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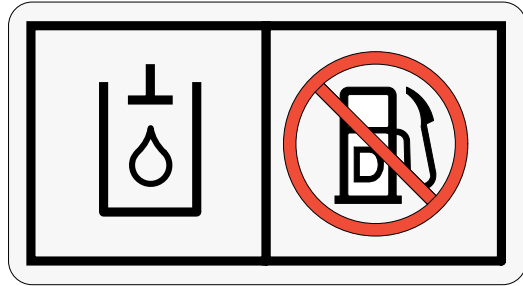
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**12) FUEL SHUT OFF (item 16)**

This warning label is positioned on the top of hydraulic tank.

- ※ Fill only the hydraulic oil.
- ※ Do not fill the diesel fuel.



140WH90FW51

**13) LIFT & TIE (item 18)**

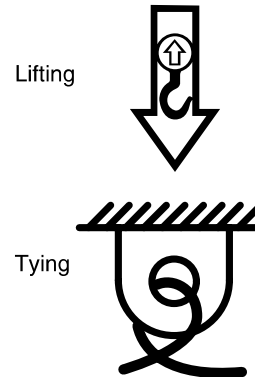
This label is positioned on the both side of the front and rear frame.

- Lifting point

In order to lift the machine, attach the lifting devices to the lifting points.

- Tying point

In order to tie down the machine, attach the tie-downs to the tying points.

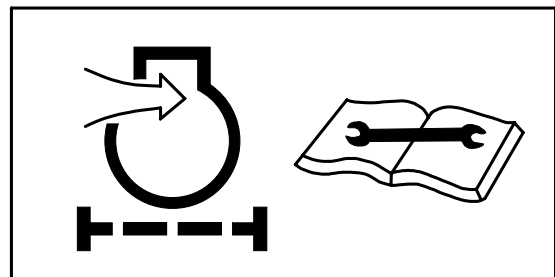


75790FW04

**14) AIR CLEANER (item 19)**

The warning label is positioned on the air cleaner.

- ▲ Periodic and proper inspection, cleaning and change of elements prolong engine life time and maintain the good performance of engine.



21070FW01

**15) RADIATOR CAP (item 20)**

This warning label is positioned on the radiator cover.

- ▲ Never open the filler cap while engine running or at high coolant temperature.



77070FW11

## FIRE PREVENTION AND EXPLOSION PREVENTION

### Regeneration

The exhaust gas temperatures during regeneration will be elevated. Follow proper fire prevention instructions and use the disable regeneration function when appropriate.

### General

All fuels, most lubricants, and some coolant mixtures are flammable.

To minimize the risk of fire or explosion, the following actions are recommended.

Always perform a Walk-Around Inspection, which may help you identify a fire hazard.

Do not operate a machine when a fire hazard exists. Contact your dealer for service.



3001SH01

Understand the use of the primary exit and alternative exit on the machine.

Do not operate a machine with a fluid leak. Repair leaks and clean up fluids before resuming machine operation. Fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire. A fire may cause personal injury or death.

Do not weld on or drill holes in the engine cover. Flammable material such as leaves, twigs, papers, trash may accumulate in engine compartment.

Remove flammable material such as leaves, twigs, papers, trash and so on. These items may accumulate in the engine compartment or around other hot areas and hot parts on the machine.

Keep the access doors to major machine compartments closed and access doors in working condition in order to permit the use of fire suppression equipment, in case a fire should occur.

Clean all accumulations of flammable materials such as fuel, oil, and debris from the machine.

Do not operate the machine near any flame.

Keep shields in place. Exhaust shields (if equipped) protect hot exhaust components from oil spray or fuel spray in a break in a line, in a hose, or in a seal. Exhaust shields must be installed correctly.

Do not weld or flame cut on tanks or lines that contain flammable fluids or flammable material. Empty and purge the lines and tanks. Then clean the lines and tanks with a nonflammable solvent prior to welding or flame cutting. Ensure that the components are properly grounded in order to avoid unwanted arcs.

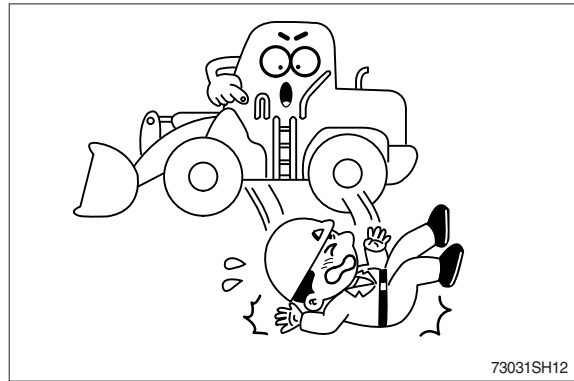
Dust that is generated from repairing nonmetallic hoods or fenders may be flammable and/or explosive. Repair such components in a ventilated area away from open flames or sparks. Use suitable Personal Protection Equipment (PPE).

Inspect all lines and hoses for wear or deterioration. Replace damaged lines and hoses. The lines and the hoses should have adequate support and secure clamps. Tighten all connections to the recommended torque. Damage to the protective cover or insulation may provide fuel for fires.

## 2. DURING OPERATING THE MACHINE

Use the handle and footstep when getting on or off the machine.

Do not jump on or off the machine.

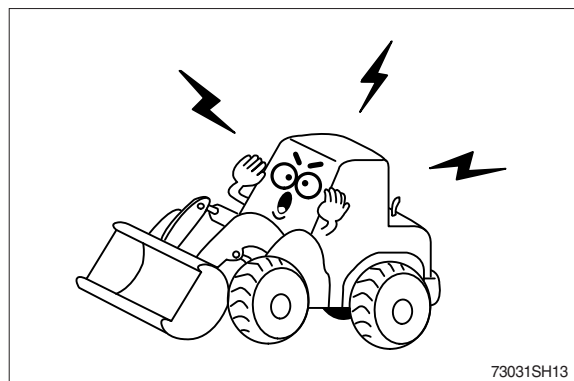


Sound the horn to warn nearby personnel before operating the machine.

