

# **AIRMAN**

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# **PG**

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## **INSTRUCTION MANUAL**

### **SCREW COMPRESSOR**

**PDSH850S-4B2**

**PDSJ750S-4B2**

Please be sure to read this manual  
before using this machine.

**HOKUETSU INDUSTRIES CO., LTD.**

# Preface

Thank you for having selected our “AIRMAN” product.

- ◆ This manual explains about the proper operation and daily inspection and maintenance of this machine.
- ◆ In order to use a machine safely, people with sufficient knowledge and sufficient technology need to deal with it.
- ◆ Before operating the unit, read the manual carefully, fully understand its operation and maintenance requirement. Maintain “SAFETY OPERATION AND PROPER MAINTENANCE OF THE UNIT”.

Be sure to follow safety warnings and cautions given in the manual.  
Unsafe operation could cause serious injury or death.

- ◆ For details of handling, maintenance and safety of the engine, see the Engine Operation Manual.
- ◆ Keep the manual available at all times for the operator or safety supervisor.
- ◆ If the manual is lost or damaged, place an order with your dealer for another copy.
- ◆ Be sure that the manual is included with the unit when it is handed over to another user.
- ◆ There may be some inconsistency in detail between the manual and the actual machine due to improvements of the machine. Ask your dealer if you have any questions or problems.
- ◆ If you have any questions about the unit, please inform us the model and serial number. A plate stamped with the model and serial number is attached to side of the unit.

PORTABLE COMPRESSOR	
MODEL	<input type="text"/>
SER. NO.	<input type="text"/>
NORMAL OPERATING PRESSURE	<input type="text"/> MPa
NET DRY MASS	<input type="text"/> kg
<b>AIRMAN</b> MADE IN JAPAN HOKUETSU INDUSTRIES CO., LTD. 22-2, NISHI-SHINJUKU 1-CHOME, SHINJUKU-KU TOKYO JAPAN	

- ◆ Each illustrated figure (Fig.) has a number of 7 digits (for instance, A990054) at the right bottom. This number is not a part number, but it is used only for our reference number.

A990054

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
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# 1.Safety

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This manual explains and illustrates general requirements for safety.

Read all safety requirements carefully and fully understand the contents before starting the machine.

For your better recognition, according to the degree of potential danger, safety messages are classified into three hierarchical categories, namely, , , and  with a caution symbol  – attached to each message.

When one of these messages is shown, please take preventive measures and carry out “SAFETY OPERATION AND PROPER MAINTENANCE OF THE UNIT”.



**DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.



**WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



**IMPORTANT** indicates important caution messages for the performance or durability of the unit.

Follow warnings mentioned in this manual. This manual does not describe all safety items. We, therefore, advise you to pay special attention to all items (even though they may not be described in the manual) for your safety.

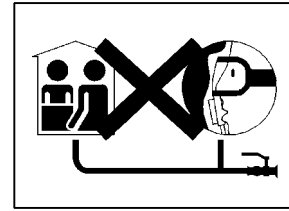
# 1.Safety

## 1.1 Caution before Operation

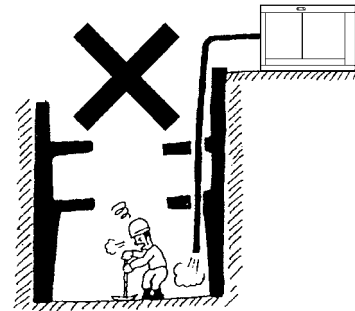


**Compressed air is prohibited to be used for human respiration**

- Compressed air by this unit contains poisonous materials. Absorption of the compressed air can cause serious injury. Never provide this compressed air for human respiration.
- This unit is not designed to be used for working chambers pressurized by compressed air such as respiratory air provided to persons working inside wells and tunnels such as pneumatic engineering method and pneumatic caisson method. Should this unit stop operation due to trouble, it can cause death and serious injury to the working persons. Refrain from using the compressed air for such pneumatic engineering method or pneumatic caisson method.



TR0201-1

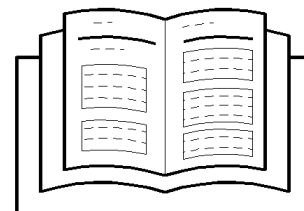


A080001



**Follow the safety instructions**

- Read each instruction plate which is displayed in the manual or on the unit carefully, understand its content and follow the indications thereof.
- Keep the Safety Warning labels clean. When they are damaged or missing, apply new ones.
- Do not modify the machine without prior approval. The safety may be compromised, functions may be deteriorated, or machine life may be shortened.
- Never use the unit for the purpose of compression of gases other than air, or as a vacuum pump. Otherwise, serious accidents may occur.

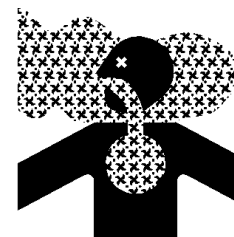


TR0086



**Ventilation**

- Exhaust gas from the engine is poisonous, and could cause death when inhaled. Avoid using the machine in an insufficiently ventilated building or tunnel.



PC002

# 1.Safety

## WARNING

- Keep flames away from battery.
- Battery may generate hydrogen gas and may explode.
- Battery electrolyte is dilute sulfuric acid.  
In case of mishandling, it could cause skin burning.
- When you deal with a battery, please be sure to wear protection implements, such as protection glasses and a glove.
- Dispose of battery, observing local regulations.

## Handling battery



D004

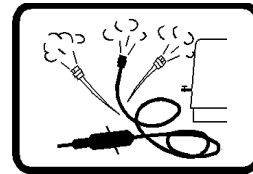


TR0093

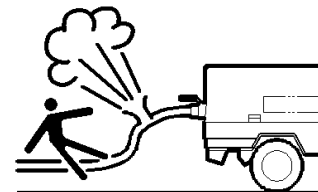
## WARNING

## Cautions of hose attachment and removal

- Piping or the hose from this machine service valve should use what can be borne enough for the discharge pressure of this machine.
- Please connect piping or a hose to this machine service valve firmly before operation and during operation. If the connection part is loosening, there is a possibility of piping or a hose separating and getting seriously injured.
- Please remove after closing a service valve and extracting pressure remained, in case piping or a hose is removed. If pressure remained should remain, a near thing blows away or there is a possibility of a hose whipping, causing a phenomenon and getting seriously injured.
- In order to use it safely, please read the handling of the work tools often used.



TR0088



TR0303A

## WARNING

## Safety outfit

- When handling machine, do not wear;
  - loose clothes
  - clothes with unbuttoned sleeves
  - hanging tie or scarf
  - accessories such as dangling jewelry
- Such outfit could be caught in the machine or dragged in the rotating portion of the machine, and this could cause a serious injury.



TR0084

# 1.Safety

## WARNING

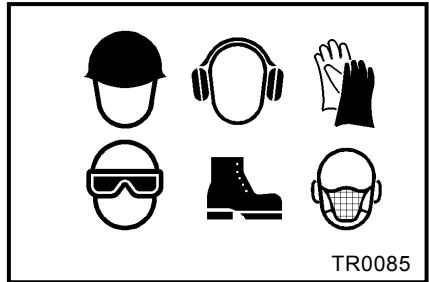
### ***Maintain both physical and mental health***

- Do not operate the machine when you are tired or drunk or under the influence of drugs. Otherwise, a hasty conclusion or careless handling may cause unexpected injury or accident. Manage your physical and mental health and be cautious in handling the machine.

## CAUTION

### ***Protection equipments***

- Please wear protection implements, such as a helmet, protection glasses, earplugs, safety shoes, a glove, and a protection-against-dust mask, according to the contents of work for safety.



## CAUTION

### ***Safety fittings***

- Have first-aid boxes and fire-extinguishers near the unit ready for emergency situations such as injuries and a fire.
- It is advisable to have a list of phone numbers of doctors, ambulance and the fire department available in case of emergency.



## CAUTION

### ***Safety around the machine***

- Such things as unnecessary equipment and tools, cables, hoods, covers and pieces of wood which are a hindrance to the job, have to be cleaned and removed. This is because operators and/or personnel nearby may stumble on them and may be injured.
- Place safety enclosures at the entrance of and around working site to prevent children or outside people from entering the site.

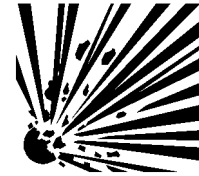
# 1.Safety

## 1.2 Caution during Operation

### WARNING

#### ***Do not replenish compressor oil during operation***

- Do not, under any circumstance, open the oil filler cap of separator receiver tank while running or immediately after stopping operation.  
It is very dangerous because the oil filler cap could be blown off and high temperature compressed air and oil could jet out from the filler port, and cause serious injury.



W010

### WARNING

#### ***Draining during operation prohibited***

- Do not, under any circumstance, open the portions below during operation:
  - Separator receiver tank drain valve
  - Coolant drain valve and plug
  - Engine oil drain valve
  - Oil cooler drain valve

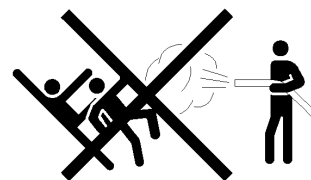


PK0028

### WARNING

#### ***Never direct the compressed air to people and foods***

- Never blow compressed air directly at people.  
Scattered impurities, dust, or foreign objects in the compressed air may cause skin and eyes to be seriously injured.
- Blowing compressed air on food is prohibited.



TR0092

### WARNING

#### ***Hands off from rotating parts and belts***

- Keep hands off from the rotating portion or belts while running.  
It could cause serious injuries if hands should be caught in.



TR0304

### CAUTION

#### ***Do not remove radiator cap during operation***

- Do not, under any circumstance, open the radiator cap while running or immediately after stopping operation. Otherwise high temperature steam jets out and this could cause scalding.



H990432

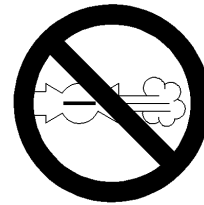


# 1.Safety

## CAUTION

### ***Operation with compressed air supply port opened is prohibited***

- Do not operate the machine with service valves and relief valve open unless air hoses and/or pipes are connected. High-pressurized air blows out and its air pressure could cause injury to the people nearby.
- When the machine has to be unavoidably temporarily operated with its port open, be sure to mount a silencer to reduce noise and wear protective materials such as earplugs to prevent damage to hearing.



D003

## CAUTION

### ***Do not touch hot parts***

- Never work nearby hot portions of the machine while it is running.
- Do not touch hot portions of the machine while inspecting the machine when running.
- Such parts as engine, exhaust manifold, exhaust pipe, muffler, radiator, oil cooler, compressor, piping, separator receiver tank, and discharging pipe are especially hot, so never touch those parts, because it could cause serious burns.
- Compressor oil, coolant water, and engine oil are also very hot and dangerous to touch. Avoid checking or refilling them while the unit is running.



H990432

## CAUTION

### ***Fire prevention***

- Do not, under any circumstance, bring lit cigarettes or matches near such oils as engine oil and compressor oil, etc. They are extremely flammable and dangerous, so be careful when handling.
- Refilling oils should be done in an outdoor well-ventilated place.
- Refuel after stopping the engine, and never leave the fuel nearby the machine. Do not spill. It may cause a fire. When it is spilt, wipe it up completely.
- Such parts as muffler and exhaust pipe can be extremely hot. Remove twigs, dried leaves, dried grass and waste paper, etc. from the exhaust outlet of the muffler.
- Keep a fire extinguisher available by the machine in case of a fire.



