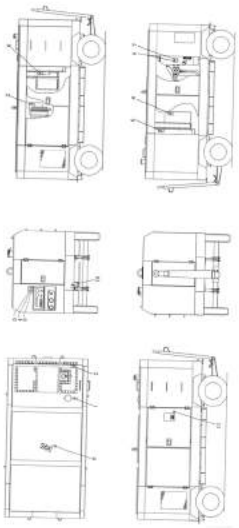
Alpha C
Un lazo para toda la vida.

PDSF830



Operation manual

AIRMAN®

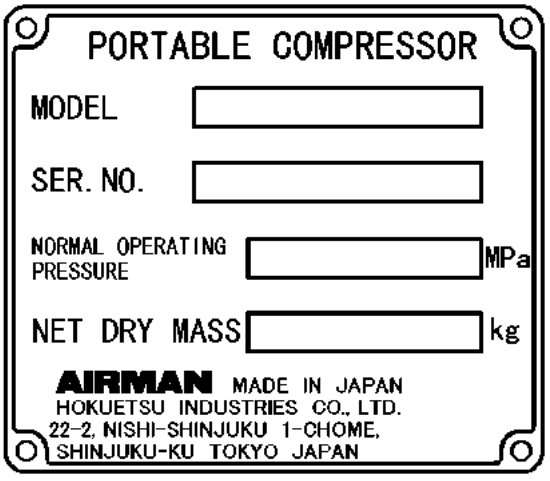
Preface

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.



A990054

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

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1.Safety

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, DANGER, WARNING, and CAUTION 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	**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	**WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	**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	**IMPORTANT** indicates important caution messages for the performance or durability of the unit.

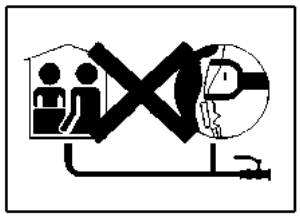
Follow warnings mentioned in this manual. This manual does not describe all safety items. We, therefore, advise you to pay special attention to all items (even though they may not be described in the manual) for your safety.

1.Safety

1.1 Caution before Operation

DANGER — ***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 serous injury to the working persons. Refrain from using the compressed air for such pneumatic engineering method or pneumatic caisson method.



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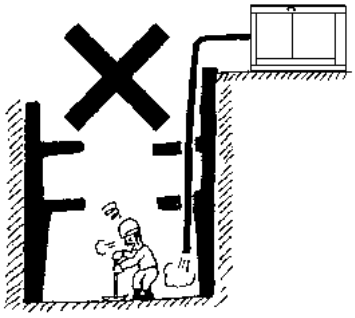

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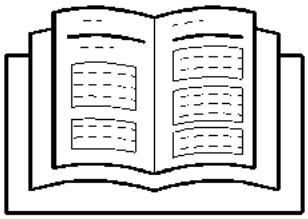
WARNING — ***Follow the safety instructions***

- 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

WARNING — ***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

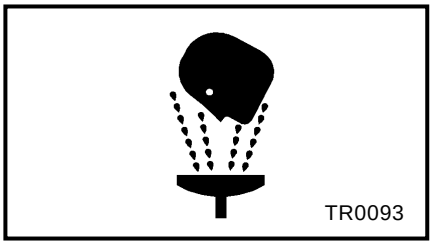
1.Safety

WARNING

Handling battery

- 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.

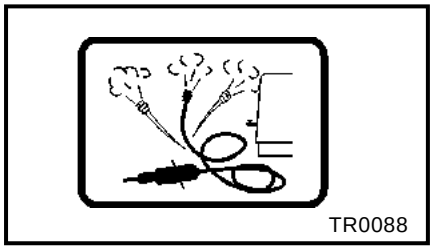
D004

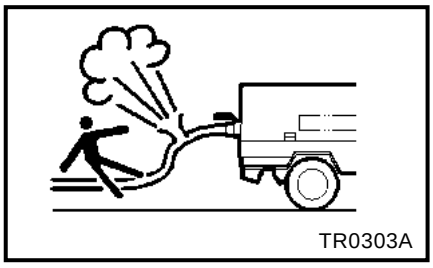

TR0093

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.

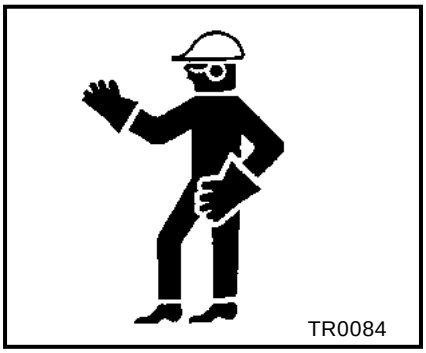

TR0088


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 physicl 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.

TR0085

⚠ 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.

TR0096

⚠ 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.

1.2 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***

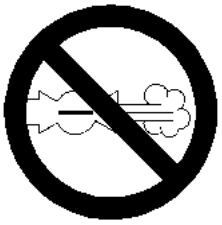
- Do not, under any circumstance, open the radiator cap while running or immediately after stopping operation. Otherwise high temperature steam jets out and this could cause scalding.

H990432

⚠ 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, air-end, pipe, 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 machine 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.
- **Do not fill fuel oil up to the cap level. When fuel tank is filled up to the cap level, fuel oil will be overfilled due to volume expansion caused by rise of ambient temperature. Further, fuel will be possibly spilled from fuel tank due to vibration caused during movement and/or transportation of the machine.**
- 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.

D004

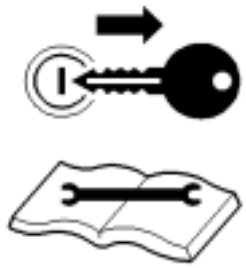
H990433

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.



SY001

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.

W010

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.

W010

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.

H990432

WARNING

Adjusting tension of belt

- Be sure to stop the engine and remove the starter key whenever the tension of the 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 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

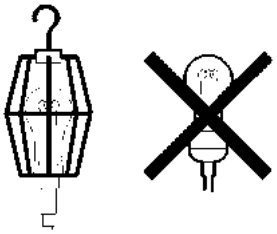
- When cleaning dust accumulated in such devices as the air-filter, by blowing compressed air, wear safety glasses, etc. to protect your eyes.

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.

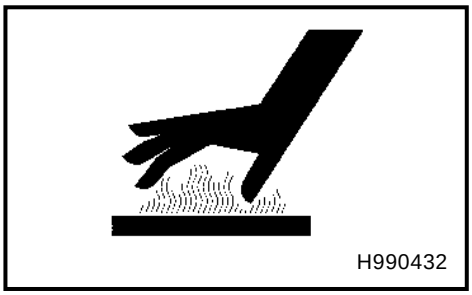


TR0206

CAUTION

Opening coolant water drain valve cap

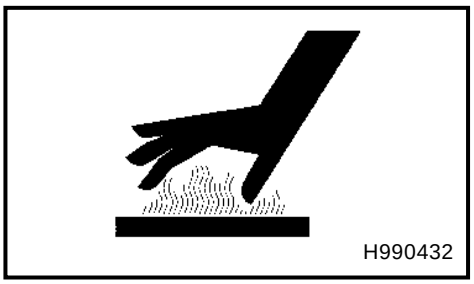
- Be sure to stop the engine, and let the coolant water sufficiently cool down before draining it.
- If the drain valve is opened before the coolant water is cooled enough, hot water could jet out, and it could cause scalding.


H990432

CAUTION

Refilling or draining of engine oil

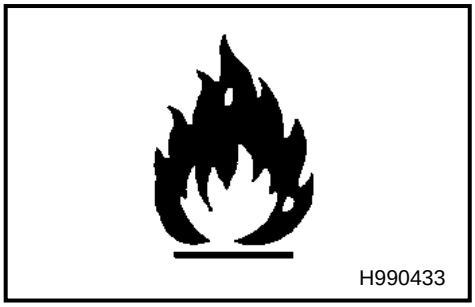
- After stopping the engine, wait for 10 to 20 minutes until the engine oil cools off. Then check the level of the engine oil, or refill or drain the oil.
- The engine oil is very hot during operation and just after it stops. Be careful because the hot oil also pressurized blows off and it can cause burning.


H990432

CAUTION

Fear of fire

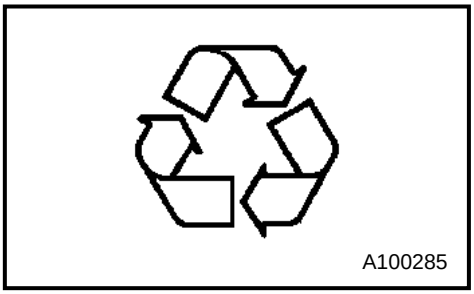
- Be sure to perform the periodical check of compressor oil and oil separator.
- Neglecting checks could cause overheat of the oil, resulting in a fire.


H990433

CAUTION

Treatment of organic wastes

- 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.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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.

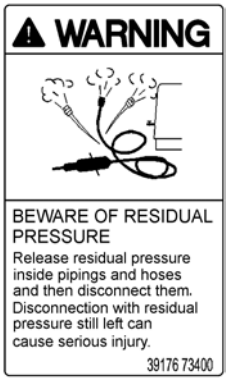
1

2

3

4

5



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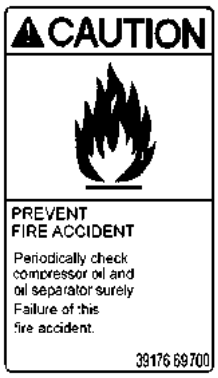

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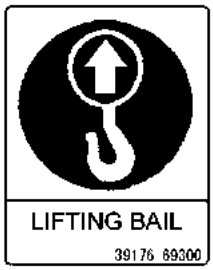

10

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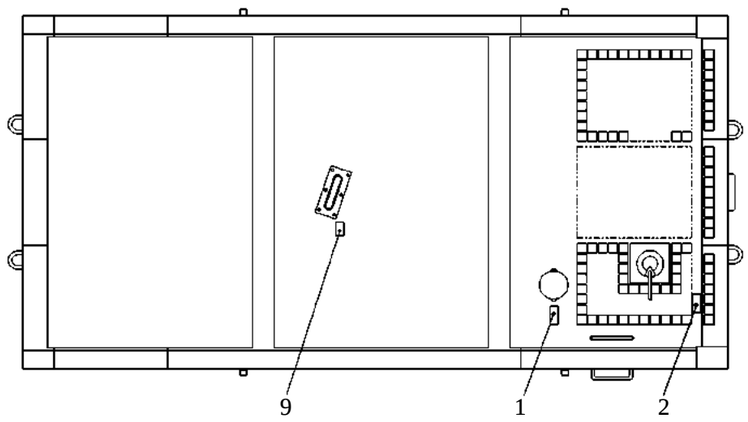
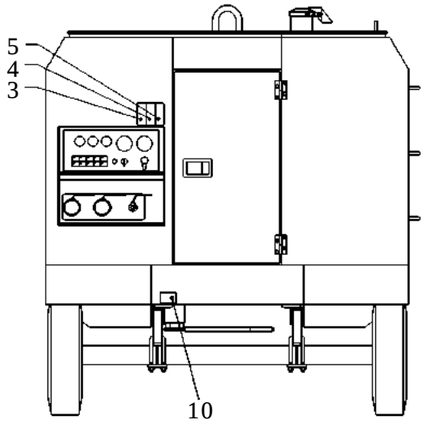
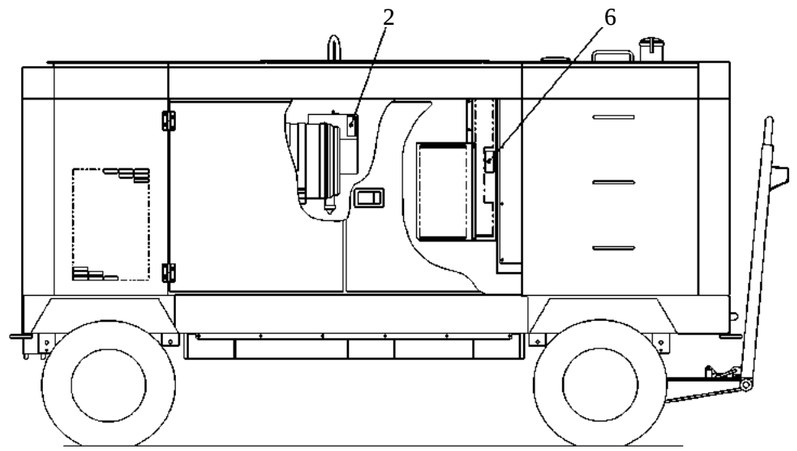
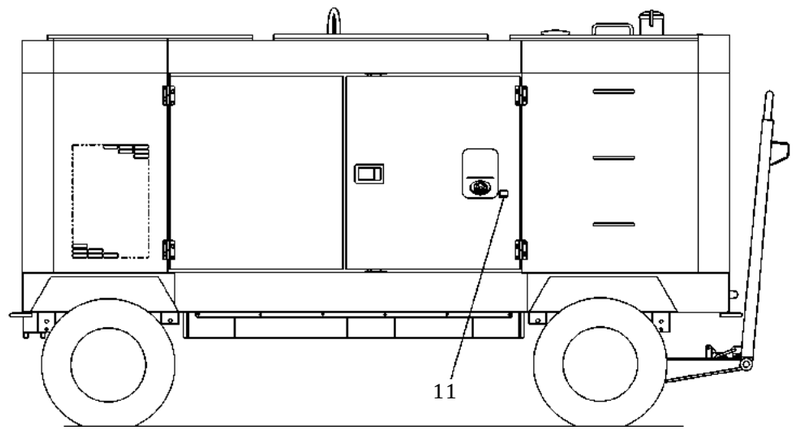
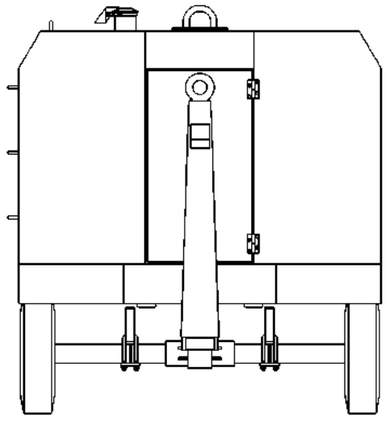
● The pasting position of safe warning label is as follows.