### KEEP RIDERS OFF MACHINE

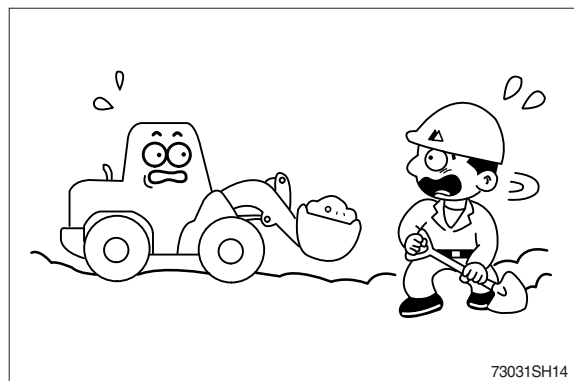
Riders on a machine are subject to injury such as being struck objects and being thrown off the machine.

Only allow the operator on the machine. Keep riders off.

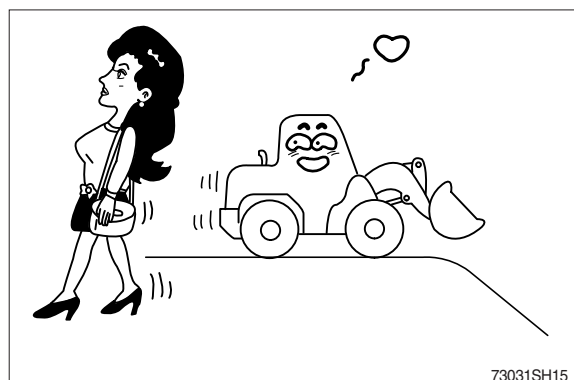


Operate carefully to make sure all personnel or obstacles are clear within the working range of the machine.

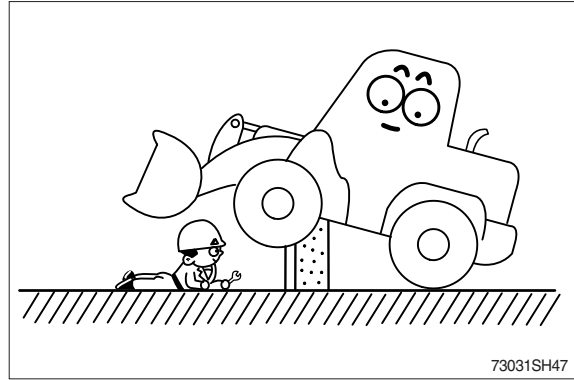
Place safety guards if necessary.



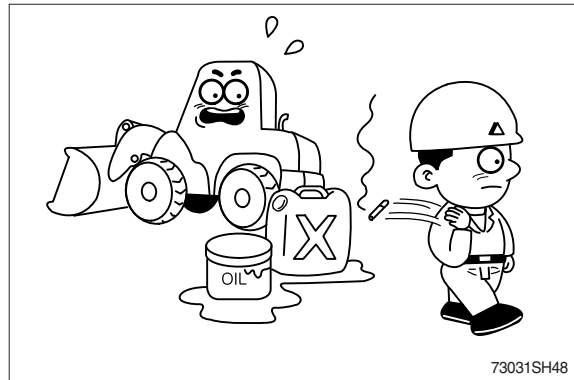
When using the work equipment, pay attention to jobsite.



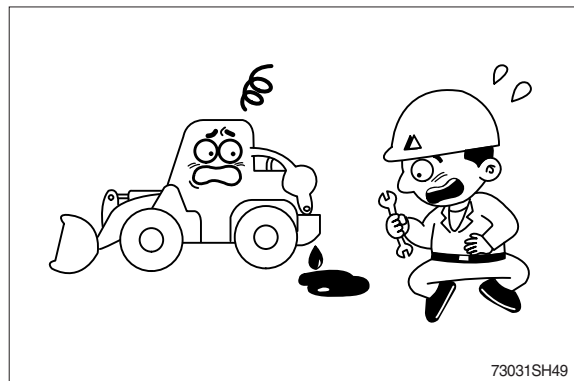
Do not work below the machine.  
When working under or around the bucket or linkage, with the bucket raised, proper support must be provided for the bucket and / or the linkage.



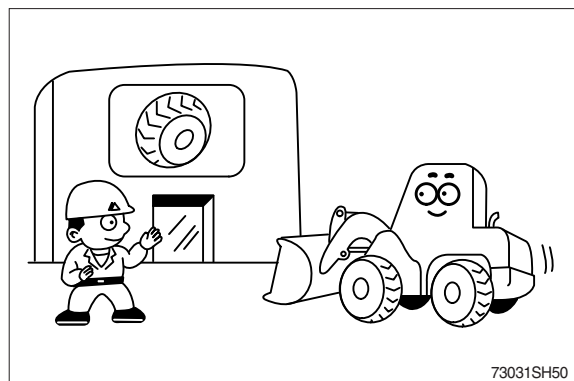
There is the danger of fire in fuel and oil.  
Store in cool dry area, away from any open flames.  
Do not refuel the machine while smoking or when near open flame or sparks.  
Always stop engine before refueling machine.



Spilled grease and oil are dangerous to safety.  
Keep your machine always clean and dry.



Disassembly, reassembly and repair of tire requires special skills and equipment.  
Contact a tire repair shop.