W005



H990433

# 1.Safety

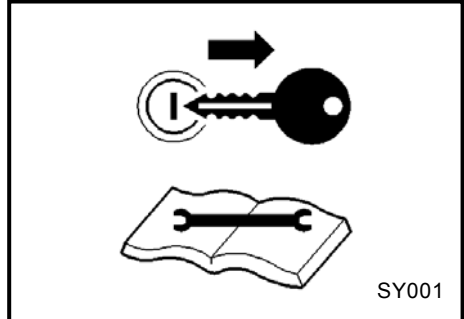
## 1.3 Caution during Inspection and Maintenance



**WARNING**

**Hang a "Now Checking and under Maintenance" tag**

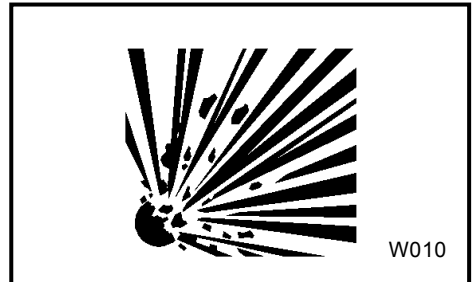
- Remove the starter key from the starter switch before starting inspection, and hang up a "Now Checking and under Maintenance" tag where it can be easily seen. The checker must keep the key during checking and maintenance.
- Remove the negative (-) side cable from the battery. If the above procedure is neglected, and another person starts operating the machine during check or maintenance, it could cause serious injury.



**WARNING**

**Refilling of compressor oil**

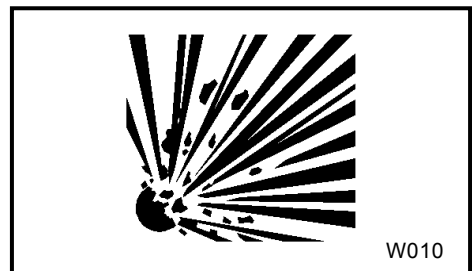
- When you refill the separator receiver tank with compressor oil, stop the engine, and make sure that the pressure gauge indicates 0MPa and there is no residual pressure in it, and then gradually loosen the oil filler cap for refilling oil.
- Note residual pressure in the separator receiver tank could force both extremely hot compressed air and oil to jet out and you may be scalded or seriously injured.



**WARNING**

**Be careful of high-pressurized air blowout**

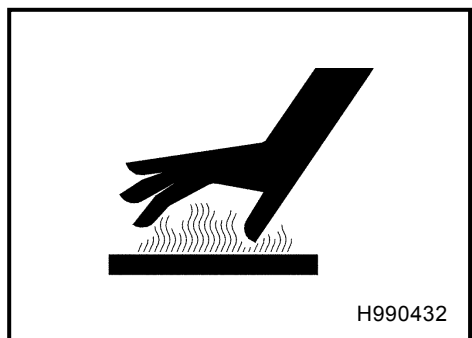
- After stopping the engine, make sure that pressure gauge indicates 0MPa. Even when the gauge shows 0MPa, open a service valve and further do not fail to make sure that there is no residual pressure in the air piping. Then start such a job as repair and maintenance.
- Residual air under pressure will blow off and severely injure operator.



**WARNING**

**Draining separator receiver tank**

- After stopping the engine, confirm that the pressure gauge indicates 0MPa and there is no residual pressure in it, then open the drain valve gradually to drain the compressor oil.
- Note residual pressure in the separator receiver tank could force both extremely hot compressed air and oil to jet out and you may be scalded or seriously injured.

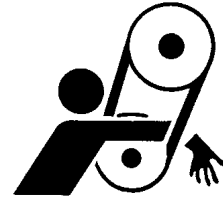


# 1.Safety

## WARNING

### *Adjusting tension of fan belt*

- Be sure to stop the engine and remove the starter key whenever the tension of the fan belt is to be adjusted.
- Remove the negative (-) side cable from the battery.
- If the machine is running, it might catch the operator's hand into the fan belts, and this could cause a serious injury.

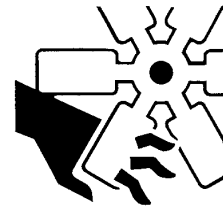


TR0304

## WARNING

### *Hands off from cooling fan*

- Be sure to stop the engine and remove the starter key whenever check or maintenance work is carried out near the cooling fan.
- If the cooling fan is rotating, it may catch the operator or part of his body into the fan, and it could cause a serious injury.



W009

## WARNING

### *Cleaning by air-blow*

- When cleaning dust accumulated in such devices as the air-filter, by blowing compressed air, wear safety glasses, etc. to protect your eyes.

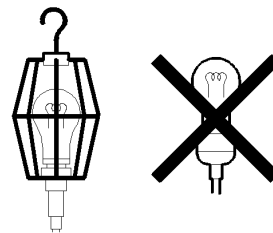


M003

## CAUTION

### *Lighting apparatus*

- It is recommended to use a lamp with safety guard fitted where the site is dark. Operating the machine gropingly or by relying on one's intuition could cause unexpected accidents.
- Any lamps without safety guard are not recommended since they can be broken and they could ignite flammables such as fuel, etc.



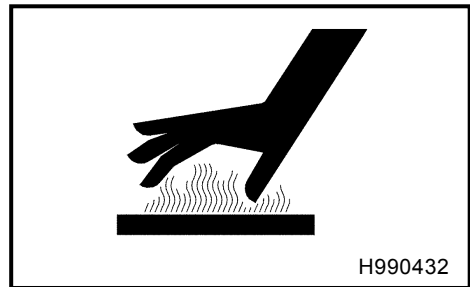
TR0206

# 1.Safety

## CAUTION

### *Opening coolant water drain valve cap*

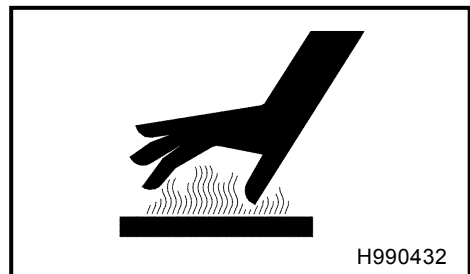
- Be sure to stop the engine, and let the coolant water sufficiently cool down before draining it.
- If the drain valve is opened before the coolant water is cooled enough, hot water could jet out, and it could cause scalding.



## CAUTION

### *Refilling or draining of engine oil*

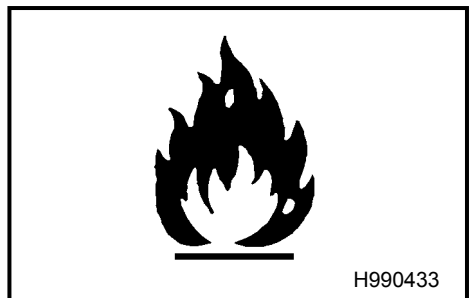
- After stopping the engine, wait for 10 to 20 minutes until the engine oil cools off. Then check the level of the engine oil, or refill or drain the oil.
- Engine oil is very hot and highly pressurized during or just after the operation. Hot oil could blow out of the tank and can cause scalding.



## CAUTION

### *Fear of fire*

- Be sure to perform the periodical check of compressor oil and oil separator.
- Neglecting checks could cause overheat of the oil, resulting in a fire.



## CAUTION

### *Disposal of waste liquid, etc.*

- Waste liquid from the machine contains harmful material. Do not discharge it onto the ground or into the river, lake or sea. Such material will contaminate the environment.
- Be sure to use a container to hold the waste liquid from the machine.
- Be sure to follow the designated regulations when disposing of oil, fuel, coolant (antifreeze), filter, battery or other harmful materials.

# 1.Safety

## 1.4 Safety Warning Labels

Following labels are attached to the machine.

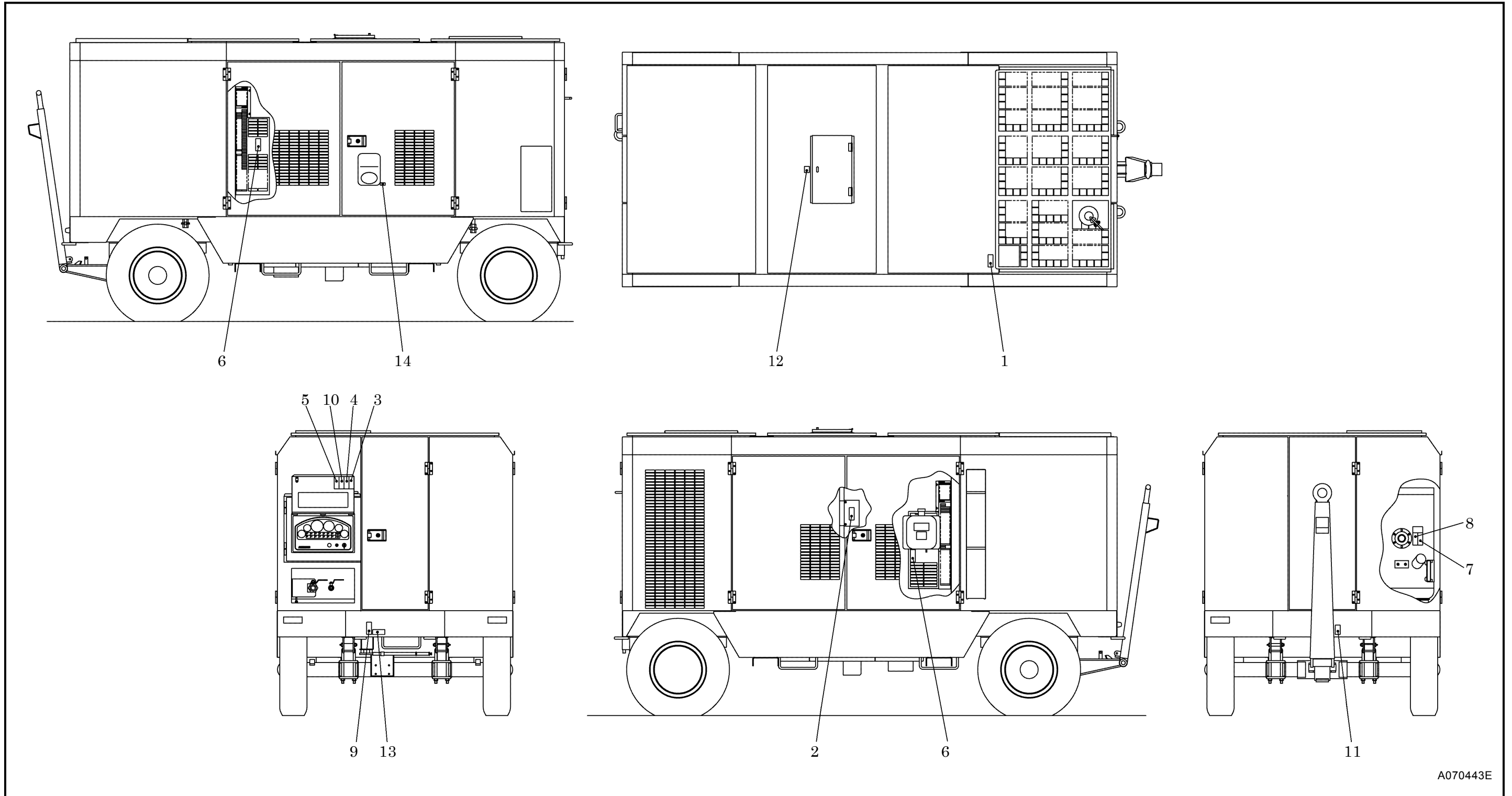
Keep them clean at all times. If they are damaged or missing, immediately place an order with your nearest dealer for replacement. Part numbers are indicated on the lower right corner of the label.