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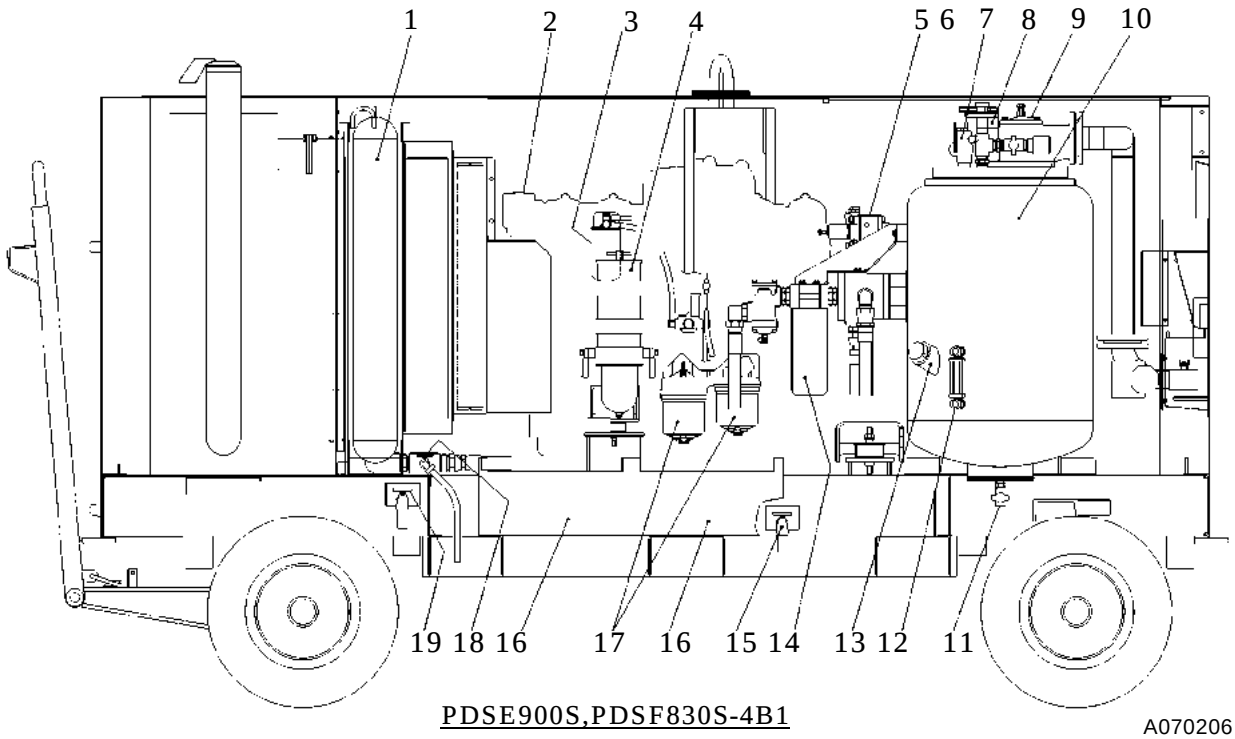
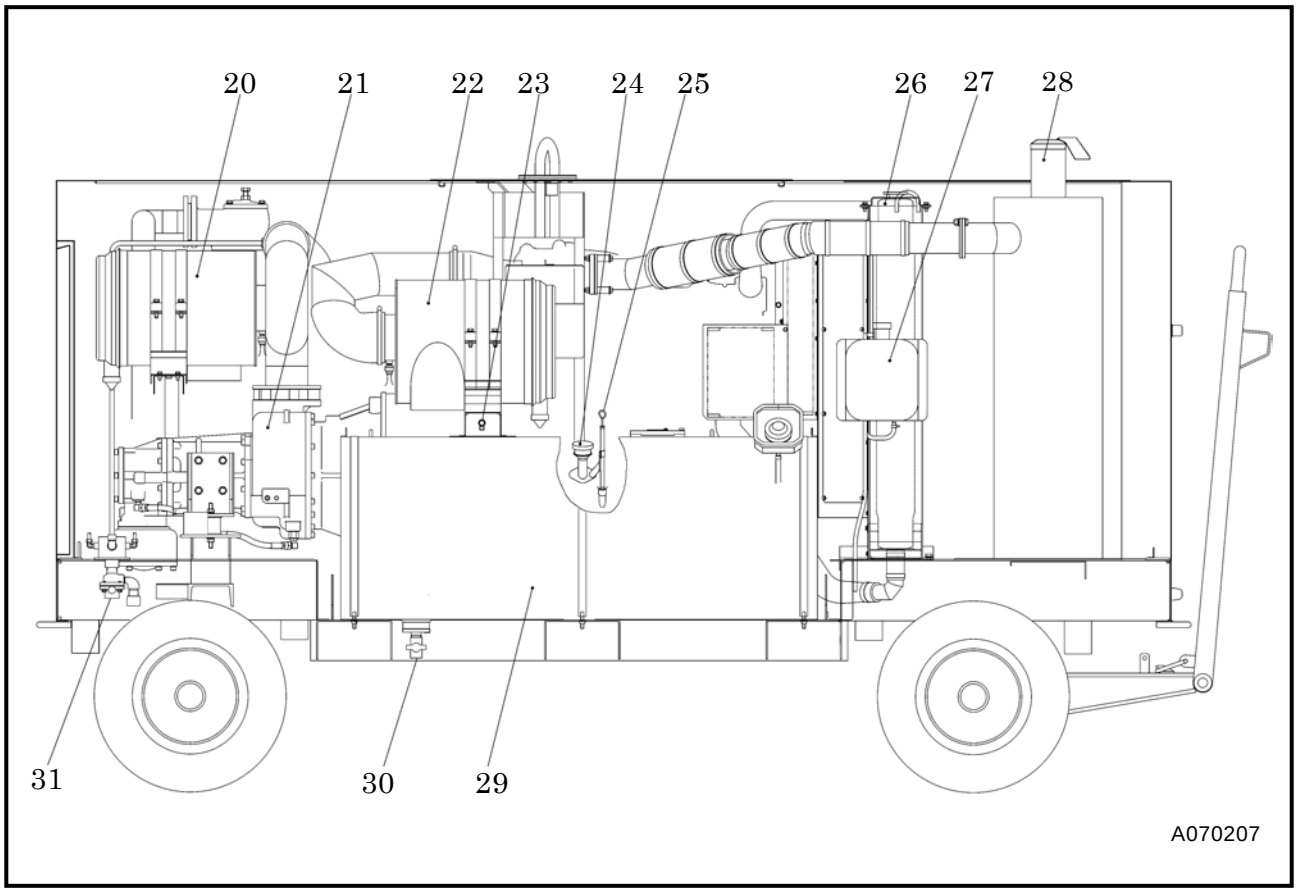
2.Part Names

2.1 Internal Components and Part Names



No.	Description	Function
1	Oil cooler	For cooling compressor oil circulating in the system.
2	Engine	For driving the compressor.
3	Fuel filter	For filtering dust and foreign matter mixed or to be mixed in the fuel oil.
4	Pre filter	For filtering dust and foreign things mixed in fuel oil and also for separating water.
5	Pressure regulator	For adjusting intake air volume (into compressor air-end)
6	Speed regulator	For regulating revolution speed of compressor air-end
7	Safety valve	For releasing compressed air to the atmosphere when the pressure rises higher than the rated pressure.
8	Vacuum relief valve	For preventing vacuum noise from occurring in compressor air-end during unloaded operation.
9	Pressure control valve	For keeping the receiver tank pressure higher than 0.4MPa in the tank.
10	Separator receiver tank	For separating compressor oil from compressed air sent into the tank.
11	Compressor oil drain valve	For draining compressor oil from separator receiver tank.
12	Compressor oil level gauge	Scale for measuring compressor oil level.
13	Compressor oil filler port	For supplying and replenishing compressor oil.
14	Compressor oil filter	For filtering compressor oil circulating in the system.
15	Engine oil drain valve	For draining engine oil for replacement of it and for maintenance.
16	Battery	For electrically starting engine.
17	Engine oil filter	For filtering engine oil.
18	Oil cooler drain valve	For draining condensate caused by reverse turning state.
19	Radiator drain valve	For draining condensate accumulated at the bottom of radiator.

2.Part Names



No.	Description	Function
20	Air filter(For compressor)	For filtering the dust floating in the intake air.
21	Air-end	For compressing intake air.
22	Air filter(For engine)	For filtering the dust floating in the intake air.
23	Coolant drain plug	For draining condensate from engine.
24	Engine oil filler port	For supplying and replenishing engine oil to engine.
25	Engine oil level gauge	For checking engine oil level.
26	Radiator	For cooling the coolant for engine because it is water-cooled.
27	Reserve tank	For feeding cooling water.
28	Exhaust muffler	Equipment which muffles an engine exhaust sound.
29	Fuel tank	For storing diesel fuel oil.
30	Fuel tank drain valve	For draining condensate and water accumulated at the bottom of the fuel tank.
31	Auto relief valve	For releasing the compressed air to the atmosphere. When the compressor stops.

3. Installation

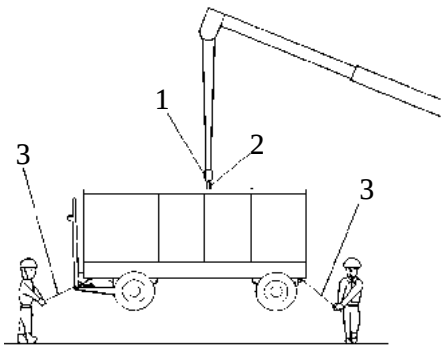
3.1 Transportation

WARNING — ***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.



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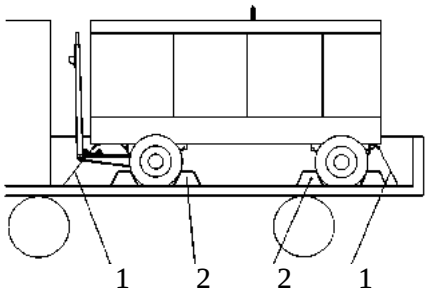
3.1.2 Mounting the unit on the truck bed

- 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.



A010190

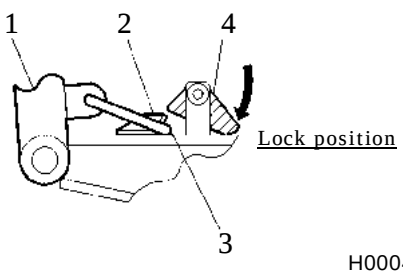
3. Installation

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.



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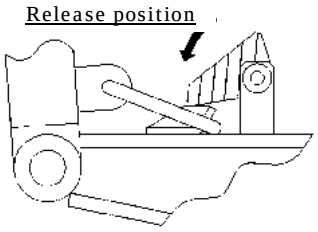

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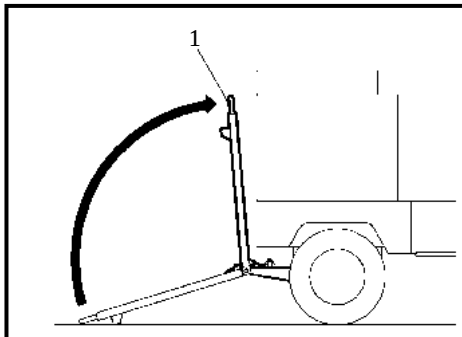
3.2.1 How to secure the drawbar

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)



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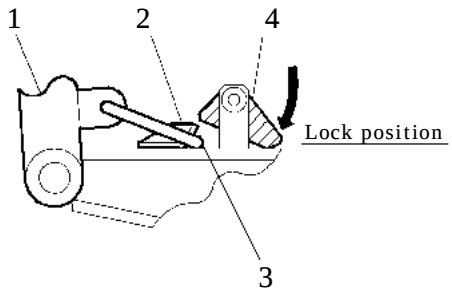

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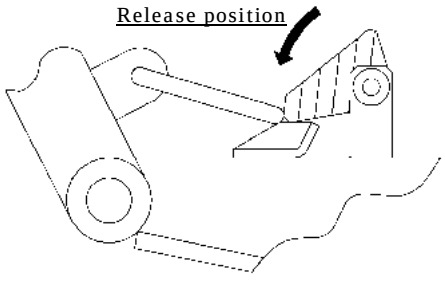
Fig.1

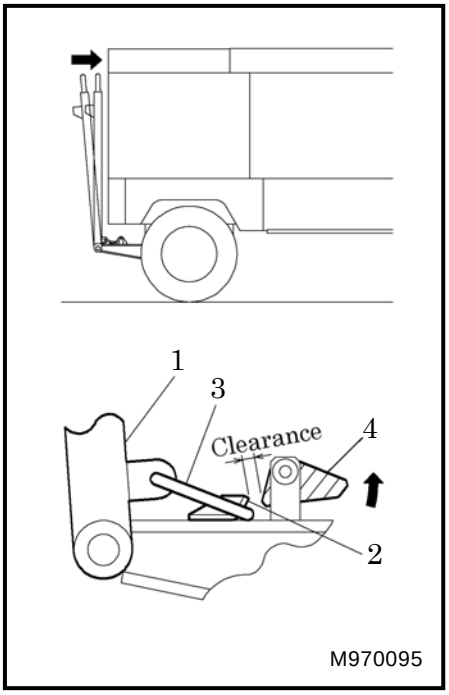


M970098

Fig.2

3.2.2 How to release the drawbar

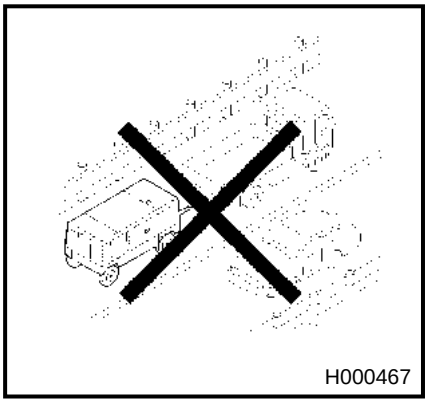
① Push the fixed drawbar "1" against the machine in the direction of arrow mark.
② Turn the stopper "4" a little to make larger the clearance between stopper "4" and holder "2" than the diameter of the hook "3".
③ Release the hook from the holder "2" through the clearance.
④ Lower the drawbar.
⑤ Return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



3.3 Towing the Unit

WARNING

- 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

Caution for towing unit

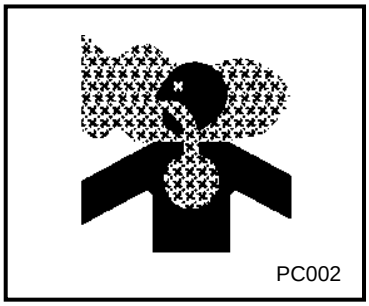
- Be sure to use a vehicle with enough capacity to tow the unit in operating weight.
- Standard pressure for a tire is at 0.45 MPa.
- Be sure not to use wrong size or type of tire in changing.
- Make sure that the end of the drawbar is so surely and firmly connected to the coupler of the towing vehicle 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 Location and 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.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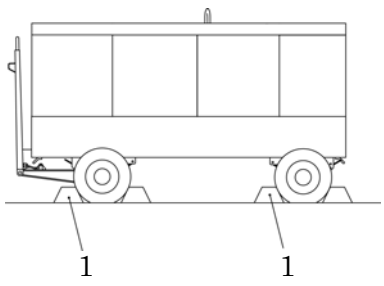
- The machine should be operated in following conditions:
- **Ambient temperature ····· -15°C to +40°C**
- **Humidity ····· Less than 90%**
- **Altitude ····· Lower than 1,500 m above sea level**
- Install the machine in a place with good ventilation, lower temperature and with surroundings as dry as 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.

3.4.1 Installation

⚠ 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).



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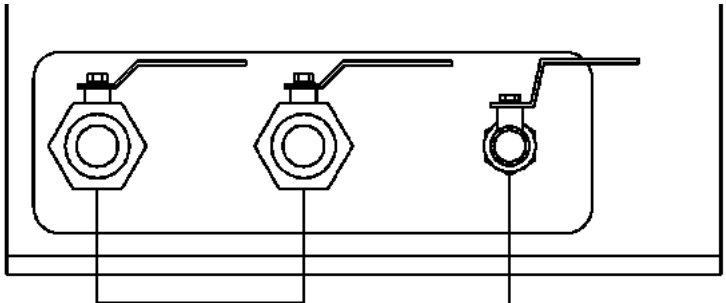
3.4.2 Service valve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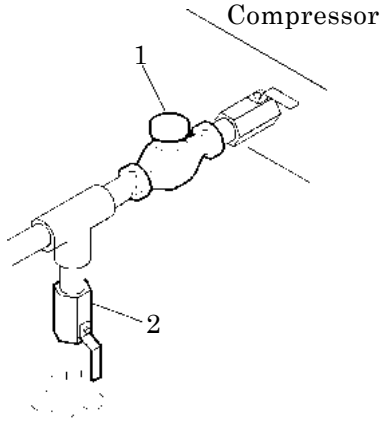
Discharge port : 50A(Rc2B)×2
[Taper female screw]

Discharge port : 20A(Rc3/4B)×1
[Taper male screw]

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.



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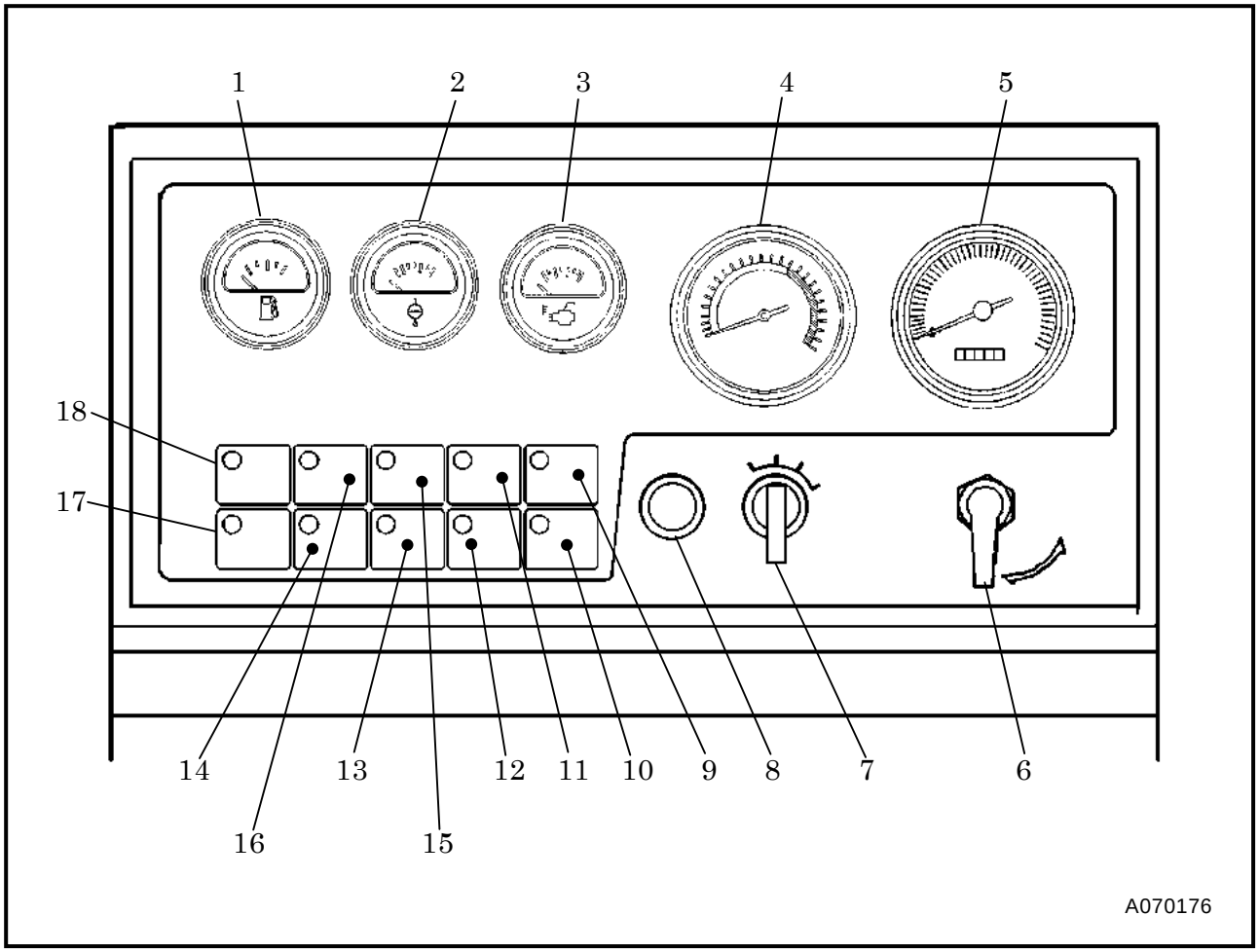
4.Operation

4.1 Instrument Panel



1. Fuel level gauge
2. Coolant temperature gauge
3. Discharge air temperature gauge
4. Discharge air pressure gauge
5. Tachometer (with hourmeter)
6. Starting unloader valve
7. Starter switch
8. Emergency stop button

＜Indicator lamp＞

9. Preheating

＜Warning lamp＞

10. Oil separator clogging
11. Charging
12. Compressor oil filter clogging
13. Compressor air filter clogging
14. Engine air filter clogging

＜Emergency stop lamp＞

15. Discharge air temperature
16. Coolant temperature
17. Engine speed down
18. Engine oil pressure

4.Operation

Indicator lamp

Item	Contents	Monitor
Preheating	Place the starter switch to “Preheating”, and the lamp goes on.	