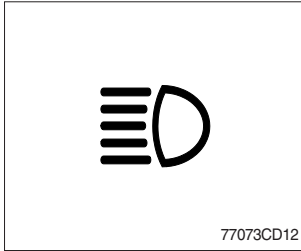


## 4. SPECIFICATION FOR MAJOR COMPONENTS

### 1) ENGINE

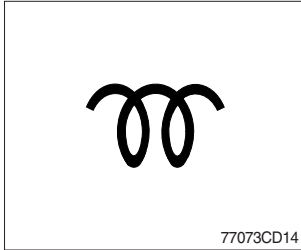
Item	Specification
Model	Cummins 6BTA5.9
Type	4-cycle turbocharged diesel engine.
Cooling method	Water cooling
Number of cylinders and arrangement	6 cylinders, in-line
Firing order	1-5-3-6-2-4
Combustion chamber type	Direct injection type
Cylinder bore × stroke	102 × 120 mm (4.0" × 4.7")
Piston displacement	5880 cc (359 cu in)
Compression ratio	17.6 : 1
Rated gross horse power	150 hp at 2200 rpm
Maximum gross torque at 1400rpm	68 kgf·m (493 lbf·ft)
Engine oil quantity	15ℓ (4.0 U.S. gal)
Dry weight	413 kg (963 lb)
High idling speed	2300 ± 50 rpm
Low idling speed	950 ± 25 rpm
Rated fuel consumption (at rated)	223 g/kw·hr
Starting motor	Lucas (24 V-4.5 kW)
Alternator	Lucas (24 V-90 Amp)
Battery	2 × 12 V × 115 Ah

#### (4) High beam pilot lamp



- ① This lamp works when the illuminating direction is upward.
- ② This lamp comes ON when the dimmer switch is operated, e.g., when passing another vehicle.

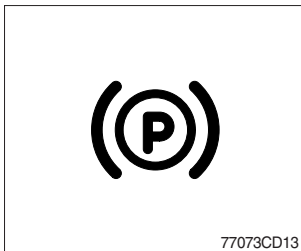
#### (5) Preheat pilot lamp



- ① This lamp lights ON when start switch is turned clockwise to the ON position. Light will turn off after approximately 5~45 seconds, depending on engine temperature, indicating that preheating is completed.
- ② When the lamp goes out the operator should start cranking the engine.

※ Refer to page 4-5.

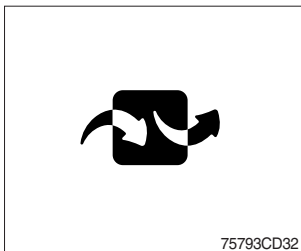
#### (6) Parking brake pilot lamp



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

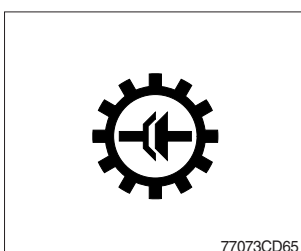
※ Check the lamp is OFF before driving.

#### (7) Maintenance pilot lamp



- ① This lamp will be ON when the consuming parts are needed to change or replace. It means that the change or replacement interval of the consuming parts remains below 30 hours.
- ② Check the message in maintenance information of the monitor menu. Also, this lamp lights ON for 3 minutes when the start switch is ON position.

#### (8) Clutch cut off pilot lamp



- ① This lamp lights ON when the clutch cut off mode switch is positioned L, M, H.

※ Refer to page 3-27.

- Change password
  - Input 5 to 10 digits and press \*.



Enter the current password.



Enter the new password.

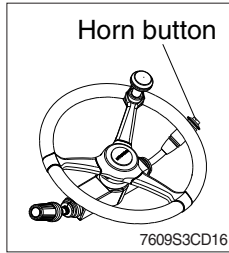


The new password is stored in the MCU.



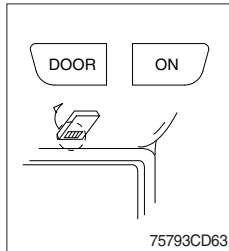
Enter the new password again.

#### 14) HORN BUTTON



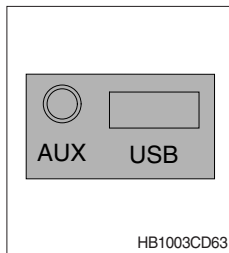
- (1) If you press the button on the top of the multifunction switch, the horn will sound.

#### 15) CAB LAMP SWITCH



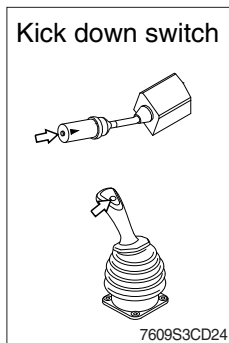
- (1) This switch turns ON the cab room lamp.
- ① DOOR  
The lamp comes ON when the door is opened.  
When the door is closed the lamp is OFF.
  - ② ON  
This switch is used to turn the lamp ON or OFF.

#### 16) USB SOCKET (machine serial No. : -#0093)



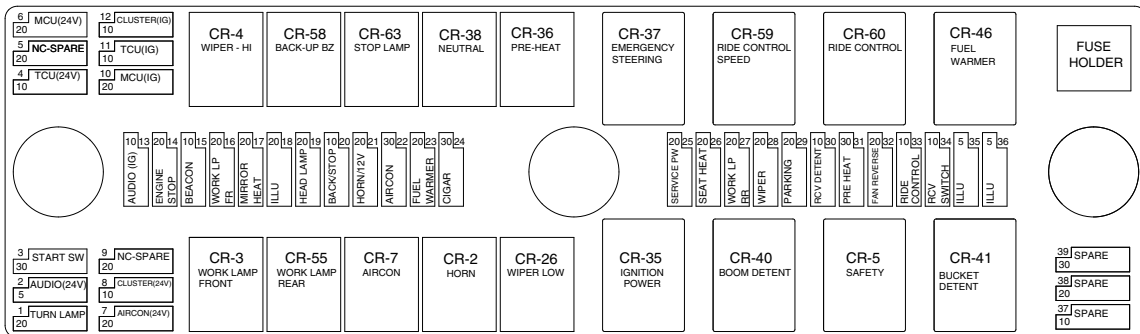
- (1) MP3 files are played when a USB device is connected to the USB port.
- (2) In addition, the AUX port enables headphone and other devices.

