Manual de operación PDSG750VRS-4C5

Alpha C
Un lazo para toda la vida.

AIRMAN®

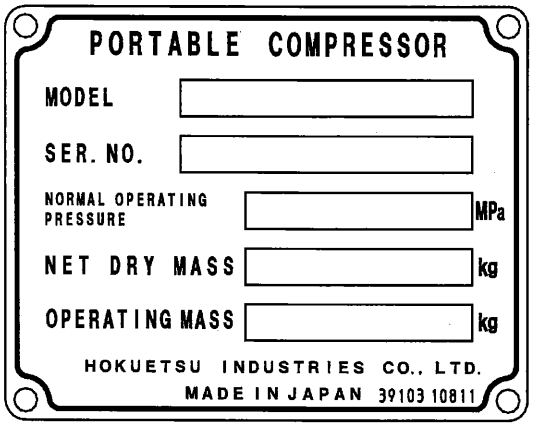
Preface

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 the machine safely, people with sufficient knowledge and sufficient technology need to deal with it.
- Before operating the machine, read the manual carefully, fully understand its operation and maintenance requirement. Maintain "SAFETY OPERATION AND PROPER MAINTENANCE OF THE MACHINE".

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.
- When this manual is missing or damaged, order it from our office nearby or distributor.
- Be sure that the manual is included with the machine 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. When you have anything unclear or you want to advise us, contact our office nearby or distributor.
- If you have any questions about the machine, please inform us the model and serial number. A plate stamped with the model and serial number is attached to side of the machine.



A130375

- Each illustrated figure (Fig.) has a number (for instance, A130375) 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 MACHINE".

⚠ DANGER	DANGER indicates an imminently hazardous situation which, if not avoided by any user, 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 to a user.
⚠ CAUTION	CAUTION indicates a potential hazardous situation which may possibly only cause a minor injury to a user and damages to property only.
IMPORTANT	IMPORTANT indicates important caution messages for the performance or durability of the machine.

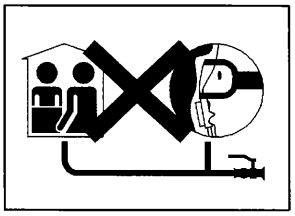
Follow warnings mentioned in this manual. This manual does not describe all safety items.
We, therefore, advise you to pay special attention to all items (even though they may not be described in the manual) for your safety.

1.Safety

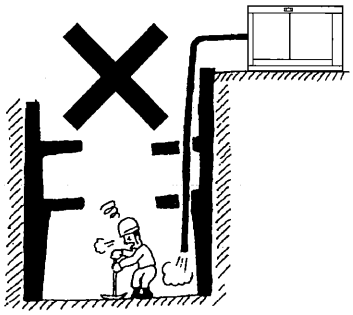
1.1 Caution before Operation

⚠ DANGER — ***Compressed air is prohibited to be used for human respiration***

- Compressed air by this machine contains poisonous materials. Absorption of the compressed air can cause serious injury. Never provide this compressed air for human respiration.
- This machine 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 machine 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.



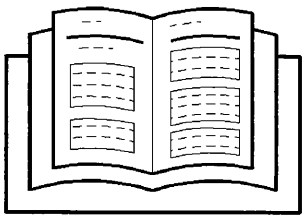
TR0201-1



A080001

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

- Read each instruction plate which is displayed in the manual or on the machine 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 the machine life may be shortened.
- Never use the machine 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

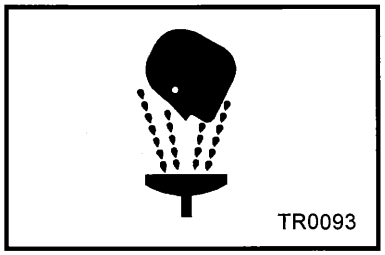
1.Safety

⚠ 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.

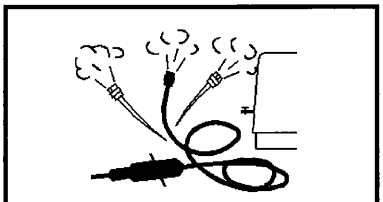
D004

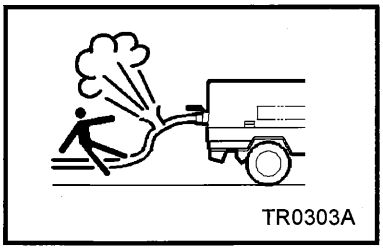

TR0093

⚠ 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.

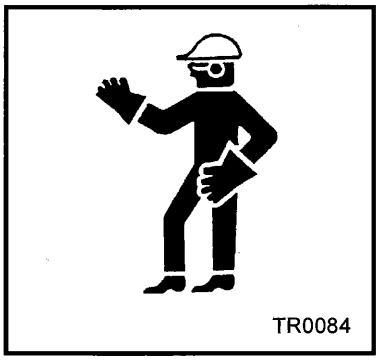

TR0088


TR0303A

⚠ WARNING

Safety outfit

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


TR0084

1.Safety

⚠ WARNING — ***Maintain both physical and mental health***

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

⚠ CAUTION — ***Protection equipments***

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

TR0085

⚠ CAUTION — ***Safety fittings***

- Have first-aid boxes and fire extinguishers near the machine 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

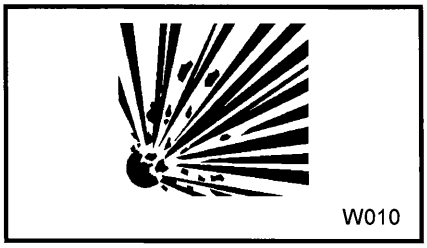
⚠ CAUTION — ***Safety around the machine***

- 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

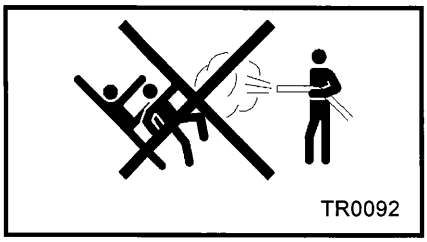
⚠ WARNING — ***Draining during operation prohibited***

- 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 and plug
- Oil cooler drain plug
- Fuel tank drain vale and plug

PK0028

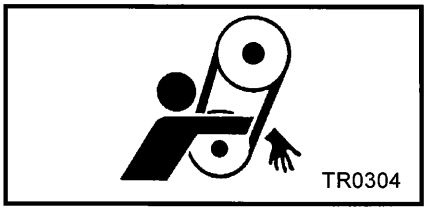
⚠ WARNING — ***Never direct the compressed air to people and foods***

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


TR0092

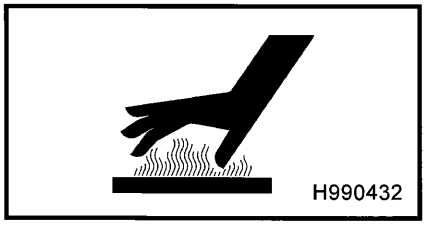
⚠ WARNING — ***Hands off from rotating parts and belts***

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


TR0304

⚠ CAUTION — ***Do not remove radiator cap during operation***

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

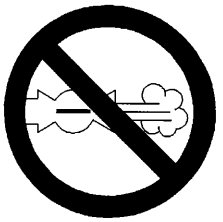

H990432

1.Safety

⚠ CAUTION

Operation with discharge port (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.

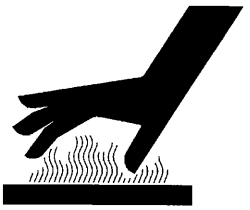


D003

⚠ 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 up to the filler level. When fuel tank is filled up to the filler level, fuel 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.

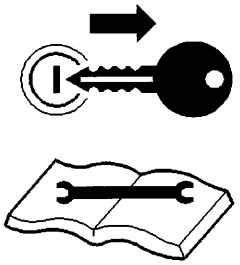
D004

H990433

1.3 Caution during Inspection and Maintenance

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

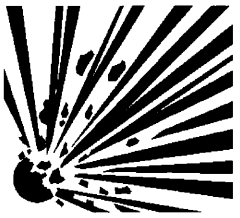
- Remove the starter key from the starter switch before starting inspection, and hang up a "Now Checking and under Maintenance" tag where it can be easily seen. The checker must keep the key during checking and maintenance.
- Remove the negative (–) side cable from the battery.
  If the above procedure 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

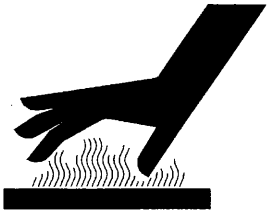
⚠ WARNING — ***Be careful of high-pressurized air blowout***

- 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

1.Safety

⚠ WARNING

Adjusting tension of belt

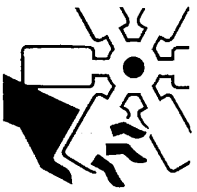
- Be sure to stop the engine and remove the starter key whenever the tension of the belt is to be adjusted.
- Remove the negative (–) side cable from the battery.
- If the machine is running, it might catch the operator's hand into the belts, and this could cause a serious injury.

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

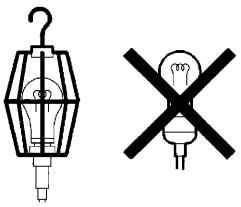
- When cleaning dust accumulated in such devices as the air-filter, by blowing compressed air, wear safety glasses, etc. to protect your eyes.

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

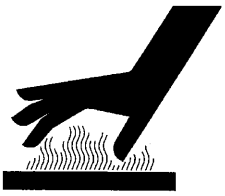
Opening coolant water drain valve cap

- 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.

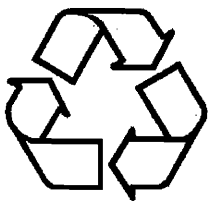
H990433

⚠ CAUTION — ***Handling of electrical equipment engine***

- The engine of this machine and electrical parts many electronic devices have been installed.
  If you do this please go airborne welding work, remove the connector of the electronic control equipment.
  Can cause equipment to malfunction due to electronic control of excessive current is applied.

⚠ 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.



A100285

1.4 Safety Warning Labels

Following labels are attached to the machine.
Keep them clean all the time. When they are found damaged or peeled off, order them by the part number printed right under from our office nearby or distributor and attach them again.

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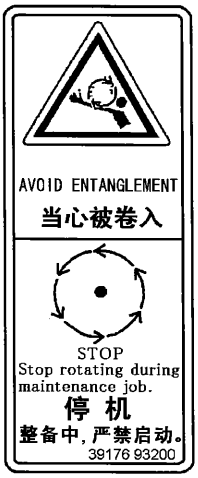

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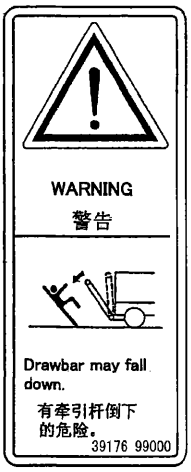

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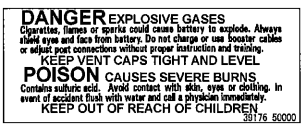
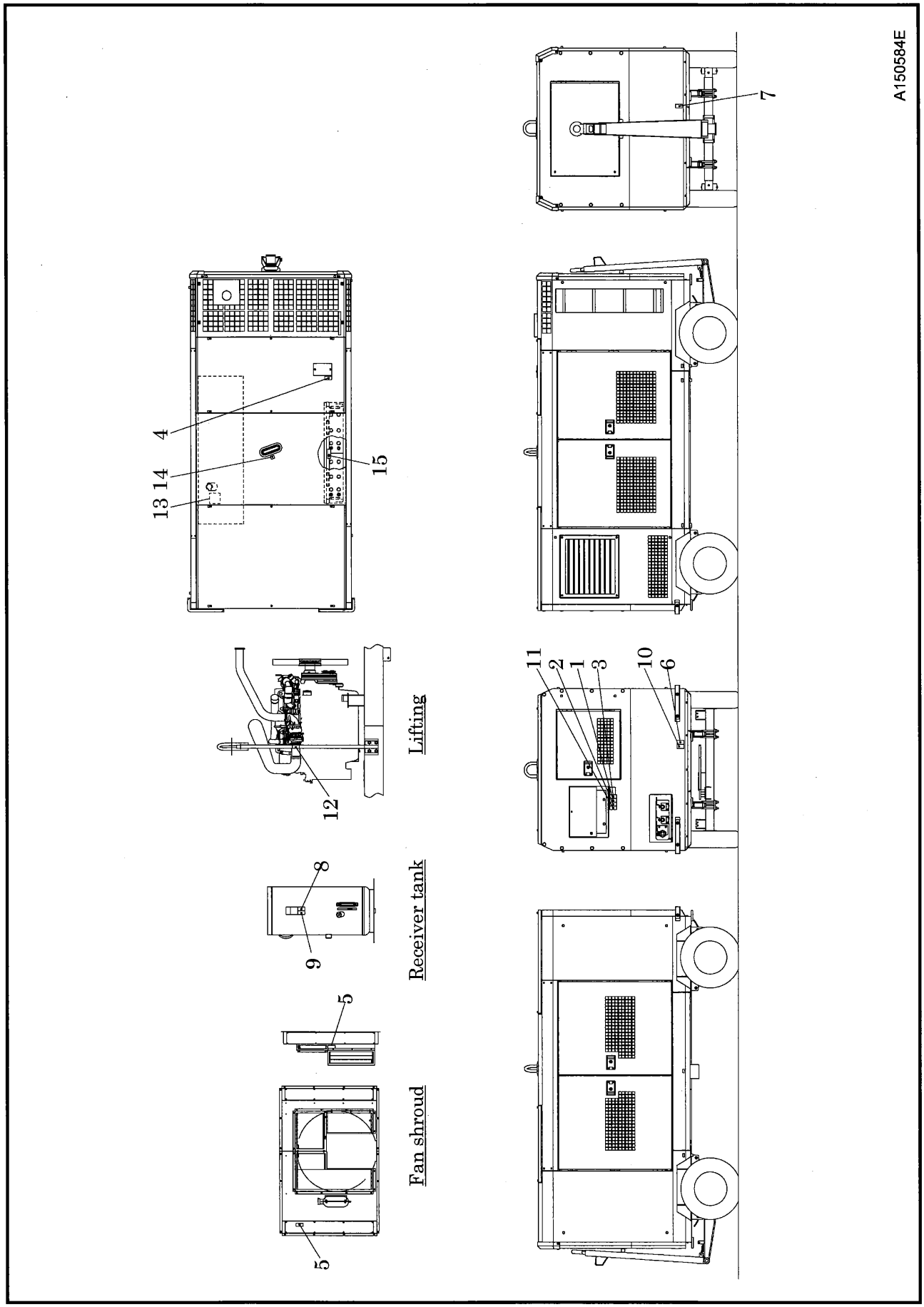


1.Safety

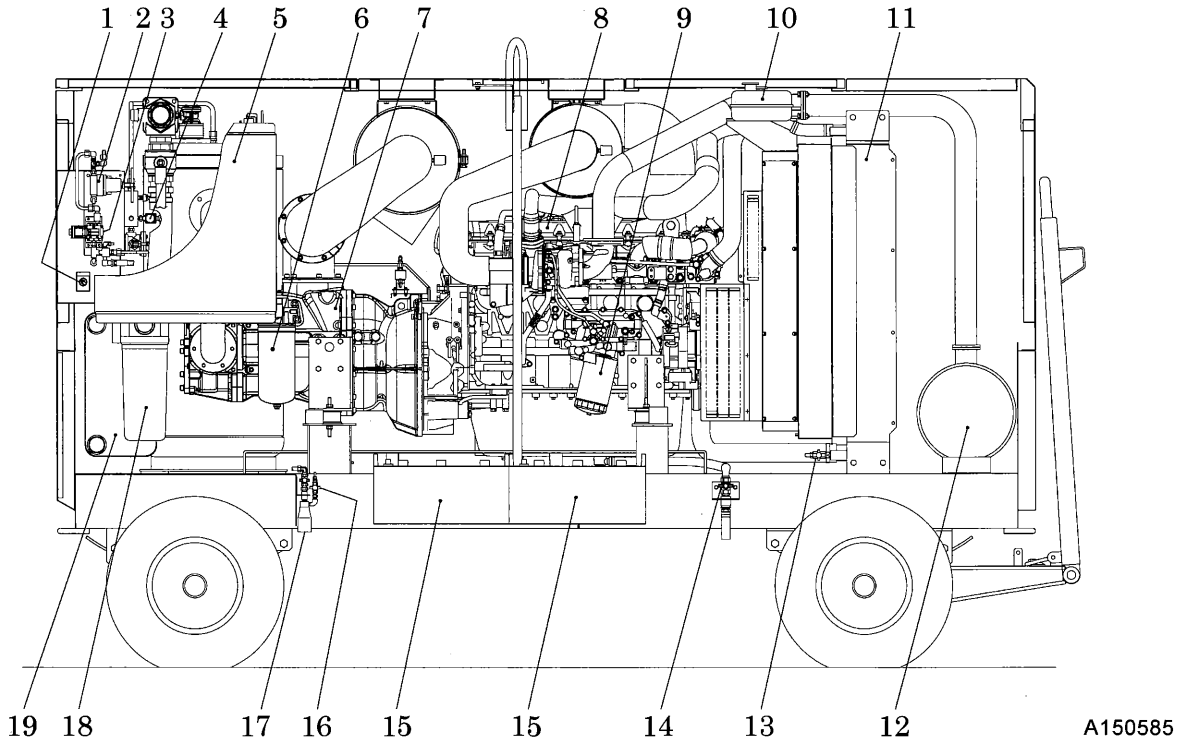
- The pasting position of safe warning label is as follows.



MEMO

2.Part Names

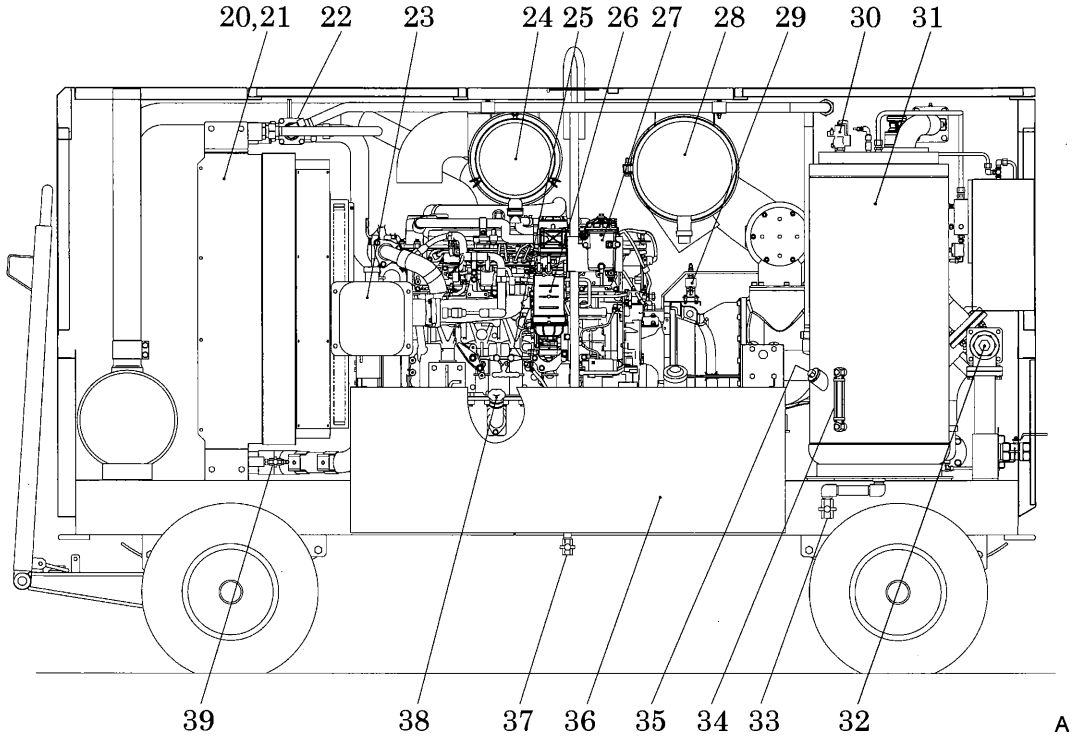
2.1 Internal Components and Part Names



PDSG750SD-4C5

No.	Description	Function
1	Setting prohibition switch	For allowing the user to change the discharge pressure.
2	Pressure regulator	For regulating the compressor pressure in the system. (in case of a fault in the electro-pneumatic regulator valve)
3	Electro-pneumatic regulator valve	For regulating the compressor pressure in the system.
4	Solenoid valve for starting unloader	For reducing load at start-up.
5	After cooler (Dry air type)	For cooling compressed air.
6	Compressor oil filter	For filtering compressor oil in the system.
7	Compressor air-end	For compressing air in the system.
8	Engine	For driving the compressor in the system.
9	Engine oil filter	For filtering engine oil in the system.
10	Header tank	For supplying cooling water to the radiator.
11	Radiator	For cooling the coolant for engine in the system.
12	Exhaust muffler	For silencing the noise caused before discharging the air.
13	Radiator drain valve	For draining engine coolant.
14	Engine oil drain valve	For draining engine oil.
15	Battery	For electrically starting engine.
16	Drain warming valve (Dry air type)	For preventing air pipe outlet port from getting frozen.
17	Drain port of after-cooler (Dry air type)	For draining condensed water filtered by drain separator.
18	Drain separator (Dry air type)	For separating water from compressed air cooled in after-cooler in the system.
19	After warmer (Dry air type)	For heating compressed air

2.Part Names



PDSG750SD-4C5

No.	Description	Function
20	Oil cooler	For cooling compressor oil in the system.
21	Inter cooler	For cooling the air compressed by engine supercharger.
22	By-pass valve	For keeping compressor oil at optimum temperature in the system.
23	Reserve tank	For checking coolant level and supplying it.
24	Air filter (For engine)	Filtering device for filtering dust floating in intake air.
25	Engine oil level gauge	For checking engine oil level.
26	Fuel pre-filter	For filtering dust and foreign things mixed in fuel oil and also for separating water in the system.
27	Fuel filter	For filtering dusts or foreign things in fuel in the system.
28	Air filter (For compressor air-end)	Filtering device for filtering dust floating in intake air.
29	Solenoid valve for unloader spring chamber	For reducing loads during start-up.
30	Safety valve	For releasing compressed air to the atmosphere when the pressure rises higher than the rated pressure in the system.
31	Separator receiver tank	For separating air and oil from compressed air in the system.
32	Pressure control valve	For keeping the pressure in receiver tank constantly higher than a certain level in the system.
33	Separator receiver tank drain valve	For draining condensed water from separator receiver tank.
34	Compressor oil level gauge	For checking compressor oil level.
35	Compressor oil filler port	For supplying or adding compressor oil.
36	Fuel tank	For storing fuel.
37	Fuel tank drain valve	For draining condensates from fuel tank.
38	Engine oil filler port	For supplying or adding engine oil.
39	Oil cooler drain valve	For draining compressor oil from oil cooler and oil line.

3.Installation

3.1 Transportation

3.1.1 Lifting up

When loading and unloading machine, be sure to use the lifting bail "1" provided on the center of the machine top.