Warning lamp

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

Item	Contents	Measures	Monitor
Oil separator	Lamp goes on when separator gets clogged and differential pressure increases. Actuating min. resistance is higher than 0.15MPa.	Replace	
Charging	Lamp goes on when alternator is not charging.	Check wiring Check alternator	
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. Actuating resistance is more than 6.23kPa.	Clean Replace	
Engine air filter			

Emergency stop lamp

The compressor stops when the emergency stop lamp goes on.
Be sure to follow the measures shown below before starting the unit again.

Item	Contents	Measures	Monitor
Discharge air temperature	When the discharge air temperature at compressor air-end outlet is lower than -15℃ or it is higher than 130℃, and also when the thermal sensor is disconnected, lamp goes on.	See “Troubleshooting”	
Coolant temperature	Lamp goes on when coolant temperature reaches 101℃.		
Engine speed down	Lamp goes on when engine speed drops below 900min^{-1} (1,000 min^{-1} in case of PDSG750S).		
Engine oil pressure	Lamp goes on when engine oil pressure drops. The function pressure is below 0.08MPa		

4.2 Door

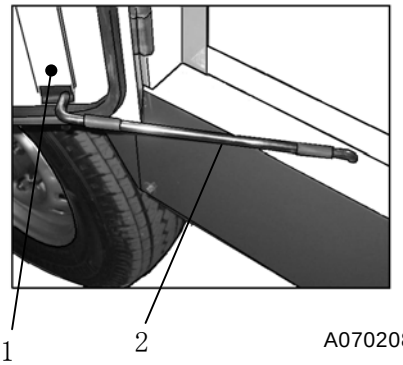
4.2.1 Open/Close the Door

WARNING

- 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.

PK0028

- Pull the handle foward to open the door "1".
- Be sure to close the door "1" tightly so that its latch is firmly caught.
- Be sure to engage the stay "2" into the slot of the door "1" receptacle, so that it is firmly held against wind or vibration.



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4.Operation

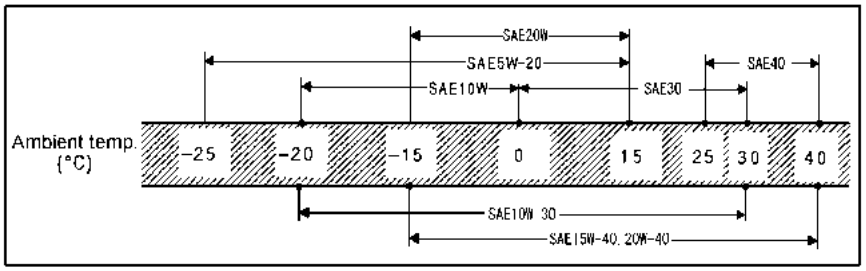
4.3 Lubricating oil・Coolant・Fuel

4.3.1 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.

Ambient temperature range and oil viscosity (SAE)



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- Use engine oil recommended by us.

Classification	API service classification CD class or higher
Viscosity	SAE10W-30

- 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.

4.3.2 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 to 40℃	MOBIL RARUS 425	MOBIL
-15 to 40℃	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”.

4.3.3 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%.
- If LLC (Antifreeze) in the water exceeds more than 60%, it may decrease its antifreezing effect. (Upon delivery from the works, LLC density is 35%)
- Follow the designated regulations to dispose of LLC (Antifreeze).

4.3.4 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.

4.4 Check before Starting Unit

CAUTION

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.

4.4.1 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)

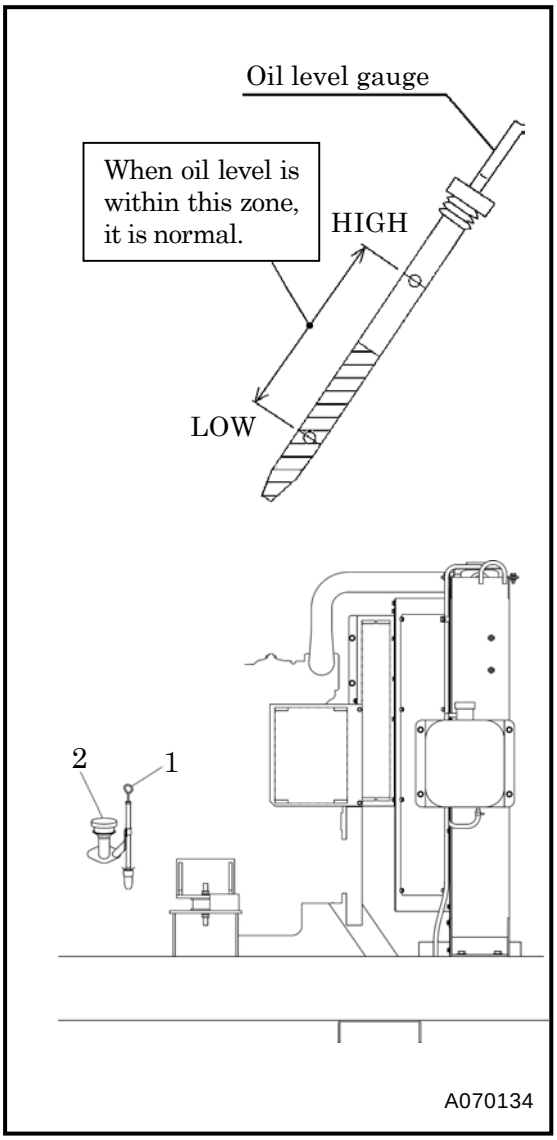
① Pull out the oil level gauge "1", and wipe it with a clean cloth.

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.

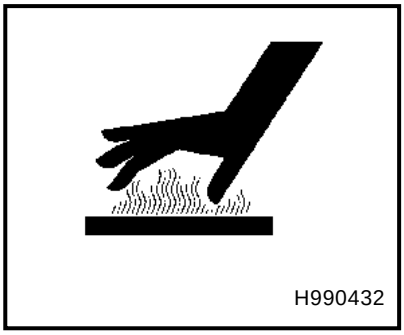


4.4.2 Check Coolant Level

CAUTION

Taking off the radiator cap

- 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.



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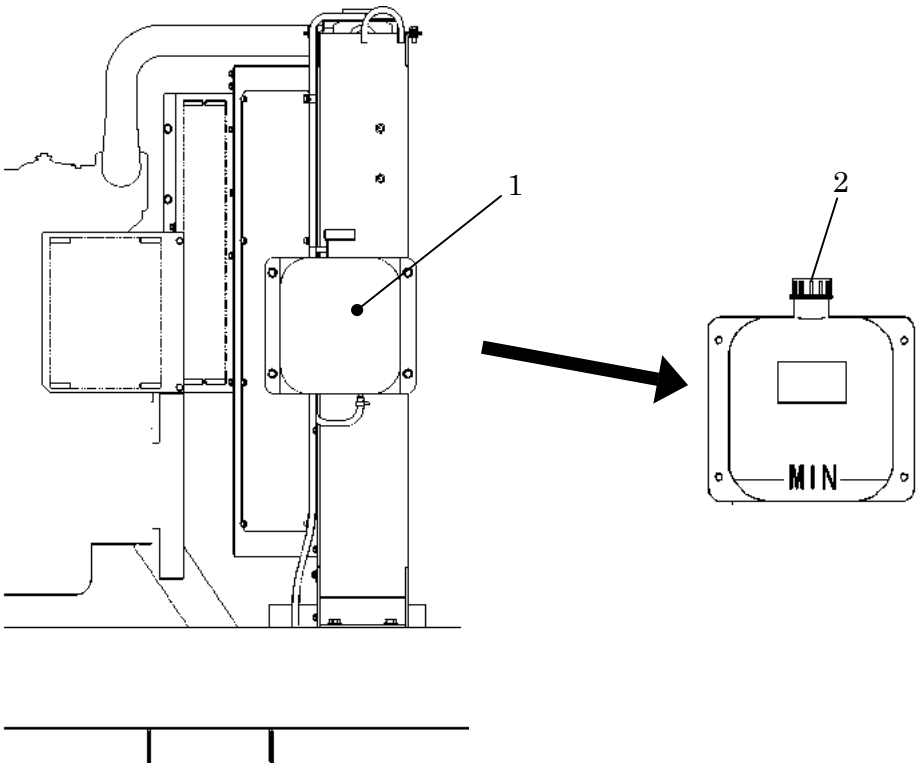
IMPORTANT

- 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 5.6.14)



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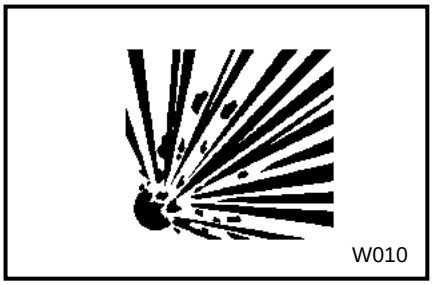
4.4.3 Check Compressor Oil Level

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 receiver tank could force both extremely hot compressed air and oil to jet out and you may be scalded or seriously injured.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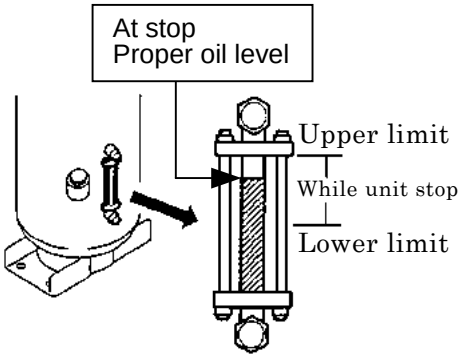
- Place the machine on level ground when checking the oil level.
- After checking and confirming that the residual pressure of separator receiver tank is 0MPa, replenish the tank with compressor oil to keep the oil level higher than the upper limit of level gauge. (See 5.6.5)

※ Excessive supply of the oil can cause deterioration of separation performance. Therefore, never supply the oil higher than the “proper oil level when the machine is on standstill”.



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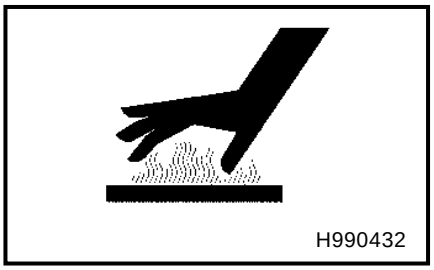
4.4.4 Drain Separator Receiver Tank

WARNING

Draining of 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 receiver tank could force both extremely hot compressed air and oil to jet out and you may be scalded or seriously injured.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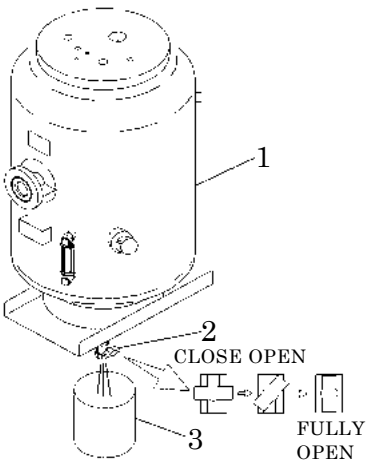
- Gradually opening the drain valve “2” fitted under the separator receiver tank “1” as shown in the fig, drain the condensate.
- Be careful not to fully open the valve. Otherwise, much oil may be lost.
- After draining the oil completely, close the drain valve “2” firmly.
- Drain the condensate in container “3”, and then dispose of condensate according to the designated regulations.



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4.4.5 Check Fuel

- Check fuel level gauge before operation. Replenish enough fuel to prevent fuel shortage during operation, if the level is low.
- Be sure to fasten the fuel tank cap firmly after replenishment. If fuel is spilt, wipe it up completely.

⚠ CAUTION

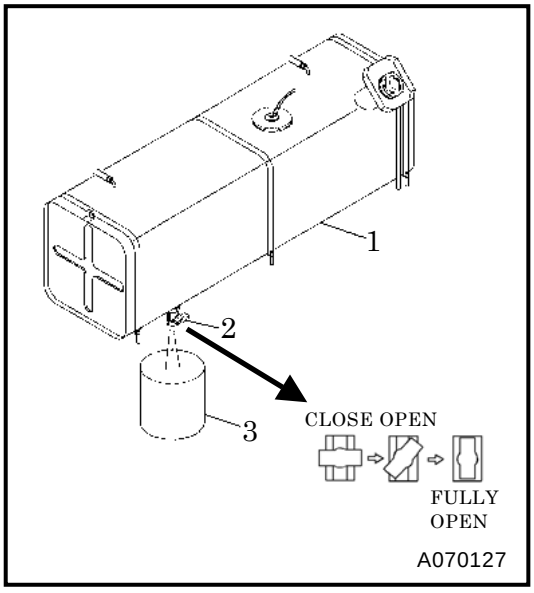
Fire prevention

- 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 fill fuel oil up to the cap level. When fuel tank is filled up to the cap level, fuel oil will be overfilled due to volume expansion caused by rise of ambient temperature. Further, fuel will be possibly spilled from fuel tank due to vibration caused during movement and/or transportation of machine.**

D004

4.4.6 Drain Fuel Tank

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



A070127

4.4.7 Drain check in pre- filter

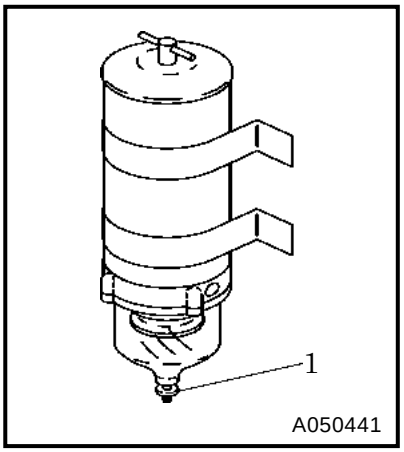
In case the pre-filter is clogged with condensate, make sure to drain water from it.

(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.



A050441

4.4.8 Check Belt Tension

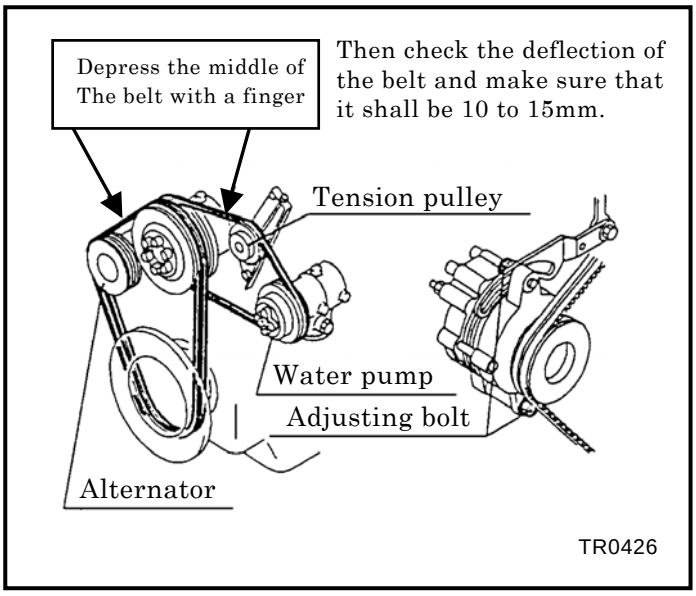
IMPORTANT

- 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.