#### 17) KICK DOWN SWITCH



- (1) **Manual mode**  
It is effective 2nd speed to 1st speed only and recover to 2nd speed quickly when push the switch one more time.
- (2) **Automatic mode**
- ① **Mode 1 (down/up)**  
It shifts down quickly from current gear to one step lower speed by pushing the switch and recover to current speed quickly when push the switch one more time.
  - ② **Mode 2 (down)**  
It shifts down from current gear to one step lower speed when push the switch every time.  
The kick down function is released in only 1st speed.
- ※ Refer to page 3-12 for the kick down setting.
- ※ The normal autoshift function continues after the kick down switch is released.

## 5) FUSE & RELAY BOX



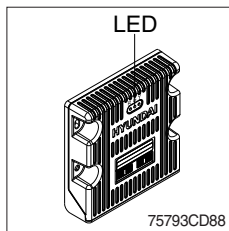
7409S3CD107

- (1) The fuses protect the electrical parts and wiring from burning out.
- (2) The fuse box cover indicates the capacity of each fuse and circuit it protects.

※ Replace a fuse with another of the same capacity.

▲ Before replacing a fuse, be sure to turn OFF the starting switch.

## 6) MACHINE CONTROL UNIT (MCU)



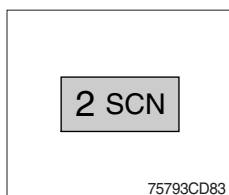
(1) It consists of electronic parts and controls all lamps and buzzers on cluster in accordance with signals transmitted from the switches, the MCU, TCU, the engine and the hydraulic pressure sensors.

(2) Three LED lamps on the MCU display as below.

LED lamp	Trouble	Service
G is turned ON	Normal	-
G and R are turned ON	Trouble on MCU	· Change the MCU
G and Y are turned ON	Trouble on serial communication line	· Check if serial communication lines between controller and cluster are disconnected
Three LED are turned OFF	Trouble on MCU power	· Check if the input power wire (24V, GND) of controller is disconnected · Check the fuse

G : green, R : red, Y : yellow

### (5) File scan (SCN)



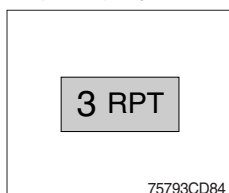
- ① During USB play, press SCN button to play the first 10 seconds of each file on the whole file on the USB (SCN mark will appear on the LCD display).

When a desired file is reached, press the SCN button again to cancel the function.

The unit will then play the selected file.

- ※ In case of playing MP3 file, when the SCN (scan) button is pressed and held for longer than 2 seconds, the SCN mark will blink on the LCD display and all files in the selected directory will be introduced until the file scan mode is cancelled by pressing the SCN button again or by activating the random or repeat functions.

### (6) Repeat play selector (RPT)

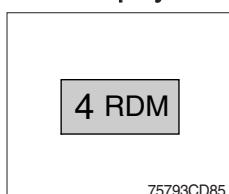


- ① During USB play, press RPT button to play the selected file repeatedly (RPT will appear on the LCD display).

Play of the file will continue to repeat until this button is pressed again and the RPT disappears from the LCD display.

- ※ In case of playing MP3 file, when the RPT button is pressed and held longer than 2 seconds, the RPT mark will blink on the LCD display and play all files in the selected directory and will be repeated until the directory repeat mode is cancelled by pressing the repeat button again or by activating the scan or random functions (RPT mark will disappear from LCD display).

### (7) Random play selector (RDM)

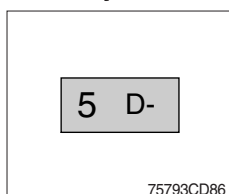


- ① During USB play, press RDM button to play the files on the USB in a random shuffled order (RDM will appear on the LCD display). The file select function will also select file in the random order instead of the normal process.

The random play mode can be cancelled by this button again.

- ※ In case of MP3 file, when the random button is pressed and held longer than 2 seconds, the RDM mark will blink on the LCD display and play all files in directory randomly until the directory random mode is cancelled by pressing the random button again or by activating the scan or repeat functions (RDM mark will disappear from LCD display).

### (8) Directory down



- ① Press D- button briefly while playing MP3. The previous directory is located each time you press this button.

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## ■ GENERAL

### (1) Power and volume button



#### ① Power ON / OFF button

Press power button (1) to turn the unit on or off.

#### ② Volume UP/DOWN control knob

Turn VOL knob (1) right to increase the volume level.

Turn VOL knob (1) left to decrease the volume.

After 5 seconds the display will return to the previous display mode.

#### ③ Initial volume level set up

I-VOL is the volume level the unit will play at when next turned on.

To adjust the I-VOL level, press and hold VOL button (1) for longer than 2 seconds. The current volume level displays on the display panel.

Then turn button (1) right or left to set the volume level as the I-VOL level.

#### ④ Clock ON/OFF control

The CLOCK was default at off status. To turn CLOCK ON, press and hold VOL button (1) for longer than 2 seconds to display I-VOL, then short press VOL again, turn VOL knob while CLOCK OFF display, then the CLOCK ON will be displayed.

※ **Due to time tolerance, the clock display on the Audio unit might have little difference.**

#### ⑤ Clock adjustment

With CLOCK ON selected, press VOL knob again after CLOCK ON display, the hour will blink, turn VOL knob right or left to adjust hour.

Simply press VOL again, the minute will blink, turn VOL knob to adjust minute. Then press VOL again to confirm the clock once finished.

#### 4) Bluetooth connection and disconnection

- (1) When established bluetooth connection between this audio unit and the cellular phone, bluetooth icon on the display appears and then the display shows HF/AV CONN when handsfree & AV profile connected.