Adhere a new one to the original location.



# 1.Safety

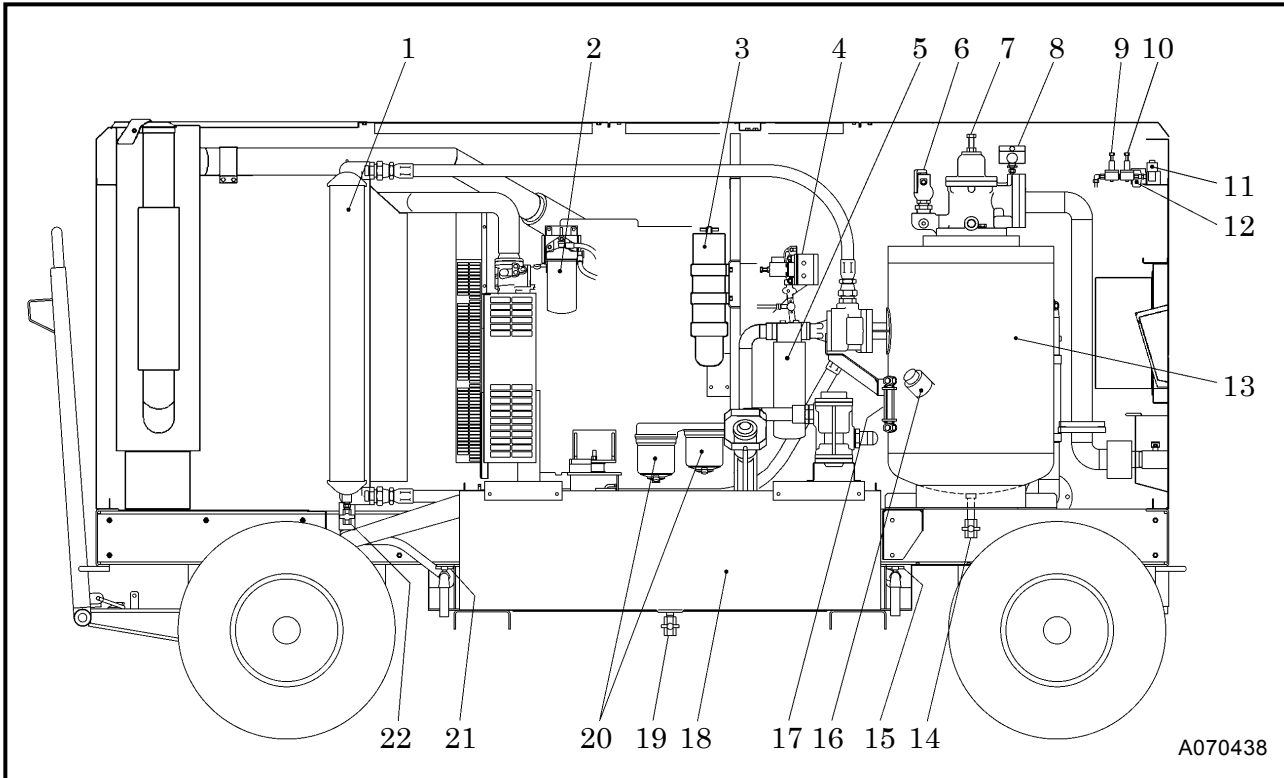
● The pasting position of safe warning label is as follows.



A070443E

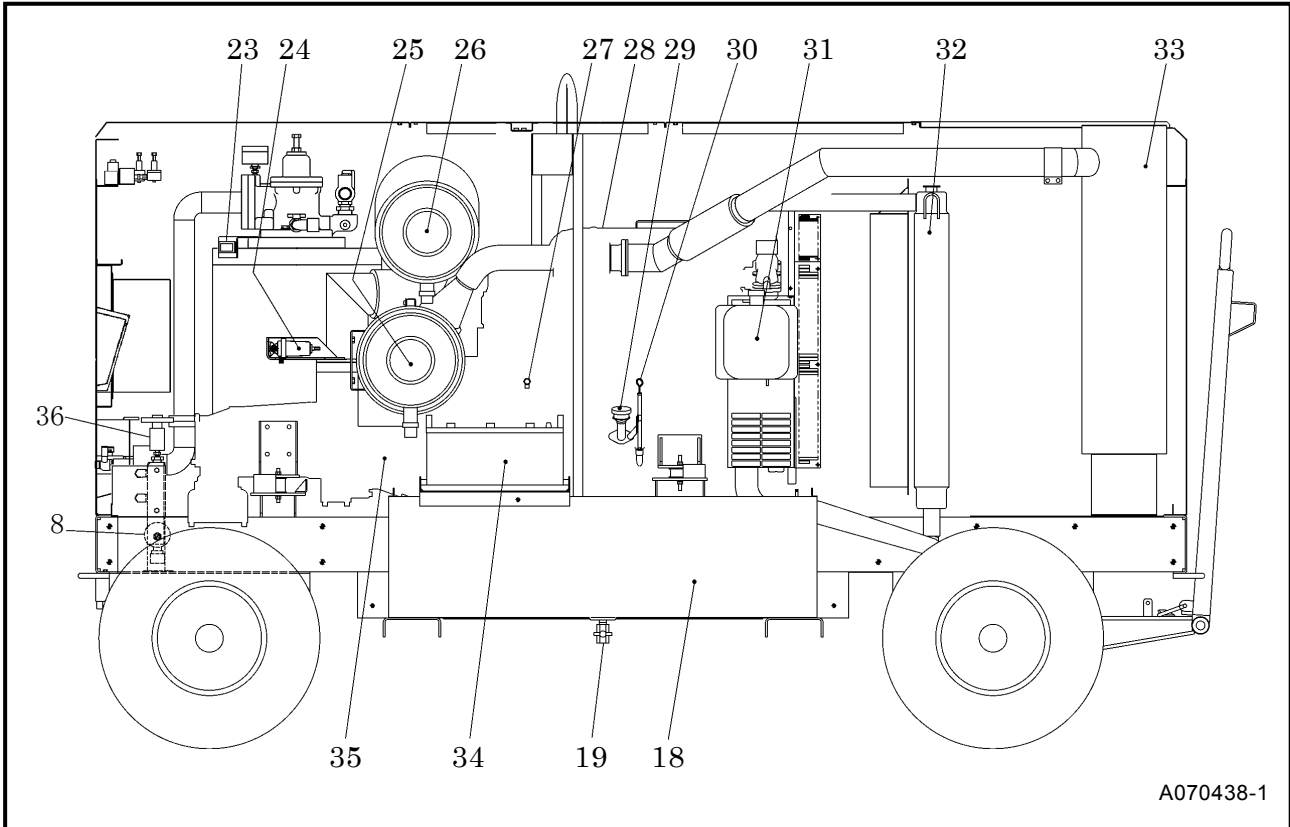
## 2.Part Names

### 2.1 Internal Components and Part Names



No.	Description	Function
1	Oil cooler	For cooling compressor oil circulating in the system.
2	Fuel filter	For filtering dust and foreign matter mixed or to be mixed in the fuel oil.
3	Pre filter	For filtering dust and foreign things mixed in fuel oil and also for separating water.
4	Pressure regulator	For adjusting intake air volume (into compressor air-end)
5	Compressor oil filter	For filtering compressor oil circulating in the system.
6	Safety valve	For releasing compressed air to the atmosphere when the pressure rises higher than the rated pressure.
7	Pressure control valve	For keeping the receiver tank pressure higher than 0.4MPa in the tank.
8	Auto relief valve	For releasing the compressed air to the atmosphere. When the compressor stops.
9	Regulator for low pressure	For pressure regulator during low pressure operation.
10	Regulator for high pressure Regulator for high pressure	For pressure regulator during high pressure operation.
11	Solenoid valve for starting unloader	For control device for closing unloader valve at start-up.
12	Solenoid valve for selection rated pressure	For control device for selection of low and high pressure operation.
13	Separator receiver tank	For separating compressor oil from compressed air sent into the tank.
14	Compressor oil drain valve	For draining compressor oil from separator receiver tank.
15	Engine oil drain valve	For draining engine oil for replacement of it and for maintenance.
16	Compressor oil filler port	For supplying and replenishing compressor oil.
17	Compressor oil level gauge	Scale for measuring compressor oil level.
18	Fuel tank	For storing diesel fuel oil.
19	Fuel tank drain valve	For draining condensate and water accumulated at the bottom of the fuel tank.
20	Engine oil filter	For filtering engine oil.
21	Radiator drain valve	For draining condensate accumulated at the bottom of radiator.
22	Oil cooler drain valve	For draining condensate caused by reverse turning state.

## 2.Part Names



A070438-1

No.	Description	Function
23	Oil separator differential pressure gauge	For indicating abnormality of oil separator clogging.
24	Unloader regulator	For regulating revolution speed of compressor air-end
25	Air filter (For engine)	For filtering the dust floating in the intake air.
26	Air filter (For compressor)	For filtering the dust floating in the intake air.
27	Coolant drain plug (For engine)	For draining condensate from engine.
28	Engine	For driving the compressor.
29	Engine oil filler port	For supplying and replenishing engine oil to engine.
30	Engine oil level gauge	For checking engine oil level.
31	Reserve tank	For feeding cooling water.
32	Radiator	For cooling the coolant for engine because it is water-cooled.
33	Exhaust muffler	Equipment which muffles an engine exhaust sound.
34	Battery	For electrically starting engine.
35	Air-end	For compressing intake air.
36	Vacuum relief valve	For preventing vacuum noise from occurring in compressor air-end during unloaded operation.



# 3. Installation

## 3.1 Transportation

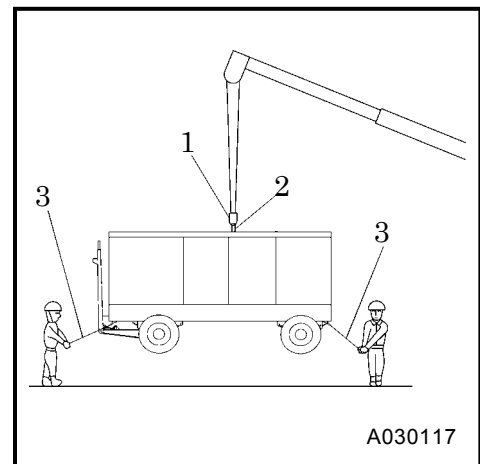


### Transportation

- When loading and unloading unit, be sure to use the lifting bail provided on the center of the unit top.
- Never get under the unit which is suspended, because it is very dangerous.
- When unit is transferred or moved from working site, be sure to place it on truck bed, and fasten it by ropes at the front and rear hooks.
- Be sure to put one set of chocks to fix its wheels firmly on the truck bed.
- Never lift unit which is still in operation, or it could cause critical damage to each component or lead to serious accident.

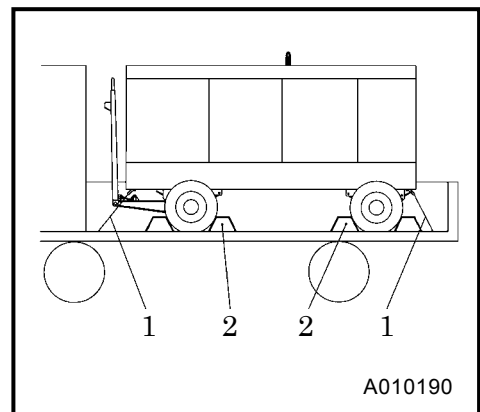
### 3.1.1 Lifting up

- ① Before lifting the unit up, make sure to check the lifting bail “2” for any crack and loosened bolts.
- ② Connect the hook “1” of the crane or shackle with lifting bail “2” eye fitted at the top center of the unit, and make sure that there is no person standing around the unit. Then perform hoisting operation.
- ③ Use auxiliary ropes “3” to prevent the unit from swinging and/or twisting, giving signs and signals each other.
- ④ Select a truck or a crane with capacity sufficient for weight and size of the unit by referring to the values shown in Chapter 8 “Specifications” of the manual.
- ⑤ Never lift the unit while it is running, or this could cause a serious accident.