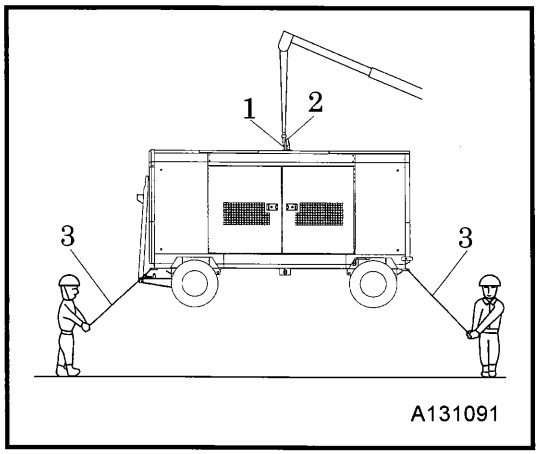
<Procedure>

① Before lifting the machine up, make sure to check the lifting bail "1" for any crack and loosened bolts.

② Connect the hook "2" of the crane or shackle with lifting bail "2" eye fitted at the top center of the machine, and make sure that there is no person standing around the machine. Then perform hoisting operation.

③ Use auxiliary ropes "3" to prevent the machine from swinging and/or twisting, giving signs and signals each other.

- Select a truck or a crane with capacity sufficient for weight and size of the machine by referring to the values shown in Chapter 8 "Specifications" of the manual.
- Never lift the machine while it is running, or this could cause a serious accident.



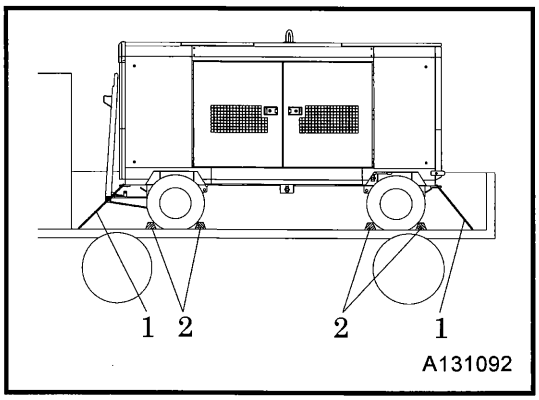
A131091

3.1.2 Mounting the machine on the truck bed

<Procedure>

① Be sure to fasten the machine with ropes "1" as shown in the figure right, and securely fix it on the truck bed.

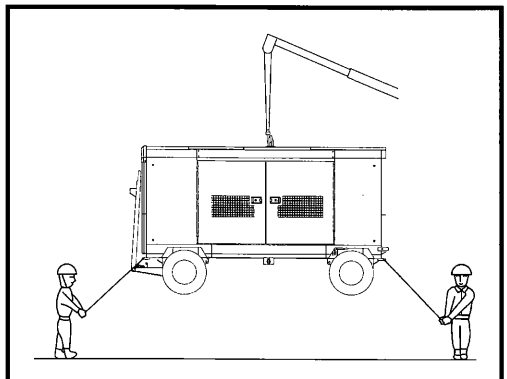
② Be sure to put one set of chocks "2" to the wheels. Pull the parking brake lever it firmly after the machine is loaded on the truck bed.



A131092

⚠ WARNING — ***Transportation***

- Never get under the machine which is suspended, because it is very dangerous.
- Never lift the machine which is still in operation, or it could cause critical damage to each component or lead to serious accident.


A131091-1

3.Installation

3.2 Handling the Drawbar

3.2.1 How to secure the drawbar

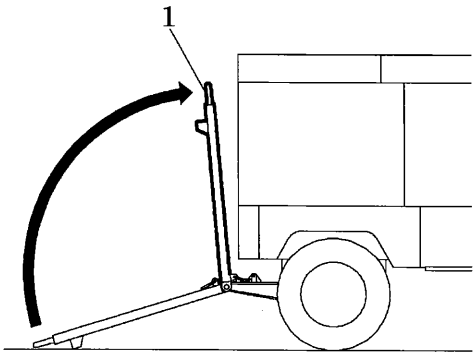
<Procedure>

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 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)

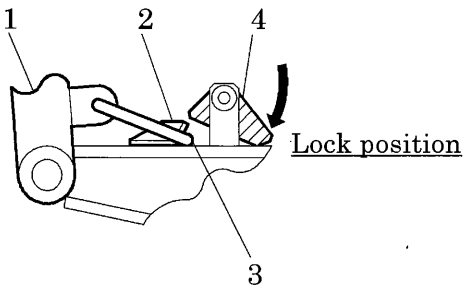
③ Make sure that the hook is securely engaged with the holder.

④ Make sure that the stopper stays at the lock position. (See Fig.1)



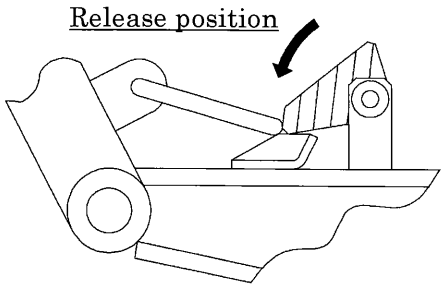
H000480

Fig.1



H000466

Fig.2



M970098

3.2.2 How to release the drawbar

<Procedure>

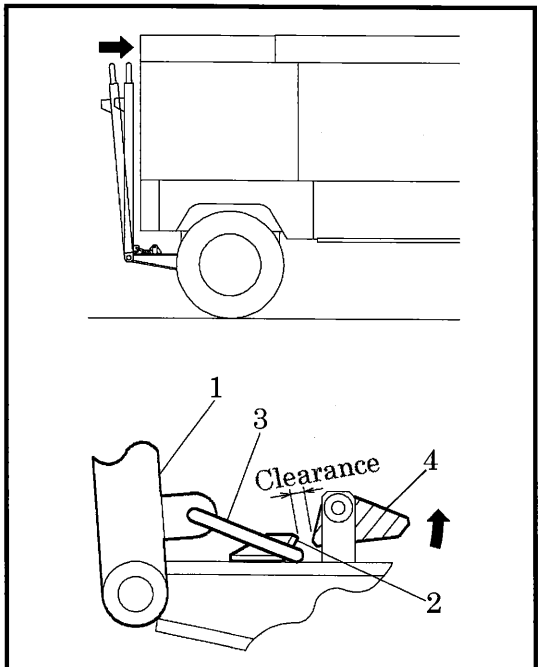
① Push the fixed drawbar "1" against the machine in the direction of arrow mark.

② Turn the stopper 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 through the clearance.

④ Lower the drawbar.

⑤ Return the stopper to the lock position.



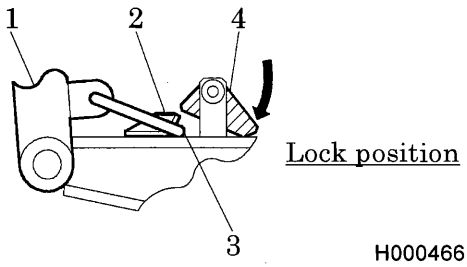
M970095

3.Installation

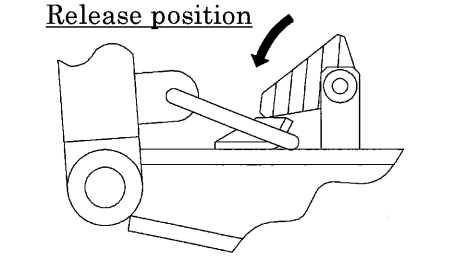
⚠ WARNING

Precautions on handling drawbar

- When the drawbar "1" is raised up for transportation, be sure to secure it by engaging the hook "3" with the holder "2" without fail.
- If the 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 could come off the holder, causing the drawbar to fall down.
- Handle the hook holder and stopper so carefully to prevent your fingers from being caught and injured.



H000466



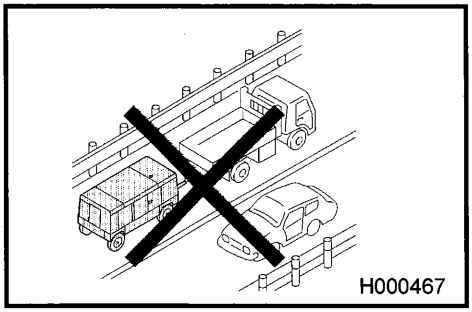
M970092

3.3 Towing the Machine

- When towing the machine, make sure there is no person or obstacle at both front and rear sides and under the machine.
- Be sure to use a vehicle with enough capacity to tow the machine in operating weight.

⚠ WARNING

- Although the machine is designed to be drawn, drawing is allowed only in construction site.
- Towing speed should be within 20 km/h.


H000467

⚠ CAUTION

Caution for towing the machine

- For standard air pressure of tires, please refer to clause 6.6.29.
- Check and confirm that the fixing nuts are not loosened and if loosened, retighten them according to the torque (6.6.29).
- 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 machine is being towed.
- Make sure if there is no deform or damage on the drawing vehicle and the drawbar of the machine.
- 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

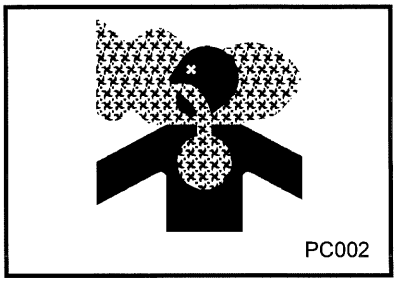
- The machine has to be parked horizontally on a level place.
- In case the machine has to be parked on a slope, place it across grade so that the machine does not tend to roll downhill.
  Following grades on a slope for the machine are recommended within 15 degrees.
- The machine should be operated in following conditions:
- **Ambient temperature ····· -15°C to 40°C**
- **Humidity ····· Less than 80%**
- **Altitude ····· Lower than 1,500 m above sea level**

※ **If you use the machine not in the conditions stated above, it may causes serious breakdown.**

- Install the machine in a place with good ventilation, lower temperature and with surroundings as dry as possible.
- If more than 2 machines are placed parallel in operation, keep enough distance so that exhaust air from one machine does not affect the other one.
- Also, a machine has to be installed in the environment where fresh air is always available.
- Keep enough space around the machine for inspection and maintenance access.

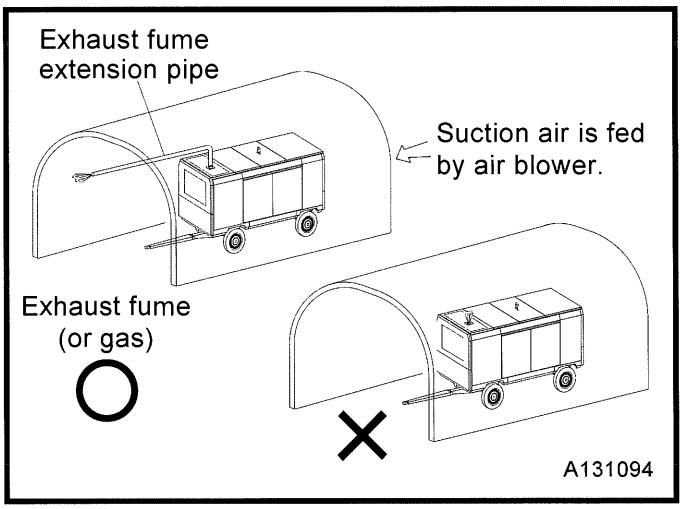
⚠ WARNING — ***Ventilation***

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



⚠ WARNING — ***Installing the machine such poorly-ventilated place***

- In case that the machine is installed inside any tunnel, make sure to provide fresh air and ventilate it.
- In this case, make sure to extend the exhaust fume pipe outdoors, and also make sure to prevent any leak from any connection pipes.

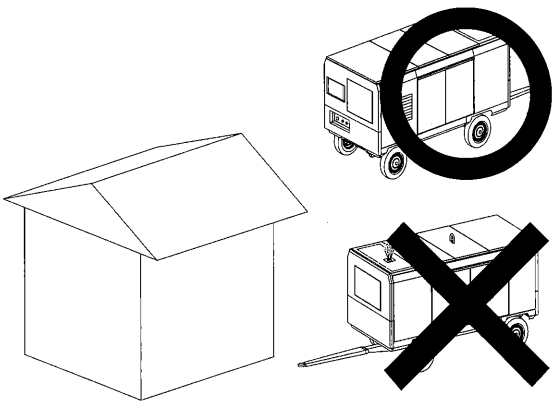


3.Installation

⚠ WARNING

- Never locate the machine with the exhaust muffler facing any private house:
- As the exhaust fume (gas) from the engine is poisonous, never direct it to any other persons passing by.

How to locate the machine

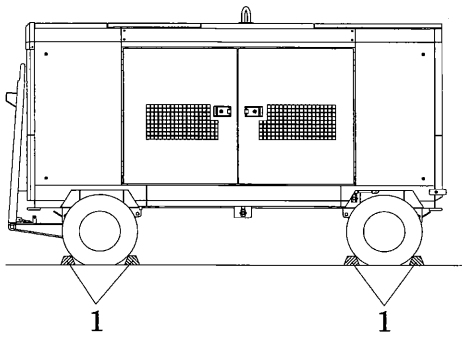


A131095

⚠ WARNING

- 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 machine when it is parked. It is not for use as a stopping brake during its transportation. (while being drawn by a vehicle).

Installation

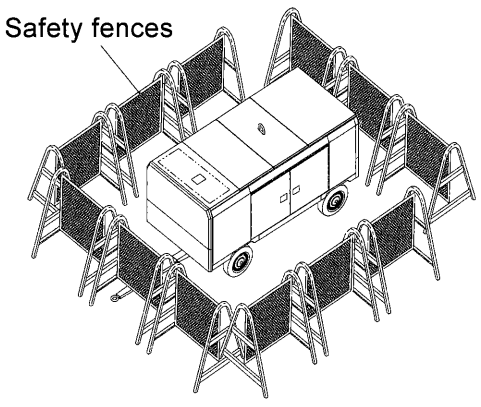


A131093

⚠ CAUTION

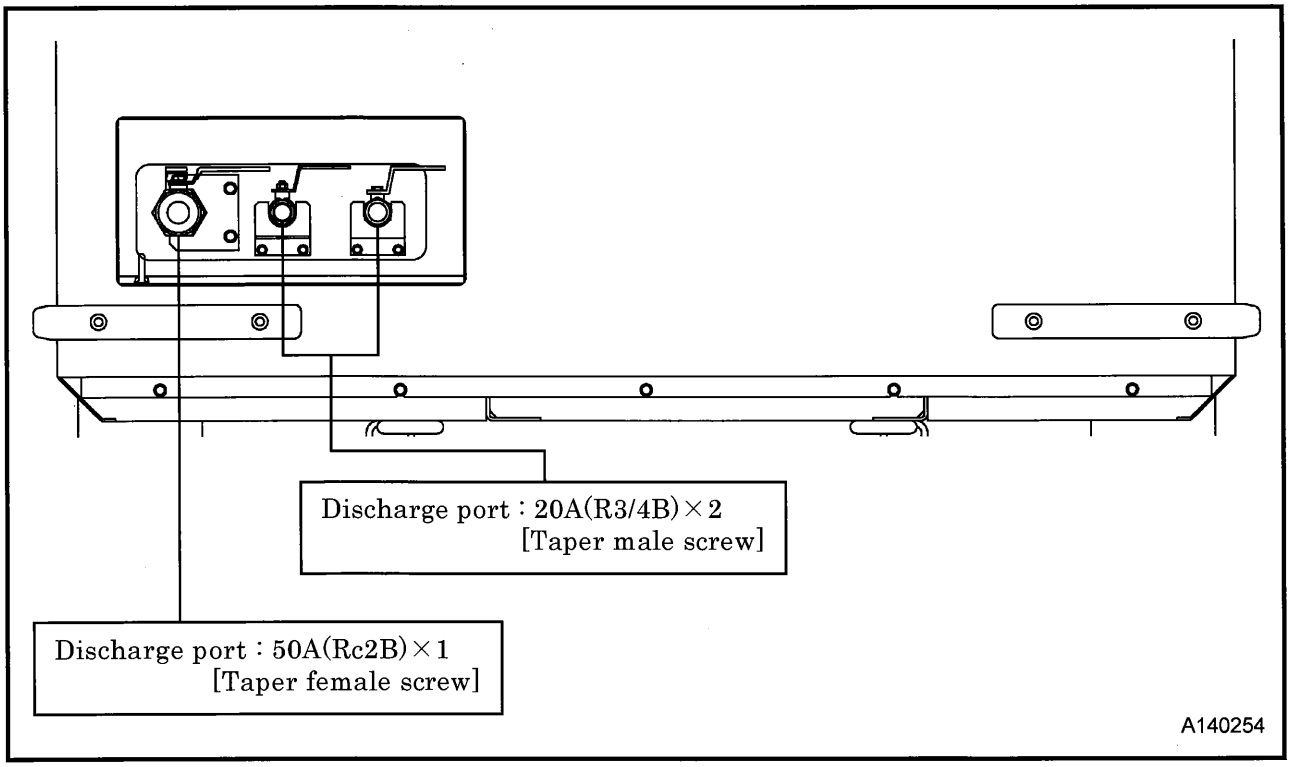
- In order to prevent from entering the jobsite or touching the equipment any other persons than the persons engaged in the job, please prepare for safety fences around the machine:

Preparation of safety fences



A131096

3.4.1 Service valve



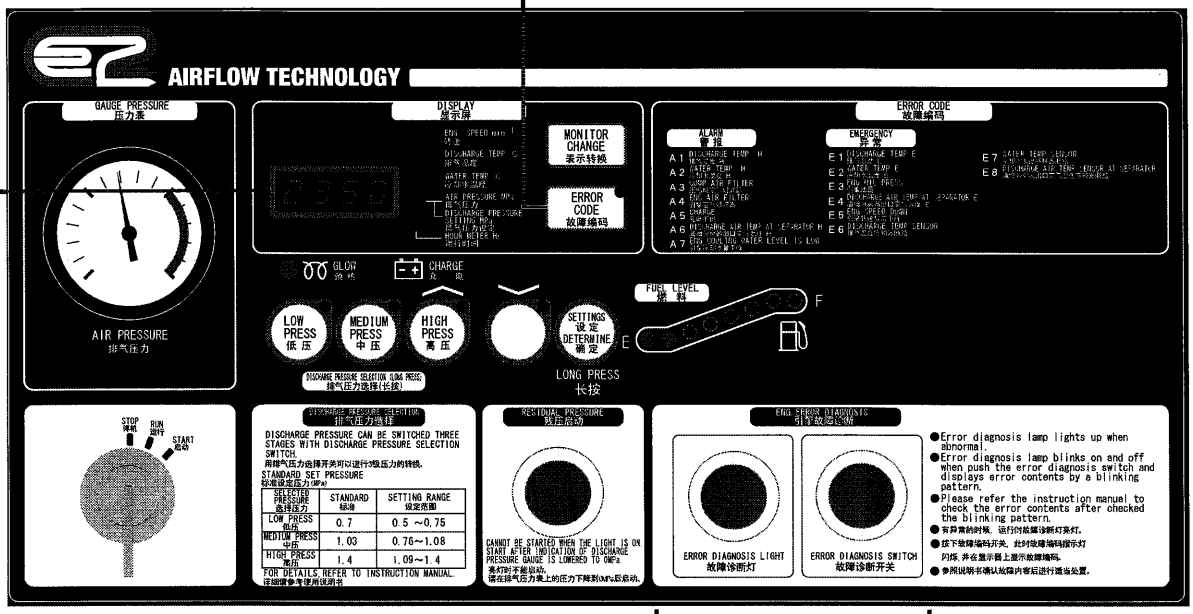
4.Operation

4.1 Instrument Panel

Each display of the operation panel is illustrated as follows.
Read and fully understand the explanations and be sure to operate safely:

Error code switch

When this switch is pushed on while lamp is blinking, it shows error code. When starter switch is placed to "STOP", displayed screen is reset.
※For details of error code, please refer to 5.1.



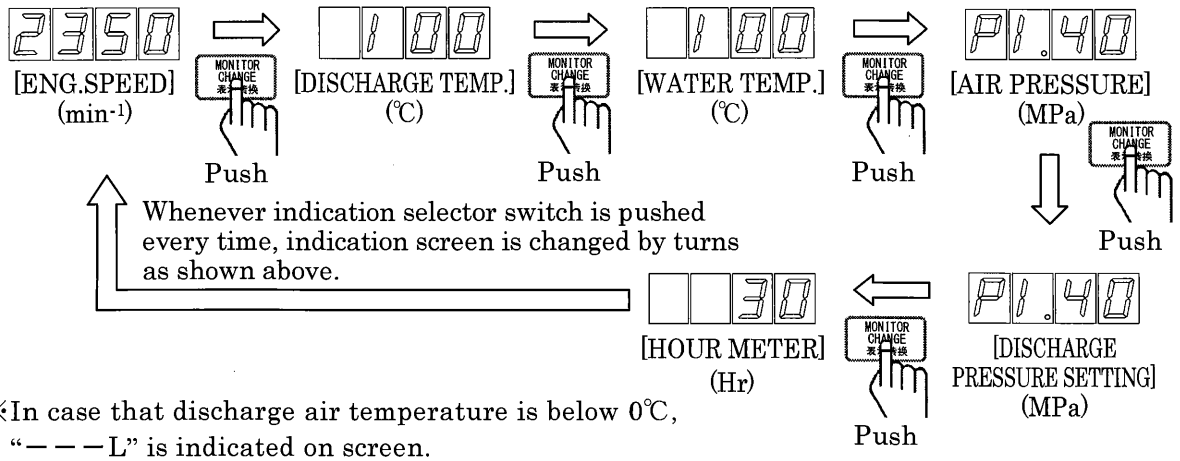
A140083EC-2

Engine error diagnosis

In case of error, the failure diagnosis lamp stays lit during operation. Constantly pushing the failure diagnosis switch causes the lamp blink; its blinking pattern indicates details regarding the trouble.

Digital monitor

As you turn the power on, the discharge pressure setting is displayed (blinking) for 5 seconds, and then engine speed is displayed. As you start the engine, the engine speed is displayed.