- (2) To disconnect bluetooth link  
Press and hold CALL END button (4) for 2 seconds, it shows DIS CON and disappears bluetooth icon on the display.



- (3) To disconnect bluetooth link  
Press CALL button (3) briefly, it blinks bluetooth icon on the display while bluetooth is being connected. If the connection is completed, it appears bluetooth icon on the display.

- ※ When your cellular phone battery is at low charge, the bluetooth connection may occasionally be lost. To maintain good connectivity ensure that your phone battery is adequately charged.
- ※ In case of failure of bluetooth pairing :
  - Delete item in paired list on your phone.
  - Reset both phone by power off/on and the audio unit by ACC off/on.
- ※ Connecting priority of handsfree profile is higher than headset profile.
- ※ The headset mode does not support caller ID, reject call and call Transfer.

#### 5) Using the audio unit as a handsfree device

- (1) When the audio unit is ringing, it shows CALL and follows with the phone number \*\*\*\*\* on the display.



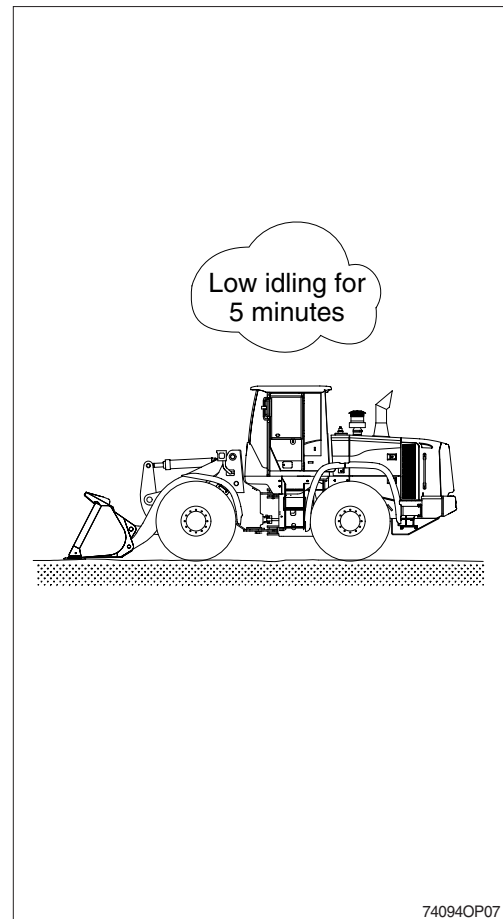
- (2) To accept call  
Press CALL button (4), it appears ANSWER CALL and follows TALKING on the display.

- (3) To end call  
To end call, press CALL END button (5), it appears REJECT on the display.

- ※ If reject call is activated in your phone, then your cellular phone does not support reject call function.

## 6) TO STOP THE ENGINE

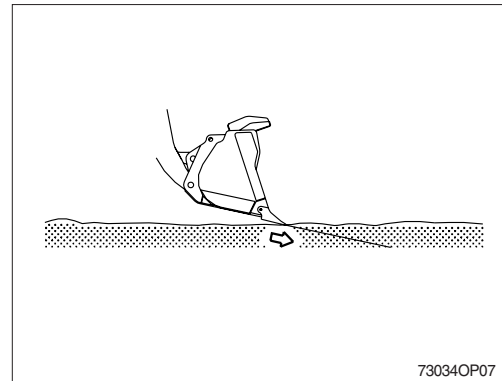
- ※ If the engine is abruptly stopped before it has cooled down, engine life may be greatly shortened. Consequently, do not abruptly stop the engine apart from an emergency.
  - ※ In particularly if the engine has overheated, do not abruptly stop it but run it at medium speed to allow it to cool gradually, then stop it.
- (1) Place the gear selector lever in neutral.
  - (2) Push the parking brake switch to the ON position.
  - (3) Run the engine for five minutes at low idle with no load.
  - (4) Return the key of starting switch to the OFF position.
  - (5) Remove the key to prevent other people using the machine.
  - (6) Turn the hydraulic safety lever in the LOCK position.
  - (7) Lock the cab door.



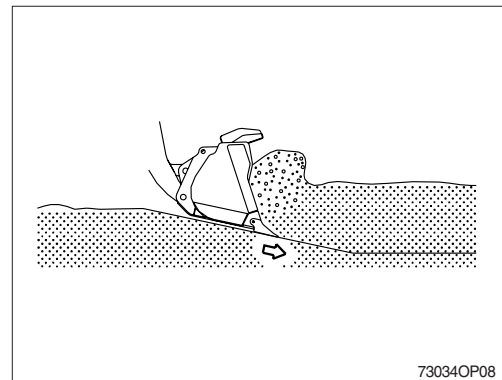
## (2) Excavation on level ground

Advance the machine with the bucket lowered slightly and make sure that the bucket is evenly loaded on both sides.

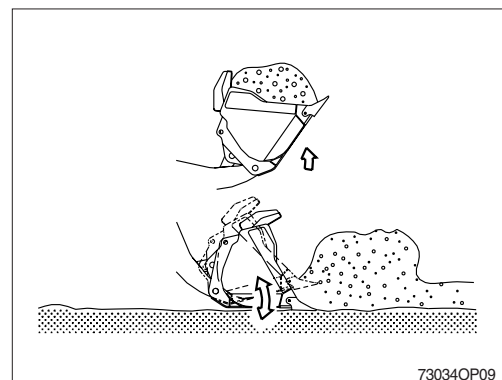
- ① Lower the bucket edge slightly.



- ② Advance the machine and lift the bucket using the bucket control lever to dig out the soil.