### 3.1.2 Mounting the unit on the truck bed

- Be sure to fasten the unit with ropes “1” as shown in the figure right, and securely fix it on the truck bed.
- Be sure to put one set of chocks “2” to the wheels. Pull the parking brake lever it firmly after the unit is loaded on the truck bed.



# 3. Installation

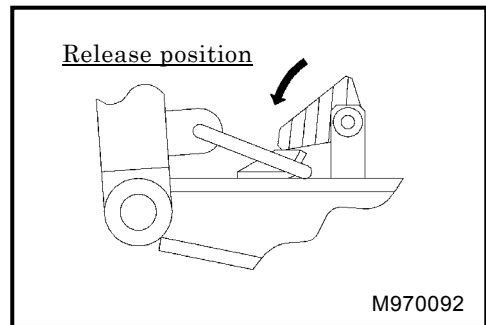
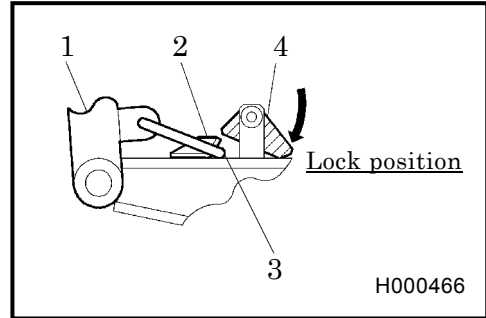
## 3.2 Handling the Drawbar



**WARNING**

### Precautions on handling drawbar

- When the drawbar “1” is raised up for transportation, be sure to secure it by engaging the drawbar hook “3” with the holder “2” without fail.
- If the drawbar hook comes off the drawbar falls down, causing serious injury.
- Therefore, make sure that the stopper “4” is locked at the lock position shown in the figure.
- When the drawbar stays at the release position shown in the figure, the hook “3” could come off the holder “2”, causing the drawbar “1” to fall down.
- Handle the hook “3” holder “2” and stopper “4” so carefully to prevent your fingers from being caught and injured.



### 3.2.1 How to secure the drawbar

- ① Place the drawbar “1” to the front of the machine so that the wheel tires can be aligned.
- ② With the stopper “4” being at the lock position, raise the drawbar “1” up to the position at which the hook “3” can be engaged with the holder “2” (See Fig.1)  
If the stopper stays at the holder and so the drawbar cannot be firmly fixed. (See Fig.2)
- ③ Make sure that drawbar hook is securely engaged with the holder.
- ④ Make sure that the stopper stays at the lock position. (See Fig.1)

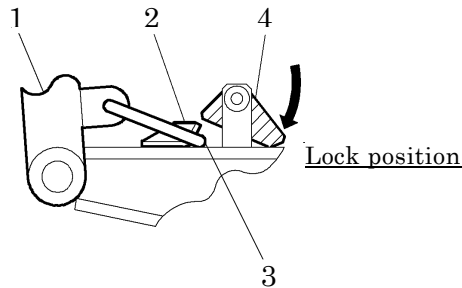
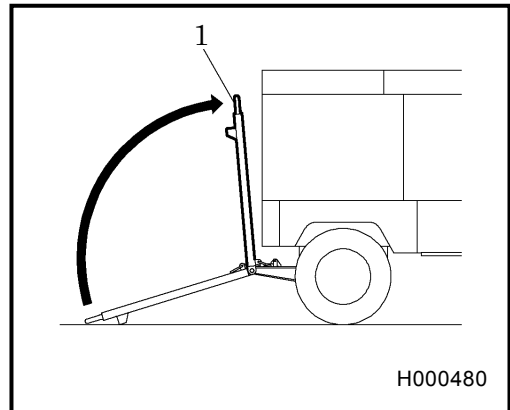


Fig.1

H000466

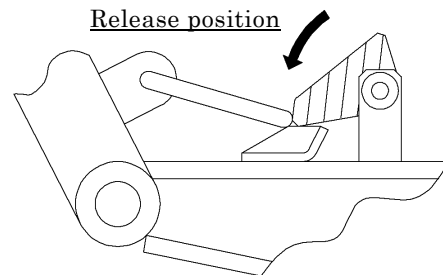


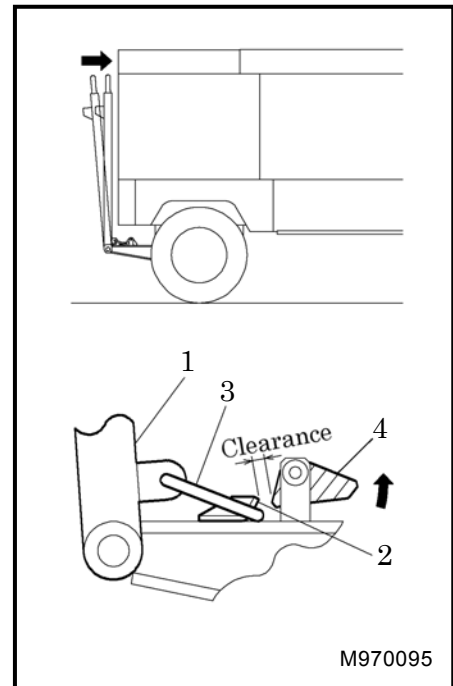
Fig.2

M970098

# 3. Installation

## 3.2.2 How to release the drawbar

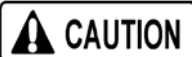
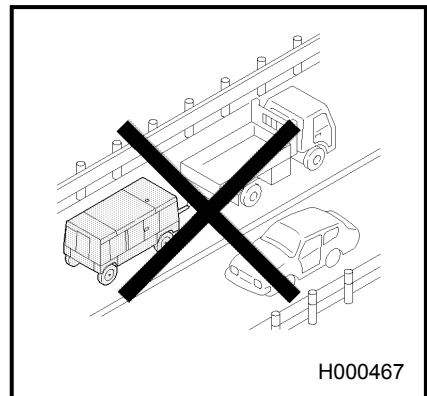
- ① Push the fixed drawbar “1” against the machine in the direction of arrow mark.
- ② Turn the stopper “4” a little to make larger the clearance between stopper “4” and holder “2” than the diameter of the hook “3” .
- ③ Release the hook from the holder “2” through the clearance.
- ④ Lower the drawbar.
- ⑤ Return the stopper “4” to the lock position.



## 3.3 Towing the Unit



- When towing unit, make sure there is no person or obstacle at both front and rear sides and under the unit. Although the machine is designed to be drawn, drawing is allowed only in construction site.
- Towing speed should be within 20 km/h.



### Caution for towing unit

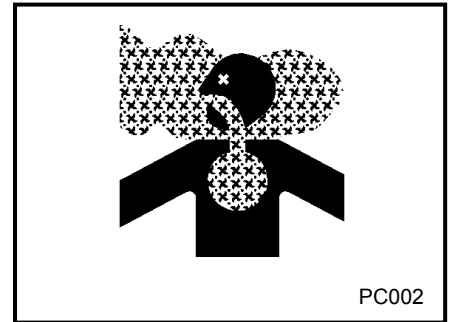
- Be sure to use a vehicle with enough capacity to tow the unit in operating weight.
- Standard pressure for a tire is at 0.45 MPa.
- Be sure not to use wrong size or type of tire in changing.
- Make sure that the end of the drawbar is so surely and firmly connected to the coupler of the towing vehicle that the disconnection may not occur while the unit is being towed.
- Make sure if there is no deform or damage on the drawing vehicle and the drawbar of the unit.
- Be sure to keep your hand or finger away from any part of the coupling device when coupling or uncoupling a drawing device to a draw bar.
- Be sure to drive the drawing vehicle safely, avoiding dangerous place or ground, if any.
- If you do not follow the above instructions, it could cause serious injury or big damage.

# 3. Installation

## 3.4 Installation

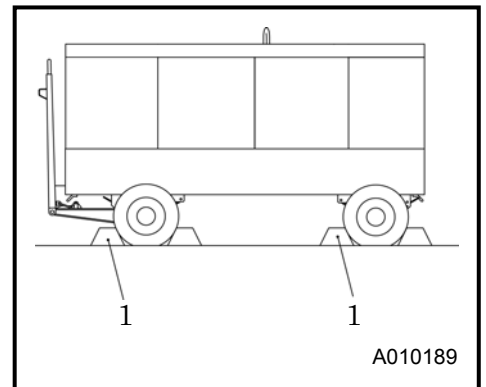
### ⚠ WARNING

- Exhaust gas from the engine is poisonous, and could cause death when inhaled.  
Avoid using the machine in an insufficiently ventilated building or tunnel.
- Do not position the exhaust gas outlet in direction of a person or a house.



### ⚠ WARNING

- The machine has to be parked horizontally on a level place.
- In case the machine has to be parked on a slope, place it across grade so that the machine does not tend to roll downhill.
- Following grades on a slope for the machine are recommended within 15 degrees
- In case of trailer type, be sure to put one set of chocks "1" to the wheels.
- This parking brake is a device exclusively used to hold the unit when it is parked. It is not for use as a stopping brake during its transportation (while being drawn by a vehicle).



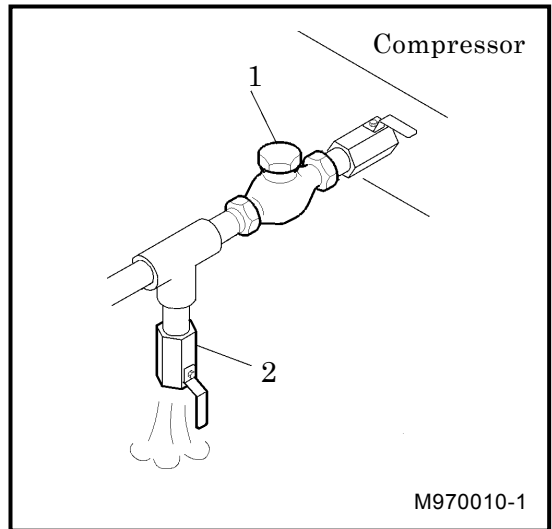
- The machine should be operated in following conditions:
  - **Ambient temperature** ..... **-15°C to +40°C**
  - **Humidity** ..... **Less than 90%**
  - **Altitude** ..... **Lower than 1,500 m above sea level**
- Install the machine in a place with good ventilation, lower temperature and with surroundings as dry as possible.
- If more than two machines are placed parallel in operation, keep enough distance so that exhaust air from one machine does not effect the other one.
- Also, a machine has to be installed in the environment where fresh air is always available.
- Keep enough space around the unit for inspection and maintenance access.

## 3. Installation

### 3.5 Compressed Air Service Valve

#### **CAUTION**

- Do not fail to install a check at the outlet of compressed air and then start piping.  
If the piping is performed without a check valve “1” installed, it is feared that the liquid in the piping can be returned into the compressor air-end it can cause a damage to the compressor air-end.  
The check valve “1” should be in accordance with the maximum working pressure of the compressor.
- For safety operation, be sure to install a valve “2” before the check valve “1” .
- Further, for the parallel operation with other compressors, the discharge of each compressor should be adjusted to be the same level. Then perform the piping.