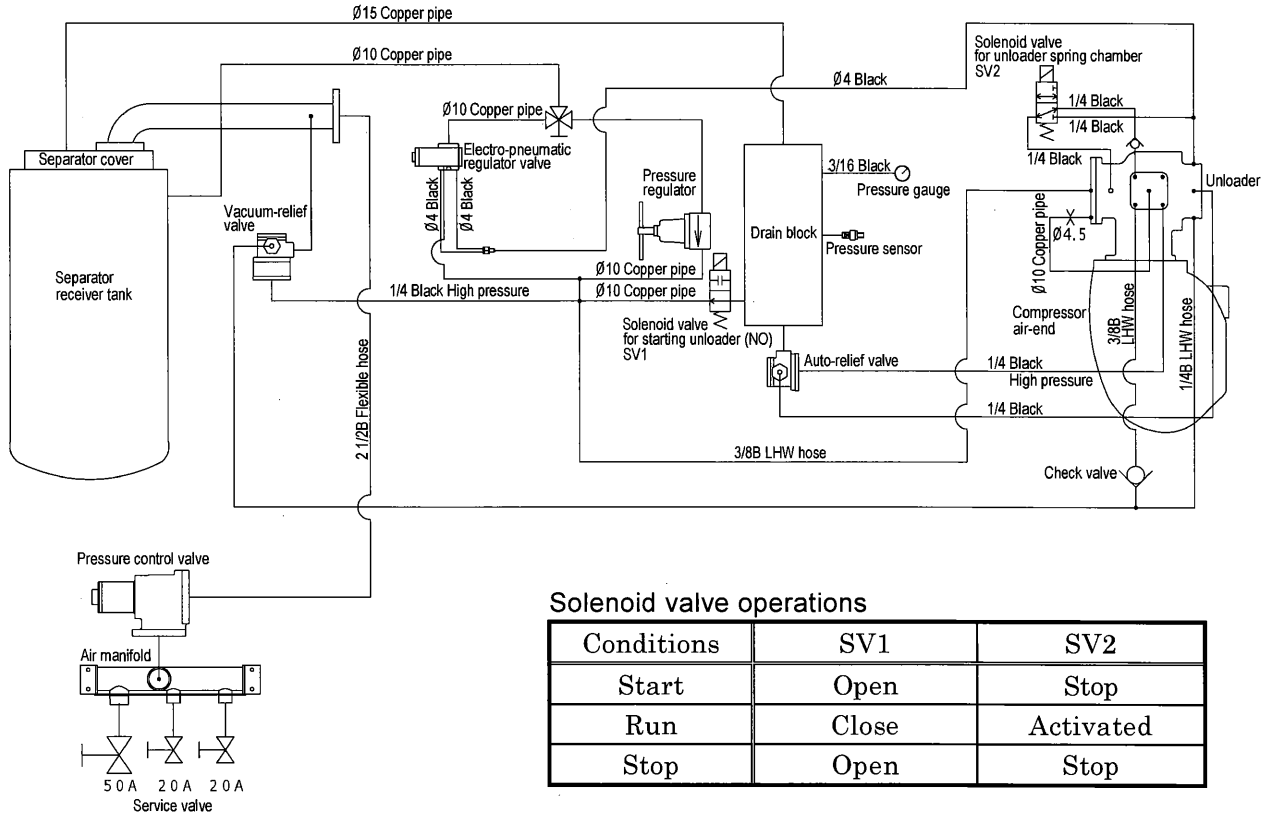
※In case that discharge air temperature is below 0℃, "– – – L" is indicated on screen.

4.Operation

4.2 Capacity control

4.2.1 Capacity control system

1. Standard type



Solenoid valve operations

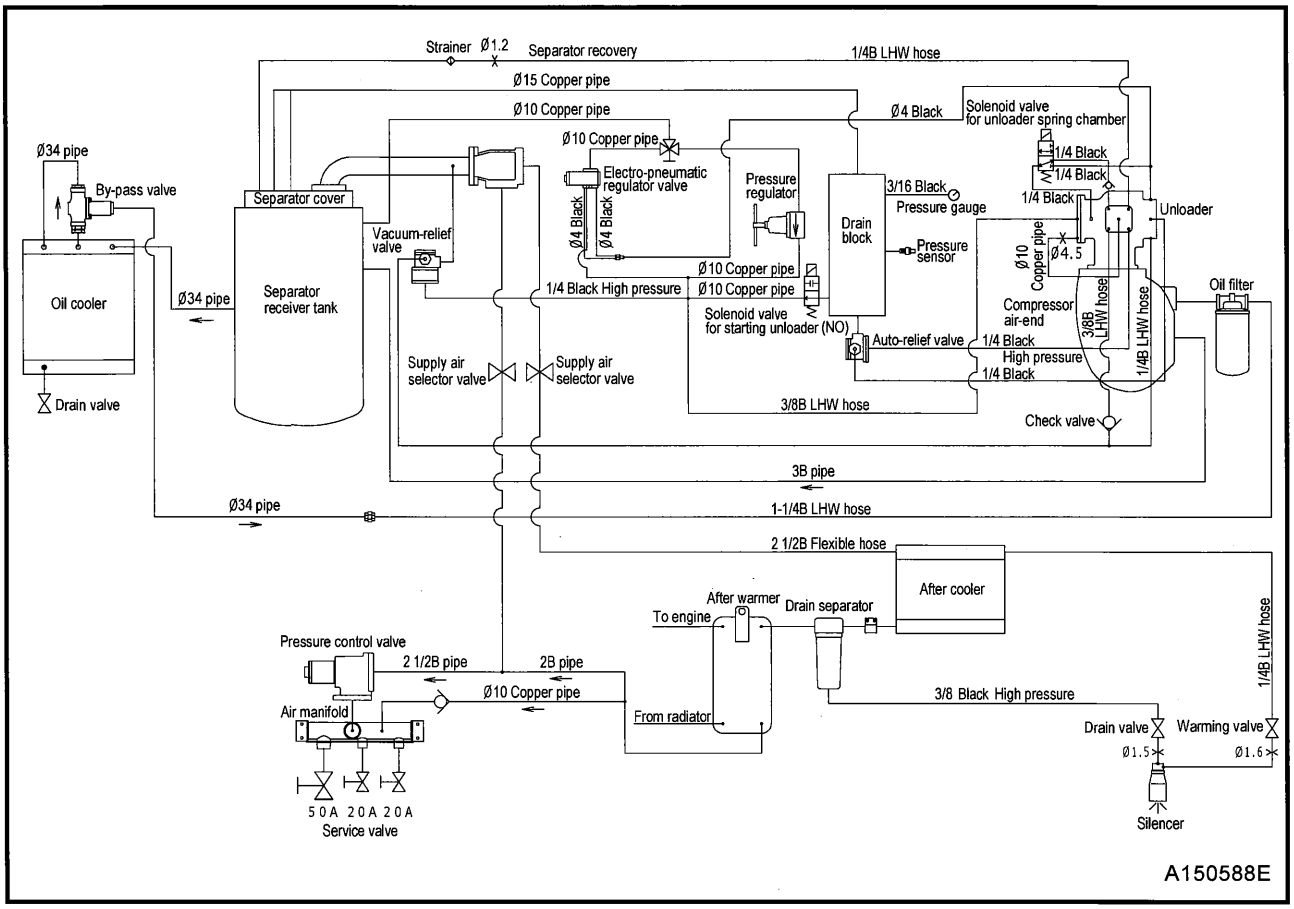
Conditions	SV1	SV2
Start	Open	Stop
Run	Close	Activated
Stop	Open	Stop

- The discharge pressure after the separator is detected via a pressure sensor. If the pressure exceeds the predefined value, the speed will be regulated first to a value not exceeding the unloading speed, before the electro-pneumatic regulator valve is activated. Then, the unloader valve smoothly regulates the supplied compressed air to the ideal volume. This process achieves an optimal volume control that leads to significantly low consumption.

  Electro-pneumatic regulator valve: Adjusts the flow rate to the unloader by regulating the travel of the internal valve according to electrical signals so as to change the area of the opening part.

2. Dry air type

- In accordance with applications of compressed air, the type used is able to supply dry compressed air from the service valve for dry/cool air outside the machine.

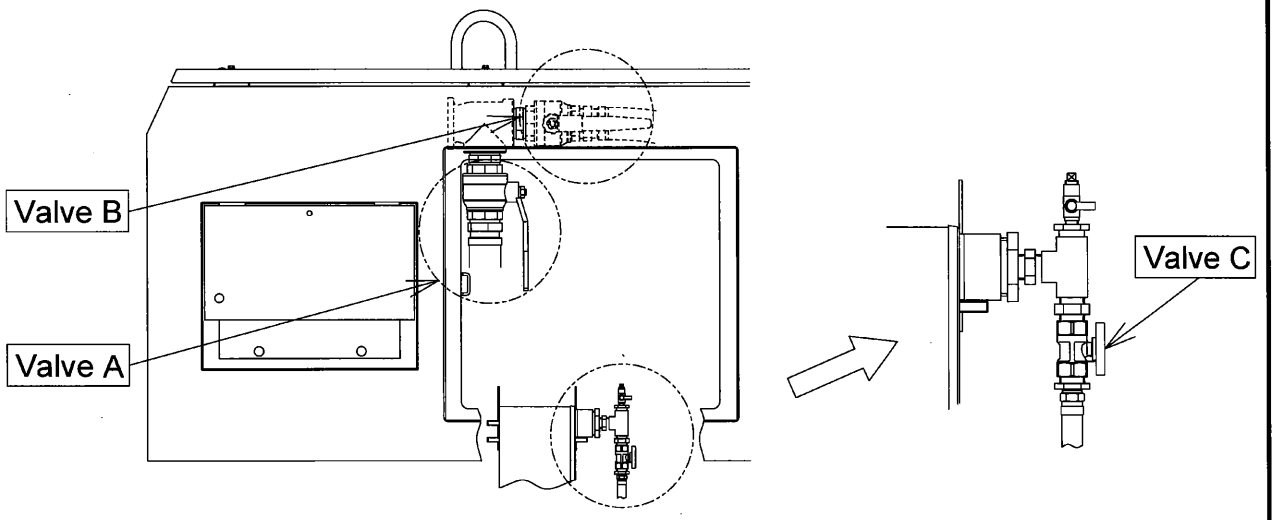


- The system supplies both cold and hot compressed air; the former is created using an after-cooler to dry the compressed air from the compressor; the latter is created using an after-warmer that uses heated engine cooling water to heat the compressed air.

4.Operation

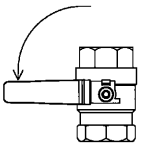
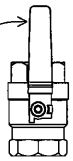
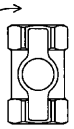
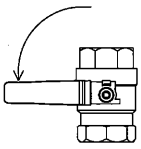
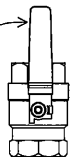
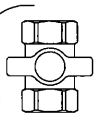
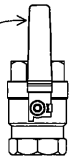
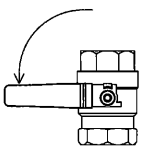
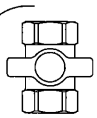
4.2.2 Selection of service air

The system allows you to switch valves A, B and C according to your application so as to obtain three different types of air by switching among hot dry air, cold dry air, and normal air.



※Closing both A and B shuts the air flow completely.

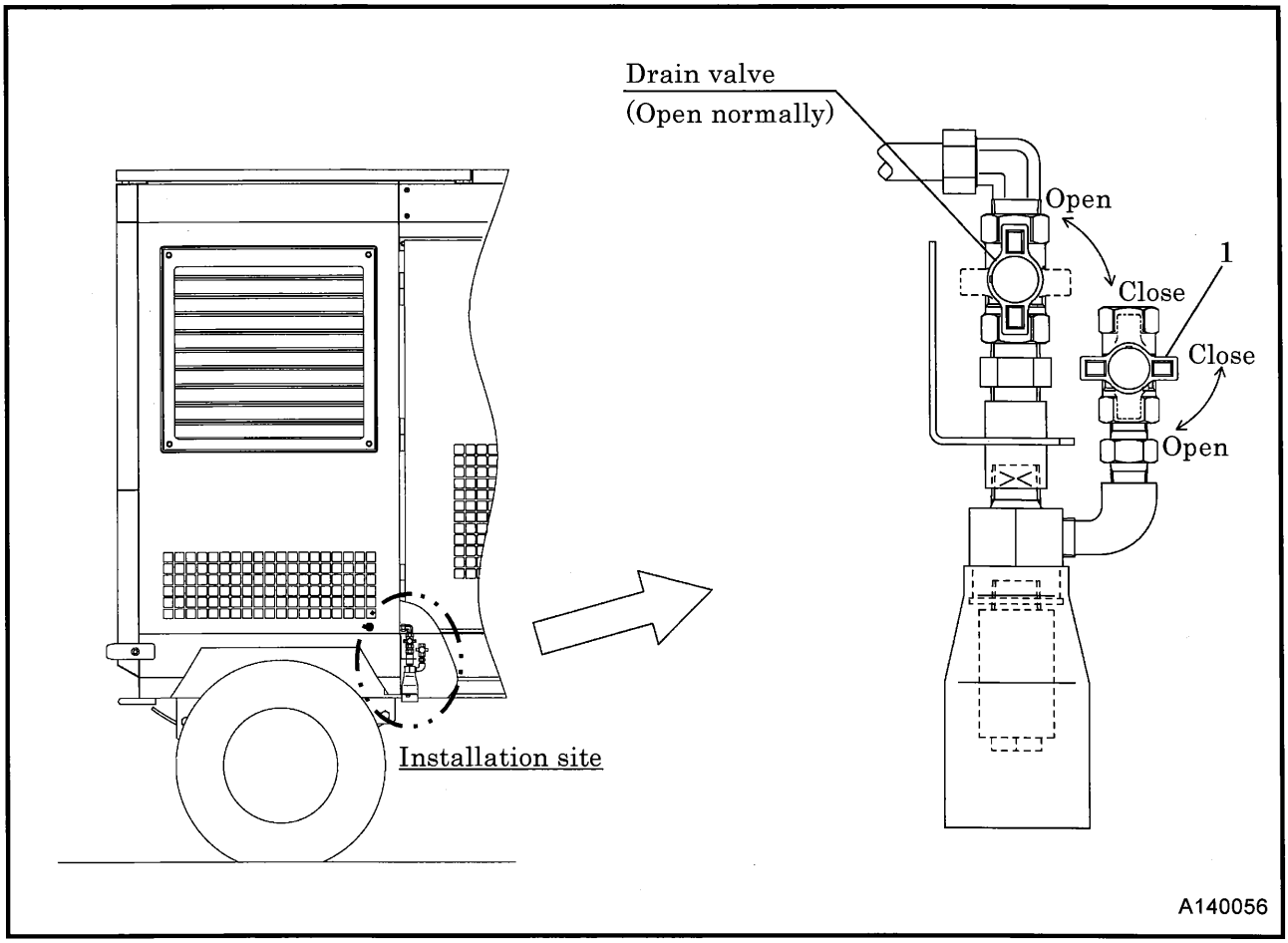
A150604

Operation / Service air	Valve A Switch for drying	Valve B Switch for drying	Valve C Temperature for the dry air switch
①Dry air (Drying/ High temperature)	Close 	Open 	Open 
②Dry air (Drying/ Low temperature)	Close 	Open 	Close 
③Normal air (Without drying)	Open 	Close 	Close 

4.Operation

[Drain warmer valve]

- This valve "1" is provided to prevent condensate water from getting frozen when draining water separated. Run the machine with the valve being "OPEN" when ambient temperature is lower than 5℃.But when freezing is impossible, the machine can be operated more dfficently if the valve is "CLOSE".



[To prevent freezing]

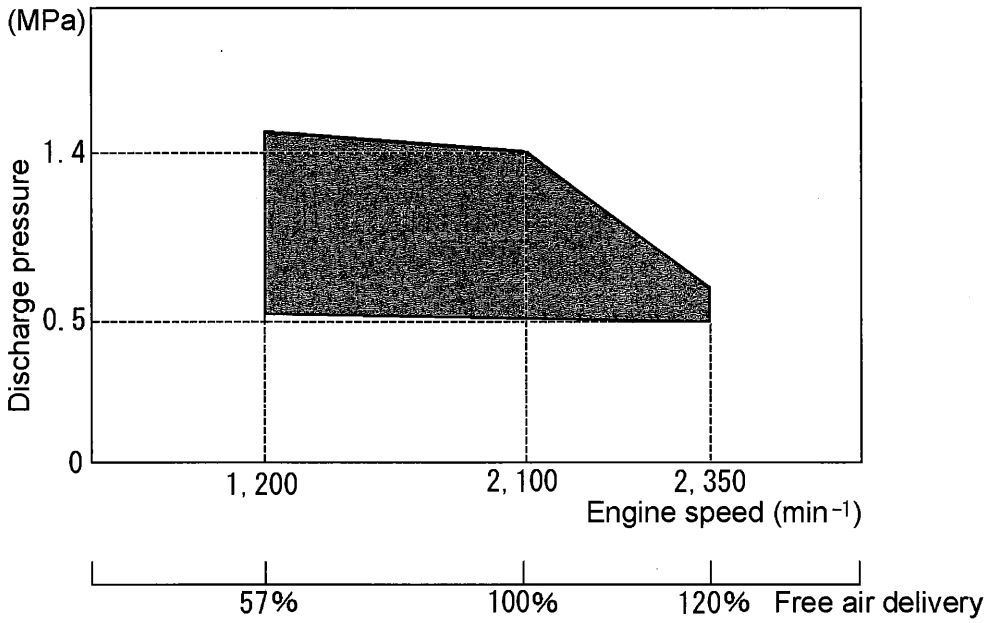
- In case the machine operates in winter season and before the machine storage, be sure to open service valve 2 to 3 times in order to remove accumulated water drop in air piping for after-cooler etc.

4.2.3 Increasing wind operation function

As the discharge pressure decreases, the energy consumption in the compressor decreases. The amount of energy saved can be reused to increase the engine speed of the compressor so as to increase the air volume. The machine increases the engine rotation speed to increase the air volume if the discharge pressure decreases due to decreased pressure setting or increased air consumption volume.

- The discharge pressure can be freely set to a range from 0.5 to 1.4 MPa.
- Engine speed range : Approx.1,200 to 2,350 min^{-1}
- Fluctuation range of discharge pressure: Approx. ±0.01 MPa

[Relationship between the discharge pressure/free air delivery and the engine speed]



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4.Operation

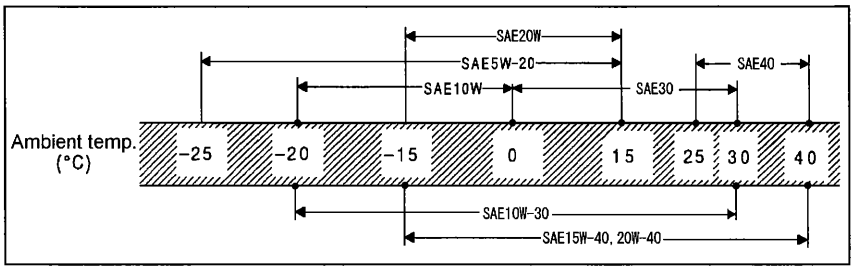
4.3 Lubricating oil · Coolant · Fuel

4.3.1 Engine oil

IMPORTANT

- 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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*** When the machine is delivered from factory, it is filled with the engine oil having the following specifications:**

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

- Be sure to use CF class engine oil or superior class.
  (Using engine oil with poor quality may shorten the life of the engine).
- When two or more different brands of oil are mixed, its performance can be deteriorated.
  Do not mix oils.
- **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 ***Do not mix compressor oil***

- Be sure to use recommended oil listed below.

Maker and Brand of Recommended Oil

Temperature	Brand	Maker
5 to 40℃	SHELL CORENA S3R (VG46)	SHELL
-15 to 40℃	MOBIL RARUS SHC 1025 (VG46)	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 machine 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.

*** The machine is delivered ex. factory, filled with "AIRMAN OIL LONG LIFE HP".**

4.3.3 Coolant

- Use soft water of good quality such as tap water for coolant.
- When the machine 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. (When the machine is delivered from factory, it is filled with the oil of density 35%.) Use LLC within the range of its mixing ratio between 30 and 60%. (If LLC in the water exceeds more than 60%, it may decrease its antifreezing effect.)

IMPORTANT — ***Quality of coolant and antifreeze***

- 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.
- Follow the designated regulations to dispose of LLC (Antifreeze).

4.3.4 Fuel

- 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.

IMPORTANT — ***Choose appropriate fuel***

- Be sure to use diesel fuel oil.
  (Using other oil will cause low power output or damage the engine.)

4.Operation

4.4 Operation Methods

4.4.1 Check before Starting Machine

Be sure to check the machine before operation.
When any abnormality is found, be sure to repair it before restarting the machine.

⚠ CAUTION — ***Check before starting the machine***

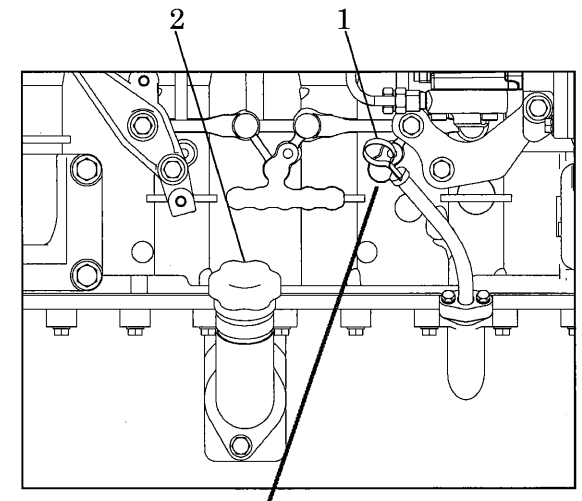
- Be sure to make daily checks before operation. If the machine is operated without prior check and without noticing its abnormality, such operation could cause seizure of components or may even cause fire.

1. Check engine oil level

- This machine should be on level place 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 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 engine 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 6.6.1)
- Excessive engine oil supply could cause engine output degradation and so never fill more than HIGH level.



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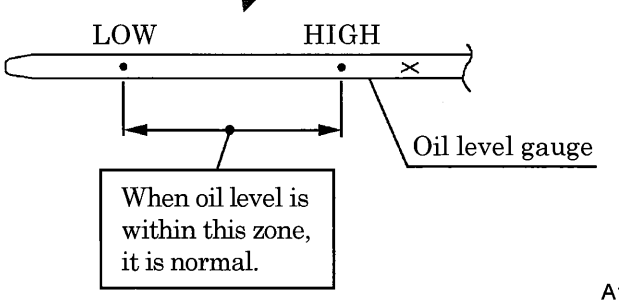

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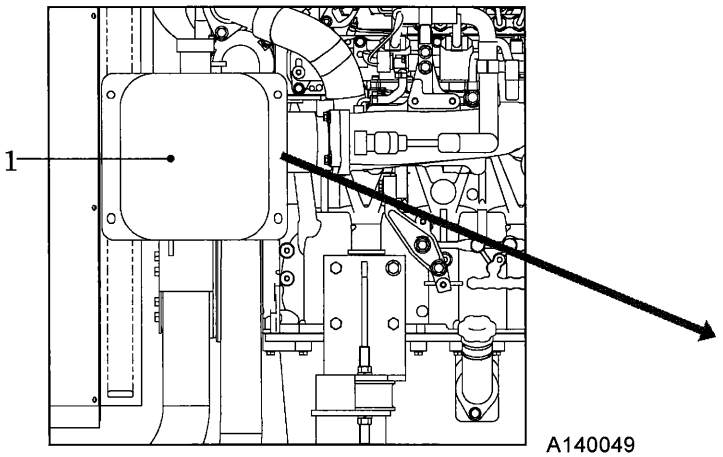
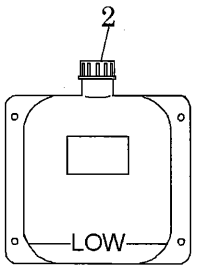
2. Check coolant level

- 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 LOW mark.)
- When coolant level of the reserve tank is found lower than LOW level, remove the radiator cap and add coolant. (See 6.6.18)

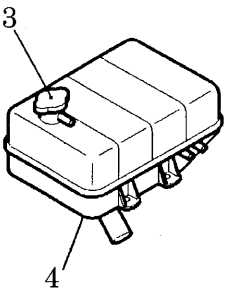




⚠ CAUTION

- Be sure to stop the machine and allow time to cool. Then loosen the radiator cap one notch. After the coolant water is sufficiently cooled and the inner pressure is released, take the cap off.
  If this procedure is neglected, the inner pressure can blow off the cap. Steam jetting out of the radiator could result in causing scalding. Follow this procedure under all circumstances.
- The radiator cap "3" of the machine is attached to the header tank "4" on the upper part of the radiator. Remove the header tank cap if you wish to supply water to the radiator.

