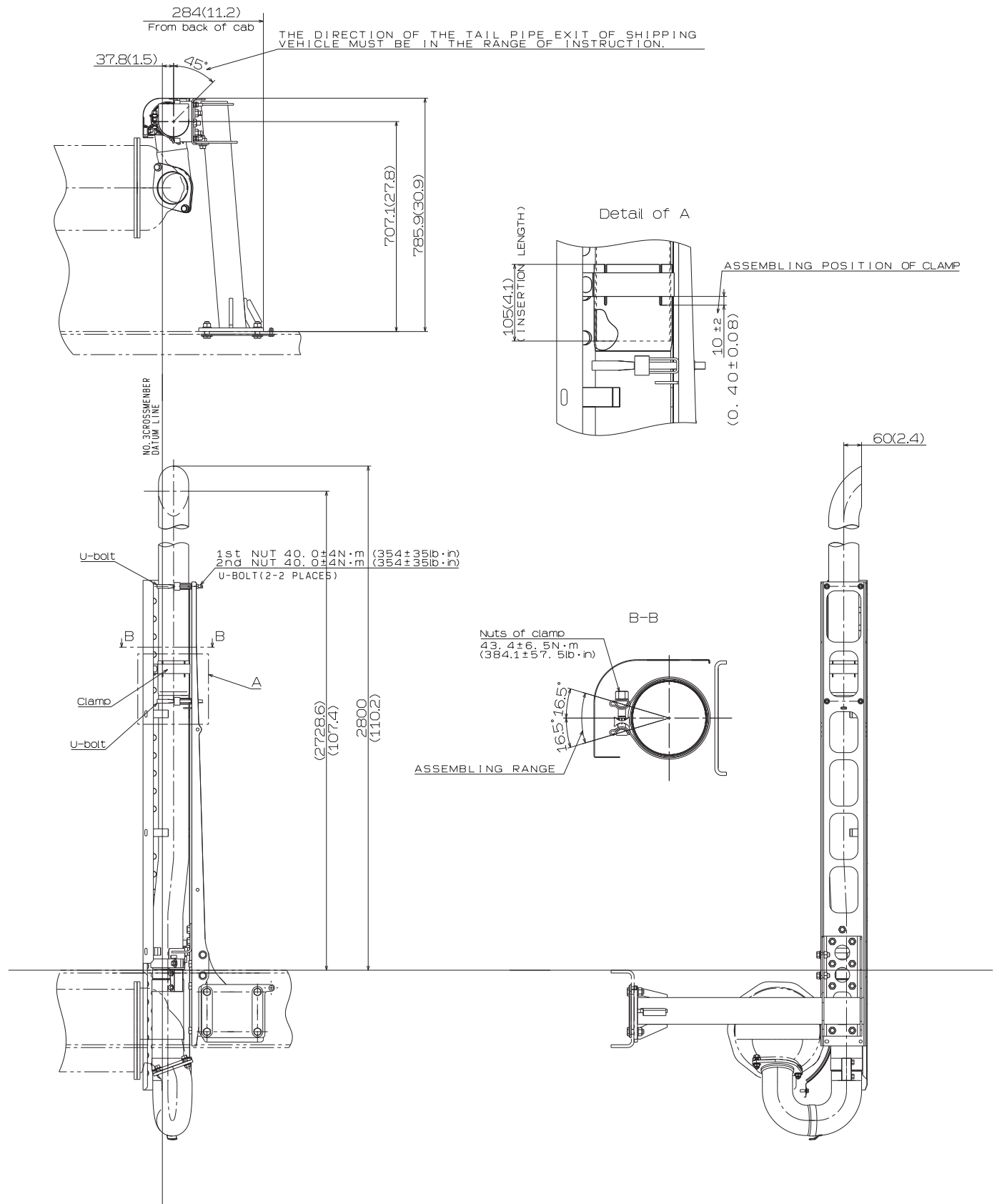
- Remove insulator (6 bolts).
- Temporary attach the clamp at No.2 tail pipe.  
Do not tighten the clamp.  
The clamp cannot be re-used once it is tightened.
- Insert No. 1 tail pipe inside No.2 tail pipe until it touches the shoulder on the inside of the No. 2 tail pipe.  
Since hot exhaust gas comes out of No.1 tail pipe, make mouth of No.1 tail pipe the direction which is not applied to body or equipment.  
(For direction of the mouth of No.1 tail pipe, refer to "ASSEMBLY DRAWING" in the next page.)
- If fitting is tight, loosen the U-bolt and tighten it with specified torque (4 nuts).
- Hand tighten No. 1 tail pipe with the U-bolt.
- Install the clamp  $10\pm2\text{mm}$  ( $0.40\pm0.08\text{in.}$ ) above the bottom end of the slit of No.2 tail pipe.  
See Detail of A and Section B-B.  
Tighten the clamp with the proper torque.
- Tighten both U-bolt completely.  
Two nuts are used to tighten each U-bolt.
- Remove the protection sheet off of the insulator.  
Do not forget to remove the protection sheet from the connecting side also.
- Install the insulator (6 bolts) with tightening torque  $22\pm4\text{N}\cdot\text{m}$  ( $195\pm36\text{ lb}\cdot\text{in}/16\pm2\text{ lb}\cdot\text{ft}$ ).
- If the insulator is deformed and there is not enough clearance between the insulator and U-bolt clamp, it may rub, causing noises.  
Make sure there is clearance after installation.  
If there is no clearance, adjust the insulator to ensure clearance.