1. Check the alternator belt of cooling fan

(Procedure)

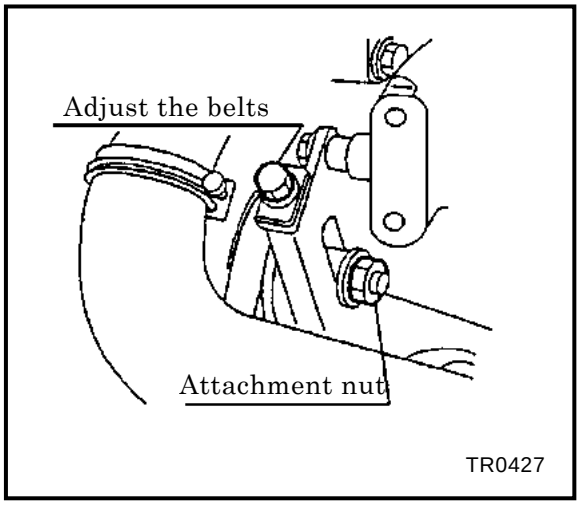
① Adjust the tension by gradually loosening the fastening bolt of the alternator.
② Visually check if there are any cracks or tears in the belt.
③ Loosen the fastening bolt of the alternator until the play of the belt reaches 10 to 15mm[98N(10kgf)] when pushed by fingers, and adjust it.
④ Be careful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



2. Check the water pump belt

(Procedure)

① After loosening the nut fixing the tension pulley, adjust the belt by moving the pulley with the adjusting bolt.
② While adjusting the belt tension, check it for any crack or wear, and if any fault is found, replace it.
③ 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.



4.4.9 Check Wiring of Each Part

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

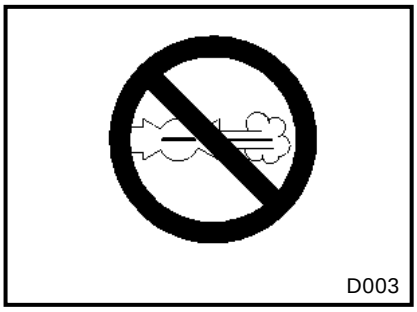
4.4.10 Check Piping of Each Part

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

4.5 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.


D003

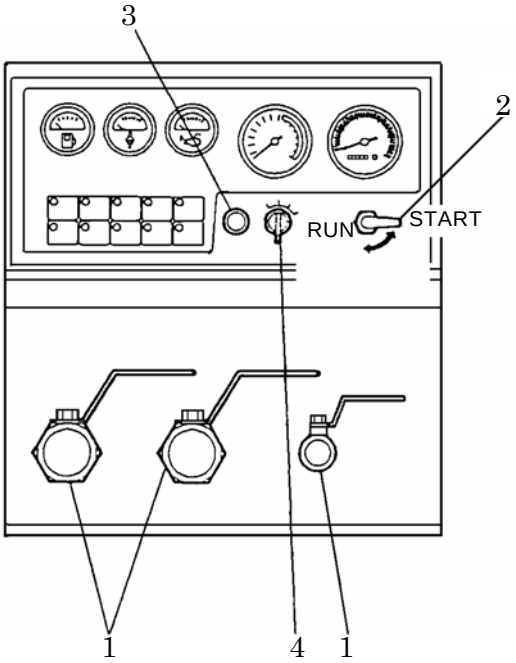
4.5.1 Procedure to Start the Unit

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 starting unloader valve "2" to "START" position.
③ Keeping pressing Stop button "3", turn the starter switch "4" to "START" position for cranking operation. (Repeat cranking operation 2 to 3 times about 4 to 5 seconds.)
④ Turn the starter switch to "GLOW" position for preheating. (Time required for preheating: about 20 to 40 seconds)
⑤ Immediately after finishing preheating, turn the starter switch "4" to "START"position to start engine.
⑥ Once the engine has started up, leave it running to warm-up for 5 minutes. The discharge air pressure in this condition ranges from 0.39 to 0.49MPa.
⑦ After warm-up of the unit, put the starting unloader switch "2" back to its "RUN" position, and open the service valve The unit is now ready to operate.



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- Be sure to turn the starting unloader valve "2" to "RUN" position prior to work. The discharge pressure does not increase as long as the starting unloader valve stays at "START" position.
- **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.**

4.5.2 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 ⑤, 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.
- 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
- Clogging of gauze filter at the inlet of fuel feed pump.
- Clogging of fuel pre-filter
- Discharge of battery (Low cranking speed)

4.5.3 How to Start the Unit at Low Temperature

IMPORTANT — ***Operation under Cold Weather Conditions below -5°C***

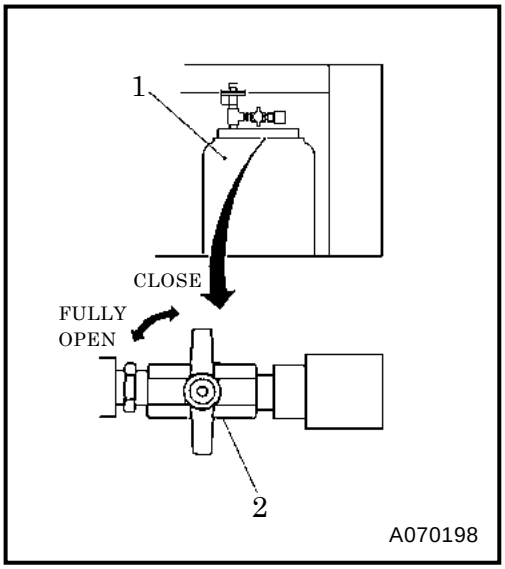
- Use SAE10W-30 (CD class) for the engine oil.
- Use LLC (antifreeze). Use correct amount to provide freeze protection, according to the ambient temperature.
- Battery should always be kept fully charged.

- When temperature is very low and it is difficult to start engine, follow the procedure shown below to start the unit.

(Procedure)

① Full open the service valve, and also fully open only relief valve "2" on the separator receiver tank "1".

② Follow the regular starting procedure to start the engine. By watching how the engine rotates, gradually close the relief valve "2" as the engine speeds up. When the valve is completely closed, keep the unit running in this way for a while for warming-up.



4.5.4 Gauge Indication while Operating

IMPORTANT

- During operation, keep the discharge air pressure gauge indicating higher pressure.
- PDSE900S ---------- than 0.64MPa
- PDSF830S,PDSG750S ---------- than 0.59MPa
- 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.
- During no-load operation (at low speed), make sure to confirm that the revolution speed should be kept higher than the under-mentioned speeds. Continuing operation at lower speed than the under-mentioned speeds could break or damage some portions owing to vibration. If the speed does not exceed the under-mentioned speeds, immediately stop operation. Then adjust the speed up to the standard one.
- PDSE900S,PDSF830S----------than 1,100min^{-1}
- PDSG750S---------- than 1,200min^{-1}

- 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			
		Discharge air temperature	Coolant temperature	Engine speed down	Engine oil pressure
Monitor					
Starting	Starter switch set to "RUN" position	● OFF	● OFF	● OFF	ON
In Operation		— ● — OFF			

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

		Model	Discharge air pressure gauge	Tachometer	Discharge air temperature gauge	Coolant temperature gauge
In Operation	Unload	PDSE900S	0.86～1.03MPa	1,100min-1	70～120℃	50～95℃
		PDSF830S	1.03～1.27MPa			
		PDSG750S	1.27～1.52MPa	1,200min-1		
	Full load	PDSE900S	0.64～0.86MPa	2,200min-1	70～120℃	50～95℃
		PDSF830S	0.59～1.03MPa			
		PDSG750S	0.59～1.27MPa			

4.5.5 Performance Check of Safety Valve

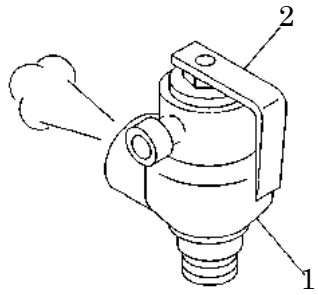
⚠ WARNING

- 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.

Model	Discharge air pressure	Set pressure
PDSE900S	0.86～1.03MPa	1.27MPa
PDSF830S	1.03～1.27MPa	
PDSG750S	1.27～1.52MPa	1.52MPa



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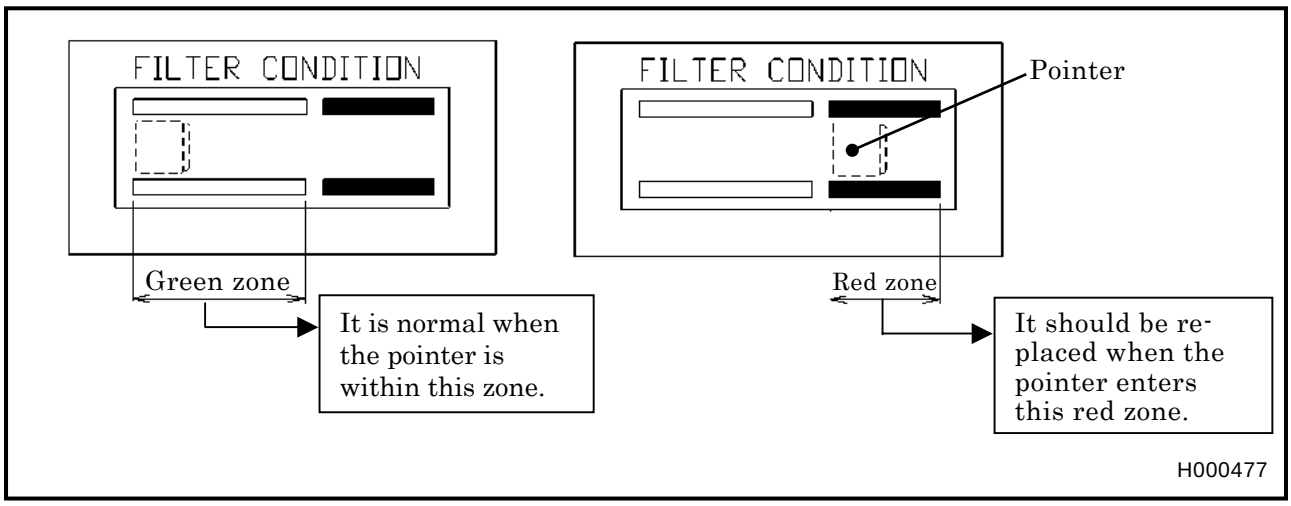
4.5.6 Check Clogging in Oil Separator

When the differential pressure gauge of oil separator shows red range, replace the oil separator. (See 5.6.15)



4.6 Stopping Procedures

(Procedure)

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.
- After stopping operation, never return the starting unloader valve to "START" position until the pressure gauge shows "0".

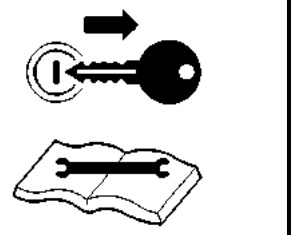
5. Periodic Inspection/Maintenance

5.1 Important Items at Periodic Inspection and Maintenance or after Maintenance

The manual shows proper interval for periodic inspection and maintenance under normally operating conditions. Inspection and maintenance should be performed more often under extremely harsh conditions.

⚠ WARNING — ***Hang a "Now Checking and under Maintenance" tag***

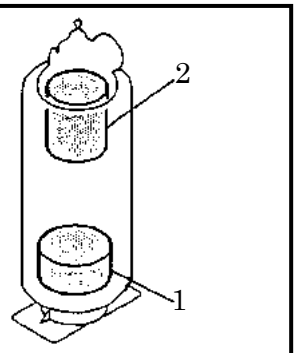
- Remove the starter key from the starter switch before starting inspection, and hang up a "Now Checking and under Maintenance" tag where it can be easily seen. The checker must keep the key during checking and maintenance.
- Remove the negative (–) side cable from the battery.
  If the above procedure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



SY001

⚠ CAUTION — ***Prevention of oil separator from catching fire***

- Be sure to perform oil change basically according to the specified interval. But if such oil is found much more contaminated before the interval, change the oil even before the specified period comes. In doing so, replace the oil completely and use our recommended oil.
- Be sure to perform following periodic inspection and maintenance:
  1. Check and change compressor oil
  2. Change oil separator
- Never mix the oil of different brands, or the mixed oil may deteriorate the oil quality.



TR0423

IMPORTANT — ***Precautions for check and maintenance***

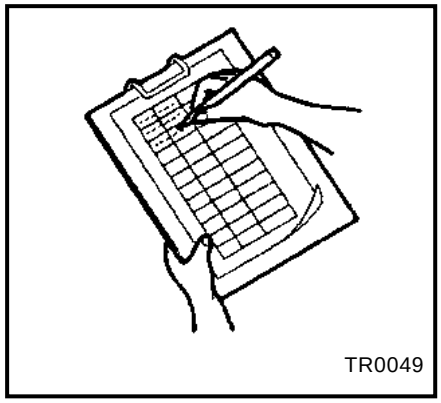
- Be sure to use recommended fuel, oil, grease, and antifreeze.
- Do not disassemble or adjust engine, compressor or part(s) for which inspection or maintenance is not referred to in this manual.
- Use genuine parts for replacement.
- Any breakdown, caused by using unapproved parts or by wrong handling, will be out of the scope of "WARRANTY".
- Keep the electrical components away from water or steam.
- Waste from machines contains harmful material. Do not dispose of such harmful fluids to the ground, rivers, lakes or ponds, and sea. It contaminates the environment.
- When draining waste fluid from machines, use leakproof containers to hold such fluids from machine.
- Be sure to follow the designated regulations when disposing of oil, fuel, coolant, filters, battery and other harmful things.

5. Periodic Inspection/Maintenance

5.2 Daily Inspection and Operation Log

- Be sure to carry out daily inspection every morning before operation. See Chapter 2 “Operation” of the manual for the details of inspection.
- Pay attention to and carefully observe the following points during daily operation or inspection and maintenance work. If any trouble or abnormality is found, immediately investigate its cause and make repairs. If the cause is unknown or not traceable, or if the trouble involves a part or component not described in the manual, ask your nearest dealer for information.

(a)Controls and instruments function properly.
(b)Quantity and any leak of water, fuel, and oil or any contamination should be checked.
(c)Appearance, abnormal noise or excessive heat should be checked.
(d)Loose bolt or nut should be checked.
(e)Any damage, wear or shortage of machine components and parts should be checked.
(f)Performance of each part or component should be proper.


TR0049

- Keep the operation log to record constant inspection of each component, so that trouble of the unit can be easily discovered and preventive measures can be taken.
  It is very useful to record information such as discharge pressure, oil level, as well as running hour, maintenance items and replenishment of lubricant on a daily maintenance log.

5.3 Inspection on Separator Receiver Tank

IMPORTANT — ***Periodic inspection of separator receiver***

- Be sure to carry out the following cleaning and inspection of the separator receiver tank at least once every year.
  (Place to check)
  (1) Any damage found on the tank.
  (2) Any excessive wear found to fastening bolts on the cover.
  (3) Any damage found to pipes and valves etc.

5. Periodic Inspection/Maintenance

5.4 Periodic Inspection List

(Unit:Hour)

	Maintenance	Daily	250	300	500	1,000	2,000	3,000	6,000	12,000	Page
Compressor	Check compressor oil level.	○									4-8
	Drain separator receiver tank.	○									4-8
	Check looseness in pipe connecting part, and wear and tear of pipe.	○									4-11
	Check oil, water, fuel and air leak.	○									4-14
	Check performance of gauge and indication lamps.	○									4-14
	Performance Check of Safety Valve.	○									4-15
	Change compressor oil.			※○	○						5-8
	Change compressor oil filter.			※○	○						5-9
	Clean strainer in the scavenging orifice.				○						5-10
	Clean and change air filter element.		○ Clean		○ Change						5-7
	Clean outside of the oil cooler.					○					5-12
	Supply grease to trailer spring pin					○					5-13
	Change pressure regulator diaphragm.					☆●					
	Change oil separator.						●				5-15
	Change nylon tubes.						☆●				
	Change rubber hoses.							★●			
	O-ring change of a piping terminal area							★●			
	Check diaphragm of auto-relief valve.							★●			
	Check o-ring of auto-relief valve.							★●			
	Clean butterfly valve (unloader)							●			
	Change diaphragm of vacuum-relief valve							★●			
	Change o-ring of vacuum-relief valve							●			
	Change o-ring of pressure control valve								●		
	Change rubber coupling.									●	
	Change oil seal/bearing									●	

Such items marked ○ shall be carried out by customers.
For the following items or clauses marked ●, contact us directly or our distributors because they require expert technical knowledge on them.
The following table shows the inspection and maintenance intervals under normal operation conditions. In case the unit is operated under harsh environmental conditions and operation conditions, the intervals should be shortened.

The items or parts marked ※1 show that they should be replaced primarily.
The items or parts marked ☆ should be replaced every two years even if they are not in disorder within their periodical maintenance interval because their materials will change or become degraded as time passes.
Also for the same reason, the parts marked ★ should be replaced every three years.