Taking off the radiator cap



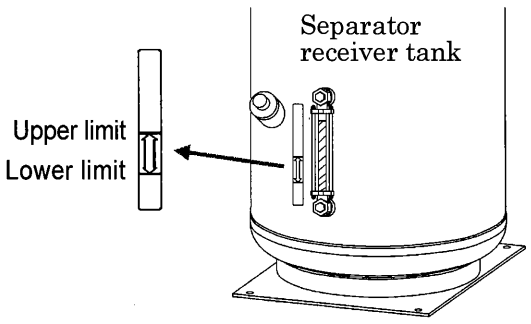
IMPORTANT

- Do not continue operation at low coolant level.
  Air bubble is mixed into radiator, and it causes damage to the radiator.

3. Check compressor oil level

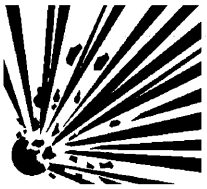
- Place the machine on level ground when checking the oil level.
- After checking and confirming that the residual pressure in separator receiver tank is 0MPa, replenish the tank with compressor oil so that the oil level is kept higher than the upper limit of oil level gauge plate. (See 6.6.6)

※ Supply of excessive oil can cause deterioration of oil separation performance and the like.



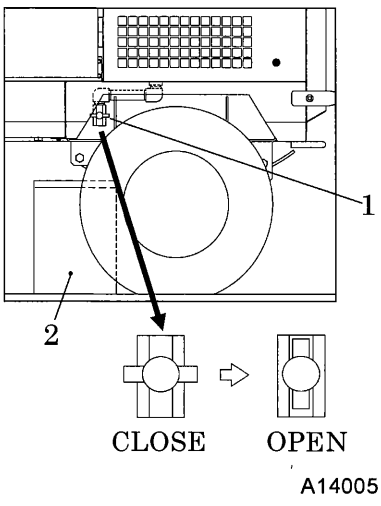
⚠ WARNING — ***Refilling of compressor oil***

- 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.



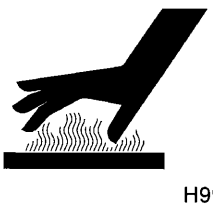
4. Drain separator receiver tank

- Gradually opening the drain valve "1" fitted under the separator receiver tank 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 firmly.
- Drain the condensate in container "2" and then dispose of condensate according to the designated regulations.
- Touch the fluid and check its viscosity to determine whether it is condensate or compressor oil, and when it is difficult to distinguish between the two.



⚠ 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.



5. Check fuel

- Check fuel level gauge before operation. Replenish enough fuel to prevent fuel shortage during operation, if the level is low.
- If necessary, drain condensate accumulated at the bottom of the fuel tank.

⚠ CAUTION — ***Fire prevention***

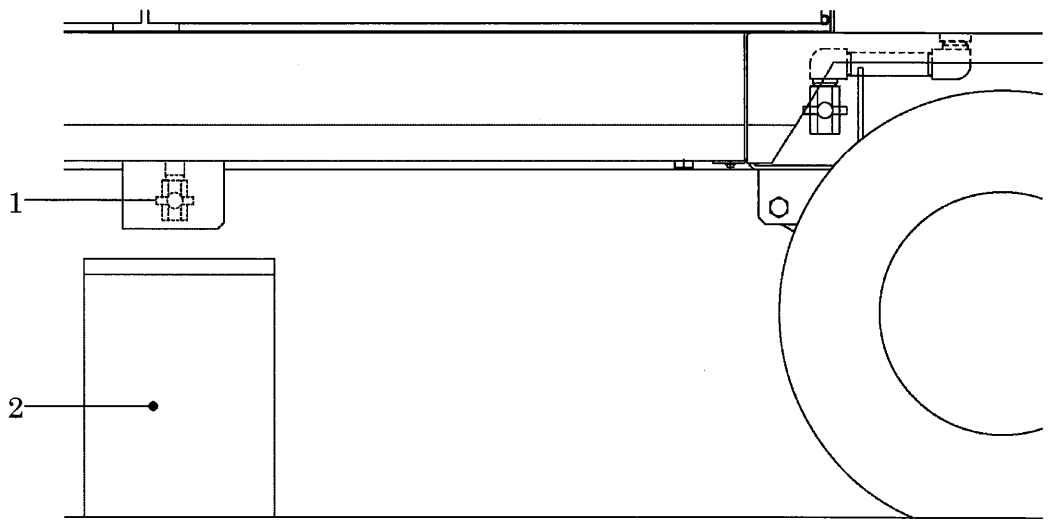
D004

- 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.
- Never use alcohol-base cleaning fluid. If it sticks to such parts made of plastic, it causes degradation of liquid surface visibility, and in worst case, it leads to crack and fuel leak due to crack caused.
- Refilling fuel tank should be done in an outdoor well-ventilated place.
- **Do not fill fuel up to the filler level. When fuel tank is filled up to the filler level, fuel 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.**

6. Drain fuel tank

<Procedure>

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



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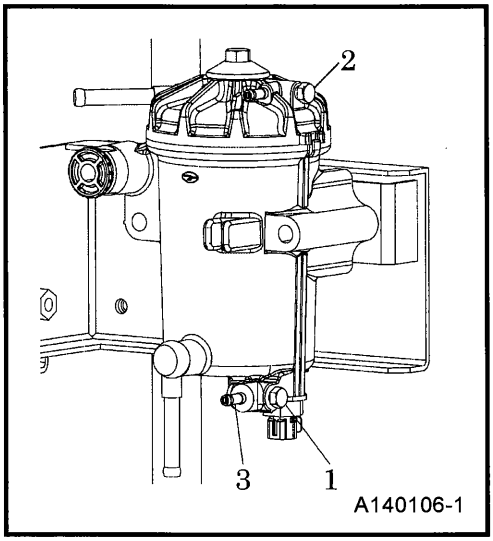
7. Drain check in fuel filter

<Procedure>

① Drain condensed water accumulated inside, after loosening drain plug "1" and air bleeding plug "2".
② Discharge the drain via drain pipe "3".
③ After draining the condensate, be sure to fasten the drain plug and air bleeding plug.

- Drain the condensate in container, and then dispose of condensate according to the designated regulations.



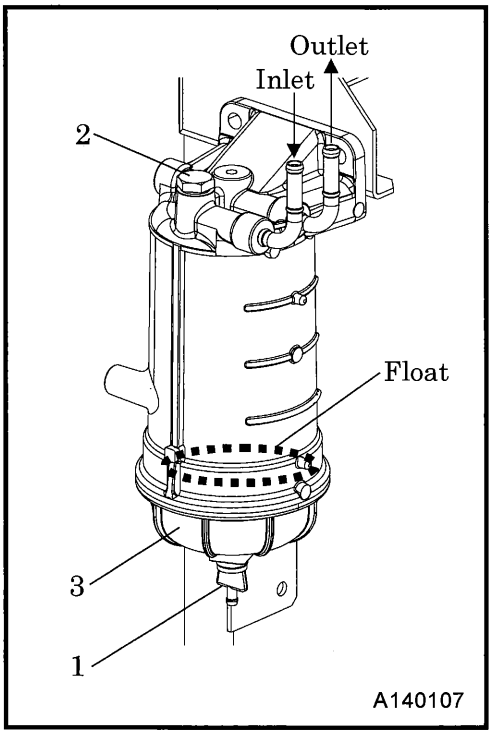
8. Drain check in fuel pre- filter

Check if the red float in the pre-filter rises up to the water drain level, then drain water if it is near the drain level.

<Procedure>

① Drain condensed water accumulated inside, after loosening drain valve "1" and air bleeding plug "2".
② After draining the condensate, be sure to fasten the drain valve and air bleeding plug.

- Never remove case "3" of fuel pre-filter because if removed fuel comes out. In case that it is necessary to remove it, do it after having clogged the inlet hose using a clip or like.
- Drain the condensate in container, and then dispose of condensate according to the designated regulations.



⚠ CAUTION

- At time of inspection, never use alcohol-base cleaner. If it sticks to such parts made of plastic, it causes degradation of liquid surface visibility, and in worst case, it leads to crack and fuel leak due to crack caused.

9. Check wiring of each part

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

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.

11. Check inside the machine

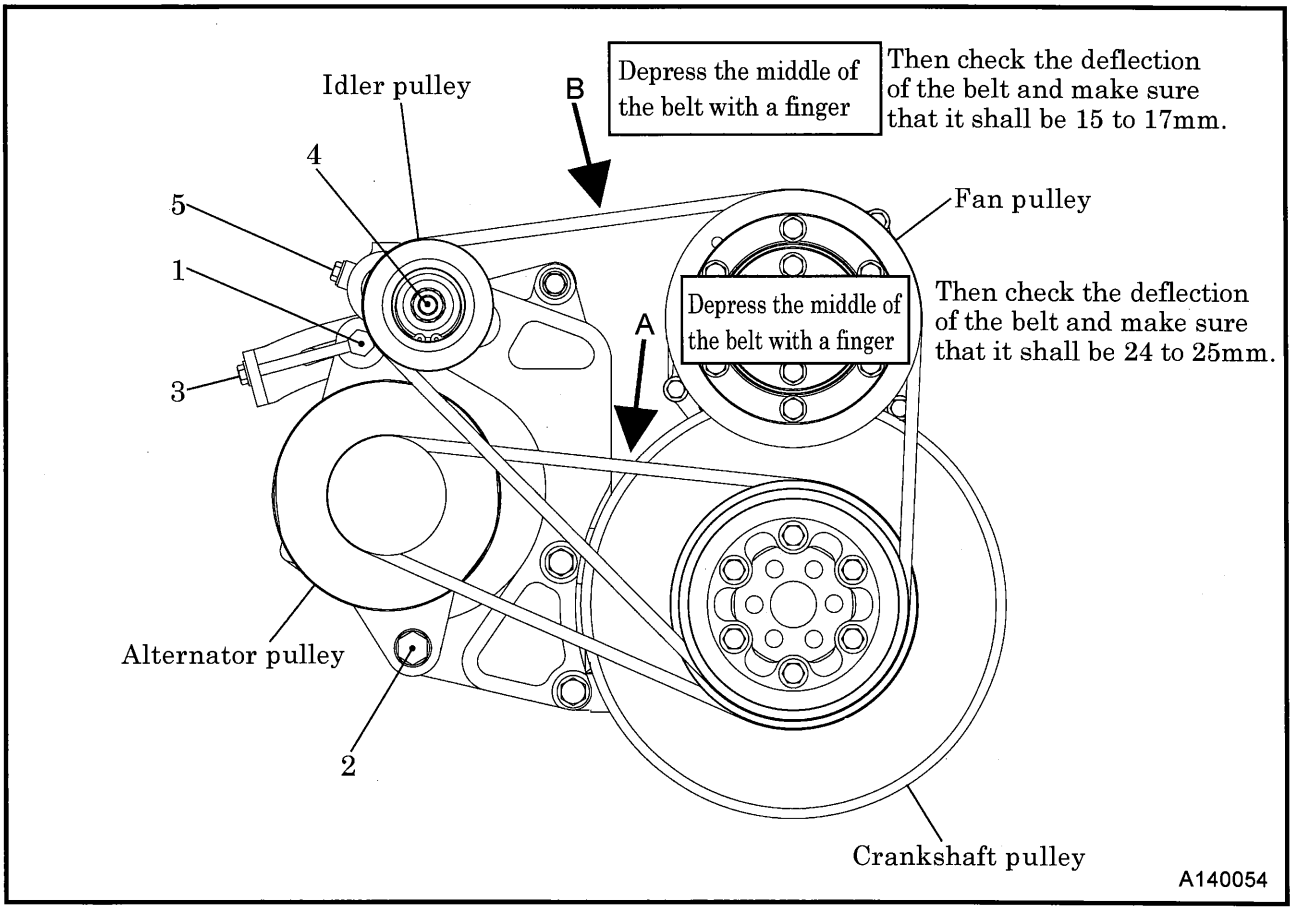
Check to be sure that there is no unwanted material, such as debris and combustibles, inside the machine.
Because the exhaust muffler and pipe are liable to reach high temperatures, remove any combustibles, such as wood pieces, dry leaves and waste paper, if they are found near the machine.

12. Check belt tension

- Visually check if there are any cracks or tears in the belt.
- 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.
- Measure the deflection of the belts at A and B, respectively.

[Adjustment of the alternator belt]
<Procedure>
① Loosen the bolt "1" and bolt/nut "2".
② Turn the adjuster bolt "3". Push the center of the belt with a force of about 100 N, or use a belt tension gauge to adjust the belt tension so that the deflection at A meets the criteria.
③ After adjustment, tighten the bolt "1" and firmly tighten the bolt/nut "2".

[Adjustment of the fan belt]
<Procedure>
① Loosen the lock nut "4" of the idler pulley.
② Turn the adjuster bolt "5". Push the center of the belt with a force of about 100 N, or use a belt tension gauge to adjust the belt tension so that the deflection at B meets the criteria.
② After adjustment, tighten the lock nut firmly.



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.

4.4.2 Starting procedures

<Procedure>

① Ascertain that the discharge air pressure gauge "1" indicates 0MPa.

② Close fully service valve.

③ Turn the starter switch "2" to "RUN" position and the glow lamp "3" goes on.

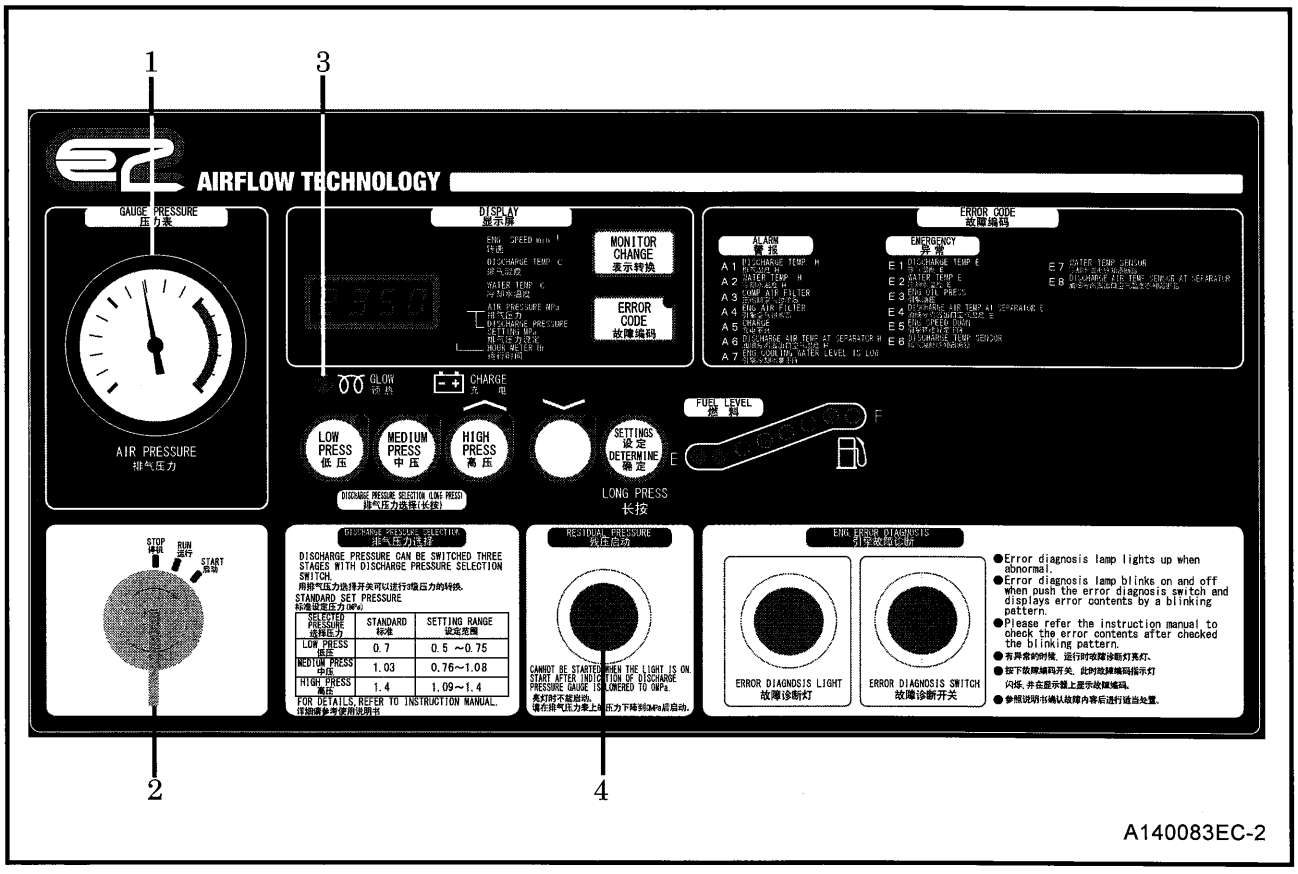
④ As soon as the glow lamp has gone out, turn the starter switch fully clockwise to start up the engine. Do not keep the starter turning for more than 15 seconds; otherwise, overheating or damage to the starter can result.
After starting engine, starting unload operation automatically begins.

- In case that there is a residual pressure left in the receiver tank, the residual pressure starter lamp "4" goes on and the starter will not turn even if the starter switch is placed to "START" position. Make sure that the residual pressure stays at "0MPa".
- Discharge air pressure rises up to the unloading pressure in about 15 seconds after it starts.
- Engine RPM is approximately 1,300 min^{-1}, when starting unloader operation is performed.
- Required time changes as mentioned in the following table according to engine cooling water temperature, when starting unloader operation is performed.

Coolant temperature	Required time for starting unloader operation
Higher than 10℃	30 sec
Less than 10℃	Shorter time either 120 sec or the time when engine coolant temperature becomes higher than 10℃.

⑤ Once the engine has started up, leave it running to warm-up for 5 minutes.
The discharge air pressure gauge "1" in this condition ranges from 0.3 to 1.6MPa.

⑥ After finishing warming up operation, open the service valve provided at the outlet of compressed air and start service job.



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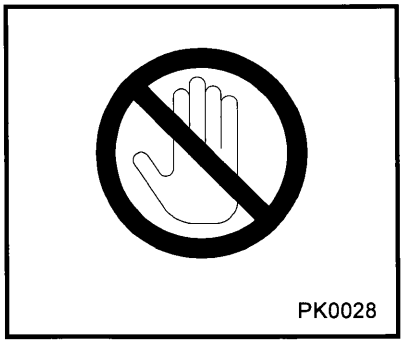
4.Operation

⚠ WARNING

- Keep the door closed and locked while running the machine.
- When the door has to be opened, be careful not to touch portions that are rotating or very hot.
  Careless touch may cause serious injury.
- Pull the handle forward to open the door.
- Be sure to close the door tightly so that its latch is firmly caught.



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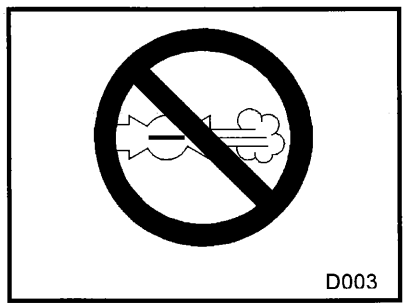
⚠ CAUTION

- 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.



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IMPORTANT ***Be sure to warm-up***

- Be sure to let machine warm-up after starting for smooth operation of the engine and the compressor air-end.
  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 diagnosis lamps are off.

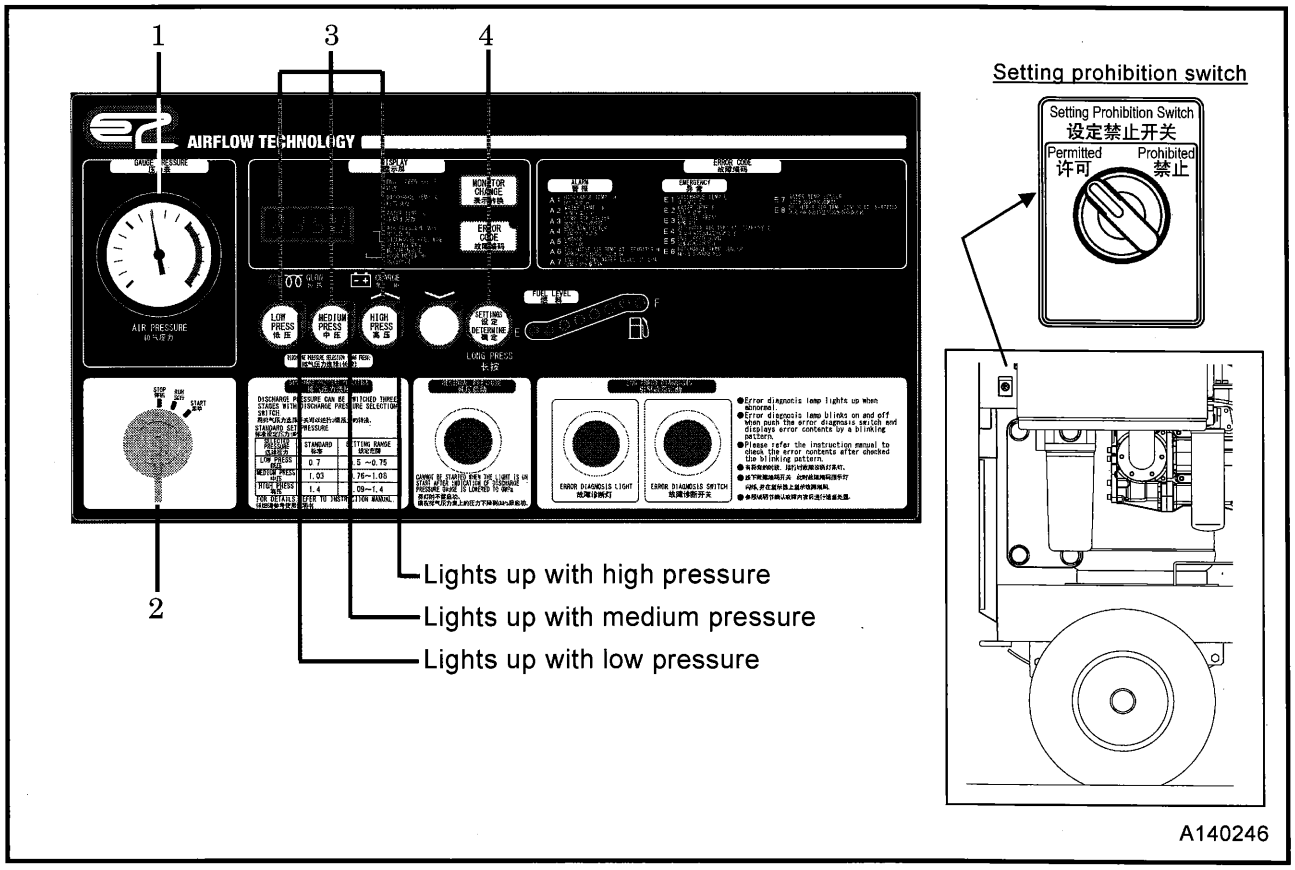
4.4.3 Switching the Usage Pressure

<Procedure>

① Ascertain that the discharge air pressure gauge "1" indicates 0MPa.
② Turn the starter switch "2" to "RUN" position.
③ Remove the cover of the setting prohibition switch in the machine (at the side of the electric parts box), and then turn the switch to the "Permitted" side.
④ Hold the pressure switch "3" for the pressure that you want to change. Then, check that the pressure switch lamp is lighting up.