## 4. Operation

### 4.1 Features of this unit

#### IMPORTANT

- The rated pressure of this unit is selectable. So it is absolutely necessary to operate it after confirming the pressure of the air hose and air tools to be used.
- Never turn the selector switch during operation of air tools. If the discharge pressure of air tools changes, it is very dangerous. Never do that during operation.
- When selecting the operating pressure, never change it by adjusting the speed regulator. Make sure to select “Low Pressure” or “High Pressure by using the selector switch of the rated pressure.

#### [PDSH850S-4B2]

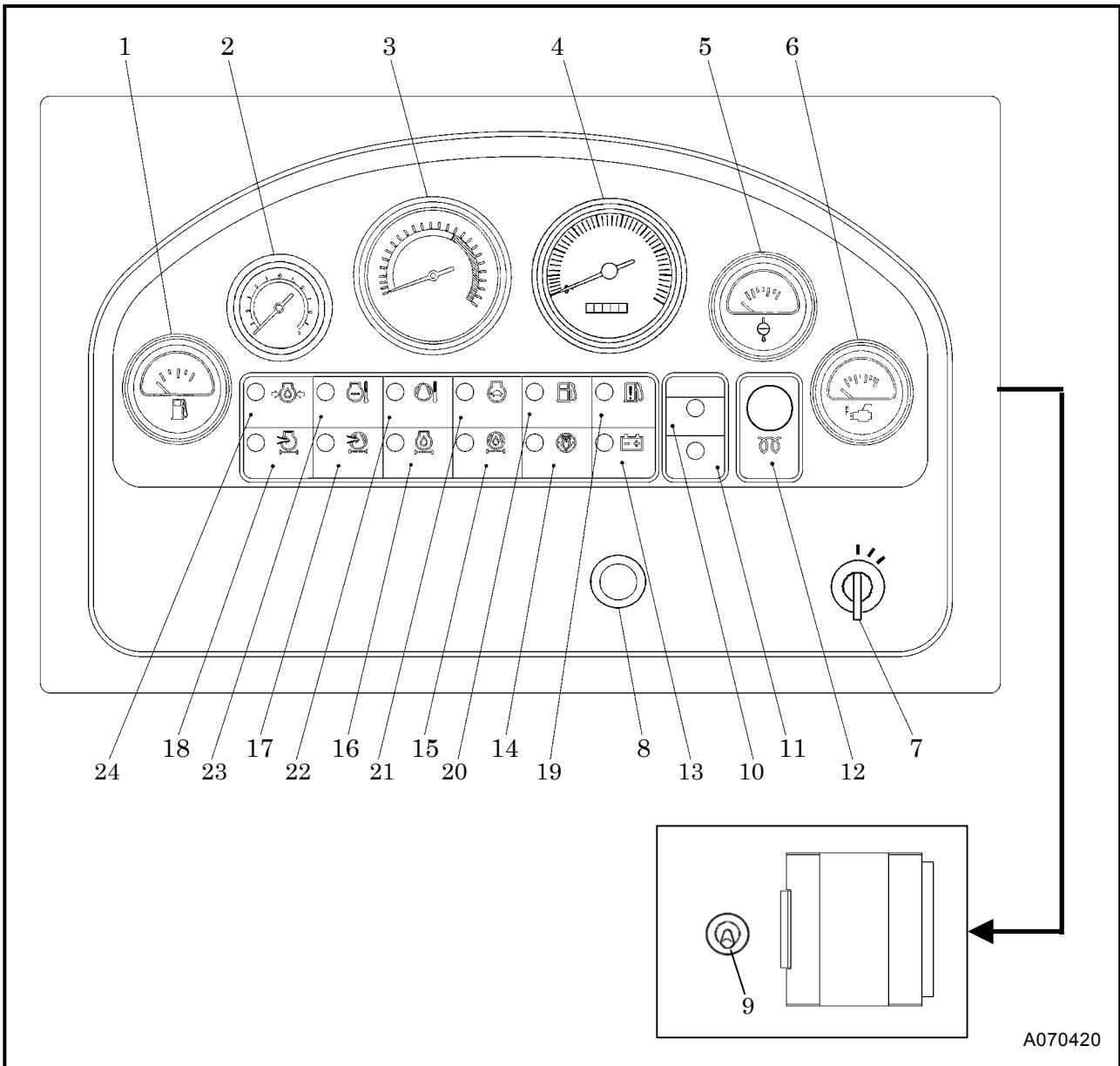
	High pressure position	Low pressure position
Working pressure	1.72MPa	1.50MPa
Free air delivery	24.0m <sup>3</sup> /min	24.0m <sup>3</sup> /min

#### [PDSJ750S-4B2]

	High pressure position	Low pressure position
Working pressure	2.07MPa	1.50MPa
Free air delivery	21.2m <sup>3</sup> /min	21.2m <sup>3</sup> /min

# 4. Operation





## 4.2 Instrument Panel



- |   |                                    |                               |
|---|------------------------------------|-------------------------------|
| 1. Fuel level gauge                                   | <Indicator lamp>                   | <Emergency stop lamp>         |
| 2. Interstage pressure gauge                          | 10. High pressure                  | 19. Fuel system failure       |
| 3. Discharge air pressure                             | 11. Low pressure                   | 20. Residual fuel gauge       |
| 4. Tachometer<br>(with hourmeter)                     | 12. Preheating                     | 21. Engine speed down         |
| 5. Coolant temperature gauge                          | <Warning lamp>                     | 22. Discharge air temperature |
| 6. Discharge air temperature<br>gauge                 | 13. Charging                       | 23. Coolant temperature       |
| 7. Starter switch                                     | 14. Oil separator clogging         | 24. Engine oil pressure       |
| 8. Emergency stop button                              | 15. Compressor oil filter clogging |                               |
| 9. Selector switch of rated<br>pressure and rated RPM | 16. Engine oil filter clogging     |                               |
|   | 17. Compressor air filter clogging |                               |
|   | 18. Engine air filter clogging     |                               |







## 4. Operation

### Indicator lamp

Item		Trouble		Monitor
PDSH850S	Low pressure	Rated pressure	1.50MPa	 LOW PRESS.
		Rated RPM	2,200min <sup>-1</sup>	
PDSJ750S	High pressure	Rated pressure	1.72MPa	 HIGH PRESS.
		Rated RPM	2,200min <sup>-1</sup>	
PDSJ750S	Low pressure	Rated pressure	1.50MPa	 LOW PRESS.
		Rated RPM	2,200min <sup>-1</sup>	
PDSJ750S	High pressure	Rated pressure	2.07MPa	 HIGH PRESS.
		Rated RPM	2,200min <sup>-1</sup>	

### Warning lamp

When the lamp goes on, take appropriate measures to recover the situation swiftly.

Item	Trouble	Measures	Monitor
Charging	Lamp goes on when alternator is not charging.	Check wiring Check alternator	
Oil separator	Lamp goes on when separator gets clogged and differential pressure increases. Actuating min. resistance is higher than 0.15MPa.	Replace	
Compressor oil filter	Lamp goes on when the differential pressure increases due to oil filter clogging. The function pressure is than 0.12MPa.	Replace	
Compressor air filter	Lamp goes on when air filter gets clogged and suction resistance increases.	Clean Replace	
Engine air filter	Actuating resistance is more than 6.23kPa.		
Engine oil filter	Lamp goes on when the differential pressure increases due to oil filter clogging.	Replace	









## 4. Operation

### Emergency stop lamp

The compressor stops when the emergency stop lamp goes on.

(※The compressor stops in 15 seconds only when engine speeds down.)

Be sure to follow the measures shown below before starting the unit again.

Item	Trouble	Measures	Monitor
Residual fuel	When the level of fuel in fuel tank drops and it becomes necessary to feed fuel, it goes on.	Replenish tank with fuel.	
※ Engine speed down	Lamp goes on when engine speed drops below 900min <sup>-1</sup> . (Engine stops within 15 seconds.)	See “Troubleshooting”	
Discharge air temperature	Lamp goes on when the air temperature at the outlet of the air-end reaches the set temperature of 130°C.		
Coolant temperature	Lamp goes on when coolant temperature reaches 101°C.		
Engine Oil pressure	Lamp goes on when engine oil pressure drops. The function pressure is below 78kPa		
Fuel system failure	When the sedimentor is fully clogged with condensate, the lamp goes on.	Drain the condensate.	

### 4.3 Door

#### 4.3.1 Open/Close the Door



- Keep the door closed and locked while running the unit.
- When the door has to be opened, be careful not to touch portions that are rotating or very hot.  
Careless touch may cause serious injury.



- Pull the handle forward to open the door.
- Be sure to close the door tightly so that its latch is firmly caught.

# 4. Operation

## 4.4 Lubricating oil · Coolant · Fuel

### 4.4.1 Engine Oil

**IMPORTANT**

*Oil should use the recommendation oil*

- Viscosity of engine oil greatly affects startability, performance, oil consumption of the engine, as well as wear of the moving parts.
- Choose appropriate oil based upon the table below according to the outside air temperature.

**Relation between viscosity (SAE) and temperature**

SAE Viscosity number	Temperature
10W	-30°C to 10°C
30	-10°C to 40°C
40	0°C to 50°C
15W/40	-20°C to 40°C

- Be sure to use CD class engine oil or superior class. (Using engine oil with poor quality may shorten the life of the engine).
- Follow the designated regulations to dispose of engine oil.

**\* Unit is delivered ex. factory, filled with engine oil recommended by engine manufacturer.**

### 4.4.2 Compressor Oil

**IMPORTANT**

*Oil should use the recommendation oil*

- Be sure to use recommended oil listed below.

**Recommended oil for compressor**

Temperature	Brand	Maker
5~40°C	MOBIL RARUS 425	MOBIL
-15~40°C	MOBIL RARUS SHC 1025	MOBIL

- Even continuous oil replenishment cannot improve its deteriorated condition. Be sure to change the oil completely at every scheduled interval.
  - Do not mix it with other brand oil, or it will cause poor performance and shorten the life of the compressor oil. (But fresh compressor oil could accept a mixture of small amount of different brands.)
  - Running the unit with old and deteriorated compressor oil will cause damage to bearings, or serious accident like ignition in a separator receiver tank. Be sure to change the oil completely at every scheduled interval.
- Follow the designated regulations to dispose of compressor oil.

**\* Unit is delivered ex. factory, filled with "AIRMAN OIL LONG LIFE HP".**

## 4. Operation

### 4.4.3 Coolant

#### IMPORTANT

#### Quality of coolant and antifreeze

- Use soft water of good quality such as tap water for coolant.
- When water with dirt, sand, and/or dust contained, or hard water such as well water (ground water) is used, this will cause deposits inside radiator or on cylinder head, and will cause engine overheat due to poor flow of coolant.
- When the unit is used in a cold region and possible freezing is expected, it is recommended to use LLC (Antifreeze) for the coolant.
- Adjust mixing ratio of LLC (Antifreeze) with water according to the temperature.
- Use LLC (Antifreeze) within the range of its mixing ratio between 30 and 60%.  
(Upon delivery from the works, LLC density is 35%)
- If LLC (Antifreeze) in the water exceeds more than 60%, it may decrease its antifreezing effect.
- Follow the designated regulations to dispose of LLC (Antifreeze).