5. Periodic Inspection/Maintenance

◎**Refer to engine operation manual for inspection and maintenance of an engine.**

(Unit:Hour)

	Maintenance	Daily	50	250	500	1,000	2,000	3,000	6,000	Page
Engine	Check fuel	○								4-9
	Drain fuel tank	○								4-9
	Drain check in pre- filter	○								4-9
	Check engine oil level.	○								4-6
	Check coolant level.	○								4-7
	Check looseness in pipe connectors, terminals and tear in wiring.	○								4-11
	Check belt tension.	○								4-10
	Change engine oil.		※○		○					5-5
	Change engine oil filter.		※○		○					5-6
	Check battery electrolyte.			○						5-6
	Clean and change air filter element.			○ Clean		○ Change				5-7
	Change fuel filter.				○					5-11
	Change filter of Pre-filter				○					5-11
	Clean outside of radiator.					○				5-12
	Change coolant.					☆○				5-14
	Clean the strainer provided inside the engine feed pump.					○				5-13
	Check fuel hose.						☆●			5-16
	Clean inside of radiator.					●				
	Clean inside of fuel tank.						●			
	Change radiator hoses.							☆●		
	Change wiring harness.								●	

The items or parts marked ※ show that they should be replaced primarily.
The items or parts marked ☆ should be replaced every two years even if they are not in disorder within their periodical maintenance interval because their materials will change or become degraded as time passes.

5.5 Periodic Replacement of Parts

Part Name		Part Number	Quantity
Element kit for engine oil filter (For Main/By-pass)		MITSUBISHI ME180514	1
Compressor oil filter		37438 05400	1
Air filter element (engine･compressor)		32143 15900 (inner cyl.) "1"	2
		32143 16000 (outer cyl.) "2"	2
Fuel filter		43541 00900	1
Oil separator	Separator "1"	34220 10502	1
	Gasket "2"	34235 06700	2
Fuel feed pump gasket		43531 00700	3
Element for fuel pre-filter		43541 01400	1

5. Periodic Inspection/Maintenance

5.6 Maintenance

5.6.1 Change Engine Oil

[At 50 hours for the first change and at every 500 hours thereafter]

⚠ CAUTION

Caution in filling or discharging 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.
- Never supply more engine oil than the proper level. Too much oil could cause white smoke out of the exhaust, and it can cause damage and accident to engine.

H990432

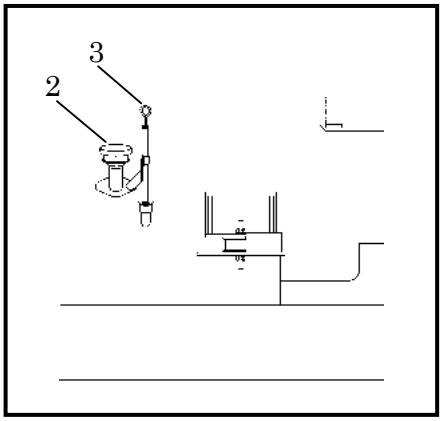
(Procedure)

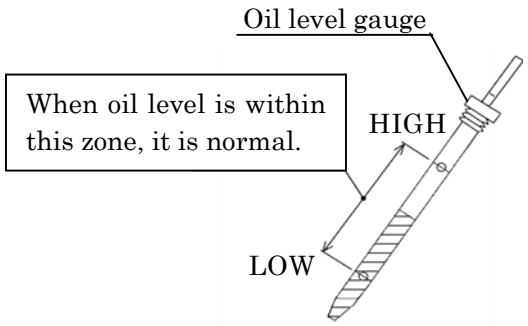
① Loosen the drain valve "1" located outside of the frame to drain out the used oil.

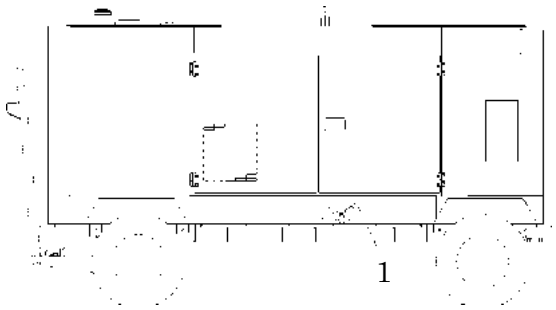
② When the oil is completely drained, close the drain valve "1" firmly and refill new engine oil through the engine oil filler "2". **[Quantity of oil : approx.54L]**
(For recommendation oil, refer to 4 .3)

③ After supplying oil, pull out the oil level gauge "3" and wipe it out.

④ Insert the oil level gauge "3" again and pull it out to make sure the oil level is between LOW and HIGH levels. When the oil level is between both levels, it is normal.







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5.6.2 Change Engine Oil Filter

[At 50 hours for the first change and at every 500 hours thereafter]

(Procedure)

① Drain condensate from the engine oil filter by loosening the drain plug "1".

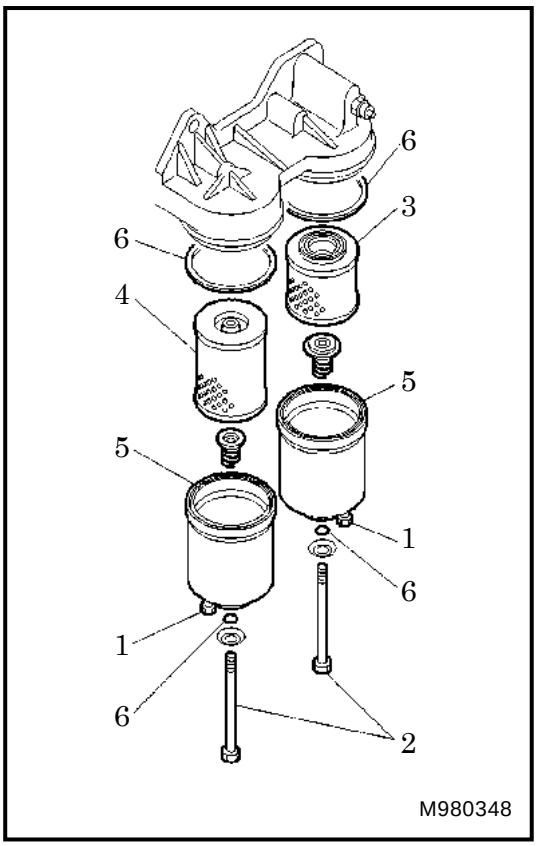
② Remove the center-bolts "2" and then take out element "3" and "4".

③ Wash the element cover "5" in diesel oil.

④ Use the oil filter element kit to replace the elements "3" & "4" and also replace the O-ring "6".

⑤ Put new elements "3" and "4" in the cover and install them by tightening them with the center bolt "2".

(For replacement parts, refer to 5.5)



5.6.3 Check Battery electrolyte

[Every 250 hours]

If there seems to be a problem in starting an engine due to a flat battery, carry out the checks by following the procedures below:

1. Ordinary type battery:
   Check battery electrolyte level and if the level is not within the specified level, add distilled water.
   Measure specific gravity of battery electrolyte, and if it shows below 1.24, recharge the battery immediately.
   Refer to 6.1. for method of specific gravity measurement and recharging the battery.

2. Enclosed type battery:
   Check the indicator on top surface of the battery.
   If the indicator shows that charge is needed, recharge the battery immediately.

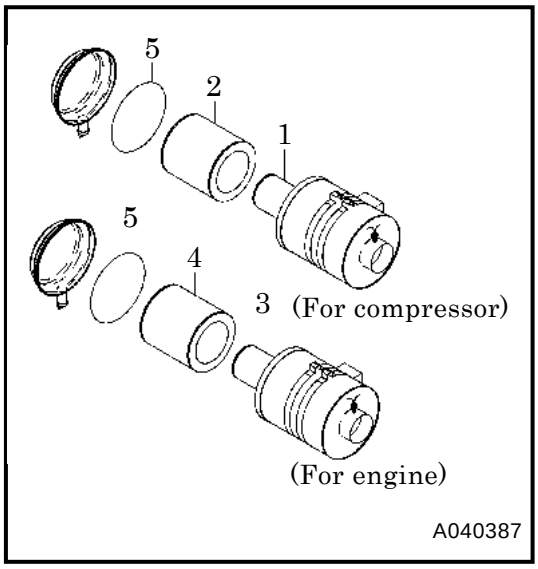
5.6.4 Check and clean Air Filter Element

[Every 250 hours]

IMPORTANT ***Cleaning of Air Filter Element should be perfectly performed***

- Clogged or cracked or pitted element could allow entrance of dust into engine and compressor to cause earlier wear of moving parts. Periodical inspection and cleaning of element should be performed to maintain life of compressor and engine long.

- Remove both external shell "2" and "4" , and clean them.
- Replace both internal shell "1" and "3" once in the proportion of replacing external ones four times. The internal ones can never be reused even after they are cleaned.
- When it is found that they cannot be repaired even after being cleaned, replace the elements. (See 5.6.8)
- When installing a new element, pay attention to the followings.
- Put the element fully into the case.
- Make sure there is no foreign matter at the contact face of the case.
- Make sure to install it correctly not to push out O-ring "5" of the cup.



5.6.5 Change Compressor Oil

[At 300 hours for the first change and at every 500 hours thereafter]

⚠ WARNING

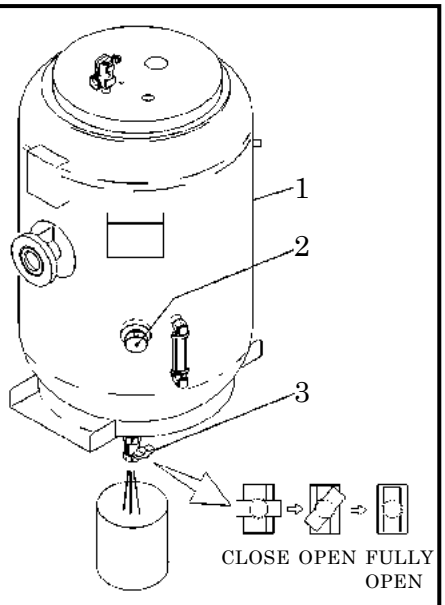
- When you refill the separator receiver tank with compressor oil, stop the engine, and make sure that the pressure gauge indicates 0MPa and there is no residual pressure in it, and then gradually loosen the oil filler cap for refilling oil.
- Note residual pressure in the receiver tank could force both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

Refilling of compressor oil

W010

(Procedures)

① Remove the oil filler cap "2" of separator receiver tank "1".
② Open drain valve "3" to discharge waste oil from the tank.
③ In case of replacement, completely discharge all the oil left in the compressor body, separator receiver tank "1", pipes and oil cooler. If wasted oil is left in the unit, this residual oil will greatly shorten the life of the newly replenished oil.
④ Be sure to close drain valve "3" after the wasted oil is completely discharged.
⑤ Fill the designated quantity of new oil into the oil filler port.
[Quantity of oil : approx.105 L]
(For recommendation oil, refer to 4 .3)
⑥ After oiling, tighten the cap "2" in its place while paying attention not to let dust get in the tank.
⑦ Start the engine for a short while, then replenish the oil to fill shortage. Repeat this procedure for 2 to 3 times to check if the oil level has reached its appropriate point. Be careful not to overfill the oil.



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5.6.6 Change Compressor Oil Filter

[At 300 hours for the first change and every 500 hours thereafter]

IMPORTANT — ***Use our genuine oil filter***

- Poor quality oil filters do not trap dust sufficiently and will cause damage to the bearings in a short period.

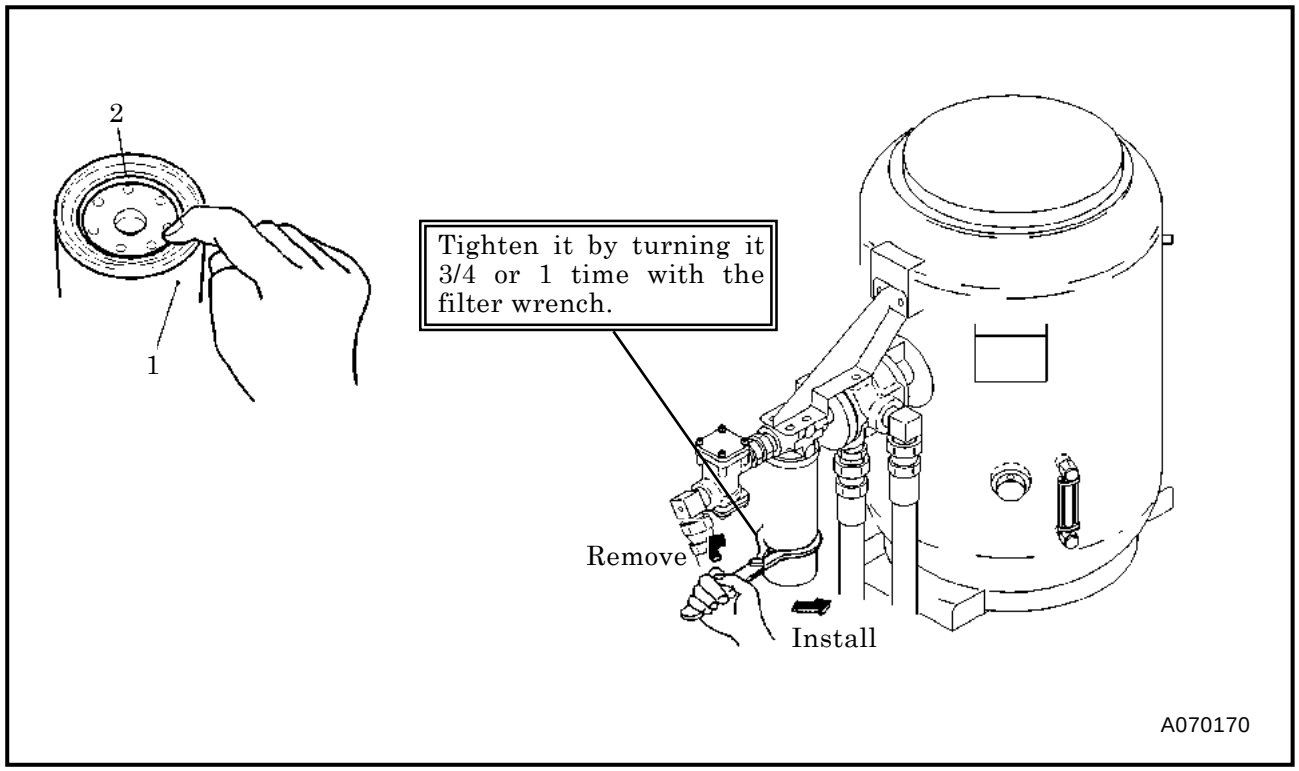
(Procedure)

① Use a filter wrench to remove the cartridge "1".

② Spread thin film of oil on a packing "2" of a new cartridge "1" and screw it in.
(For replacement parts, refer to5.5)

③ After a packing "2" touches the sealing face, tighten it 3/4 or 1 time turn, using filter wrench.

④ After installing oil filter, be sure to check for oil leak during the operation.



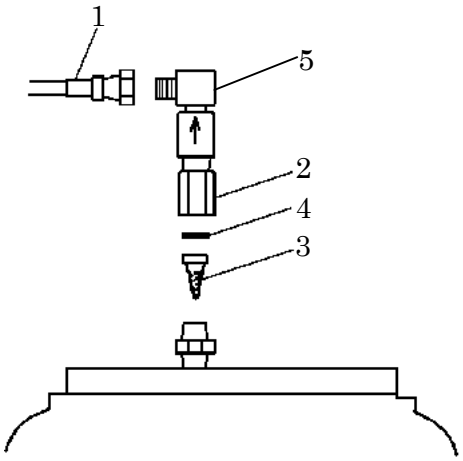
5.6.7 Clean Strainer in the Scavenging Orifice

[Every 500 hours]

(Procedure)

① Remove the hose "1" if the oil recovery line provided on the top of Separator receiver tank.
② Remove the recovery orifice "2"first.
③ Pull out the strainer "3" out of the nipple.
④ Wash the strainer "3" in diesel oil (gas oil) and then clean dirt and dust by air blow .
⑤ After finishing cleaning, install again the removed parts in reverse order. and then install the gasket "4" to the strainer "2" without fail.

- When removing the hose "1", loosen the nipple "5", holding its head with a spanner. If not holding it, it could break the check valve. So take care not to damage it.



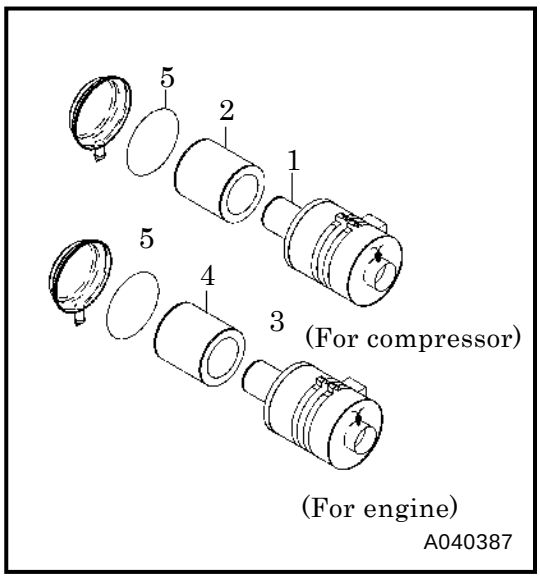
5.6.8 Change Air Filter Element

[Every 500 hours]

IMPORTANT — ***Use our genuine part***

- Air filter is an important part which is crucial to machine's performance and life. Be sure to use genuine parts.