Pressure switch	Setting range
Low pressure	0.5to 0.75MPa
Medium pressure	0.76 to 1.08MPa
High pressure	1.09 to 1.4 MPa

⑤ Hold the "SETTINGS/DETERMINE" switch "4". The lamp of the pressure switch that you selected will start blinking.
⑥ The digital monitor shows the discharge pressure setting. Use the UP "⌃" and DOWN "⌄" buttons to set the pressure as desired. (Min. unit: 0.01 MPa)
⑦ After that, push the "SETTINGS/DETERMINE" switch "4".
The lamp of the pressure switch that you selected starts lighting up, activating the pressure
⑧ Turn the setting prohibition switch to the "Prohibited" position.



IMPORTANT — ***On Pressure Switching***

- This machine allows you to select the supply pressure by holding the discharge pressure selector switch.
- When changing the pressure, check the pressure specifications of the device on the load side to which pressure is applied, and confirm that the device can tolerate the supply pressure.

4.4.4 Operating procedures when engine fails to start up on first attempt

- When the engine fails to start up even after performing the startup procedures ①to④, 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
  - Insufficient air-bleeding of the fuel system (See 4.4.9)
  - Clogging of fuel filter
  - Discharge of battery (Low cranking speed)

4.4.5 How to start the machine at low temperature

<Procedure>

① Fully close the service valve.

② Follow the regular starting procedure to start the engine.

⚠ CAUTION

- When using the machine in areas of cold temperature, use an engine oil, compressor oil, LLC, and fuel that are suitable for such temperature.

IMPORTANT ***Operation under cold weather conditions below -5°C***

- Use SAE10W-30 (CF class) for the engine oil.
- Use LLC (antifreeze).
  - In accordance with 4.3.3, use LLC antifreeze mixed according to the mixing ratio for ambient temperature.
- Battery should always be kept fully charged.

4.4.6 Indication of Instrument Gauge during Operation

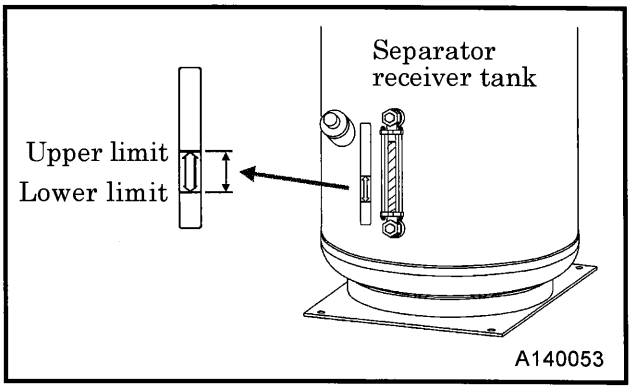
- Be sure to check at times to see if gauges or each component of the machine are properly working, or if there is any air-leak, oil-leak, water-leak or fuel-leak etc.
- During normal operation, each indication of instruments is shown in the table below. Refer to the table for daily checks.
- The above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

		Discharge pressure gauge (MPa)			Display ※2 (Digital monitor)	Indicator lamp			
		Low press. selected	Medium press. selected	High press. selected		Glow	Charging	Fuel	Engine failure diagnosis
Starting (On turning the starter switch to "RUN")		-			For the rotation speed 0	● OFF ※1	☼ ON	☼ ON Changes depending on the remaining quantity	☼ ON
Starting unload operation		0.1	0.1	0.1	For the rotation speed Approx. 1,300min^{-1}	● OFF	● OFF		Lights up in case of failure (See 5-1 for details.)
In operation	No load (Unload)	0.5～0.9	0.76～1.2	1.09～1.6	For the rotation speed Approx. 1,200min^{-1}	● OFF	● OFF		
	Full load	0.4～0.75	0.4～1.08	0.4～1.4	For the rotation speed Low pressure: Approx. 2,350min^{-1} Medium pressure: Approx. 2,280min^{-1} High pressure: Approx. 2,100min^{-1}	● OFF	● OFF		

※1 : This lamp will be OFF in 0 to 20 seconds, (varying upon ambient temperature.)

※2 : Depends on the display switching. See page 4-1 for details.

- During loaded operation, make sure to check and confirm that the oil level stays between upper limit and lower limit. If not, replenish compressor oil.

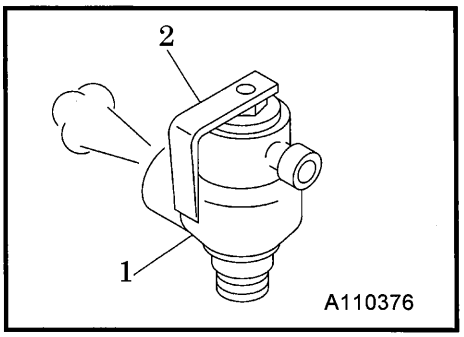


IMPORTANT

- Keeping the discharge pressure under 0.4 MPa during operation results in a temperature rise, because it affects the separation of lubricating oil inside the oil separator and reduces the oil flow to the compressor air-end.

4.4.7 Performance check of safety valve

- Be sure to check the safety valve "1" performance once a day.
- Close the service valve completely and pull the test lever "2" of the safety valve to check the performance. It is performing normally when the compressed air jets out with slight force at a discharge pressure between 1.4 to 1.6MPa.
- Pressure setting for safety valve is 1.70MPa.



⚠ WARNING

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

4.4.8 Stopping

<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 air valves.

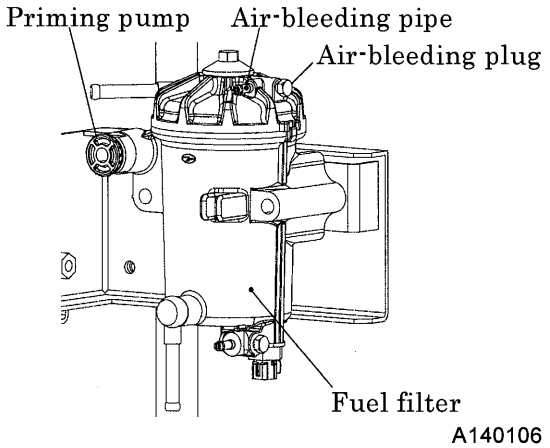
4.4.9 Bleeding air in fuel system

Should the machine stop due to fuel shortage, perform air bleeding according to the following steps.

<Procedure>

① Turn the "priming pump" counterclockwise and pull it out to your side.
② Loosen the "air-bleeding plug" of the fuel filter. Then push and pull the priming pump to deliver fuel.
③ If fuel flowing through the hose connected to the "air-bleeding pipe" includes an air bubble, tighten the air-bleeding plug.
④ Push and pull the priming pump tightly to check for the smooth screwing of the piston, and then tighten it fully to the right end.
⑤ After air bleeding, start the engine to check for fuel leakage.

- For details on air bleeding, see the manuals of the engine in question.



⚠ CAUTION

- Even after air bleeding with the priming pump, residual air in the fuel system may make the engine difficult to start. If the engine does not start upon first attempt, turn the starter key to the "RUN" position and wait about 30 seconds before attempting the next engine start. Do not keep the starter turning for more than 15 seconds; otherwise, the starter can experience failure or the battery may become discharged.

5.Failure cause and measures

5.1 Indicator lamp and Warning / Emergency display

[Indicator lamp] Turn the starter switch to "RUN" position. Then the lamp goes on.

Item	Contents	Measures	Monitor
GLOW	Press starter switch "GLOW" and the lamp goes on and after preheating is finished, the lamp will be off.	—	
CHARGE	Lamp goes on when alternator is not charging.	Check wiring. Check alternator.	

[Warning display] This displays such trouble of less importance when it occurs during operation, but the unit continues operating.
When any abnormality happens, a trouble code lamp flickers. In this time when trouble code switch is pressed, a failure code will be displayed.

Item	Failure code	Contents	Measures
DISCHARGE TEMP. H	A-1	Lamp displays when the discharge air temperature at the compressor outlet reaches 125℃ [High Pressure] or 115℃ [Medium pressure /Low Pressure]	See "Troubleshooting"
WATER TEMP. H	A-2	Lamp displays when coolant temperature reaches 97℃.	
COMP.AIR FILTER	A-3	Lamp displays when air filter gets clogged and suction resistance increases. [Actuating resistance is more than 6.2kPa.]	Clean or replace
ENG. AIR FILTER	A-4		
CHARGE	A-5	Belt loosened and/or cut Faulty generation of alternator	See "Troubleshooting"
DISCHARGE AIR TEMP. AT SEPARATOR H	A-6	Lamp displays when the discharge air temperature at the separator outlet reaches 125℃ [High Pressure] or 115℃ [Medium pressure /Low Pressure]	
ENG.COOLING WATER LEVEL IS LOW	A-7	When the engine cooling water becomes low.	

5.Failure cause and measures

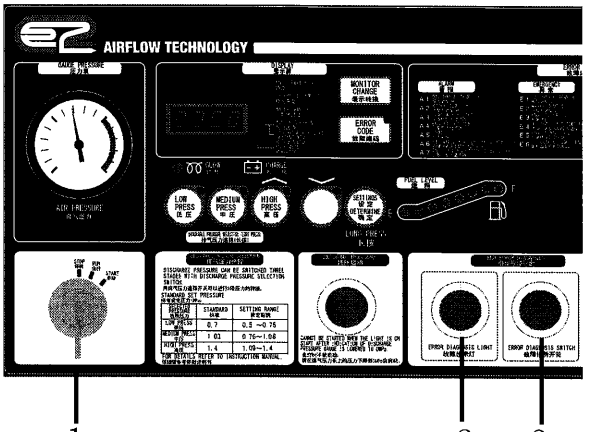
[Emergency Display] When any trouble takes place during operation, this displays and it stops as an emergency stop.
When any abnormality happens, a trouble code lamp flickers. In this time when trouble code switch is pressed, a failure code will be displayed.

Item	Failure code	Contents	Measures
DISCHARGE TEMP. E	E-1	Lamp displays when the discharge air temperature at the compressor outlet reaches 130℃ [High Pressure] or 120℃ [Medium pressure /Low Pressure]	See "Troubleshooting"
WATER TEMP. E	E-2	Lamp displays when coolant temperature reaches 102℃.	
ENGINE OIL PRESS	E-3	Lamp displays when engine oil pressure drops. [The function pressure is below 49kPa.]	
DISCHARGE AIR TEMP. AT SEPARATOR E	E-4	Lamp displays when the discharge air temperature at the separator outlet reaches 130℃ [High Pressure] or 120℃ [Medium pressure /Low Pressure]	
ENG. SPEED DOWN	E-5	Lamp displays when engine revolution speed drops. [Actuating speed is more than 900min^{-1}.]	
DISCHARGE TEMP. SENSOR	E-6	Lamp displays when air temperature sensor at the outlet port of compressor air end is disconnected.	
WATER TEMP. SENSOR	E-7	Lamp displays when engine coolant temperature sensor is disconnected.	
DISCHARGE AIR TEMP. SENSOR AT SEPARATOR	E-8	Lamp displays when separator outlet air temperature sensor is disconnected.	

5.1.1 Engine trouble

- This is equipped with controller which memorizes engine troubles. In case that any abnormality occurs to engine, diagnosis lamp "2" continues to lighting. When the diagnosis switch "3" is continuously pressed, it displays trouble contents by flickering patterns.

<Procedure>
① Turn the starter switch "1" to "RUN" position.
② In case that any abnormality or trouble occurs, the diagnosis lamp "2" continues to light.
③ When diagnosis switch "3" is continuously pressed, it displays the contents of the trouble by flickering patterns.
(When no trouble is found, diagnosis lamp "2" lights on 0.3 seconds and lights out 0.3 seconds continuously. This cycle is repeated.)



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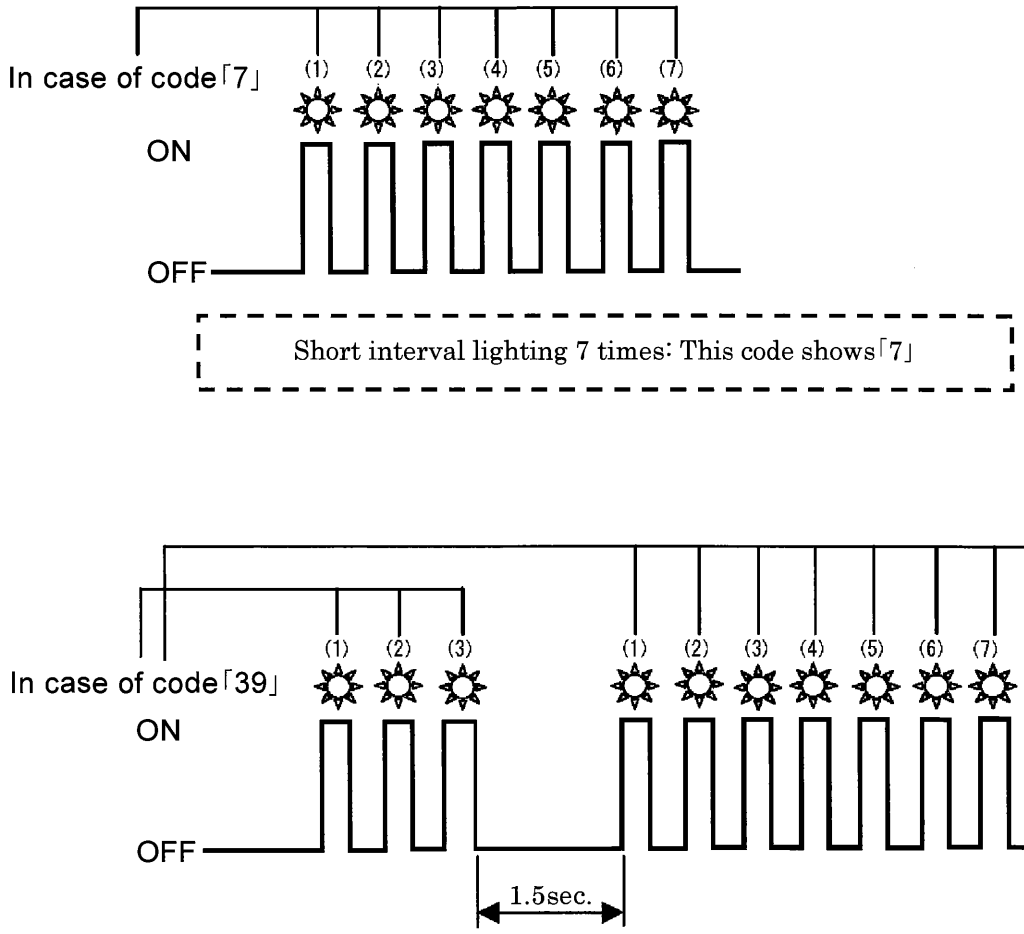
5.Failure cause and measures

[Examples of reading and confirming diagnostic codes]



5.Failure cause and measures

[List of diagnostic codes]

Some examples of diagnostic codes are mentioned in the following table.
Concerning the codes of trouble conditions, they are grouped into decades of the trouble kinds.
For the details and countermeasures, contact our office nearby or distributor because technical knowledge is required.

Code	Items to be detected	Code	Items to be detected
2	QR code error	46	Failure in closure of the engine STOP switch
3	Error in the flash ROM, CPU failure	57	Injector Common 1 failure
5	Fault in the main relay	58	Injector Common 2 failure
7	Engine overrun	59	Failure in the ECU charge circuit
11	Water temperature sensor failure	67	Common rail pressure sensor failure
12	Sub-rotation sensor failure	74	Shortage in SCV (+) VB
13	Main rotation sensor failure	75	SCV other failure, sticky supply pump solenoid valve
14	Fuel temperature sensor failure	79	History of abnormal supply pump pressure
15	Air pressure sensor failure	51～56	Injector disconnected
22	Accelerator sensor failure	61～66	Compensation error between cylinders
25	Preheater failure	68,69	Common rail abnormal high pressure
37	Intake pressure sensor failure	81,82	EGR Linear Solenoid failure
39	Turbo over-boost	86,87	EGR Lift Sensor failure
45	Starter switch failure	88,89	EGR valve stuck

5.Failure cause and measures

5.2 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 machine, 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) Faulty battery.	Check battery → Charge Change
Starter rotates but engine does not start.	(1) Fuel filter clogging. (2) Fuel pre-filter clogging (3) No diesel fuel oil (4) Air mixing in fuel piping	Disassemble, clean, and change Disassemble, clean, and change Replenish fuel Bleed air
Discharge air pressure will not rise.	(1) The pressure setting on the operation panel is not suitable as a usage pressure. (2) Faulty unloader. (3) Trouble of solenoid valve for starting unloader.	Resetting Disassemble/check Change
Engine does not reach its maximum speed.	(1) Faulty engine control. (2) Unloader orifice clogging. (3) Engine trouble. (4) Fuel filter clogging.	Call your nearest dealer Disassemble/clean Call your nearest dealer Disassemble/check
While the discharge pressure will not rise up to the specified one, RPM will drop.	(1) Pressure insufficient adjustment. (2) Trouble of the electro-pneumatic regulator valve. (3) Unloader orifice clogging.	Re-adjust Change Disassemble/repair
Engine does not reach minimum revolution at unload.	(1) Faulty engine control.	Call your nearest dealer
Safety valve relieves at unload.	(1) Faulty electro-pneumatic regulator valve. (2) Unloader valve damaged·Faulty seat. (3) Faulty safety valve. (4) Faulty engine speed sensor (5) Clogged orifice at the inlet of the electro-pneumatic regulator valve.	Change Disassemble/repair Change Change Disassemble/clean
Oil mixes in Air. (Poor oil separation)	(1) Scavenging orifice strainer clogging. (2) Excessive oil in separator receiver tank. (3) Low discharge pressure. (4) Oil separator element deteriorated.	Disassemble/clean Drain to its proper level Disassemble/check Check/change
Water found mixed in air. (Condensate separation malfunctioned.) Dry air type only	(1) Silencer of after-cooler drain outlet clogging. (2) Inside of piping between after-cooler and silencer clogged with dust. (3) The valve fitted under drain separator is closed.	Disassemble, clean, and change Disassemble/clean Open

5.Failure cause and measures

Symptom	Cause	Countermeasures
Insufficient free air delivery.	(1) Air filter element clogging. (2) Unloader valve cannot fully open. (3) Engine does not reach rated revolution speed.	Clean element or change Call your nearest dealer Call your nearest dealer
It is indicated that engine oil pressure is abnormal, and engine stops.	(1) Engine oil shortage. (2) Engine oil filter clogging. (3) Faulty oil pressure sensor. (4) Loose wiring, connectors and disconnection.	Replenish oil Change Change Check/fasten
It is indicated that coolant temperature is abnormal, and engine stops.	(1) Radiator clogging. (2) Faulty thermostat. (3) Faulty coolant temperature sensor. (4) Low coolant level. (5) Belt slippage. (6) Loose wiring, connectors and disconnection. (7) Coolant temperature sensor is disconnected.	Clean Change Change Replenish Re-adjust tension Check/retighten Repair/change
It is indicated that discharge air temperature is abnormal, and engine stops.	(1) Oil cooler clogging. (2) Oil filter clogging. (3) Faulty discharged air temperature sensor. (4) Loose wiring connectors and disconnection. (5) Belt slippage. (6) Shortage of compressor oil. (7) Malfunction of by-pass valve. (8) Discharge air temperature sensor is disconnected.	Clean Change Disassemble/check Check/retighten Re-adjust tension Replenish oil Check/change Repair/change
It is indicated that engine speed down is abnormal, and engine stops.	(1) Trouble of controller. (2) Loose wiring connectors and disconnection. (3) Shortage of feeding fuel caused due to fuel filter clogging. (4) Air mixed in fuel line system (5) Output reduction due to clogged engine air filter	Change Check/retighten Replace filter Bleed the air Clean and/or replace air filter
Discharge air temperature will not drop to be low temperature air.	(1) Selector valve is set at hot temperature position. (2) After cooler clogged.	Select low temp. position Clean
Discharge air temperature will not rise to be hot dry air.	(1) Selector valve is set at low temperature position.	Select high temp. position
Pressure does not change.	(1) Trouble of controller. (2) Trouble of pressure sensor. (3) Trouble of the electro-pneumatic regulator valve. (4) Loose wiring connectors and disconnection.	Call your nearest dealer Call your nearest dealer Call your nearest dealer Check/retighten

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

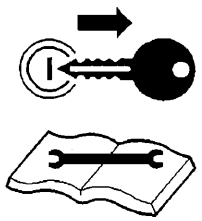
6.Periodic Inspection/Maintenance

6.1 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.



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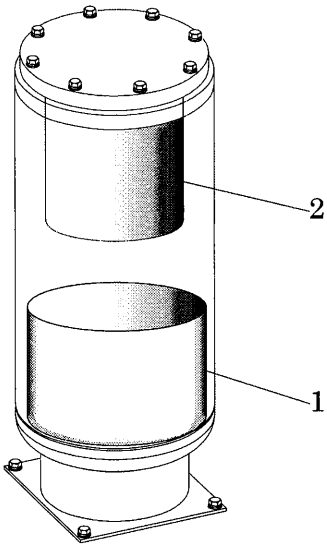
⚠ CAUTION — ***Prevention of oil separator from catching fire***

- Continuous operation with compressor oil being degraded can cause serious accidents such as a fire accident within the separator receiver tank as well as damages to the bearings. Therefore, in order to prevent such accidents, it is absolutely necessary to replace the whole compressor oil in accordance with the specified schedule of oil replacement. In principle, make sure to strictly follow the scheduled replacement time. Further, whenever the compressor oil is found too much degraded even before the replacement periodical interval comes, it is imperative to replace the oil; complete oil replacement is required. Make sure to use the specified 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.



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6.Periodic Inspection/Maintenance

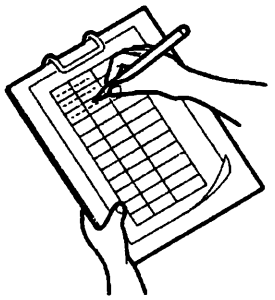
IMPORTANT — ***Precautions for check and maintenance***

- 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 the 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 the machines, use leak proof containers to hold such fluids from the machine.
- Be sure to follow the designated regulations when disposing of oil, fuel, coolant, filters, battery and other harmful things.

6.2 Daily Inspection and Operation Log

- Be sure to carry out daily inspection every morning before operation. See Chapter 4 "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 our office nearby or distributor 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 the machine components and parts should be checked.
(f) Performance of each part or component should be proper.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- Keep the operation log to record constant inspection of each component, so that trouble of the machine 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.

6.3 Inspection on Separator Receiver Tank

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

- 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.

6.Periodic Inspection/Maintenance

6.4 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.	○									4-11
	Drain separator receiver tank.	○									4-11
	Check looseness in pipe connecting part, and wear and tear of pipe.	○									4-14
	Check oil, water, fuel and air leak.	○									4-20
	Check functions of all instruments and devices.	○									4-20
	Performance check of safety valve	○									4-21
	Check and clean clogging air filter element.		○								6-9
	Change compressor oil.			○ First time	○						6-10
	Change compressor oil filter.			○ First time	○						6-11
	Change air filter element				○						6-11
	Clean strainer in the scavenging orifice.				○						6-12
	Clean outside of the oil cooler.					○					6-13
	Clean outside of the after cooler. (Dry air type)					○					6-13
	Check and clean drain outlet port of the after cooler (Dry air type)					※1○					6-14
	Change pressure regulator diaphragm.					☆●					
	Change oil separator.						●				6-17
	Change nylon tubes.						☆●				6-18
	Change rubber hose						☆●				6-18
	Check and change bushing of unloader.					※2○		★●			
	Change O-ring of unloader.							★●			6-19
	Check consumable part of auto-relief valve							★●			6-19
	Check consumable part of vacuum-relief valve.							★●			6-20
	Performance check of pressure control valve								●		6-21
	Check O-ring and piston of pressure control valve								●		6-21
	Change rubber coupling.									●	
	Change oil seal/bearing.									●	
	Change solenoid valve.									●	

Such items marked ○ shall be carried out by customers.
For the following items or clauses marked ●, contact our office nearby or distributor because technical knowledge is required.