Reference of LLC (Antifreeze) mixing ratio

Temperature	Mixing ratio
-10°C	30%
-15°C	35%

### 4.4.4 Fuel

#### IMPORTANT

#### Choose appropriate

- Be sure to use diesel fuel oil.  
(Using other oil will cause low power output or damage the engine.)
- As for fuel, use diesel fuel oil (having higher than 45 cetane number).
- Use of diesel fuel oil having lower than 45 cetane number will cause inferior function to engine and, what is worse, it will cause serious accident to the engine.

## 4. Operation

### 4.5 Check before Starting Unit



#### Check before starting unit

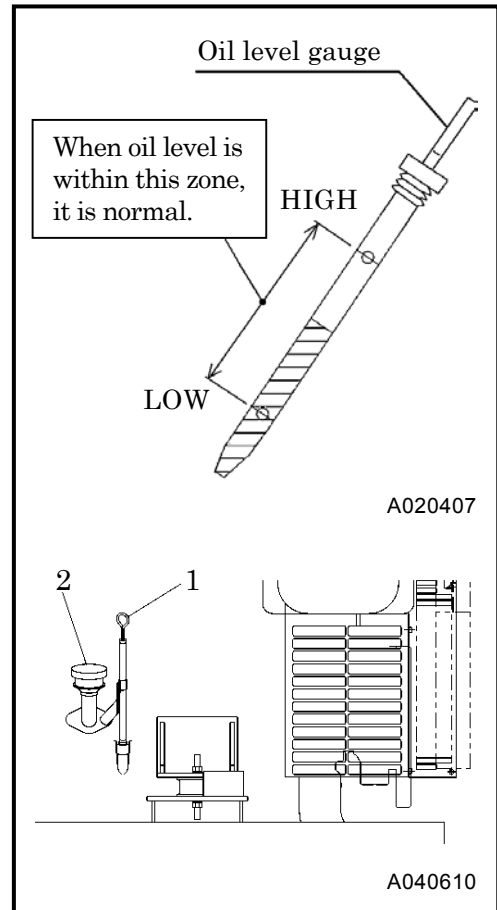
- Be sure to check the unit before operation.  
When any abnormality is found, be sure to repair it before restarting the unit.
- Be sure to make daily checks before operation. If the unit is operated without prior check and without noticing its abnormality, such operation could cause seizure of components or may even cause fire.

#### 4.5.1 Check Engine Oil Level

- Unit should be on level before checking oil level.
- When you check oil level after you have once started operation, wait 10 to 20 minutes after stopping engine, before checking the oil level.

##### <Procedure>

- ① Pull out the oil level gauge "1", and wipe it with a clean cloth.
  - ② Then, re-insert the oil level gauge "1" fully and pull it out again. If the oil level gauge shows the oil level between LOW and HIGH, it is normal.
  - ③ When the oil level is below its LOW, add engine oil from oil filler port "2".
- While checking oil level, check also for contamination. If the oil is found dirty, contaminated or should it be changed according to the periodic inspection list, change the oil.  
(See 5.6.1)
  - Never fill oil more than HIGH level.



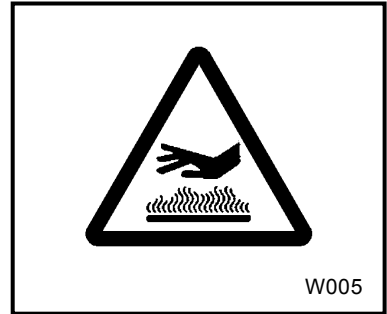
## 4. Operation

### 4.5.2 Check Coolant Level

#### CAUTION

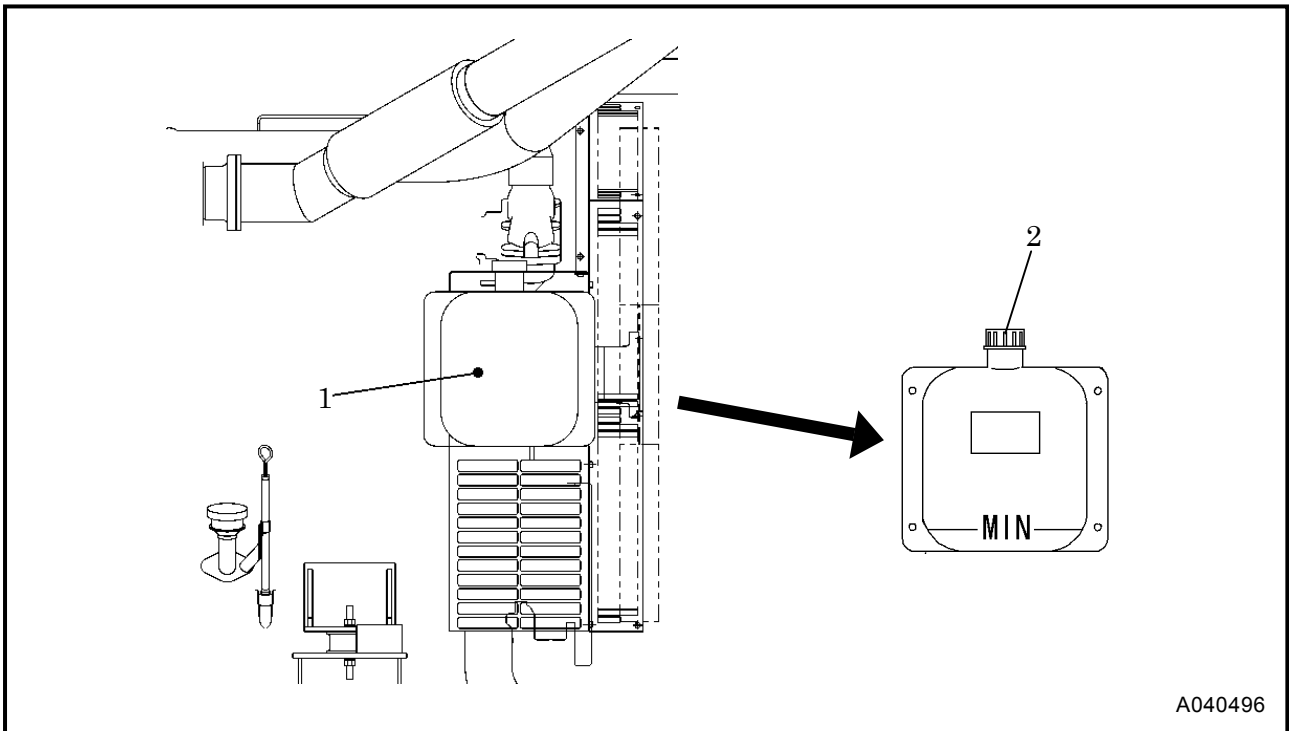
- Be sure to stop the machine and allow time to cool. Then loosen the radiator cap one notch. After the coolant water is sufficiently cooled and the inner pressure is released, take the cap off. If this procedure is neglected, the inner pressure can blow off the cap. Steam jetting out of the radiator could result in causing scalding. Follow this procedure under all circumstances.

#### Taking off the radiator cap



#### IMPORTANT

- Do not continue operation at low coolant level. Air bubble is mixed into radiator, and it causes damage to the radiator.
- Check the coolant level in the reserve tank "1". If it is lower than the limit, open the cap "2" and replenish the coolant. (Level must be kept above MIN mark.)
- If little coolant is left in the reserve tank "1" (lower than MIN. level), replenish the radiator with cooling water. (See 5.6.12)



## 4. Operation

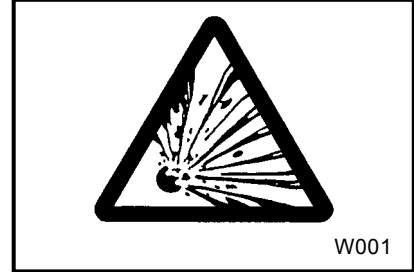
### 4.5.3 Check Compressor Oil Level



**WARNING**

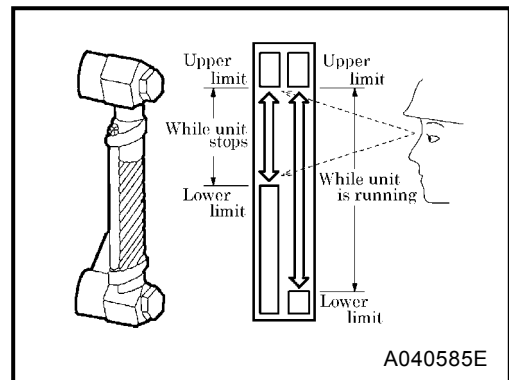
- When you refill the separator receiver tank with compressor oil, stop the engine, and make sure that the pressure gauge indicates 0MPa and there is no residual pressure in it, and then gradually loosen the oil filler cap for refilling oil.
- Note residual pressure in the receiver tank could force both extremely hot compressed air and oil to jet out and you may be scalded or seriously injured.

#### Refilling of compressor oil



W001

- Place the machine on level ground when checking the oil level.
- Make sure to confirm that the level of compressor oil shall be higher than the lower limit of the plate “stopping”. If not, replenish oil. (See 5.6.5)



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### 4.5.4 Drain Separator Receiver Tank



**WARNING**

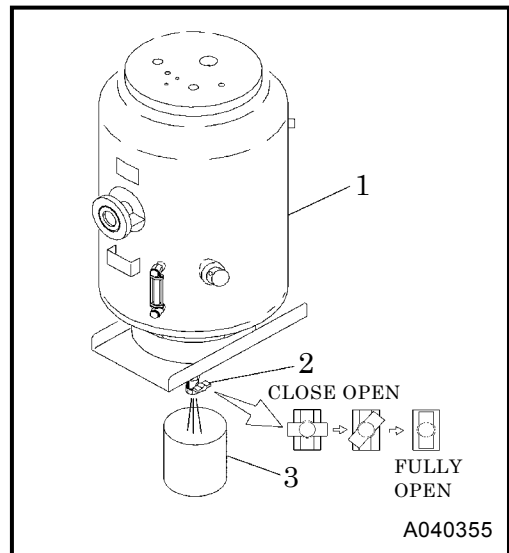
- After stopping the engine, confirm that the pressure gauge indicates 0MPa and there is no residual pressure in it, then open the drain valve gradually to drain the compressor oil.
- Note residual pressure in the receiver tank could force both extremely hot compressed air and oil to jet out and you may be scalded or seriously injured.

#### Draining of Separator receiver tank



W005

- Gradually opening the drain valve "2" fitted under the separator receiver tank "1" as shown in the fig, drain the condensate.
- Be careful not to fully open the valve. Otherwise, much oil may be lost.
- After draining the oil completely, close the drain valve "1" firmly.
- Drain the condensate in container "3", and then dispose of condensate according to the designated regulations.



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## 4. Operation

### 4.5.5 Check Fuel

- Check fuel level gauge before operation. Replenish enough fuel to prevent fuel shortage during operation, if the level is low.
- Drain condensed water accumulated at the bottom of fuel tank whenever it becomes necessary.