- Even before 500 hours of use, if it is used under harsh conditions, remove the element "1" , "2" , "3" , "4" check and clean it. If it is found difficult to restore it, change it a little earlier. (For replacement parts, refer to 5.5.)
- When installing a new element, pay attention to the followings.
- Put the element fully into the case.
- Make sure there is no foreign matter at the contact face of the case.
- Make sure to install it correctly not to push out O-ring "5" of the cup.



5.6.9 Change Fuel Filter

[Every 500 hours]

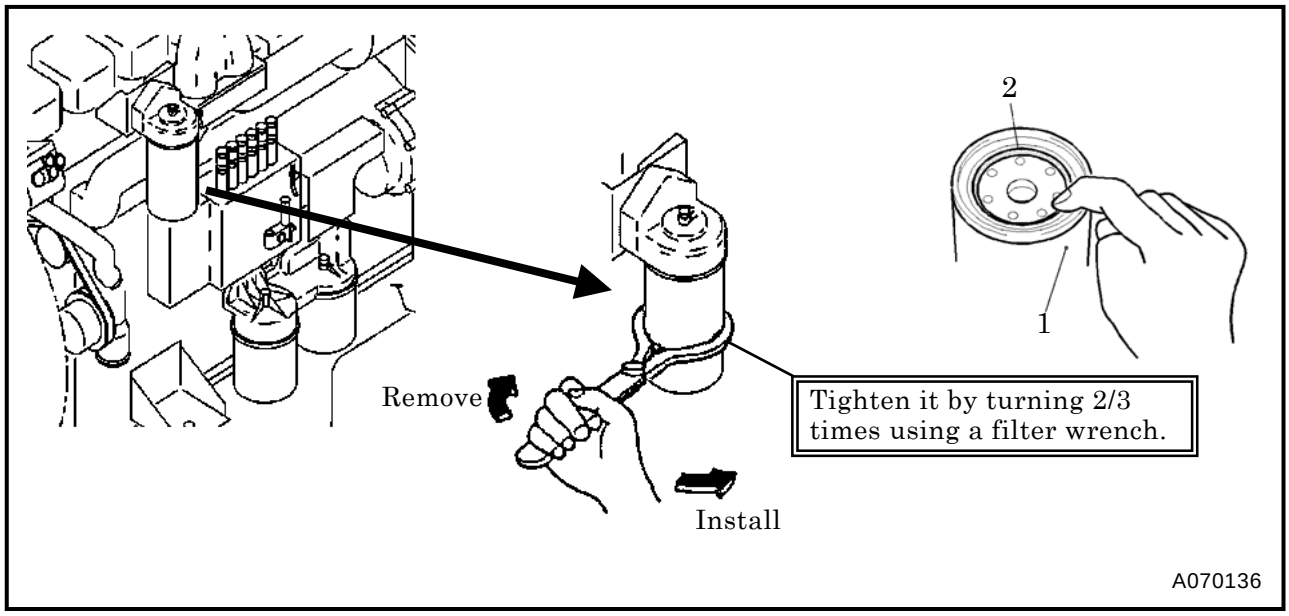
(Procedure)

① Remove the cartridge "1", using a filter wrench.

② Spread thin film of oil on a packing "2" of a new cartridge "1" and screw it in.
(For replacement parts, refer to 5.5)

③ After a packing "2" touches the sealing face, tighten it by turning 2/3 times using a filter wrench.

④ After installing a fuel filter, be sure to check for oil leak during operation.



5.6.10 Change filter of Pre-filter

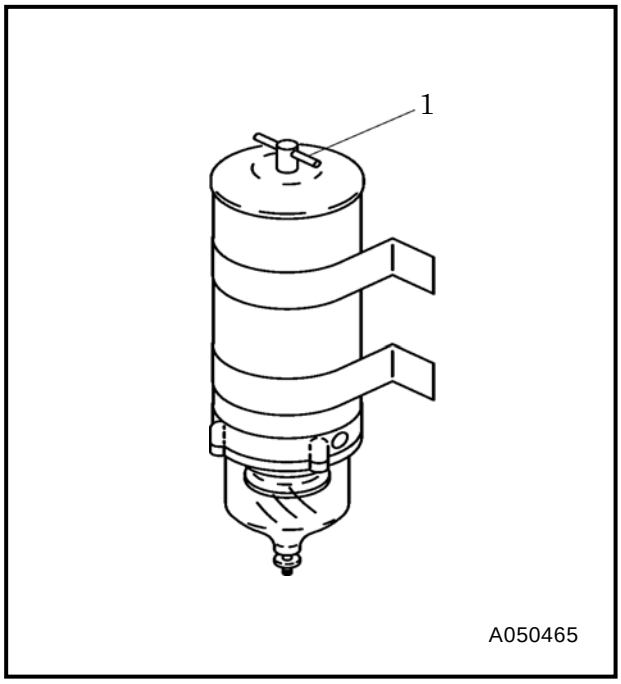
[Every 500 hours]

(Procedure)

① Take out the cover and element inside the pre-filter by turning T-handle "1"

② Install a new element by pressing it up to the fuel shut-off valve at the bottom.
(For replacement parts, refer to 5.5)

③ Install the T-handle "1" cover, and then tighten it by turning T-handle.



5.6.11 Clean outside of the Radiator･Oil Cooler

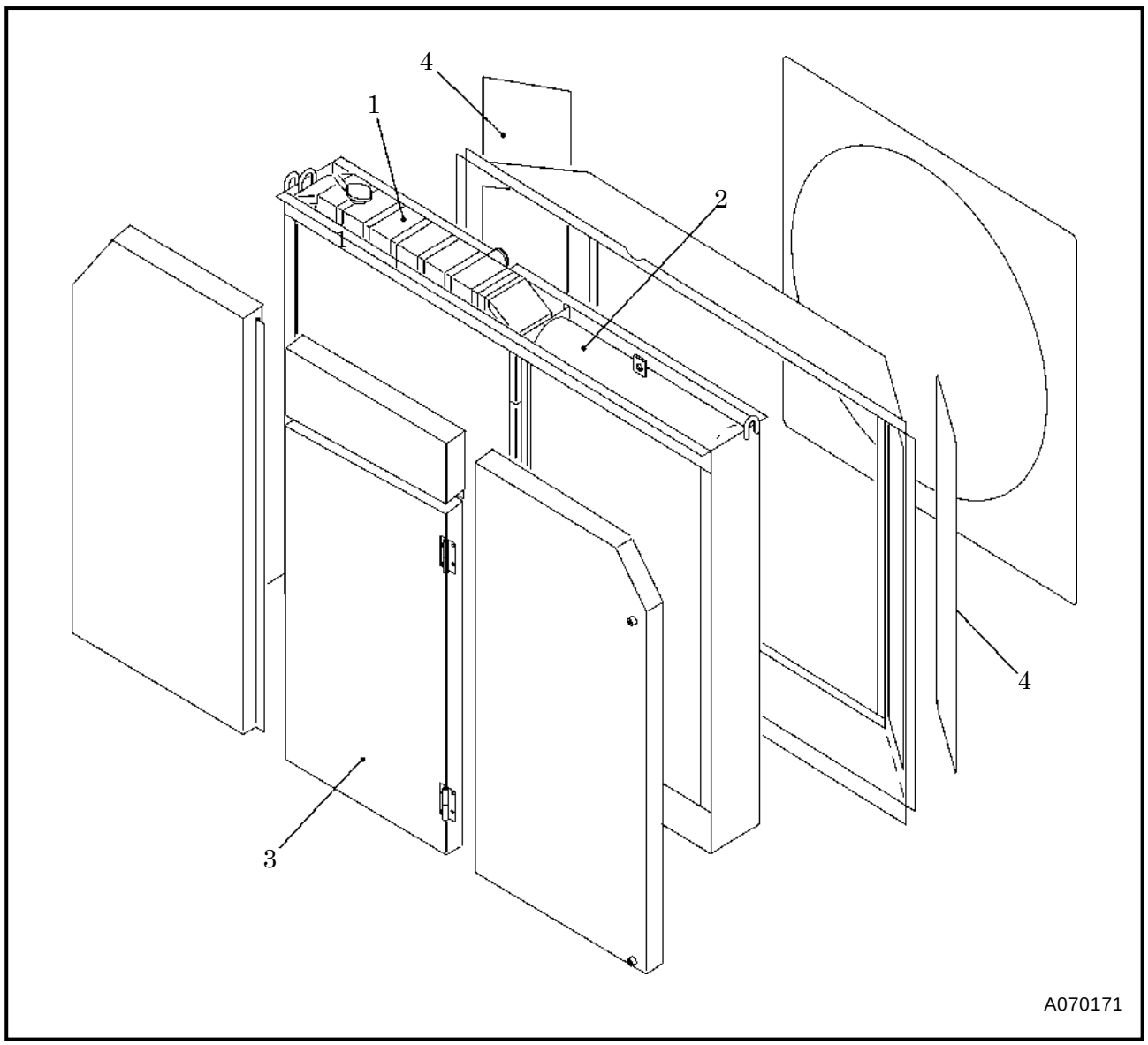
[Every 1,000 hours]

- When the fin tubes of a radiator“1”, an oil cooler“2”are clogged with dust or other foreign materials, the heat exchange efficiency drops and this will raise coolant temperature and discharge air temperature. These tubes and fins should be cleaned depending on the state of clogged tubes “1” even before maintenance schedule.
- This unit is provided with the cover on both sides of the shroud to make it easy to clean both radiator “1” and oil cooler “2” . Perform the cleaning job according to the following procedures.

（Procedure）

① Open the front door “3” of the bonnet.

② Remove the covers “4” for cleaning fitted on both sides of the fan shroud and then perform cleaning job. For protection of fins and tubes of both radiator and oil cooler, never perform high pressure cleaning work.

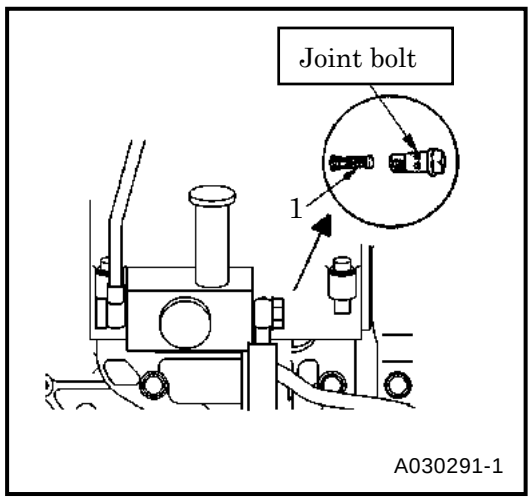


5.6.12 Clean the strainer provided inside the engine feed pump

[Every 1,000 hours]

- Periodically remove the strainer "1" inside the feed pump, and clean it.
- Remove the strainer "1" by loosening the joint bolt and clean it with diesel fuel oil, and also using high air pressure blow. At this time be sure to replace gasket. (For part numbers, refer to 5.5.)

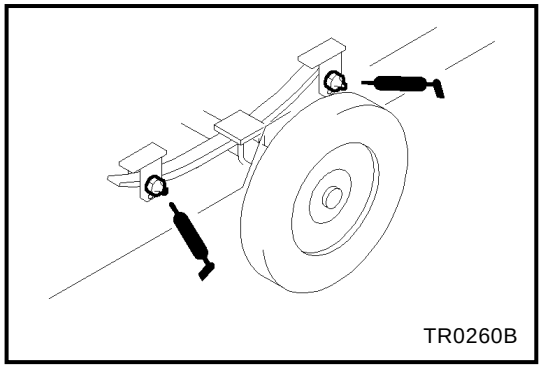
Then after finishing all cleaning jobs, install it again in reverse steps.



5.6.13 Supply grease to trailer spring pin

[Every 1,000 hours]

- Supply grease through grease nipples positioned at the bottom.
  Grease: Chassis grease

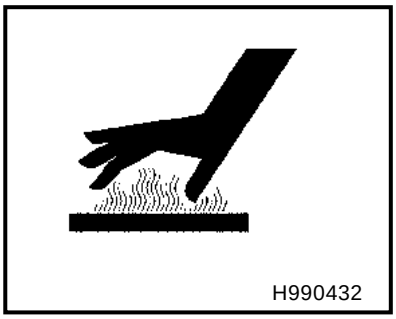


5.6.14 Change Coolant

[Every 1,000 hours or every 2 years]

⚠ CAUTION

Caution of coolant change



- Be sure to stop the machine and loosen the radiator cap slowly, after the coolant water is sufficiently cooled and the inner pressure is released, then take the cap off.
  If this procedure is neglected, its inner pressure can blow off the cap, and steam jetting out of the radiator could result in causing scalding. Follow the procedure under all circumstances.
- LLC (Antifreeze) is a toxic material.
- When a person has drunk LLC (Antifreeze) by accident, make him vomit and see a doctor immediately.
- When a person gets LLC (Antifreeze) in his eyes, wash the eyes with clean running water and make him see a doctor immediately.
- When LLC (Antifreeze) is stored, put it in a container with an indication saying “LLC (Antifreeze) inside” and seal it up, then keep it in a place away from children.
- Beware of flames.
- Follow the designated regulations to dispose of LLC (Antifreeze).

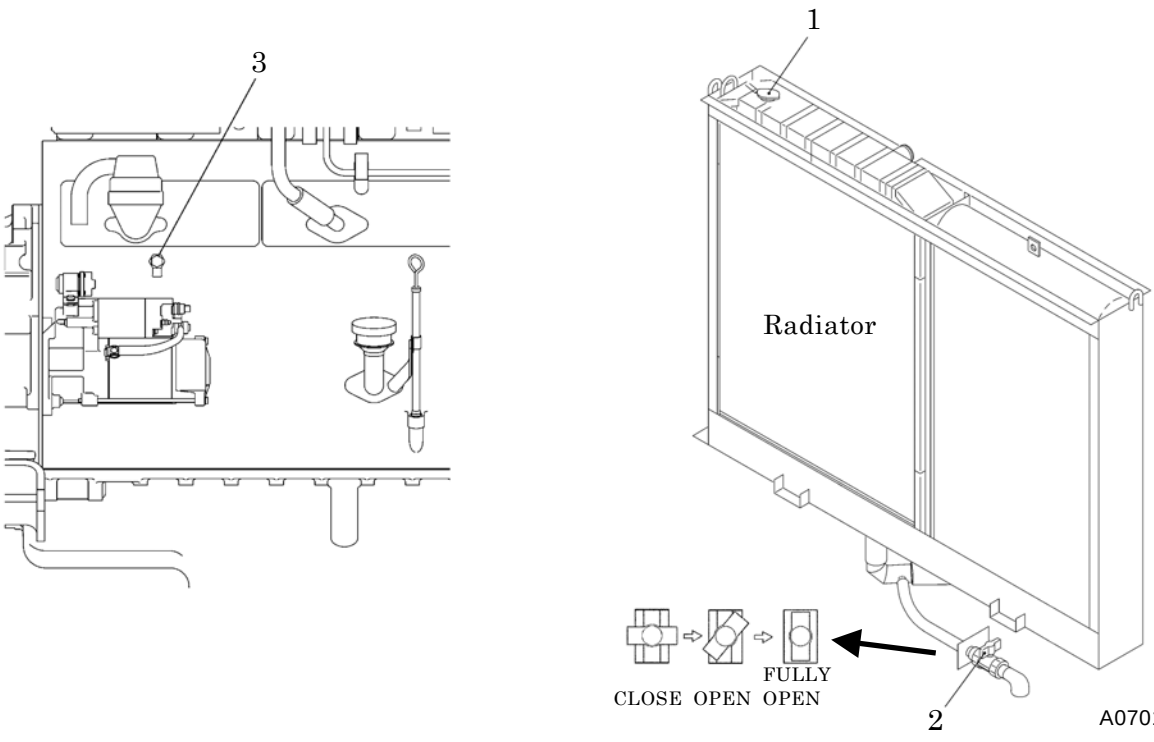
(Procedure)

① To drain coolant, remove radiator cap “1” of radiator top and open the drain valve “2” to drain it.

② Also be sure to drain engine by loosening the drain plug “3” without fail.

③ After completing drainage, close the drain valve “2” and drain plug “3” and then supply coolant through the filler port. [**Quantity of water : approx.45L**]

④ After coolant is filled up, run unit at unload condition for 2 or 3 minutes and stop it. Then check coolant level. When the level is low, replenish it.