Regarding the item marked ※1:When water is found mixed in the discharged air, perform cleaning work even before the specified interval comes.
Regarding the item marked ※2,check the function of the unloader. In case the unloader malfunctions, change O-ring or bushing of unloader. This is because either of both parts may be worn out.

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.

6.Periodic Inspection/Maintenance

◎**Refer to engine operation manual for inspection and maintenance of an engine.**
For the details, contact our office nearby or distributor.

(Unit:Hour)

	Maintenance	Daily	50	250	500	1,000	2,000	3,000	6,000	Page
Engine	Check engine oil level.	○								4-9
	Check coolant level.	○								4-10
	Check fuel.	○								4-12
	Drain fuel tank.	○								4-12
	Drain check in fuel filter.	○								4-13
	Drain check in fuel pre-filter.	○								4-13
	Check looseness in pipe connectors, terminals and tear in wiring.	○								4-14
	Check belt tension.	○								4-15
	Change engine oil.		○ First time		○					6-6
	Change engine oil filter.		○ First time		○					6-7
	Check battery electrolyte.			○						6-7
	Check and clean clogging air filter element.			○						6-9
	Change air filter element				○					6-11
	Change fuel filter.				○					6-12
	Change element of fuel pre-filter.				○					6-13
	Clean outside of the radiator and inter cooler.					○				6-13
	Clean inside of the radiator.					●				6-14
	Change coolant.					☆○				6-16
	Clean inside of fuel tank.						●			6-18
	Change inter cooler hose.						☆●			6-18
	Change fuel hose.						☆●			6-18
	Change radiator hoses.							☆●		6-20
	Change wiring harness.								●	

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.

(Unit:Hour)

	Maintenance	Daily	250	300	500	1,000	2,000	3,000	6,000	Page
Undercarriage	Check and confirm that the fixing nuts for the tires are properly tightened.	○								
	Check and confirm that the nuts with which tires are fixed are properly tightened			○ Every 3 months						6-21
	Supply grease to trailer hub bearing					○				6-15
	Supply grease to leaf spring pin					○				6-15

6.Periodic Inspection/Maintenance

6.5 Periodic Replacement of Parts

- Part number changes upon modification.
  For replacement of parts, make sure whether the part number is correct or applicable.
- The following mentioned parts are to be changed or replaced by customer only.
  When the other parts than the ones in the following table are required, contact our office nearby or distributor.

Part Name		Part Number	Quantity
Cartridge for engine oil filter		HINO S1560-72190	1
Air filter element (For compressor air-end)	Outer element "3"	32143 16000	1
	Inner element "4"	32143 15901	1
Air filter element (For engine)	Element "5"	32143 15300	1
Cartridge for compressor oil filter		37438 09500	1
Fuel filter kit		HINO 23304-EV120	1
Fuel pre-filter kit		HINO 23304-EV140	1
Unloader valve	O-ring "1"	03402 10165	2
	O-ring "2"	21441 04300	1
	O-ring "3"	21441 04400	1
	O-ring "4"	03402 10200	1
Oil separator	Separator "1"	34220 11502	1
	Gasket "2"	34235 06700	2
Auto-relief valve	O-ring "1"	03402 25042	1
	O-ring "2"	21441 04600	1
	O-ring "3"	03402 15060	1
Vacuum relief valve	O-ring "1"	03402 15060	2
	O-ring "2"	21441 04600	1
	O-ring "3"	03402 25042	1
	O-ring "4"	03402 25007	1
Pressure control valve	O-ring "1"	03402 15090	1
	O-ring "2"	21441 05000	1
	Teflon ring "3"	22505 03200	1
	Piston "4"	35303 09300	1
Solenoid valve for starting unloader		46811 29500	1
Solenoid valve for unloader spring chamber		46811 28700	1
Electro-pneumatic regulator valve		36400 23701	1
Diaphragm for pressure regulator		36437 02101	1
Belt (four belts for the cooling fan)		HINO SZ910-49259	1
Belt (two belts for the alternator)		HINO SZ910-49258	1

6.Periodic Inspection/Maintenance

6.6 Maintenance

6.6.1 Change engine oil

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

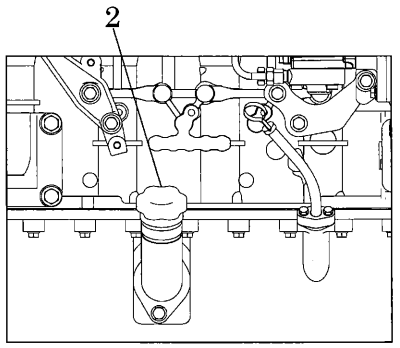
<Procedure>

① Open the drain valve "1" inside the machine, and discharge engine oil drain.

② When the oil is completely drained, close the drain valve "1" firmly and refill new engine oil through the oil level gauge "2". **[Quantity of oil : approx.23.5L]**

③ After supplying oil, pull out the oil level gauge "2" and wipe it out.

④ Then, re-insert the oil level gauge "2" fully and pull it out again. If the dipstick shows the oil level between LOW and HIGH, it is normal.



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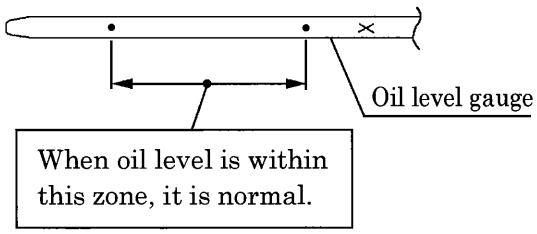

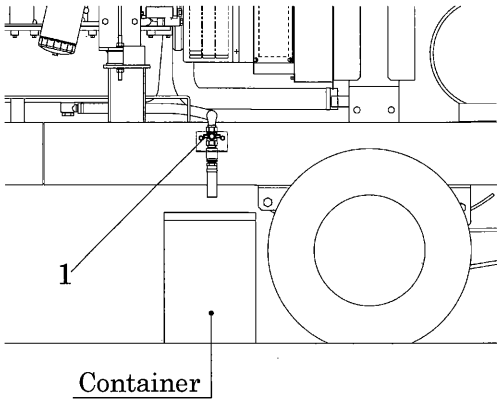

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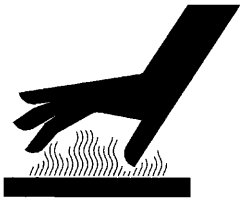
⚠ CAUTION — ***Caution in filling or discharging engine oil***

- 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.



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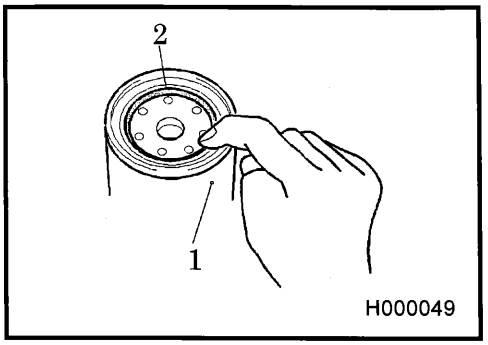
6.6.2 Change engine oil filter

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

<Procedure>

① Remove the cartridge "1", using a filter wrench.
② Install the new cartridge after applying oil to the surface of gasket "2" of cartridge "1". (For part number, see 6.5)
③ After the packing "2" touches the sealing face, tighten another 2/3 turn with a filter wrench.
④ After installing the oil filter, check it for any leak during operation.



6.6.3 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 6.6.4 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.

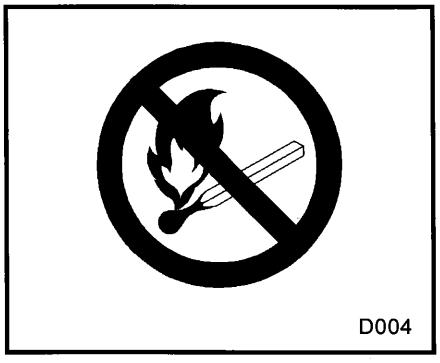
6.6.4 Maintenance of Battery

[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 machine, 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.

⚠ WARNING — ***Handling battery***

- 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.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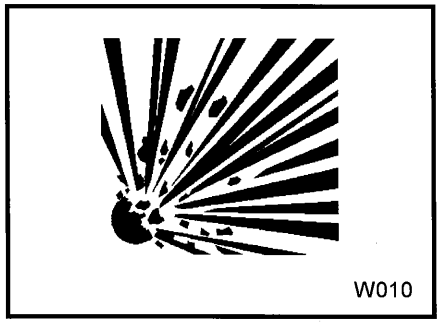
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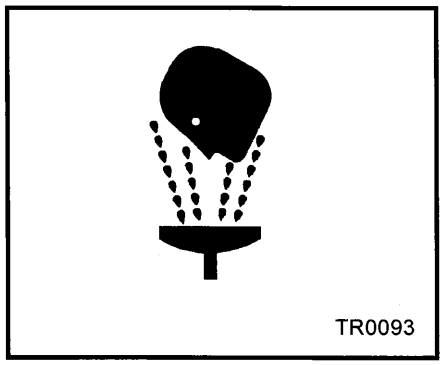
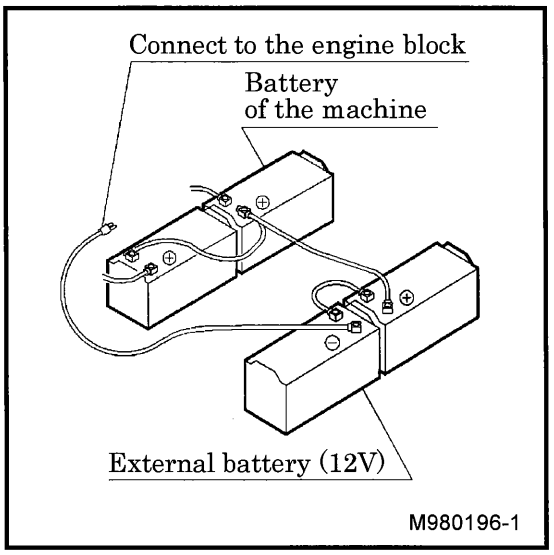

TR0093

[How to use booster cable]

<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.



⚠ CAUTION — ***Do not reverse the cable connection***

- 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.

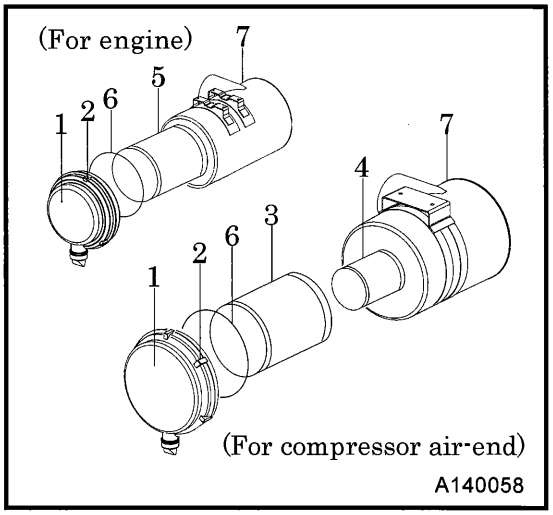
6.6.5 Check and clean clogging air filter element

Every 250 hours

<Procedure>

① After removing the cup "1" by loosening its cup fixing latch "2", clean its interior properly.
② Take out outer element "3", "5" only, and clean it. Do not remove the inner element "4" for the compressor air-end, in order to prevent the intrusion of dust.
③ When installing cup after cleaning it, hold O-ring "6" to the case "7" with a hand so that O-ring may not come out, and then tighten it after confirming that the hook of cup fixing latch is engaged.

- Not limited to the above, be sure to replace an element new one in case of it became dirty extremely. (For replacement parts, refer to 6.5)



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 air-end to cause earlier wear of moving parts. Periodical inspection and cleaning of element should be performed to maintain life of compressor air-end and engine long.

6.6.6 Change compressor oil

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

<Procedure>

① After the machine has stopped and pressure inside the separator receiver tank has been completely released as much time passed, remove the oil filler cap "1" and open the drain valve "2" to drain the residual oil. Drain the residual oil accumulated in the cooler by opening the oil cooler drain valve "4".

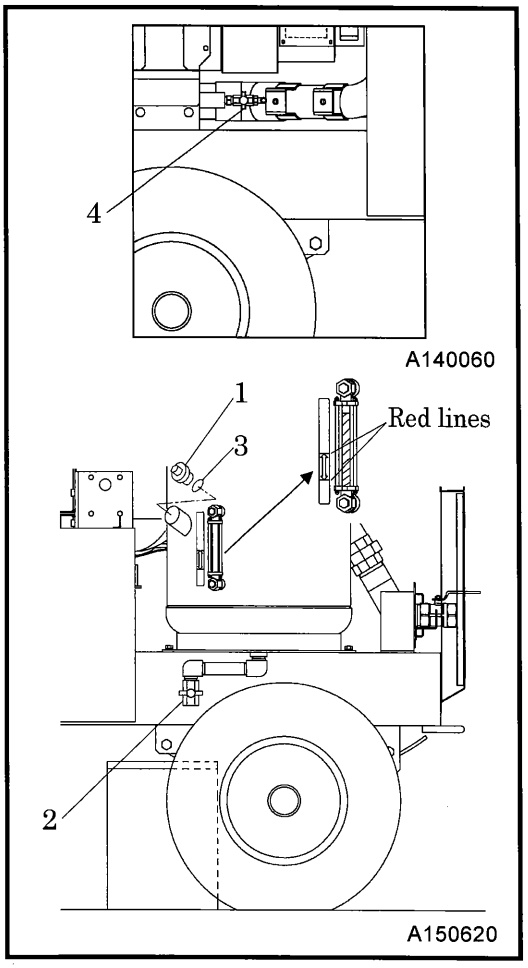
② After compressor oil is completely drained out, close drain valve "2" and "4" for sure.

③ After filling new compressor oil up to the upper limit, retighten the oil filler cap "1". Check the O-ring "3" of the oil filler cap "1". If it is found hardened or damaged, replace it with a new one.

④ Start the machine. Then check and confirm that the oil level is between red lines at full load operation.

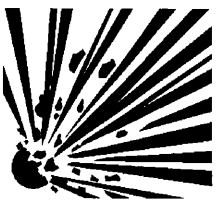
- In replacing the compressor oil, it takes substantial time to discharge cold compressor oil. Make sure to discharge the compressor oil completely.

Oil level between red lines	Approx.10L
Oil quantity to be changed	Approx.82L



⚠ WARNING

Refilling of compressor oil



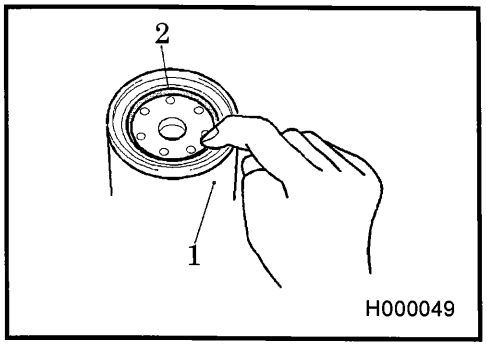
- When you refill the separator receiver tank with compressor oil, stop the engine, and make sure that the pressure gauge indicates 0MPa and there is no residual pressure in it, and then gradually loosen the oil filler cap for refilling oil.
- Note residual pressure in the receiver tank could force both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

6.6.7 Change compressor oil filter

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

<Procedure>

① Remove the cartridge "1", using a filter wrench.
② Install the new cartridge after applying oil to the surface of packing "2" of cartridge "1". (For part number, see 6.5)
③ After the packing "2" touches the sealing face, tighten another 1/2 turn with a filter wrench.
④ After installing the oil filter, check it for any leak during operation.



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

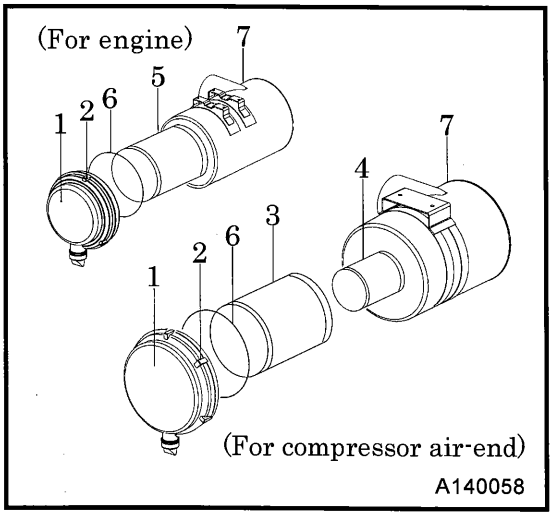
- Poor quality oil filters do not trap dust sufficiently and will cause damage to the bearings in a short period.

6.6.8 Change air filter element

Every 500 hours

<Procedure>

① After removing the cup "1" by loosening its cup fixing latch "2", clean its interior properly.
② Remove the element "5" for the engine and replace it with a new one. Replace the inner element "4" for the compressor air-end, once generally for every four times of cleaning the outer element "3". When removing the inner element, take care not to contaminate any secondary parts.
(For part number, see 6.5)
③ When installing cup after cleaning it, hold O-ring "6" to the case "7" with a hand so that O-ring may not come out, and then tighten it after confirming that the hook of cup fixing latch is engaged.



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

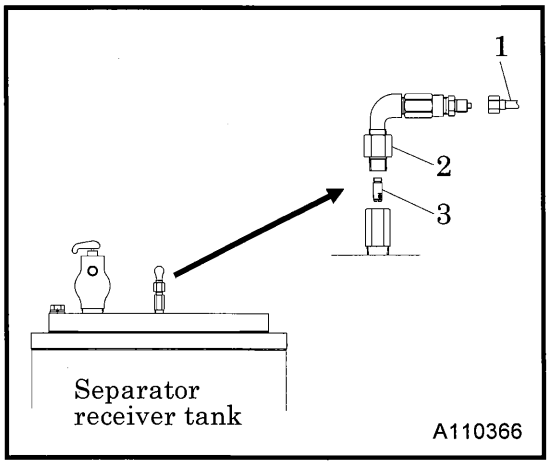
- Air filter is an important part which is crucial to machine's performance and life.
Be sure to use genuine parts.

6.6.9 Clean strainer in the scavenging orifice

Every 500 hours

<Procedure>

① Remove the pipe "1", using a spanner.
② First remove the bushing "2".
③ Then remove the strainer "3".
④ Wash the removed strainer "3" in diesel oil and blow out "dust" by air blowing.
⑤ After finishing the cleaning, install the strainer "3" again in the reverse procedure.



6.6.10 Change element of fuel filter

Every 500 hours

<Procedure>

① Put a waste oil container under the fuel filter.
② Loosen the drain plug "1", and then loosen the air-bleeding plug "2". Extract the fuel via the drain pipe "3".
- In extracting fuel, remove all the fuel in the filter. If you try to replace any element with fuel remaining, unfiltered fuel left in the filter can flow into the engine area.

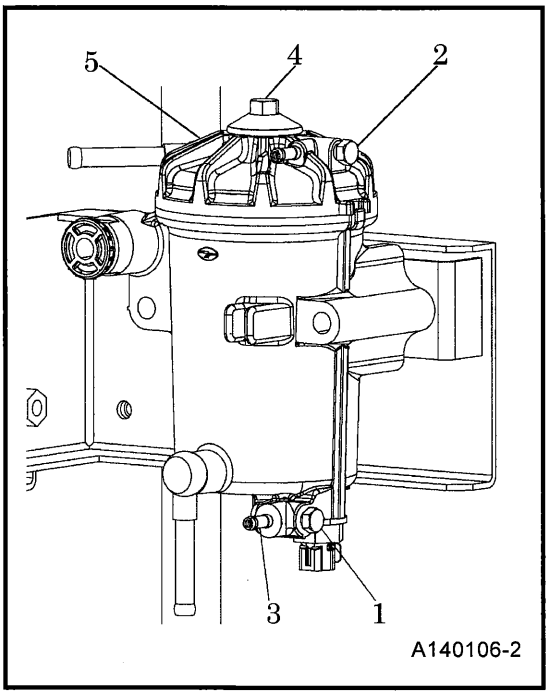
③ After checking that fuel no longer flows out of the drain pipe, tightly close the drain plug.
④ Loosen the central bolt "4", remove the cap "5", and then remove the element.
⑤ Replace the element with a new one. Then, put the cap back on, and tighten the central bolt and the air-bleeding plug.
- In replacing the element, also replace the gasket (comes with the new element kit).

(For part number, see 6.5)

- Do not reuse any used element.

⑥ After replacement, bleed the air from the fuel system. (See4.4.9)
⑦ After installing the element, check for any fuel leakage during operation.

● For further details on the replacement method, refer to the engine's operation manual.



6.6.11 Change element of fuel pre-filter

Every 500 hours

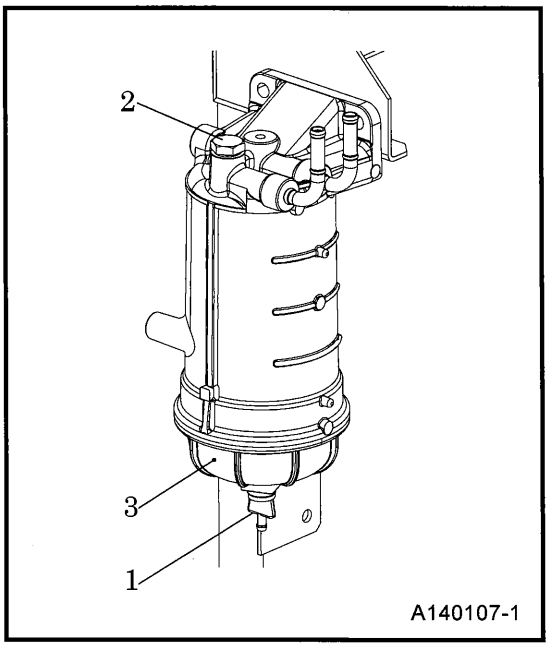
<Procedure>

① Loosen the drain valve "1" and the air-bleeding plug "2", and then extract the fuel from the filter. After fully extracting fuel, close the drain valve and tightly close the air-bleeding plug.

② Use a filter wrench to remove the filter case "3". (Be careful not to damage the filter case, as it's made of plastic.)

③ Remove the element kit inside and replace it with a new one.
(For part number, see 6.5)

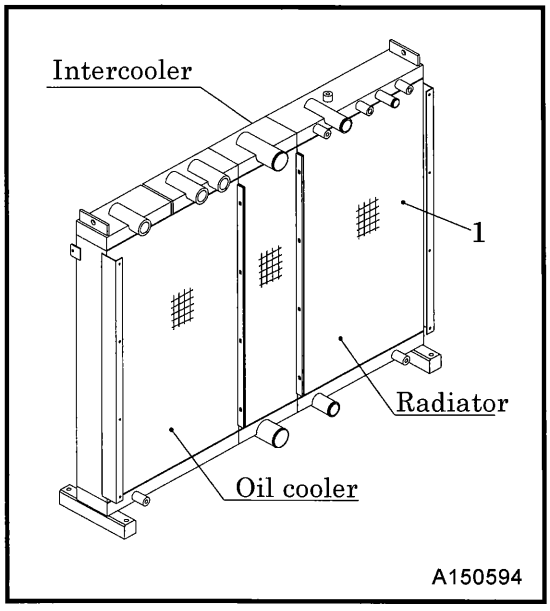
④ After installing the element kit, check for any fuel leakage during operation.