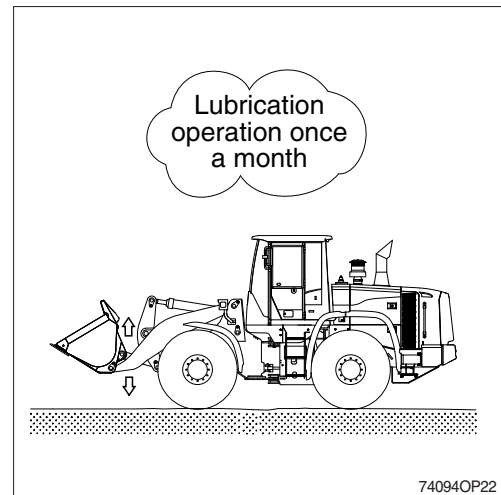
- ③ Advance the machine while controlling the depth of digging with the control lever.
  - ※ Do not press the bucket heavily into the ground. It may damage its driving force.
  - ※ Use the bucket suitable to the working condition.
  - ※ When excavating, prevent the excavation force from applying only one side of the bucket.



## 6) DURING STORAGE

Start engine and move the machine and working equipment once a month and apply lubrication to each part.

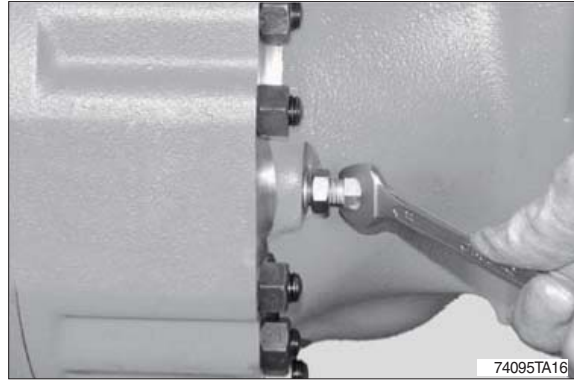
- ※ Check the level of engine oil and coolant and fill if required when starting engine.
- ※ Clean the anticorrosive on the piston rod of cylinder.
- ※ Operate the machine such as traveling, turning, and work equipment operation to make sure enough lubrication of all functional components.



### ※ BATTERY

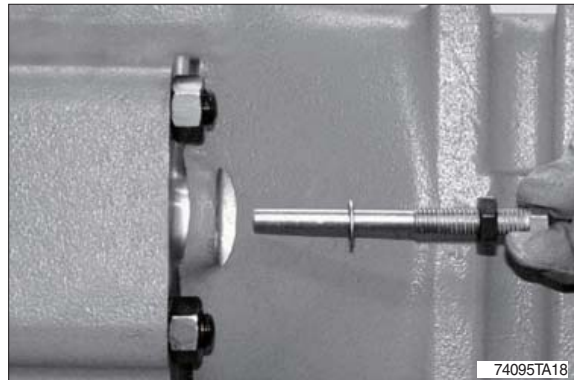
- ① Once a month, start the engine for 15 minutes (or use a charger) to charge the battery.
- ② Every 2 months, check the battery voltage and keep battery voltage over 25.08V.
- ③ If the machine stock period is over 6 months, disconnect the battery negative (-) terminal.

- ② Tighten screws (31) so as to fasten them onto the pressure plate.
  - ③ Using a wrench, tighten the screws (31) in an alternate sequence by 1/4 turn at a time so as to compress the washers (1) and disengage the braking disks.
- ※ **Tighten max by one turn.**

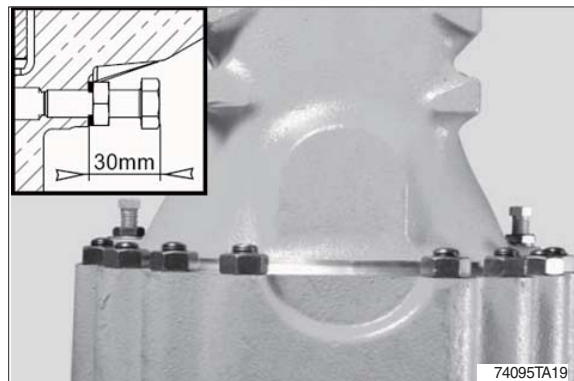


#### **Adjustment after manual release**

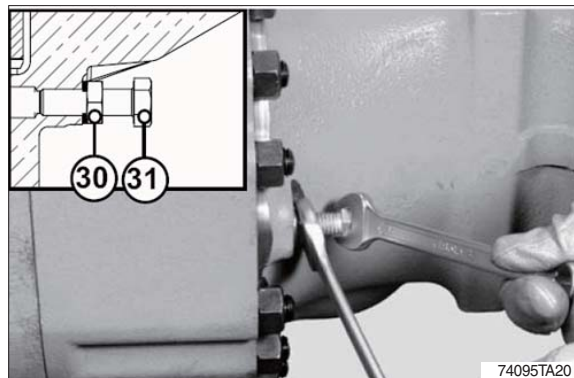
- ① Remove screws complete with nuts and seals. Replace seals, apply silicone-based tecno lube / 101 grease to the screws and install all parts into the arm.



- ② Adjust screws (31) to obtain a jut of  $30 \pm 0.5$  mm in relation to the arm.



- ③ Lock into position with nuts (30).
- ※ **Hold screws (31) into position while locking the nuts (30); after locking, check the jut of screws (31) once more.**



## 2) RECOMMENDED OILS

Use only oils listed below or equivalent. Do not mix different brand oil.