#### **CAUTION**

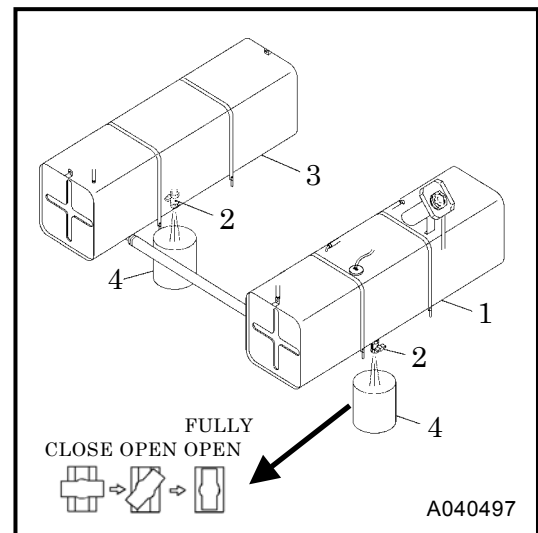
- Do not, under any circumstance, smoke cigarettes or light matches during fueling.
- Fuel is extremely flammable and dangerous. It therefore, could catch fire should it flame or other sources of ignition be brought near fuel.
- Refuel only after stopping the engine, and never leave an open fuel can near the machine. Do not spill. It could cause a fire. When it is spilt, wipe it up completely.
- Refilling fuel tank should be done in an outdoor well-ventilated place.
- Do not supply fuel up to the fuel cap. And then the fuel may get spilt when the unit is moved, transported and it is vibrating.

#### **Fire prevention**



### 4.5.6 Drain Fuel Tank

- Opening the drain valve "2" fitted under the fuel tank "1", drain the condensate from the tank. Also drain condensate from the fuel tank "3" on the other side.
- When completely drained, firmly close the drain valve "2".
- Drain the condensate in container "4", and then dispose of condensate according to the designated regulations.

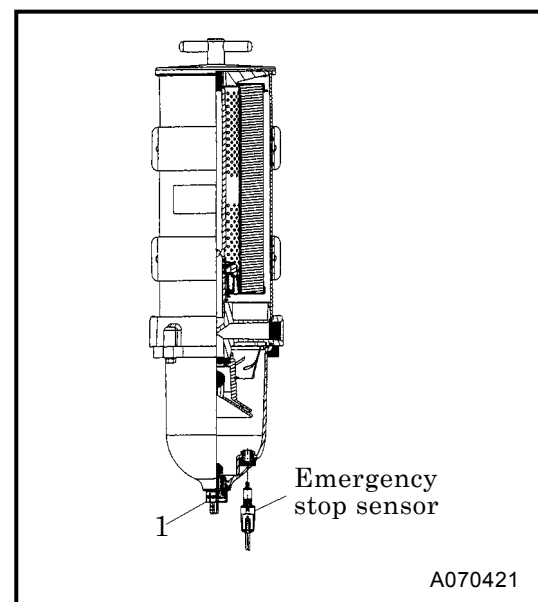


### 4.5.7 Drain check in pre- filter

Drain the condensate inside the sedimentor. When the condensate is clogged up to the emergency stop level, engine shuts down automatically for emergency stop.

<Draining procedure>

- ① Loosen the drain plug "1" and drain out condensed water inside.
  - ② After draining condensed water, close the drain plug "1" without fail.
- Drain the condensate in container, and then dispose of condensate according to the designated regulations.



## 4. Operation

### 4.5.8 Check V-Belt Tension

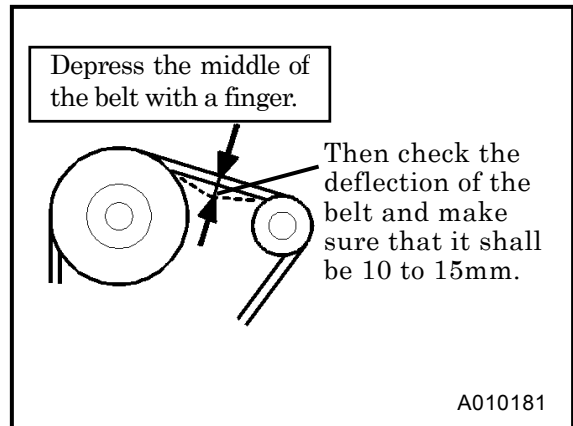
#### IMPORTANT

- Too tight belt tension could damage shaft and shorten bearing life. Too loose belt tension may result in damaging belt earlier and machine components due to overheat.

Follow the procedure below to adjust tension of fan belt and V-belt for alternator.

<Procedure>

- ① Adjust the tension by gradually loosening the fastening bolt of the alternator.
- ② Visually check if there are any cracks or tears in the belt.
- ③ Loosen the fastening bolt of the alternator until the play of the belt reaches 10 to 15mm[98N(10kgf)] when pushed by fingers, and adjust it.
- ④ Be careful not to leave any grease or LLC on a belt while changing it. If any such material is left, wipe it off completely.



### 4.5.9 Check Wiring of Each Part

Check each wiring for any loose connection, damage to insulating sheathed portion, disconnection, and short-circuit.

### 4.5.10 Check Piping of Each Part

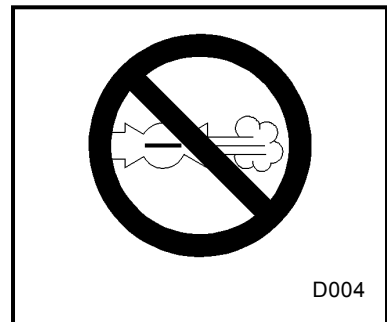
Check each piping for any loose connection and also check each hose and pipe for any tear and leaks.

## 4.6 Unit Operation

#### CAUTION

**Operation with compressed air supply port opened is prohibited**

- Do not operate the machine with service valves and relief valve open unless air hoses and/or pipes are connected. High-pressurized air blows out and its air pressure could cause injury to the people nearby.
- When the machine has to be unavoidably temporarily operated with its port open, be sure to mount a silencer to reduce noise and wear protective materials such as earplugs to prevent damage to hearing.





# 4. Operation

## 4.6.1 Procedure to Start the Unit

### IMPORTANT

### Be sure to warm-up

- Be sure to let unit warm-up after starting for smooth operation of the engine and the compressor.  
Do not operate the engine at full load immediately after it starts up. This will shorten the equipment life.
- During the warm-up operation, examine the different parts of the equipment for any looseness, leakage of water, oil, fuel, and other irregularities.
- Also, make sure that warning lamps are off.

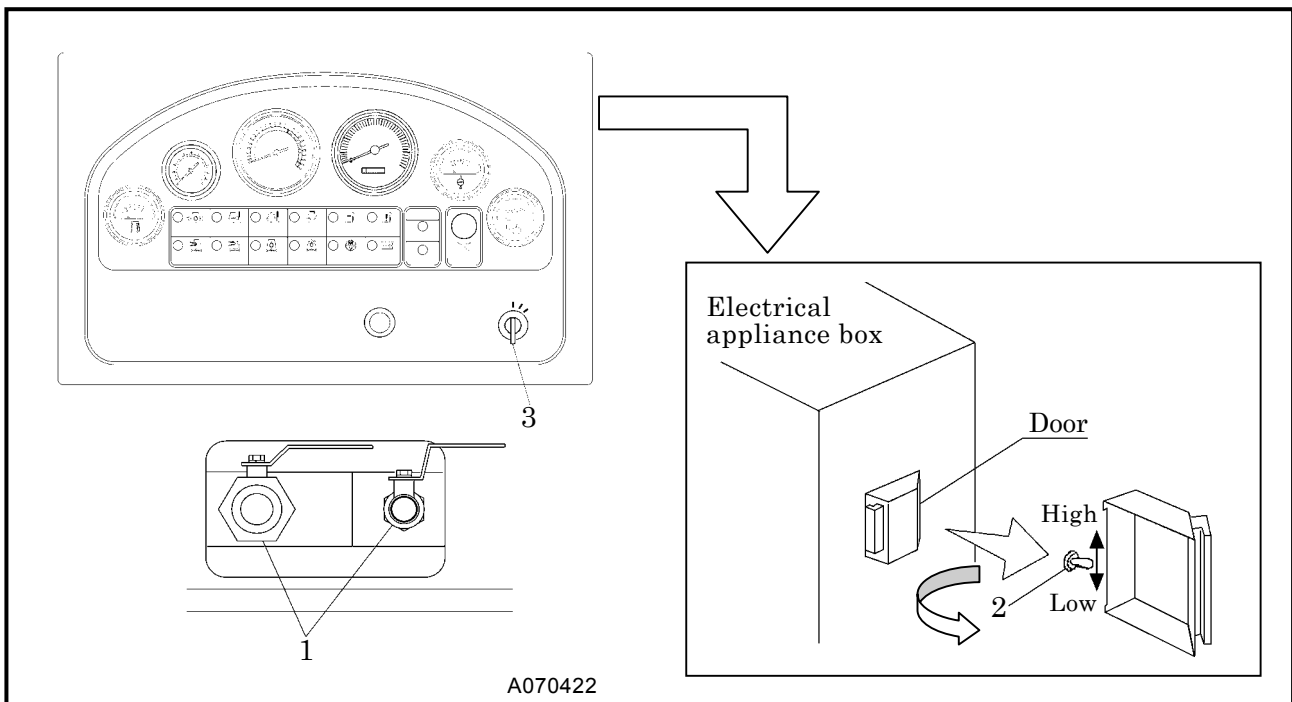
#### <Procedure>

- ① Close fully service valves “1” .
- ② Set the selector switch “2” to “High pressure” or “Low pressure” in accordance with your pressure required for your job.

When it is set to “High pressure”, the orange lamp on operation panel glows. On the other hand, when set to “Low pressure”, the lamp green lamp glows. Further, when set at “High pressure” or “Low pressure”, the free air delivery shown in the following table is served. (The switch “2” is fitted on the wall of the side door beside the operation panel.)

Selection of discharge pressure	PDSH850S		PDSJ750S	
	Low pressure	High pressure	Low pressure	High pressure
Working pressure	1.50MPa	1.72MPa	1.50MPa	2.07MPa
Free air delivery	24.0m <sup>3</sup> /min		21.2m <sup>3</sup> /min	

- ③ Turn starter switch to “Preheat” position and keep it preheated for 30 seconds.
  - ④ Turn the starter switch “3” fully clockwise to start up the engine.
  - ⑤ After the engine starts, operate the machine at the pressure of about 0 MPa (0 kgf/cm<sup>2</sup>) 5 to 10 seconds to make the engine start smoothly. Then warm-up operation is automatically performed at the discharge pressure of 0.39 to 0.49 MPa (4 to 5 kg/cm<sup>2</sup>) about 80 seconds.
  - ⑥ After warm-up operation is finished, open the service valve “1” to start servicing air.
- Adjustment of air delivery with the service valve “1” opened by halves can cause trouble. So adjust air delivery with the service valve “1” fully opened.