6.6.12 Clean outside of the radiator, oil cooler and inter cooler

Every 1,000 hours

- When the fin tubes "1" of the radiator, oil cooler and intercooler get clogged with dirt and dust heat, exchange effectiveness drops so much that temperature rise of coolant temperature and engine suction air is caused. It is necessary to clean them even prior to the regular interval according to the clogging state of them.
- Do not use a high pressure washer to protect fin tubes from being damaged.



6.6.13 Clean outside of the after cooler (Dry air type)

Every 1,000 hours

- When the fin tubes "1" of after cooler get clogged with dirt and dust heat exchange effectiveness drops so much that discharge air can not become low temperature air, and dried high temperature air. It is necessary to clean them even prior to the regular interval according to the clogging state of them.
- Do not use a high pressure washer to protect fin tubes "1" from being damaged.

6.6.14 Clean inside of radiator

Every 1,000 hours

- When the inside of a radiator and water conduits of an engine are dirty with scale and rust, its cooling efficiency will be deteriorated. Clean the interiors of such components periodically.
- When cleaning it, contact our office nearby or distributor because technical knowledge is required.

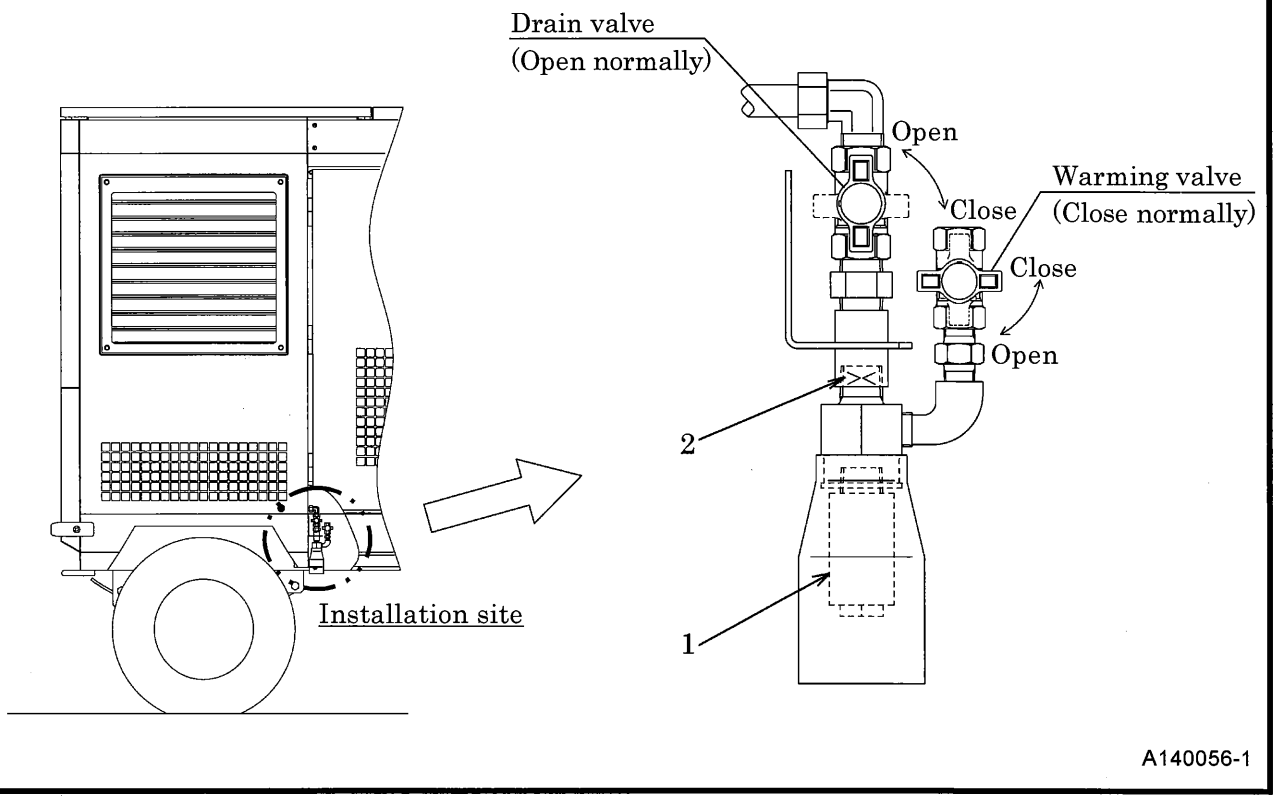
6.6.15 Check and clean drain outlet port of the after cooler (Dry air type)

Every 1,000 hours

- The after-cooler drain contains a small amount of oil; take care in handling the drain.

[If the drain allows for mixing with discharged air]

- Check whether air is discharged from the outlet of the after-cooler drain during operation. If drain allows for mixing with air, clean the silencer "1" and orifice "2" at the outlet. Replace these if severely contaminated.
  When cleaning or replacing it, contact directly us or distributor because it requires expert technical knowledge.



IMPORTANT — ***Cleaning it completely and keeping it cleaned***

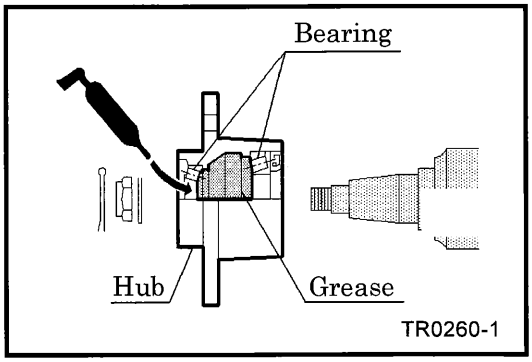
- When any water is found mixed in discharged air, silencer and orifice and air pipe could be clogged. Periodically carry out inspection and cleaning of it.

6.6.16 Supply grease to trailer hub bearing

Every 1,000 hours

- When replenishing grease to the trailer hub bearing, contact our office nearby or distributor.

  Grease: Chassis grease

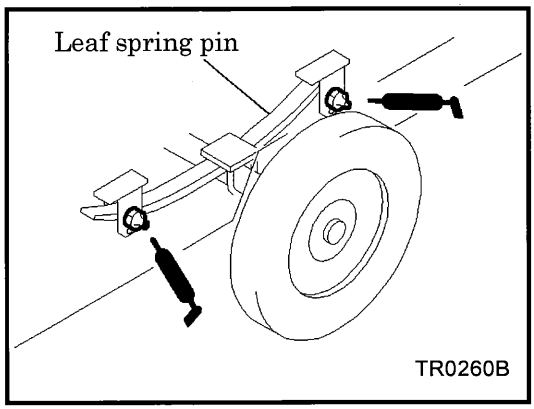


6.6.17 Supply grease to leaf spring pin

Every 1,000 hours

- Supply grease through grease nipples positioned at the bottom.

  Grease: Chassis grease



6.6.18 Change coolant

Every 1,000 hours or every 2 years

<Procedure>

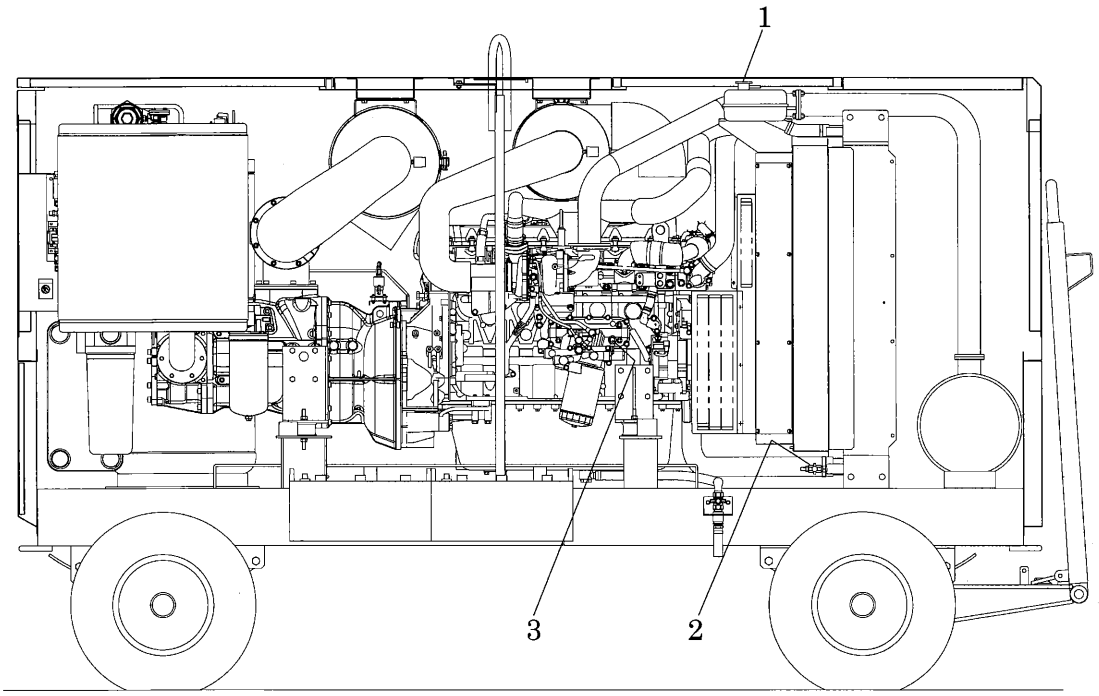
① Extract coolant by removing the header tank cap "1" at the upper area of the radiator and by opening the drain valve "2".

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

③ As all the coolant is being extracted, close the drain valve "2", tighten the drain plug "3" on the engine, and then supply coolant water from the water inlet.

[Quantity of water : Standard type 42L/ Dry air type 54L]

④ After coolant is filled up, run machine at unload condition for 5 minutes and stop it. Then check coolant level. When the level is low, replenish it.



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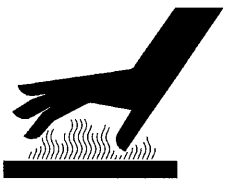
⚠ CAUTION

Caution in filling or discharging engine oil

- 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.
  - If it should be swallowed by mistake, it is necessary to see a doctor immediately instead of being sent out enforcedly.
  - 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).



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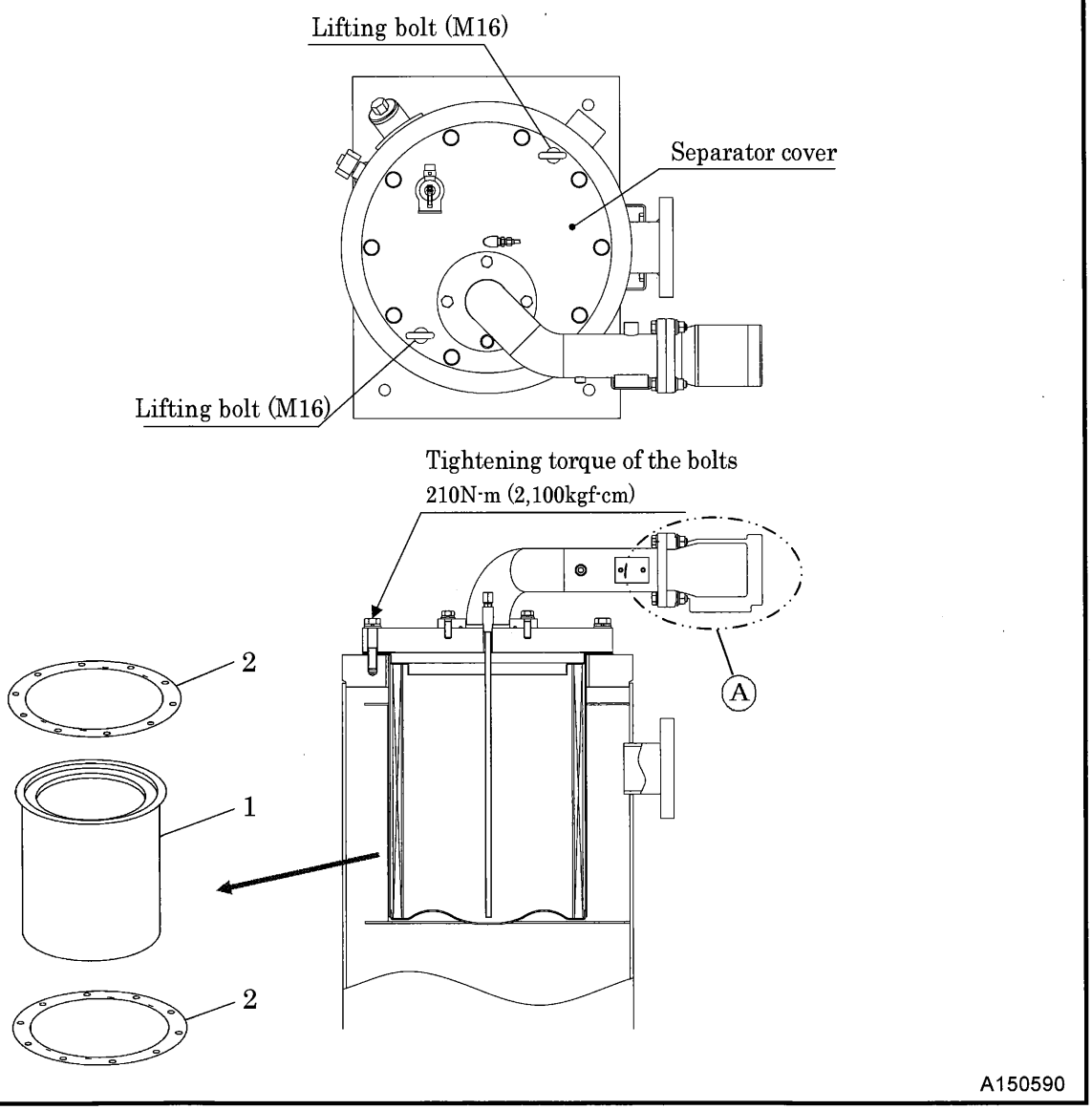
6.6.19 Change oil separator

Every 2,000 hours

<Procedure>

① In order to pull out the separator, remove the bolts (6 pieces) fixing the top cover on the separator cover, using an impact wrench.
② Remove nylon tubes and copper pipes connected to the pipes and parts fitted on the separator cover, using a spanner.
③ At first remove the union joint Ⓐ between 3-way tee outlet and air manifold.
④ Remove the fixing bolts (10pcs.) of separator cover, using an impact wrench etc.
⑤ Screw two lifting eyebolts (M16) for the 2 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.

- Even before the scheduled periodic time, when compressor oil is so much consumed that so much oil is found mixed in discharged compressed air, replace oil separator.
- When replacing oil separator, make sure to replace gasket "2" at the same time. (For part number, see 6.5)
- 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 it, contact our office nearby or distributor because technical knowledge is required.



6.6.20 Clean inside of fuel tank

Every 2,000 hours

- When cleaning it, contact our office nearby or distributor because technical knowledge is required.

6.6.21 Change inter cooler hose

Every 2,000 hours or every 2 years

- When any crack or wear is found on the inter cooler hoses, replace it even before the scheduled time.
- When replace it, contact our office nearby or distributor because technical knowledge is required.

6.6.22 Change fuel hose

2,000 hours or every 2 years

- In case various rubber hoses for fuel system and engine lubrication system are hardened or deteriorated, replace them even before the specified replacement time.
- When replacing it, contact our office nearby or distributor because technical knowledge is required.

6.6.23 Change nylon tubes

2,000 hours or every 2 years

- Replace nylon tubes used for the oil and air pipings.
- When replacing it, contact our office nearby or distributor because technical knowledge is required.

6.6.24 Change rubber hose

2,000 hours or every 2 years

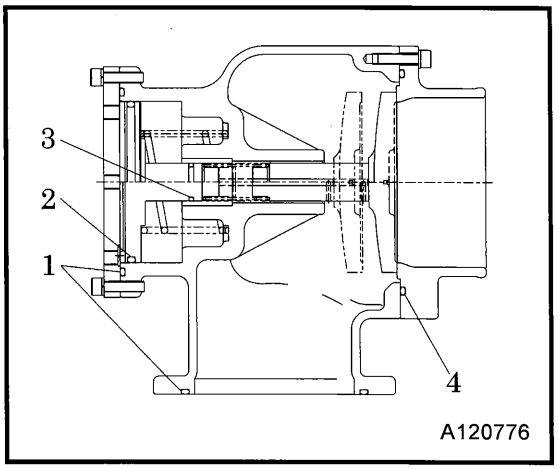
- Check hoses used for oil piping for any crack or tear, and replace when an abnormality is found.
- When replacing it, contact our office nearby or distributor because technical knowledge is required.

6.Periodic Inspection/Maintenance

6.6.25 Change O-ring of unloader

3,000 hours or every 3 years

<Caution during O-ring replacement>
After replacing O-ring "1", "2", "3" and "4", coat new O-rings with CALTEX MULTIFAK EP1 for installation.
(For part number, see 6.5)



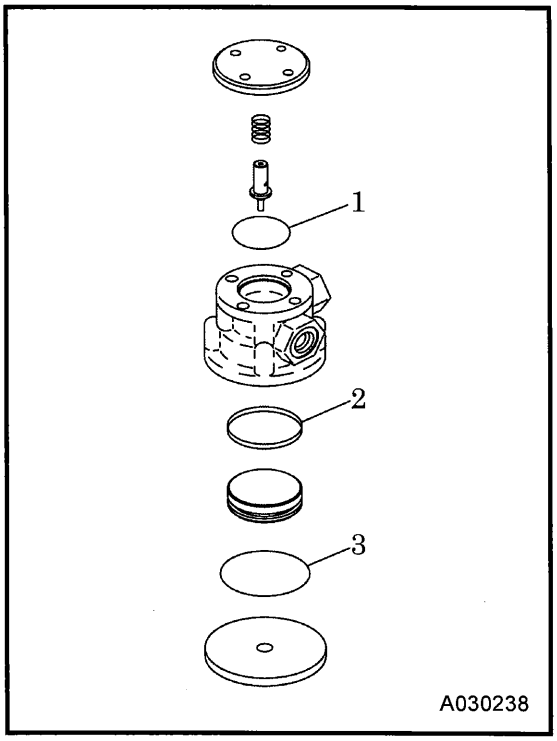
IMPORTANT

- When reassembling, apply sufficient grease to O-ring Slot/O-ring and sliding surface.
  Use CALTEX MULTIFAK EP1 grease or equivalent. Grease of poor quality will deteriorate the material.

6.6.26 Check consumable part of auto-relief valve

3,000 hours or every 3 years

- Disassemble and clean the component, and check O-ring "1" "2", "3". Then, replace O-ring "1", "2", "3" , if hardened.
  (For part number, see 6.5)
- When replacing it, contact our office nearby or distributor because technical knowledge is required.



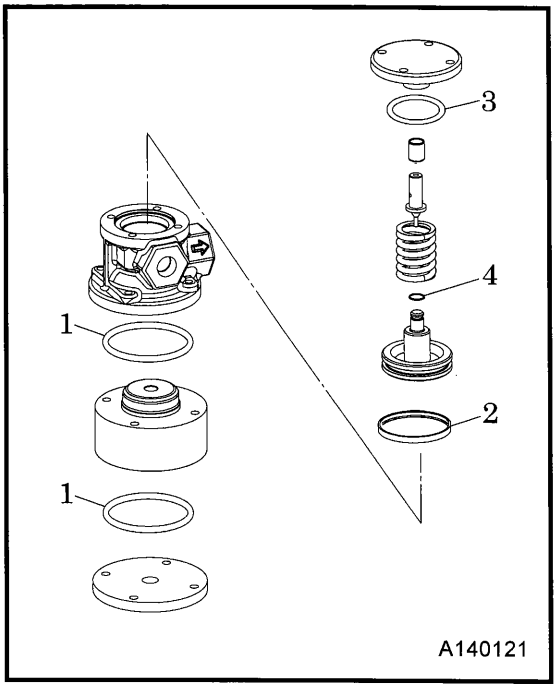
IMPORTANT

- When reassembling, apply sufficient grease to O-ring Slot/O-ring and sliding surface.
  Use CALTEX MULTIFAK EP1 grease or equivalent. Grease of poor quality will deteriorate the material.

6.6.27 Check consumable part of vacuum-relief valve

3,000 hours or every 3 years

- Disassemble and clean the component, and check O-ring "1" "2", "3", "4". Then, replace O-ring "1", "2", "3" , "4", if hardened.
  (For part number, see 6.5)
- When replacing it, contact our office nearby or distributor because technical knowledge is required.



IMPORTANT

- When reassembling, apply sufficient grease to O-ring Slot/O-ring and sliding surface.
  Use CALTEX MULTIFAK EP1 grease or equivalent. Grease of poor quality will deteriorate the material.

6.6.28 Change radiator hoses

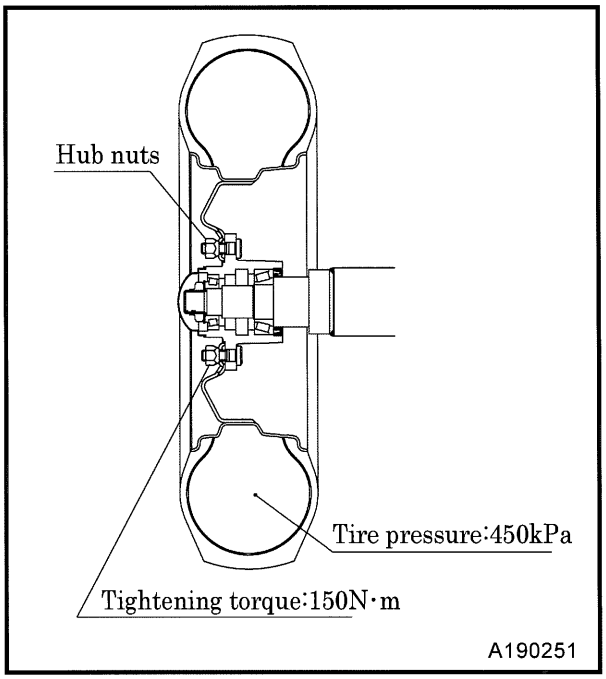
3,000 hours or every 2 years

- When any crack or wear is found on the hoses, change it even before the scheduled time.
- When replacing it, contact our office nearby or distributor because technical knowledge is required.