Service point	Kind of fluid	Capacity ℓ (U.S. gal)	Ambient temperature °C ( °F)						
			-50 (-58)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)
Engine oil pan	Engine oil	18 (4.8)	★ <sup>1</sup> SAE 5W-40						
			SAE 30						
			SAE 10W						
			SAE 10W-30						
			SAE 15W-40						
Transmission	Engine oil	25 (6.6)	SAE 10W-30						
			SAE 15W-40						
Axle (DANA) -#0079	Gear oil	FR : 21.8 (5.8) RR : 21.8 (5.8)	SAE 80W-90 LS / API GL-5						
Axle (ZF) #0080-	UTTO	FR : 24 (6.3) RR : 23 (6.1)	★ Refer to below list						
Hydraulic tank	Hydraulic oil	Tank; 130 (34.3) System; 164 (43.3)	★ <sup>1</sup> ISO VG 15						
			ISO VG 46						
			ISO VG 68						
Fuel tank	Diesel fuel	220 (58.1)	★ <sup>1</sup> ASTM D975 NO.1						
			ASTM D975 NO.2						
Fitting (grease nipple)	Grease	As required	★ <sup>1</sup> NLGI NO.1						
			NLGI NO.2						
Radiator (reservoir tank)	Mixture of antifreeze and soft water★ <sup>2</sup>	43 (11.4)	Ethylene glycol base permanent type (50 : 50)						
			★ <sup>1</sup> Ethylene glycol base permanent type (60 : 40)						

**SAE** : Society of Automotive Engineers

**API** : American Petroleum Institute

**ISO** : International Organization for Standardization

**NLGI** : National Lubricating Grease Institute

**ASTM** : American Society of Testing and Material

**UTTO** : Universal Tractor Transmission Oil

★<sup>1</sup> Cold region

- Russia, CIS, Mongolia

★ Recommended oil list

- BP TERRAC SUPER TRANSMISSION 10W-30

- CASTROL AGRI TRANS PLUS 10W-30

- MOBILFLUID 426

- SHELL DONAX TD 10W-30

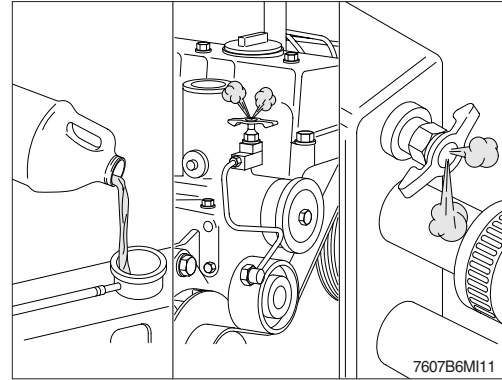
- TOTAL DYNATRANS MPV

★<sup>2</sup> Soft water

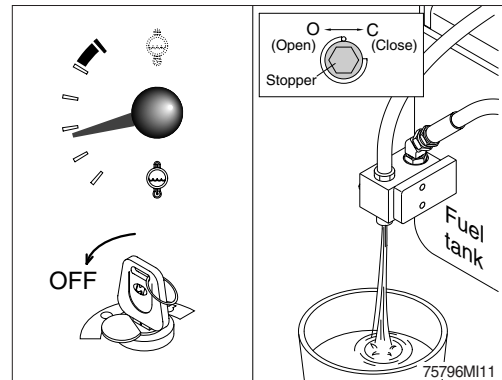
City water or distilled water

- ※ During filling, air must be vented from the engine coolant passages. Open the engine venting petcock.

The system must be filled slowly to prevent air locks. Wait 2 to 3 minutes to allow air to be vented, then add mixture to bring the level to the top.

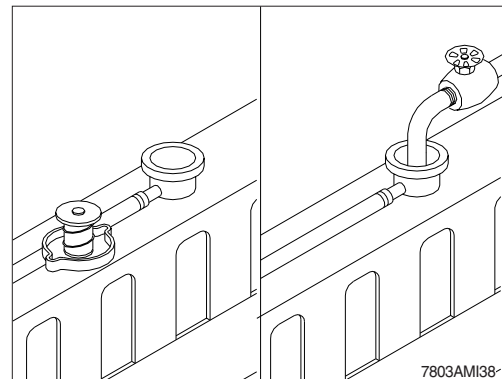


- ② Operate the engine for 5 minutes with the coolant temperature above 80°C (176°F). Shut the engine off, and drain the cooling system.



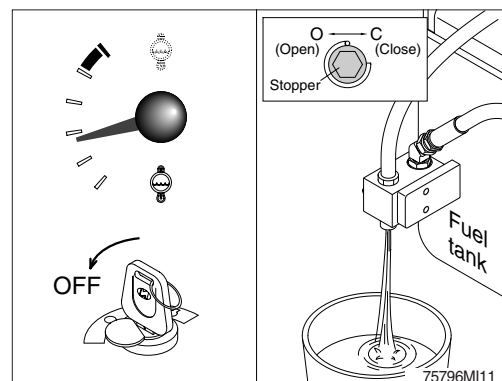
- ③ Fill the cooling system with clean water.

- ※ Be sure to vent the engine and aftercooler for complete filling.
- ※ Do not install the radiator cap or the new coolant filter.



- ④ Operate the engine for 5 minutes with the coolant temperature above 80°C (176°F). Shut the engine off, and drain the cooling system.

- ※ If the water being drained is still dirty, the system must be flushed again until the water is clean.



## 23) TIRE PRESSURE

(1) Inappropriate tire pressure is a primary cause for tire damage. Insufficient tire pressure will damage internal carcass of tire. Repeated excessive bending will damage or break the carcass. Excessive pressure will also cause premature damage of tire.

(2) Recommended tire pressure (When tire is cooled)


(3) Continuous operation will produce heat and increase pressure on tire. But such phenomenon was already taken into account when designing a tire. Do not try to remove normally increased air because tires may be crushed or overinflated.

(4) The three major causes for excessive heat and pressure of tire are insufficient pressure, excessive load and overspeed. Avoid excessive load and overspeed in order to keep tires in good shape.

**▲ Do not inflate tires using flammable gases or alcohol injector.**

This cause explosion or personal injury.

**▲ Inflate tires at the pressure level recommended by the manufacturer, and check periodically pressure and wear of tires.**

**▲ When replacing the inflated tire, do not stand near the tire.**

※ Check the tire when the tire is at normal temperature and the machine is not loaded.