[NOTE] For details of tightening torques, see the ASSEMBLY DRAWING on the next page.

# Assembly Drawing of Vertical Exhaust Tail Pipe

Unit : mm (in.)





## 21. INSTALLING EQUIPMENT ON THE CAB ROOF

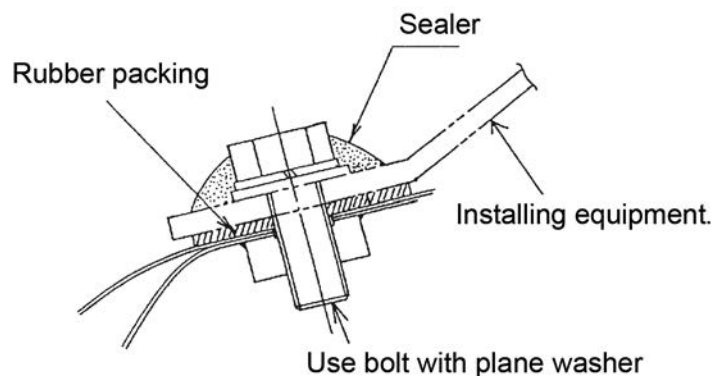
If need to install equipment such as the roof rack and roof step on the cab roof, please consult with HMC before installing.

There are some weld nuts (bolt holes) for making easy installing equipment such as the roof rack and roof step on the cab roof.

See the next page for detail of weld nuts.

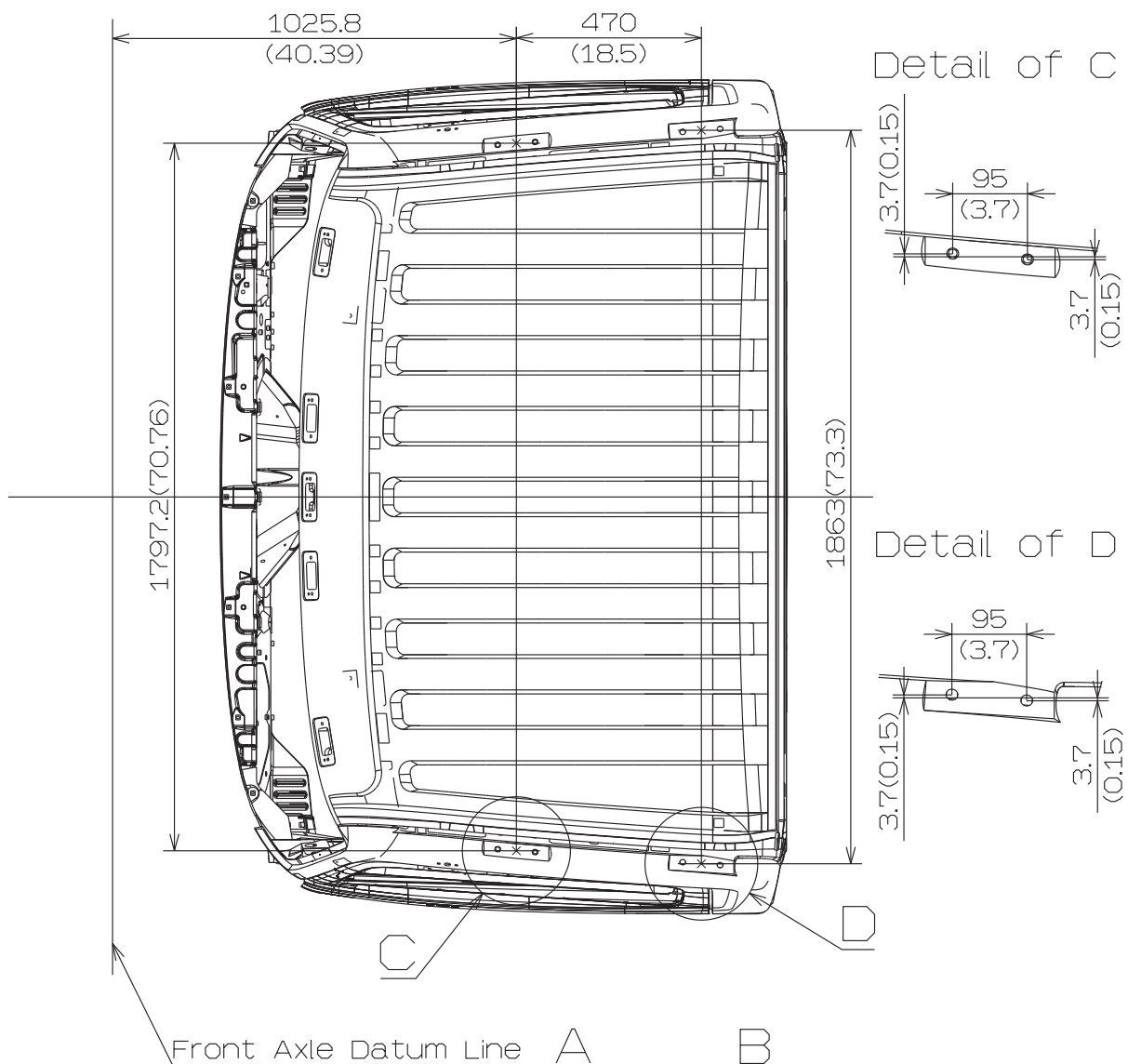
Be sure to observe the following precautions for installing.