6.6.29 Check and confirm that the nuts with which tires are fixed are properly tightened

Every 3 months

- Check and confirm once every three months that hub nuts with which tires are fixed are not loosened. (24 points)
- If it is found that specified tightening torque of clamped bolts drops to a lesser value, retighten them to correct specified value.
  (Tightening torque : 150N·m)



6.6.30 Performance check of pressure control valve

Every 6,000 hours

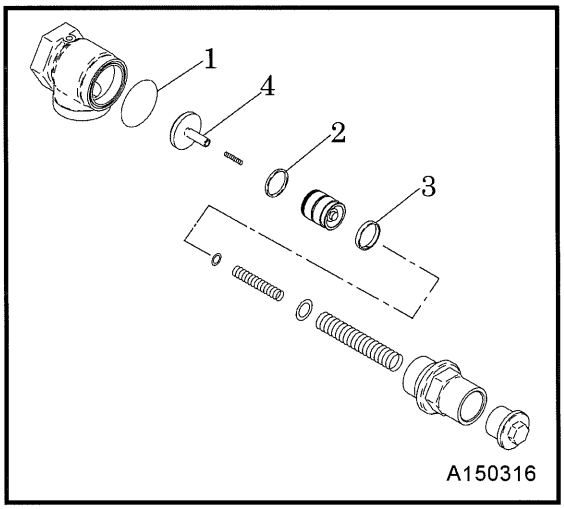
<Procedure>

① When closing stop valve and fully opening service valve while the machine is running, make sure that the discharge pressure gauge shows the figure between 0.35 to 0.50MPa.

② When the pressure is lower than 0.35MPa, replace spring with a new one.
(For part number, see 6.5)

③ When the indicator shows excessively higher pressure, you will find that the piston does not move smoothly due to foreign material and rust stuck inside valve. In such a case, disassemble the component for checking and cleaning.

- When replacing it, contact directly us or distributor because it requires expert technical knowledge.



IMPORTANT

- When reassembling, apply sufficient grease to O-ring Slot/O-ring and sliding surface.
  Use CALTEX MULTIFAK EP1 grease or equivalent. Grease of poor quality will deteriorate the material.

6.6.31 Check O-ring and piston of pressure control valve

- After disassembling and cleaning pressure control valve, check O ring "1", "2" and also teflon ring "3" and piston "4" in 6.6.30.
  When the rubber of these parts is found hardened, or damaged, replace them.
  (For part number, see 6.5)
- When replacing it, contact directly us or distributor because it requires expert technical knowledge.

7. Storage of the Machine and Disposal of Product

7.1 Preparation for Long-term Storage

When the machine is left unused or not operated longer than half a year (6 months), store it at the dry place where no dust exists after the following treatments have been done to it.

- Put the machine in a temporary cabin if it is stored outside.
  Avoid leaving the machine outside with a sheet cover directly on the paint for a long time, or this will cause rust to the machine.
- 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 Completely charge the battery and disconnect grounding wires. Remove the battery from the machine, if possible, and store it in a dry place. (Charge the battery at least once every month.)
③ Drain coolant and fuel from the machine.
④ 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 entering the machine.
⑤ Be sure to repair any breakdowns and maintain the machine so that it will be ready for the next operation.

7.2 Disposal of Product

- In case of disposal of this machine, at first drain the cooling water and oils.
  When you have anything unclear or you want to advise us, contact our office nearby or distributor.

8.Specifications

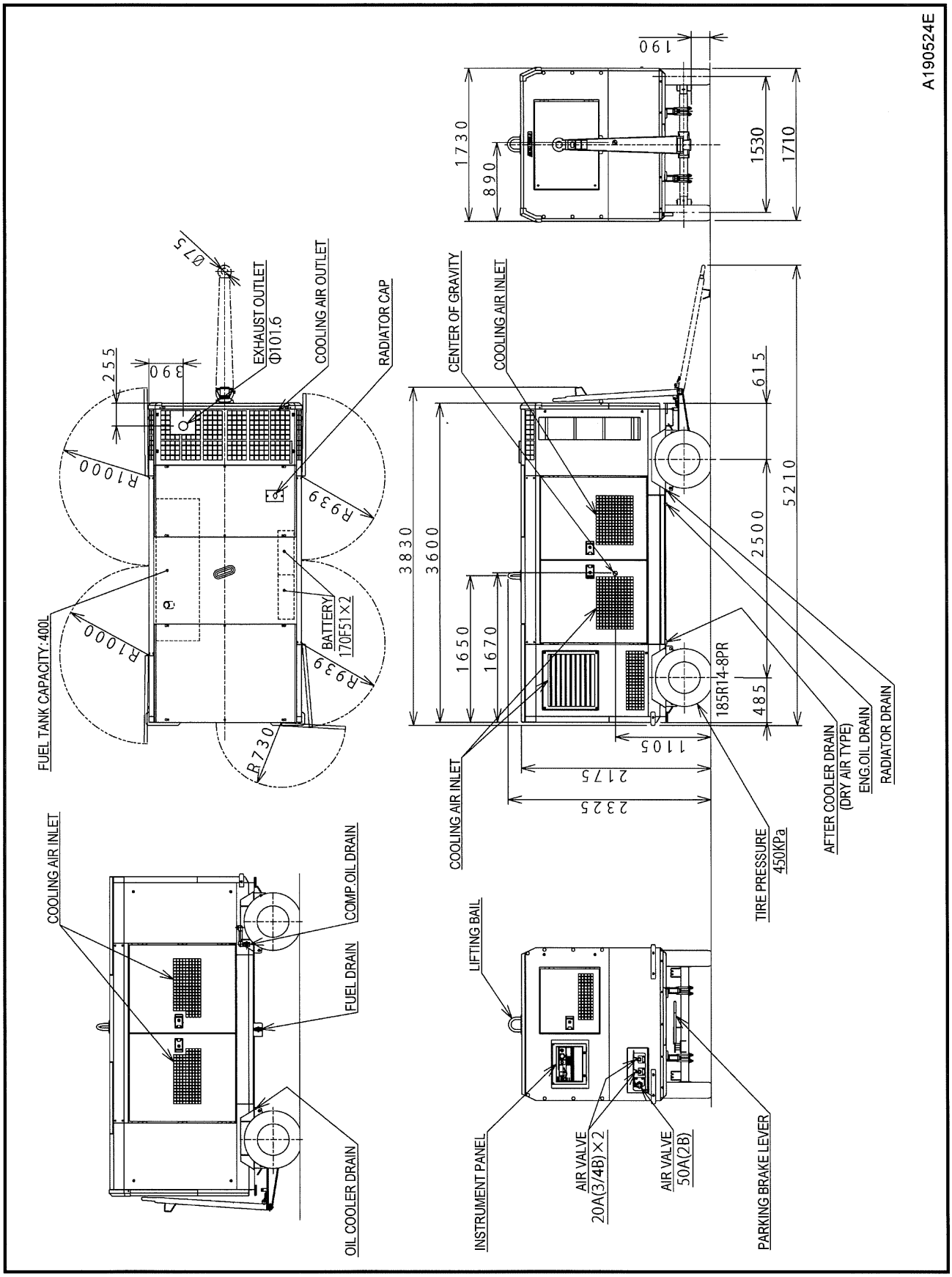
8.1 Specifications

Model			PDSG750S-4C5	PDSG750SD-4C5 (Dry air type)
COMPRESSOR	Type		Single-stage oil cooled, screw type compressor	
	Free air delivery	m^3/min	21.2 to 25.5	
	Working pressure	MPa	1.4 to 0.5	
	Lubricating system		Forced Lubrication by compressed pressure	
	Driving system		Direct driving with rubber coupling	
	Receiver tank capacity	m^3	0.213	
	Lubricating oil capacity	L	82	
ENGINE	Model		HINO JO8E-UK	
	Type		4 cycle water-cooled, direct injection, turbo-charged	
	Number of cylinders, bore stroke		6 – 112 mm × 130 mm	
	Total displacement	L	7.684	
	Rated output	kW/min^{-1}	197 / 2,100	
	Lubricating oil capacity	L	23.5	
	Coolant capacity (including radiator)	L	42	54
	Battery		170F51×2 (24V) equivalent	
	Fuel tank capacity	L	400	
WEIGHT・MASS	Overall length (Bonnet only)	mm	3,600	
	Overall length (with drawbar folded up)	mm	3,830	
	Overall length (with drawbar laid down)	mm	5,210	
	Overall width	mm	1,730	
	Overall height	mm	2,325	
	Net dry mass	kg	3,410	3,580
	Operating mass	kg	3,870	4,040

8.Specifications

8.2 Outline drawing

PDSG750S-4C5
PDSG750SD-4C5 (Dry air type)



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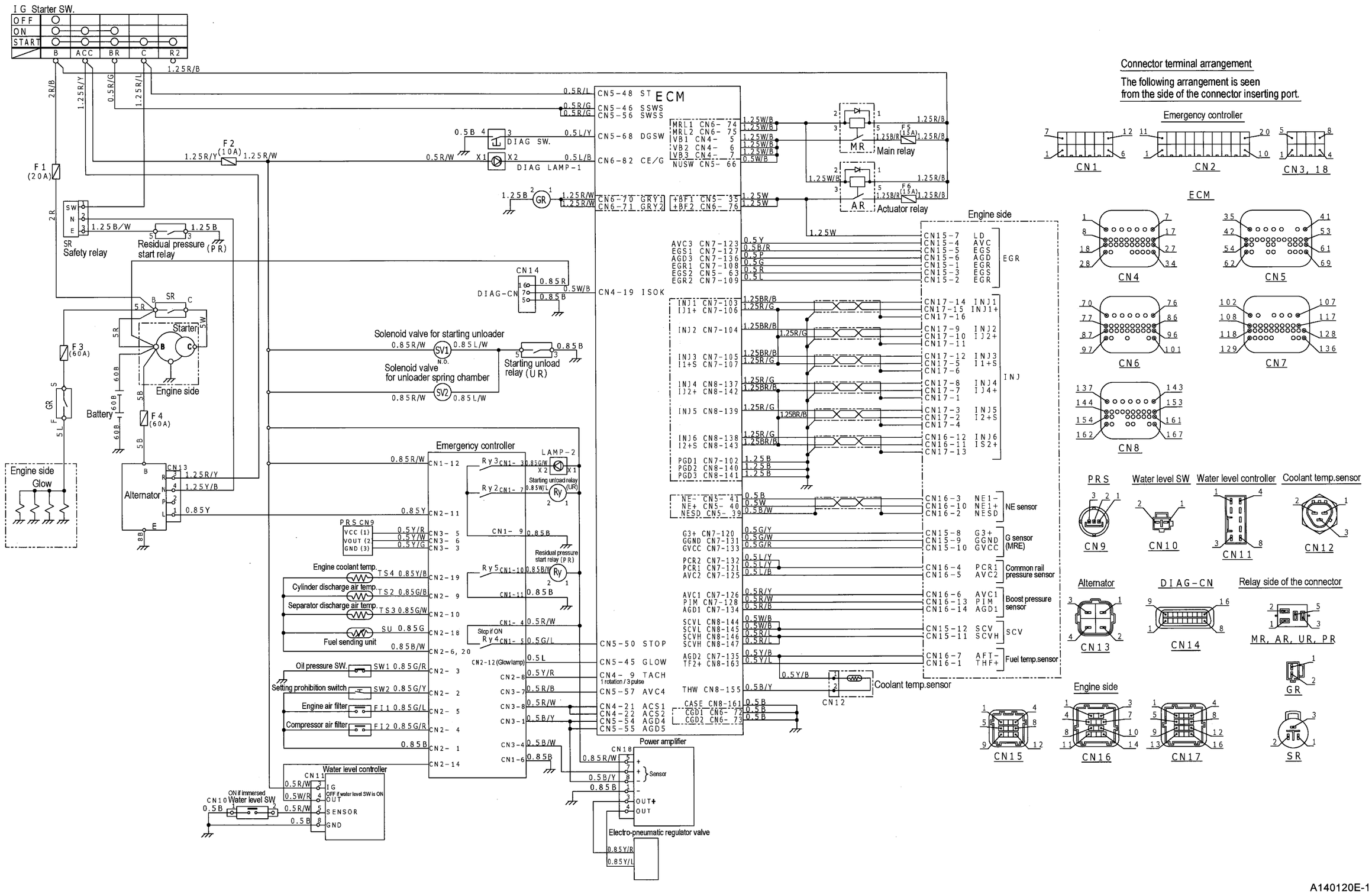
9.Wiring Diagram



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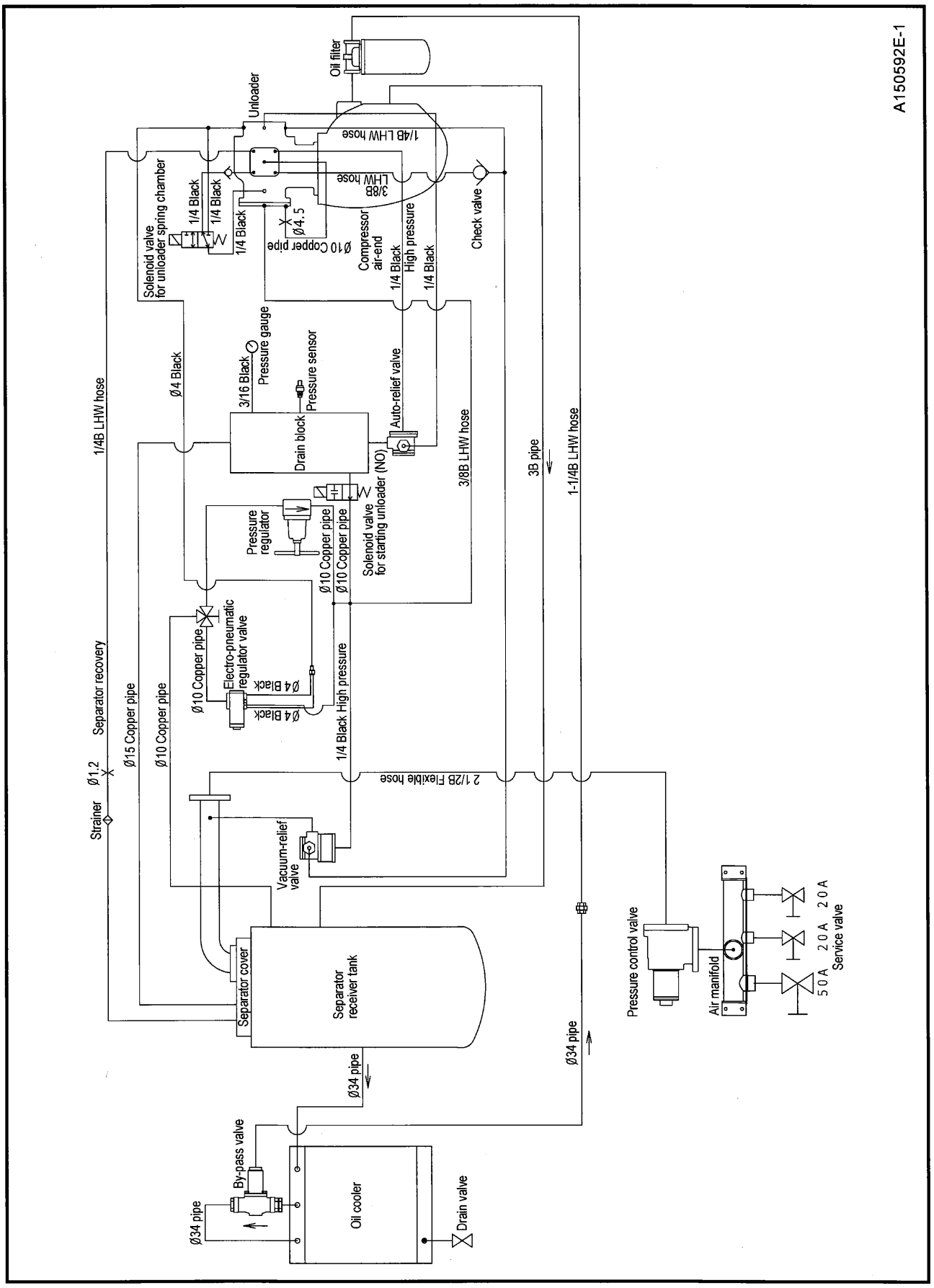
10.Piping Diagram

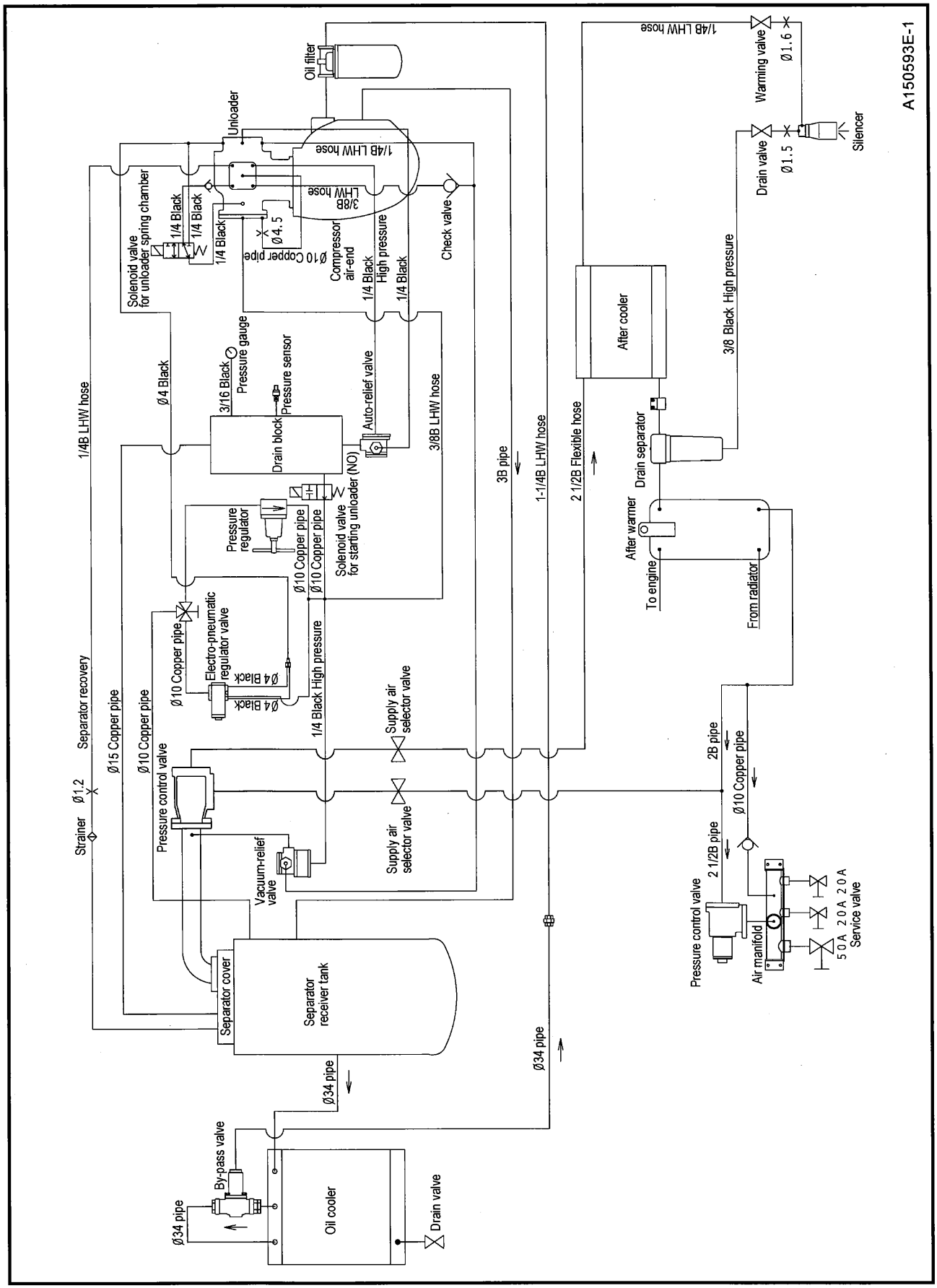
10.1 Air piping·Compressor oil piping

PDSG750S-4C5



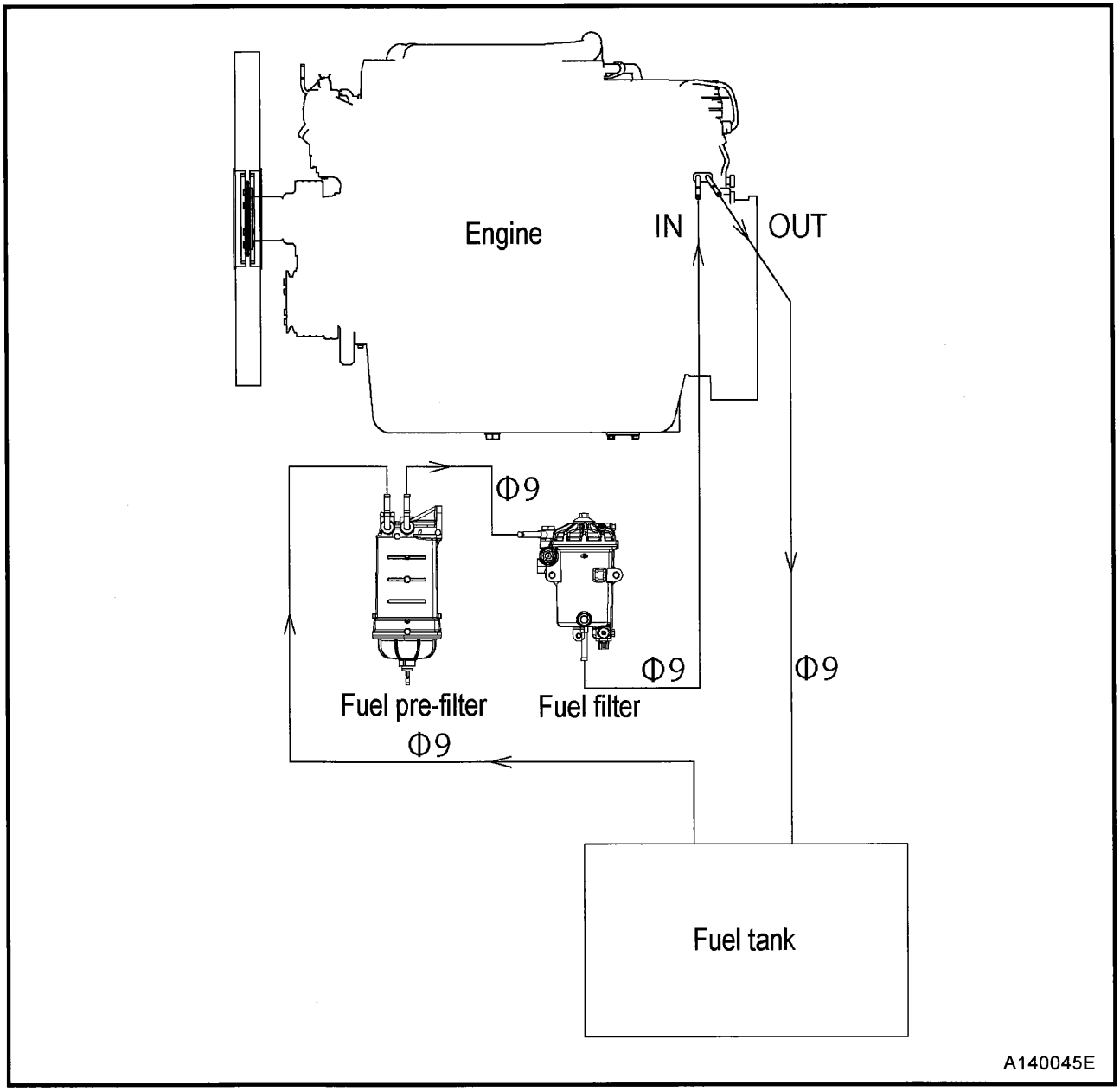
10.Piping Diagram

PDSG750SD-4C5 (Dry air type)



10.Piping Diagram

10.2 Fuel piping



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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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