**▲ Do not use recycled wheel parts.**

**▲ When removing lockering or inflating tire, use safety cable or chain to ensure safety.**

※ Be sure to bleed air before removing lockering. Never inflate tires unless the lockering is assembled in its place.

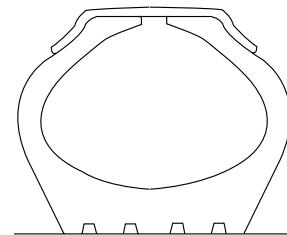
① Avoid the followings when traveling.

② Rubbing tires against road bank or rack at cargo-unloading spot.

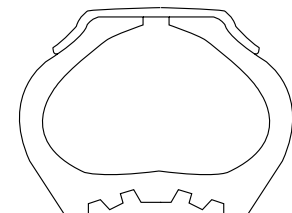
③ Tires slippage during working.

④ Abrupt starting of machine.

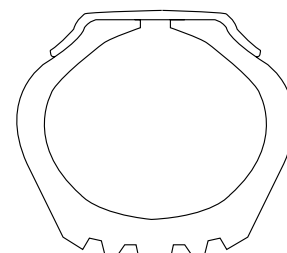
When oil, grease or gasoline smeared on tire, clean those. Otherwise it may cause of permanent deformation.



Normal



Too low pressure



Excess pressure

### 35) LUBRICATION

(1) Supply grease through the grease nipple, using grease gun.

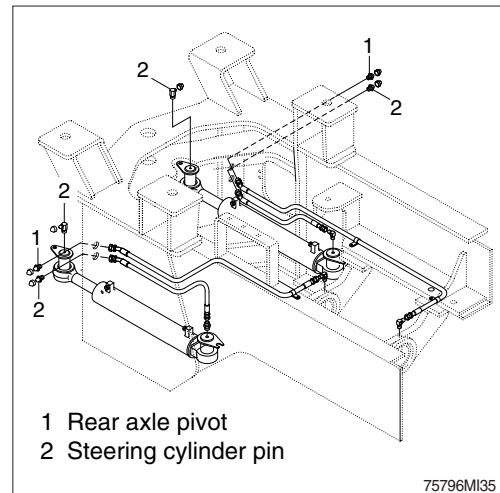
(2) After lubricating, clean off spilled grease.

▲ Press the parking brake switch and fix front and rear frames using the safety lock bar.

▲ Set the work equipment in a stable position and turn the hydraulic safety lever into the LOCK position.

(3) Rear axle pivot : 2EA

(4) Steering cylinder pin : 4EA



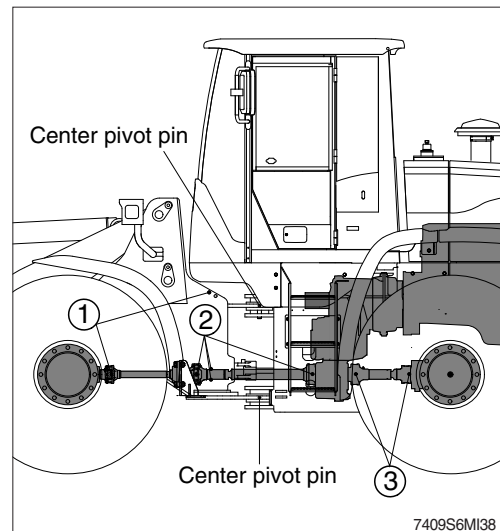
(5) Center pivot pin : 2EA

(6) Drive shaft

① Front (flange bearing, journal bearing) : 2EA

② Center (slip yoke, journal bearing) : 4EA

③ Rear (journal bearing) : 2EA



# TROUBLESHOOTING GUIDE

## 1. ENGINE

※ This guide is not intended to cover every conditions, however many of the more common possibilities are listed.

Trouble	Service	Remark
Engine oil pressure lamp fails to go off immediately after the engine is started.	<ul style="list-style-type: none"> <li>· Add the oil to the specified level.</li> <li>· Replace the oil filter.</li> <li>· Check oil leakage from the tube or the joint.</li> </ul>	
Steam is emitted from the top part of the radiator (The pressure valve). Engine coolant temperature gauge indicates red range.	<ul style="list-style-type: none"> <li>· Supply the cooling water and check leakage.</li> <li>· Adjust fan belt tension.</li> <li>· Wash out inside of cooling system.</li> <li>· Clean or repair the radiator fin.</li> <li>· Check the thermostat.</li> <li>· Check the engine coolant temperature gauge.</li> <li>· Tighten the radiator cap firmly or replace the gasket of it.</li> </ul>	
Engine does not start when the starting motor is turned over.	<ul style="list-style-type: none"> <li>· Add fuel</li> <li>· Repair where air is inhaled into fuel system.</li> <li>· Check the injection pump or the nozzle.</li> <li>· In cold weather, check if fuel warmer system is working normal.</li> <li>· Check the valve clearance.</li> </ul>	Refer to the pages 4-5.
Exhaust gas is white or blue.	<ul style="list-style-type: none"> <li>· Adjust to specified oil quantity.</li> <li>· Replace with specified fuel.</li> </ul>	
Exhaust gas occasionally turns black.	<ul style="list-style-type: none"> <li>· Clean or replace the air cleaner element.</li> <li>· Check the nozzle.</li> <li>· Check engine compression pressure.</li> <li>· Check or replace the turbocharger.</li> </ul>	
Combustion noise occasionally changes to breathing sound.	<ul style="list-style-type: none"> <li>· Check the nozzle.</li> <li>· Check the injection pump.</li> </ul>	
Unusual combustion noise or mechanical noise.	<ul style="list-style-type: none"> <li>· Check with specified fuel.</li> <li>· Check overheating.</li> <li>· Check the muffler.</li> <li>· Adjust valve clearance.</li> </ul>	

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