- Remove the bolts which were installed temporary at bolt holes, and do not use them for installing equipment.
- Install rubber packing between the equipment and the cab roof for preventing scratch of cab paint and penetration of water.
  - Detail of packing : RC710CP (EPDM) equivalent  
Thickness --- 2 mm (0.08 in.) or less  
Diameter --- 10 mm (0.39 in.)
- Should use a nickel chrome stainless for the installation bolt.  
It may be rusty if do not use a nickel chrome stainless.
  - Size of bolt : M10
  - Tightening torque : 320 ~ 480 kg·m (23.2 ~ 34.7 lb·ft)
- Should install equipment after completed final painting.
- Do not scratch the painting of the cab body when installing equipment.
- Make sure that apply a sealer to all around the bolt for prevention of water after tightening the bolt.  
If insufficient seal with sealer, it may be the cause of rust.
  - Sealer : TEROSON MS9320 or MS9120 equivalent of Henkel  
: Sikaflex-221 equivalent of Sika.
  - Color : Black

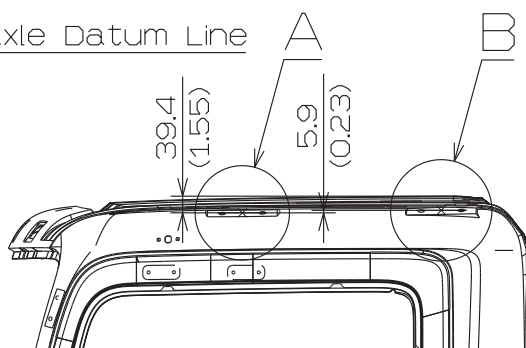
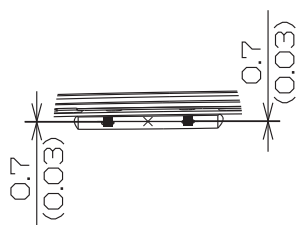


Detail of weld nuts (bolt hole) on the cab roof

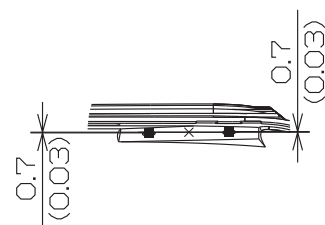
Unit : mm ( in. )



Detail of A



Detail of B



## 22. VEHICLE STORAGE

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We deliver only the vehicles which have passed our delivery inspection. However, it frequently happens that when the vehicles (chassis with cab) are kept in a storage of the dealers or rear body manufacturers for long periods of time, the vehicles are placed on the irregular-surfaced ground in the manner in which their frames are twisted. If the frame is kept in a twisted state for a long time, it will be permanently deformed, thus becoming a cause of complaints to be lodged later. So, you are requested to make sure that the surface of the ground on which the vehicles are stored be levelled to prevent the twisting the frame.