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## 4. Operation

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### 4.6.2 Operating Procedures when Engine Fails to Start up on First Attempt

- When the engine fails to start up even after performing the startup procedures ① to ⑥, do not keep the starter running, but set the starter switch back to "STOP" and wait about 30 seconds. Then, repeat the startup procedure once again. (It is impossible to start for 30 seconds after it is returned to "STOP" position.)
- If the repeated procedure does not allow the engine to run, the following causes are suspected. Therefore, check the following:
  - No fuel
  - Clogging of fuel filter
  - Discharge of battery (Low cranking speed)

## 4. Operation

### 4.6.3 How to Start the Unit at Low Temperature

#### IMPORTANT

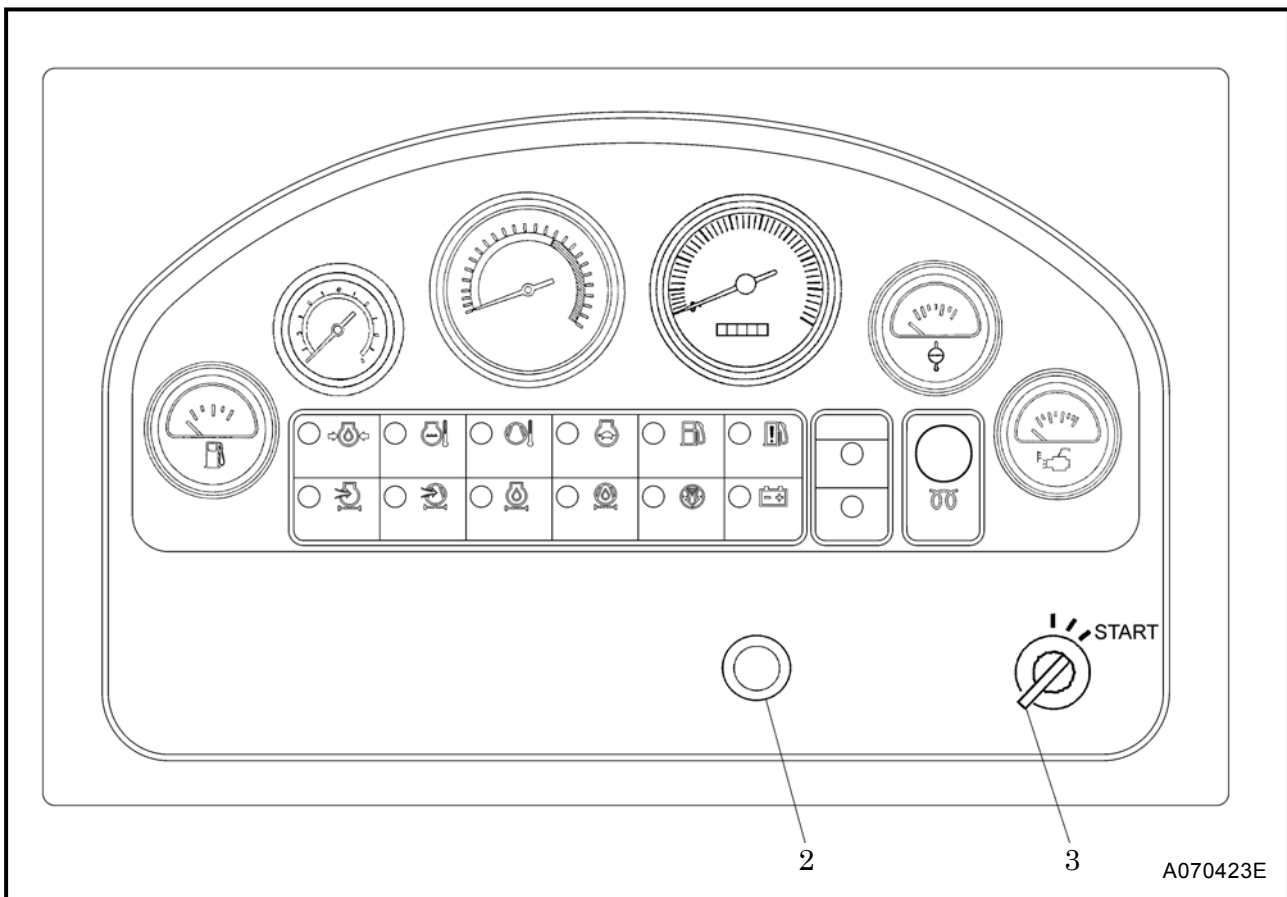
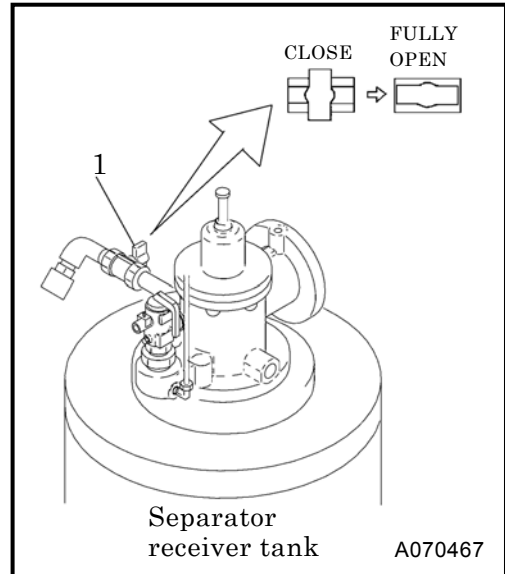
#### Operation under Cold Weather Conditions below -5°C

- Use SAE10W-30 (CD class) for the engine oil.
- Use LLC (antifreeze). Use correct amount to provide freeze protection, according to the ambient temperature.
- Battery should always be kept fully charged.

When it is difficult to start engine in cold weather, take the following measures.

#### <Procedure>

- ① Close fully service valves.
- ② Fully open the relief valve "1" just in front of a separator receiver tank.
- ③ Repeat the cranking operation two or three times by turning the starter switch "3" fully to the right, pushing the emergency stop button "2" .
- ④ Perform usual starting operation. When the engine starts, gradually close a relief valve "1" , watching engine revolution rise. In the state after the valve is fully closed, perform warming-up operation.









# 4. Operation

## 4.6.4 Gauge Indication while Operating







### IMPORTANT

- During operation, keep the discharge air pressure gauge indicating higher pressure than 1.37MPa (for PDSH850S/PDSJ750S)
- Continuing equipment operation at a lower pressure than the above pressure may cause overheating, since it affects the separation of lubricating oil inside the oil separator and reduces the oil flow to the compressor air-end, resulting in temperature rise.
- Make sure that RPM is higher than 1,100min<sup>-1</sup> at no load (or low load) operation. Long continuous operation at the lower speed than 1,100min<sup>-1</sup> could cause damage to each part by vibration. When the speed becomes lower than 1,100min<sup>-1</sup>, stop the machine soon.





- Be sure to check at times to see if gauges or each component of the unit are properly working, or if there is any air-leak, oil-leak, water-leak or fuel-leak etc.
- During normal operation, each indication of instruments is shown in the table below. Refer to the table for daily checks.
- The above table gives standard values. They may vary slightly depending on the operating conditions and other factors.

Protection device		Emergency stop Lamp					
		Residual fuel	Engine speed down	Discharge air temperature	Coolant temperature	Engine oil pressure	Fuel system failure
Monitor							
Starting	Starter switch set to "RUN" position	● OFF	● OFF	● OFF	● OFF	☀ ON	※ ● OFF
In Operation		— ● — OFF					

Note) Monitor marked "※" for fuel filter failure : Lamp goes on for one seconds and then automatically goes out.

Protection device		Warning Lamp					
		Charging	Oil separator	Compressor oil filter	Compressor air filter	Engine air filter	Engine oil filter
Monitor							
Starting	Starter switch set to "RUN" position	☀ ON	● OFF	● OFF	● OFF	● OFF	● OFF
In Operation		— ● — OFF					

## 4. Operation

		Indicator lamp	
		High pressure	Low pressure
Monitor		 HIGH PRESS.	 LOW PRESS.
Starting	Starter switch set to "RUN" position	● OFF	● OFF
In Operation		※  Orange coloured lamp ON	※  Green coloured lamp ON

Note) ※: Each lamp glows, according to the selection of rated pressure.

Type	Pressure	In Operation	Discharge air pressure	Discharge air temperature gauge	Coolant Temperature gauge
PDSH850S-4B2	1.50MPa Low pressure	Unload	1.50~2.07MPa	95~120°C	75~95°C
		Full load	1.37~1.50MPa		
	1.72MPa High pressure	Unload	1.82~2.07MPa		
		Full load	1.37~1.72MPa		
PDSJ750S-4B2	1.50MPa Low pressure	Unload	1.50~2.45MPa	95~120°C	75~95°C
		Full load	1.37~1.50MPa		
	2.07MPa High pressure	Unload	2.19~2.45MPa		
		Full load	1.37~2.07MPa		

## 4. Operation

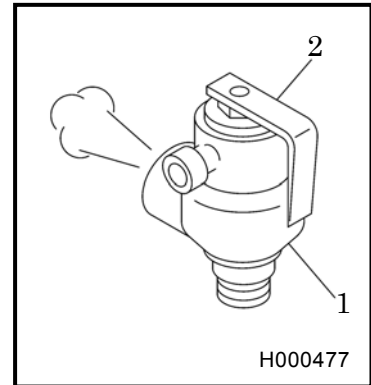
### 4.6.5 Performance Check of Safety Valve

#### IMPORTANT

- Keep face or hand away from the discharging outlet of safety valve. It is very dangerous because high-pressure compressed air jets out.

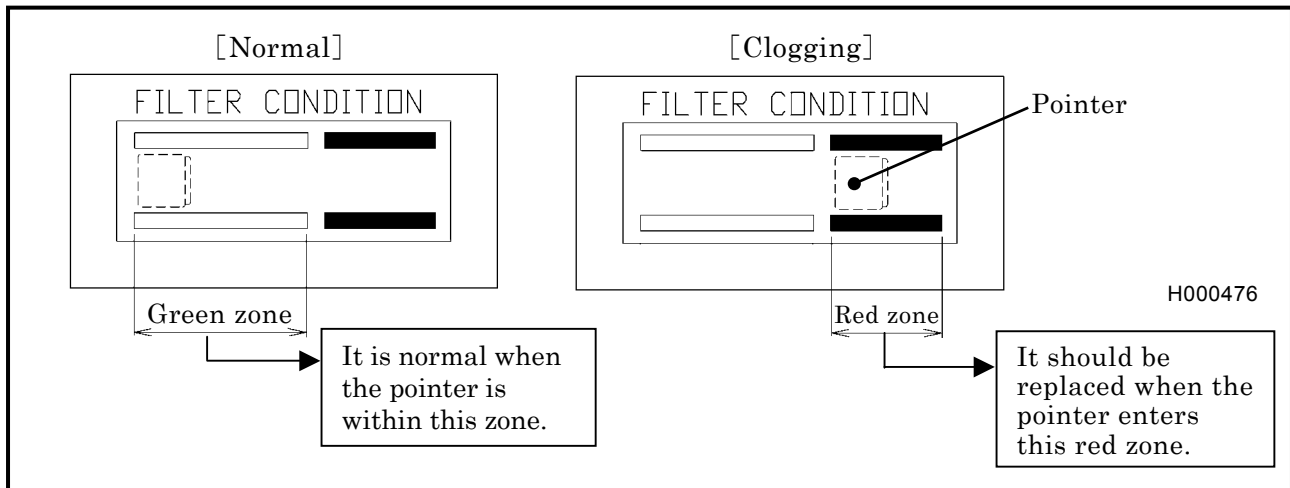
#### IMPORTANT

- Make sure to check the safety valve “1” performance once a day.
- Close the service valves completely and pull the test lever “2” to check the performance. The function is good when the discharge air blows off with a slight force in the following conditions.
- PDSH850S / PDSJ750S ..... 2.11~2.45MPa
- The pressure set for the safety valve is mentioned as follows.
- PDSH850S / PDSJ750S ..... 2.45MPa



### 4.6.6 Check Clogging in Oil Separator

- When the differential pressure gauge of oil separator shows red range, replace the oil separator. (See 5.6.14)
- For checking for clogging, perform the checking with the service valve opened while the unit is running. Filter condition cannot be displayed properly while it is stopping.



## 4.7 Stopping Procedures

- ① Close the service valve completely and operate the machine about 5 minutes, until it cools down.
  - ② Turn the starter switch to “STOP” position to stop the engine.
  - ③ Remove the key from the compressor every time when you stop the engine. Keep the key and be careful not to lose it.
- Unless all the service valves are fully closed upon stopping operation, the compressed air will be sent in reverse direction in the hoses (pipes) connected to air tools and relieved to atmosphere continuously through the auto-relief valve. Further, when re-starting operation next time, compressed air will be jetted out through service valves.