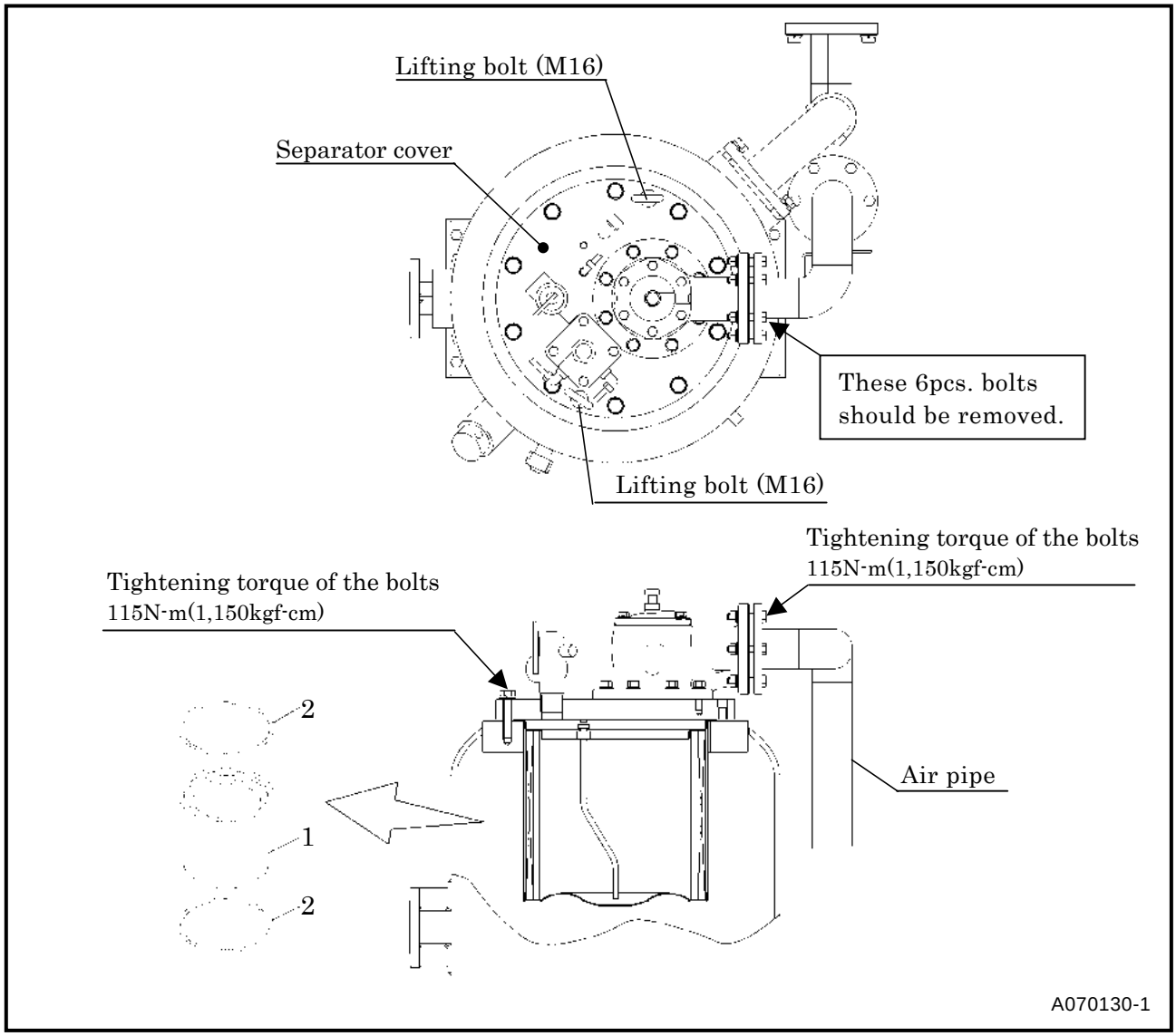
5.6.15 Change Oil Separator

[Every 2,000 hours]

(Procedure)

① In order to pull out the separator, remove the bolts (14 pieces) fixing the top cover on the separator cover.
② Remove the nylon tubes fitted on the piping of separator cover, using a spanner etc.
③ Remove the air pipe, by loosening the fixing bolts (6pcs) of the air pipe.
④ Remove the fixing bolts (10pcs.) of separator cover, using an impact wrench etc.
⑤ Screw two lifting eyebolts for the two threaded holes provided on the separator cover.
⑥ Pass a rope or wire rope through the eyes of the lifting bolts and lift the separator up by a crane etc.

- If even before scheduled interval of 2,000 hours operation, consumption of compressor oil is unusually high. and the differential pressure gauge of the oil separator reaches Red range, change the oil separator.(Refer to 4.5.6) But note that the differential pressure gauge shows correct indication only in full load operation and minimum pressure.
- When replacing oil separator "1", be sure to replace gasket "2" too. (For part numbers, refer to 5.5.)
- The oil separator "1" is made from electrically conducting material in order to be anti-static.
  Also gaskets "2" is treated for conduction by using staplers.
  Make sure to use our genuine parts for replacement.
- When replacing oil separator, contact directly us or distributor because it requires expert technical knowledge.



5.6.16 Check Fuel hose

[Every 2,000 hours or every 2 years]

- When any crack or wear is found on the hoses, change it even before the scheduled time.
- Ask your nearest dealer for its replacement.

6. Maintenance/Adjustment

6.1 Maintenance of Battery

WARNING

- Keep flames away from battery.
- Battery may generate hydrogen gas and may explode. Therefore, recharging should be done at a well-ventilated place.
- Do not spark near the battery nor light a match, nor bring lit cigarette and match close to the battery.
- Do not check the battery by short-circuiting the positive and negative terminals with a metallic piece.
- Never operate the machine nor charge the batteries with the battery liquid level being kept lower than the "LOWER" level. Continuing operation at this lower level will cause deterioration of such parts as pole plates etc., and also it may cause explosion as well as reduction of battery life. Add distilled water so that the liquid level may reach the middle level between the "UPPER" and "LOWER" level without any delay.
- Do not charge the frozen battery. Otherwise it may explode. If the battery is frozen, warm it up until the battery temperature becomes 16°C to 30°C.
- 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.
- When such battery electrolyte contacts your clothes or skin, wash it away with large amount of water immediately.
- If the battery electrolyte gets into your eyes, wash it away immediately with plenty of water and see a doctor at once, because it is feared that eyesight might be lost.
- Dispose of battery, observing local regulations.

Handling battery

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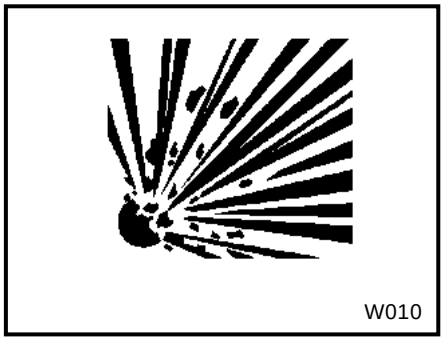

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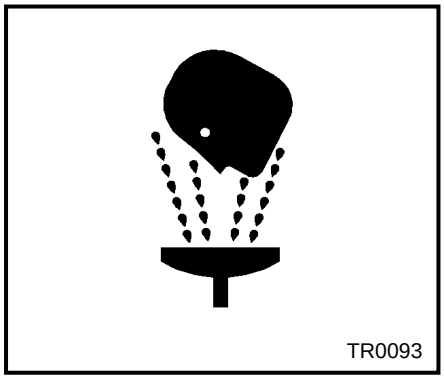

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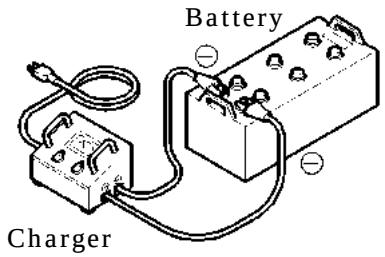
6. Maintenance/Adjustment

6.1.1 Charge Battery

- Be sure to read the operation manual of the battery charger to know if it is applicable, before using it.
- Disconnect the cable between battery and the unit, and charge the battery with a 12V battery charger. Do not charge two batteries at the same time.
- Be sure not to connect (+) and (–) terminals backwards.



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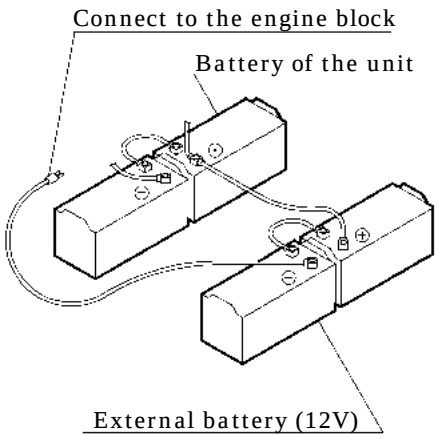
6.1.2 How to Use Booster Cable

⚠ CAUTION — ***Do not connect the cable reversely***

- If a booster cable has to be used or when cables are connected at battery replacement, be careful not to connect (+) and (–) terminals backwards. Such a wrong-connection will cause spark and damage each component.

(Procedure for using a booster cable)

① Stop the engine.
② Connect one end of the (+) cable to the (+) terminal of the machine battery.
③ Connect the other end of the (+) cable to the (+) terminal of the external battery.
④ Connect one end of the (–) cable to the (–) terminal of the external battery.
⑤ Connect the other end of the (–) cable to the engine block of the machine.
⑥ Start up the engine.
⑦ Disconnect the booster cable by following the procedure back in the reverse order.



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6. Maintenance/Adjustment

6.2 Troubleshooting

- Should any trouble occur during operation, do not leave it. Investigate the cause and take appropriate measures.
- Read the manual carefully and fully understand what to do in case of trouble.
- The better you understand the construction and function of the unit, the faster you can find a problem and solution.
- This chapter describes the state, cause and countermeasures of important troubles in detail:

Symptom	Cause	Countermeasures
Low starter revolution speed.	(1) Battery malfunction.	Check battery→ Charge, change
Starter rotates but engine does not start.	(1) Fuel filter clogging. (2) Malfunction of fuel cut solenoid.	Disassemble, clean, and change Check fuse
Discharge air pressure will not rise.	(1) Pressure regulator insufficient adjustment. (2) Starting unloader valve is left at its start position. (3) Manually operated relief valve is kept open.	Re-adjust (Fasten) Place it at "RUN" position Check/ Re-adjust
Engine does not reach its maximum speed.	(1) Improper length in speed regulator rod. (2) Faulty speed regulator. (3) Fuel filter clogging. (4) Engine trouble. (5) Unloader orifice clogging.	Re-adjust (longer length) Disassemble/Check Disassemble/Change Call your nearest dealer Disassemble/Clean
While the discharge pressure will not rise up to the specified one, RPM will drop.	(1) Pressure regulator insufficient adjustment. (2) Trouble of pressure regulator.	Re-adjust (Fasten) Change
Engine does not reach minimum revolution at unload.	(1) Improper length in speed regulator rod. (2) Faulty speed regulator.	Re-adjust(Shorter length makes the speed drop/longer length makes it rise.) Disassemble/Check
Safety valve relieves at unload.	(1) Pressure regulator insufficient adjustment. (2) Unloader regulator insufficient adjustment. (3) Unloader valve damaged and seat malfunction. (4) Faulty safety valve.	Re-adjust(loosen) Re-adjust Change Change
Oil mixes in Air. (Poor oil separation)	(1) Scavenging orifice strainer clogging. (2) Low discharge pressure. (3) Oil separator deteriorated.	Disassemble/Clean Disassemble/pressure control valve/check Change
Insufficient free air delivery.	(1) Air filter element clogging. (2) Unloader valve cannot fully open. (3) Engine does not reach rated speed.	Clean element or change Call your nearest dealer

Symptom	Cause	Countermeasures
Engine oil pressure lamp goes on and engine stops.	(1) Engine oil shortage. (2) Engine oil filter clogging. (3) Malfunction of engine oil pump (4) Faulty oil pressure switch. (5) Loosened or disconnected wiring or connector.	Replenish oil Change Change Change Check/Fasten
Water temperature lamp goes on and engine stops.	(1) Radiator clogging. (2) Low coolant level. (3) Belt slippage. (4) Faulty thermostat. (5) Loose wiring, connectors and disconnection. (6) Faulty coolant temp. switch.	Clean Replenish Re-adjust tension Change Check/retighten Change
Discharge air temperature lamp goes on and engine stops.	(1) Oil cooler clogging. (2) Oil filter clogging. (3) Shortage of compressor oil. (4) Slippage of belt. (5) Malfunction of by-pass valve. (6) Loose wiring connectors and disconnection. (7) Faulty discharged air temp. switch. (8) Malfunction of oil check valve. (9) Ambient temperature is lower than -15℃ or higher than 130℃.	Clean Change Replenish oil Re-adjust tension Check/change Check and retighten Check/inspect Disassemble/check Arrange the ambient temperature correctly
Engine speed down lamp goes on and engine stops.	(1) Unload revolution speed is low. (2) Shortage of feeding fuel caused due to fuel filter and gauze filter clogging (3) Air mixed in fuel line system (4) Power drops, owing to clogging of engine air filter. (5) Controller against engine speed drop is defective.	Adjust the speed. Replace filter and/or clean the gauze filter Bleed the air Clean and/or replace air filter Change

- Contact your nearest dealer if you find it difficult to repair by yourselves.
- Refer to the engine operation manual for trouble concerning the engine.

7.Storage of the Unit

7.1 Preparation for Long-term Storage

When the unit is to be kept unused in storage for a long time, be sure to follow the preparations below and put the unit in a dry and less dusty place.

- Put the unit in a temporary cabin if it is stored outside. Avoid leaving the unit outside with a sheet cover directly on the paint for a long time, or this will cause rust to the unit.
- Perform the following treatments at least once every three months.

(Procedure)

① Drain existing lubricant from the engine oil pan. Pour new lubricant in the engine to clean its inside. After running it for a while, drain it again.
② Spread lubricant on moving parts like speed regulator and rod end, beforehand.
③ Completely charge the battery and disconnect grounding wires. Remove the battery from the unit, if possible, and store it in a dry place. (Charge the battery at least once every month.)
④ Drain coolant and fuel from the unit.
⑤ Seal the engine, air-intake port and other openings like the muffler with a vinyl sheet, packing tape, etc., to prevent moisture and dust from getting in the unit.
⑥ Be sure to repair any trouble and maintain the unit so that it will be ready for the next operation.

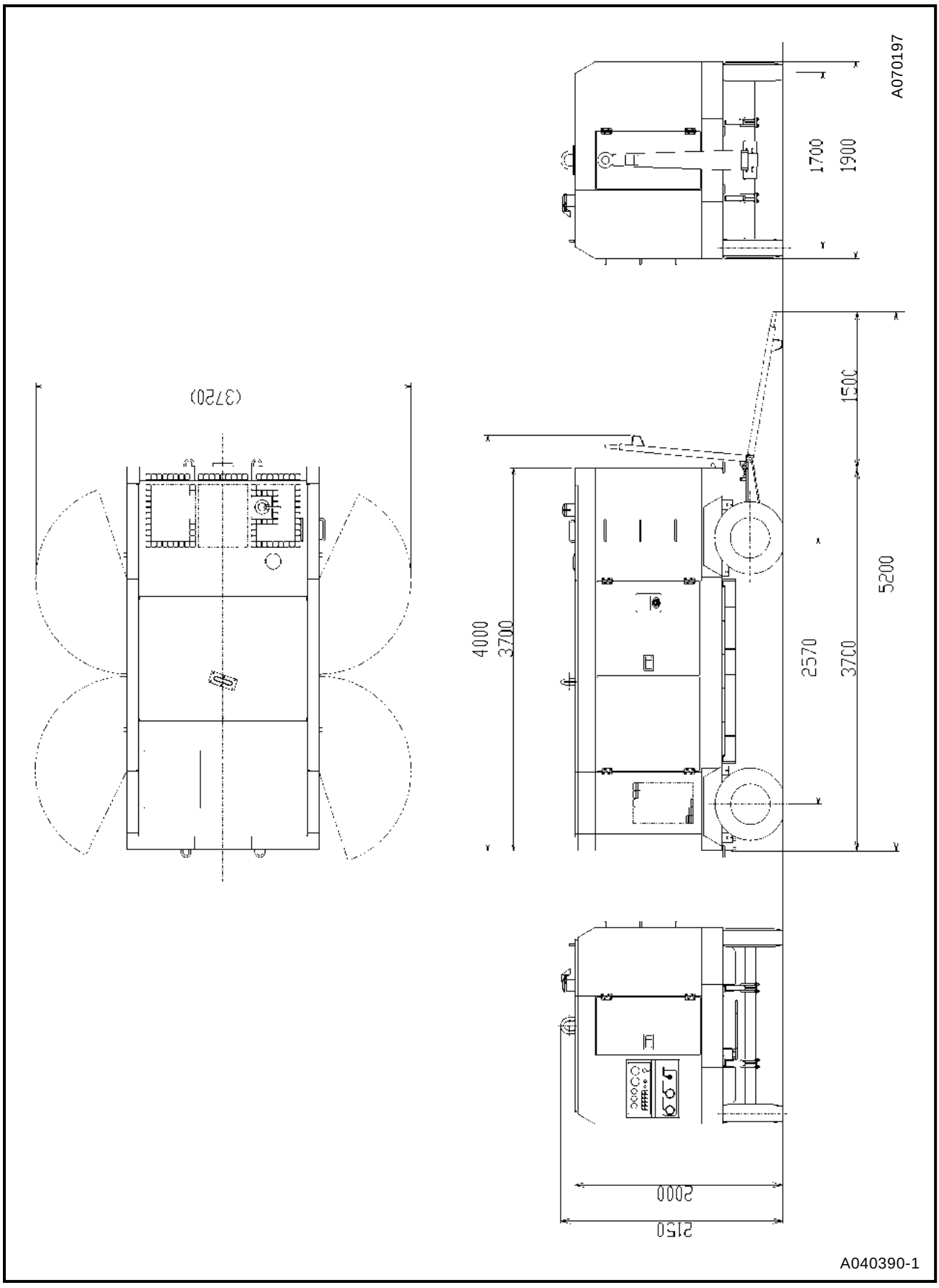
8.Specifications

8.1 Specifications

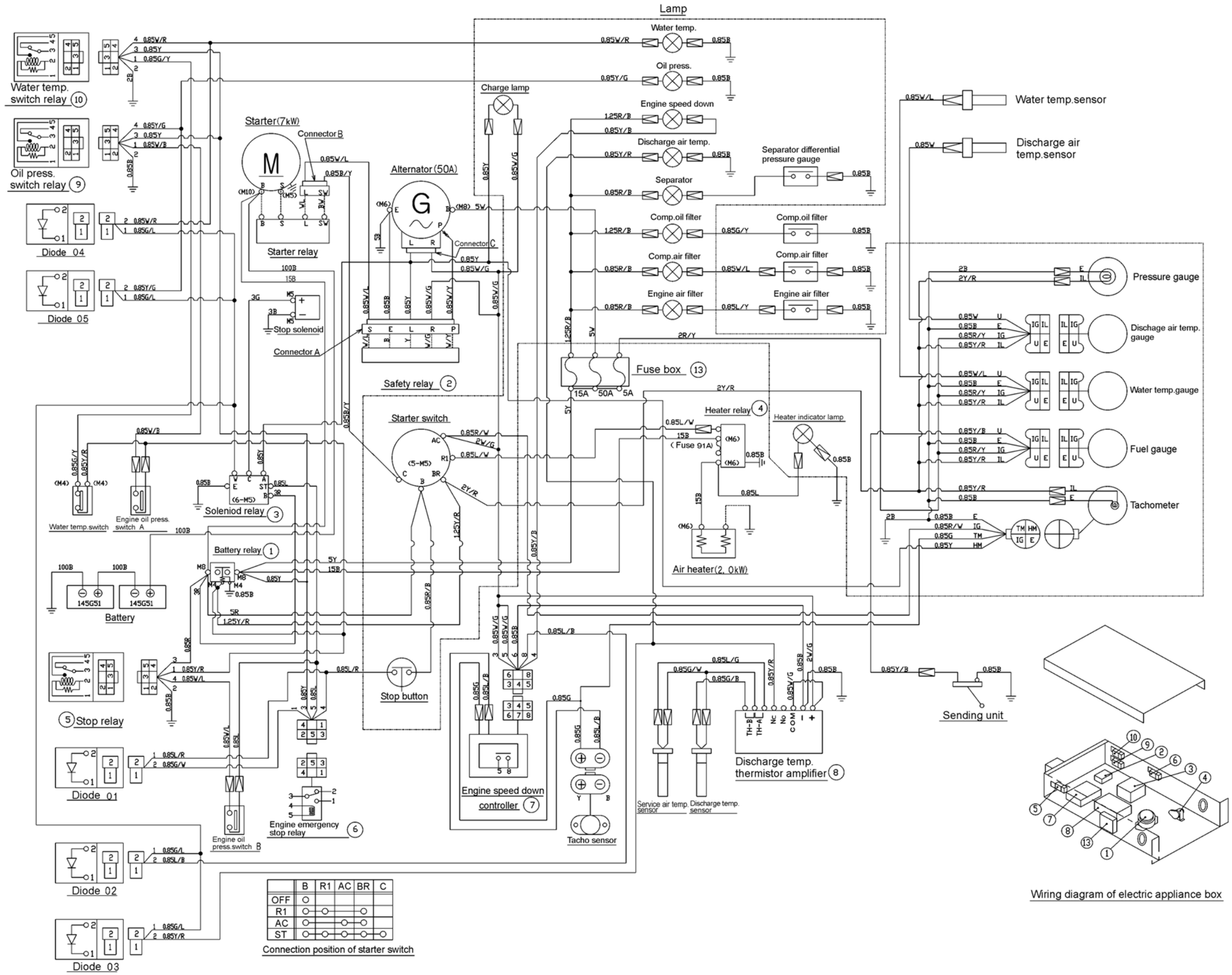
Model			PDSE900S-4B1	PDSF830S-4B1	PDSG750S-4B1
Compressor	Type		Single-stage oil cooled, screw type compressor		
	Free air delivery	m^3/min	25.0	23.5	21.2
	Working pressure	MPa	0.86	1.03	1.27
	Lubricating system		Forced Lubrication by compressed pressure		
	Driving system		Direct driving with rubber coupling		
	Receiver tank capacity	m^3	0.248		
	Lubricating oil capacity	L	105		
Engine	Model		MITSUBISHI FUSO TRUCK & BUS CORPORATION 6D24-TE1		
	Type		4 cycle water-cooled, in-line vertical, direct injection, turbo-charged		
	Number of cylinders, bore stroke		6 – 130 mm × 150 mm		
	Total displacement	L	11.94		
	Rated output	kW	206		
	Revolution per minute	min^{-1}	2,200		
	Lubricating oil capacity	L	54		
	Coolant capacity (including radiator)	L	45		
	Battery		155G51×2		
	Fuel tank capacity	L	400		
Weight・Mass	Overall length (with drawbar folded up)	mm	4,000		
	Overall length (with drawbar laid down)	mm	5,200		
	Overall width	mm	1,900		
	Overall height	mm	2,150		
	Net dry mass	kg	4,100		
	Operating mass	kg	4,600		

8.Specifications

8.2 Outline drawing



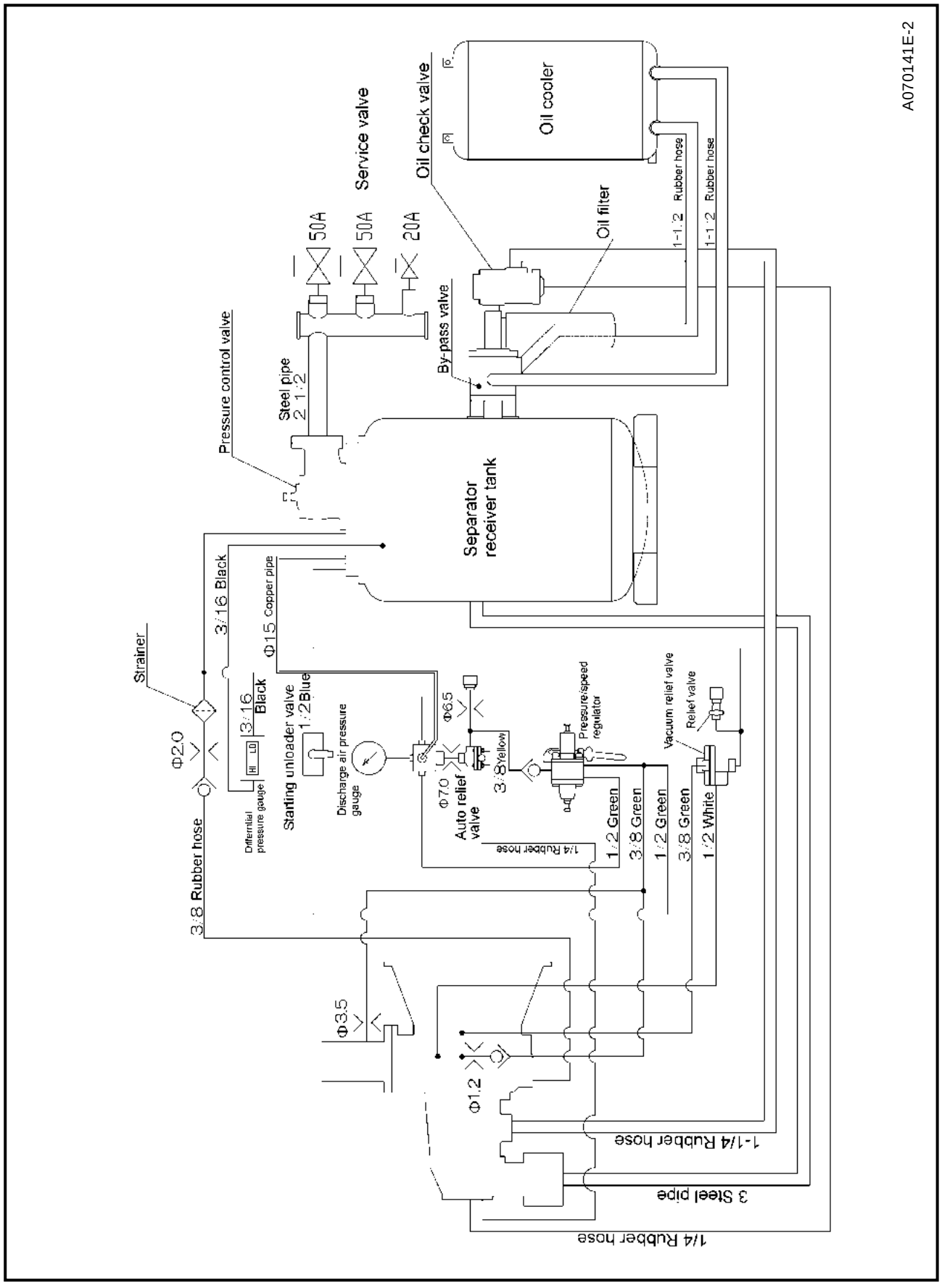
9. Wiring Diagram



10. Piping Diagram

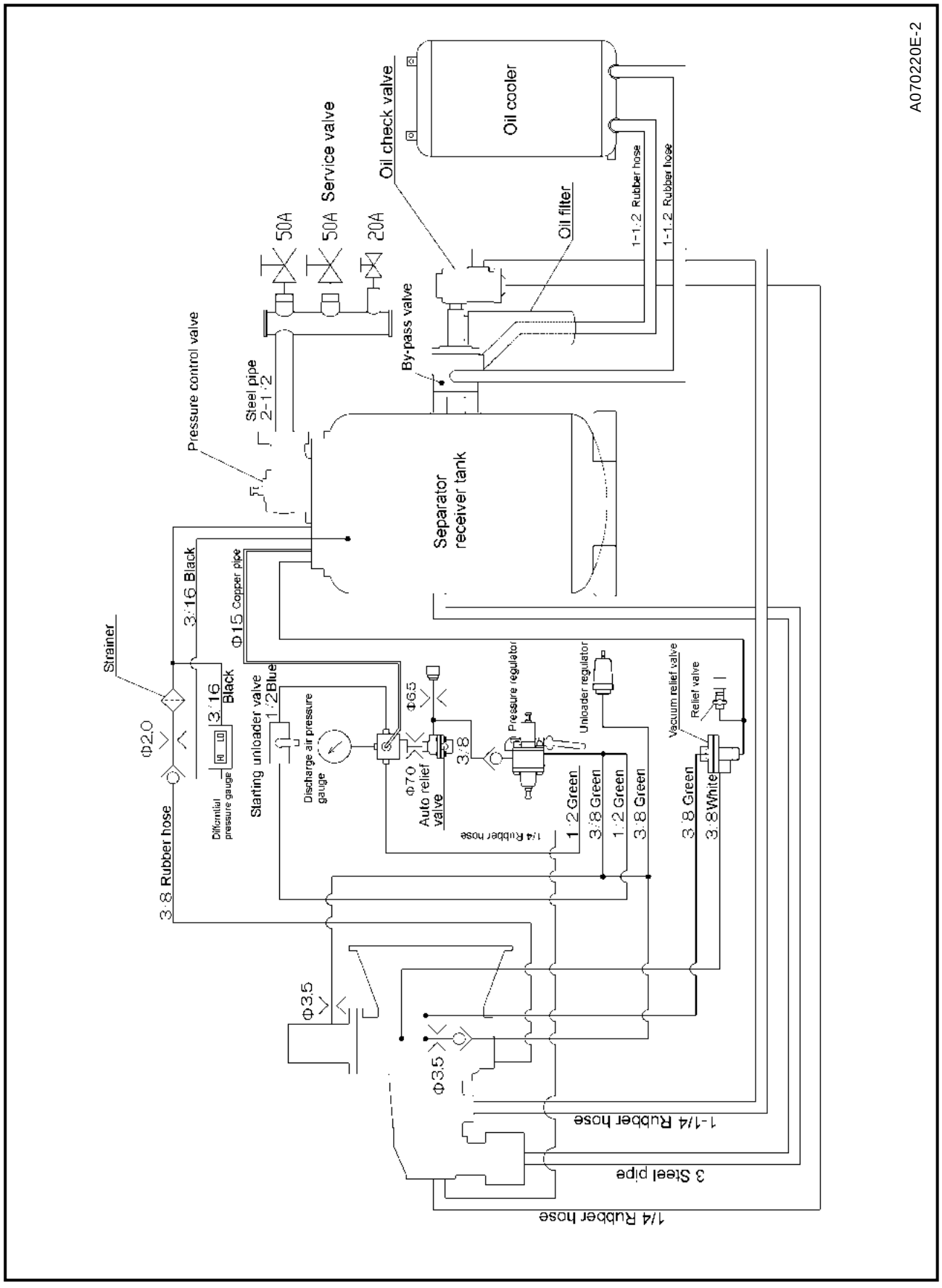
10.1 Compression air・Compressor oil

PDSE900S,PDSF830S-4B1



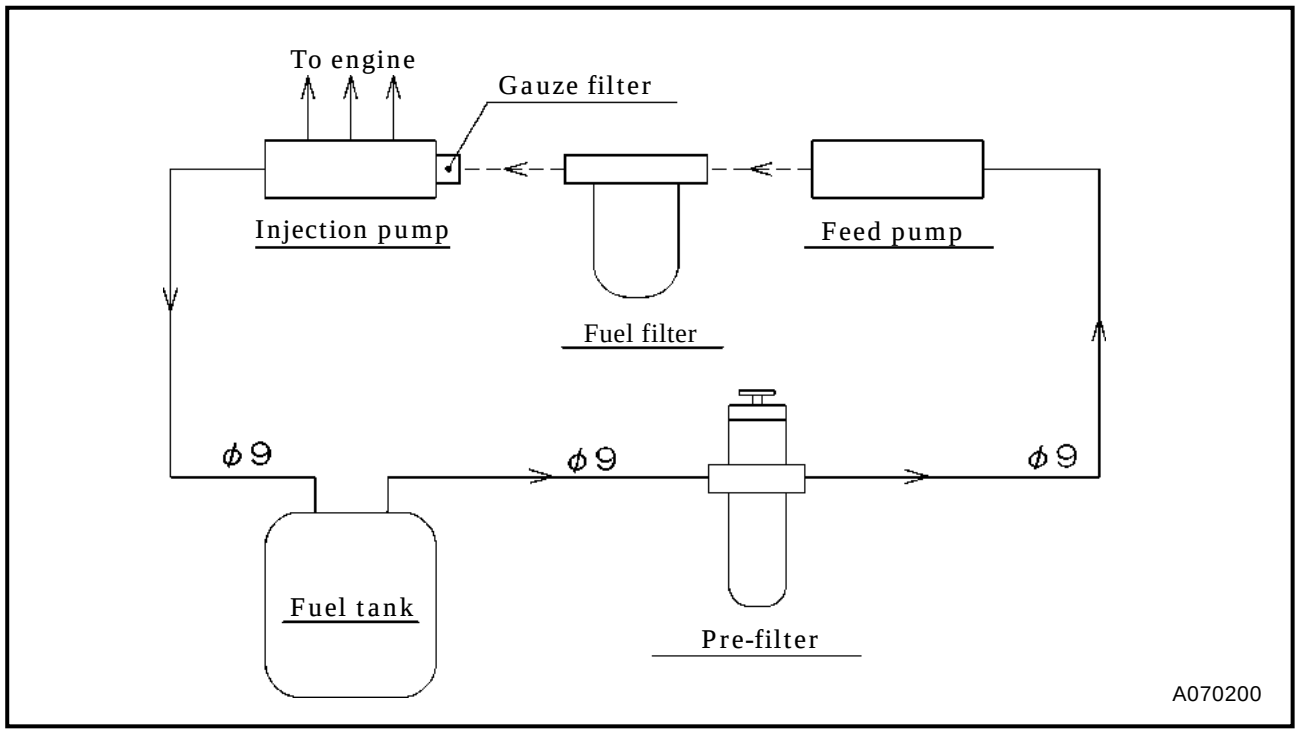
10. Piping Diagram

PDSG750S-4B1



10. Piping Diagram

10.2 Fuel



OPERATION LOG

OPERATION DATE	OPERATION TIME		TOTAL OPERATION HOURS (h)	DISCHARGE AIR PRESS.(MPa)	AMBIENT TEMP.(℃)	DISCHARGE AIR TEMP. (℃)	COOLANT TEMP.(℃)	RATED RPM (rpm,min^{-1})	ENG.OIL REPLACEMENT HOUR (h)	COMP.OIL SUPPLY(L)	REMARKS (INSPECTION/PART CHANGE HISTORY ETC.)
	START TIME	STOP TIME									
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