



INSTRUCTION MANUAL

PORTABLE
SCREW COMPRESSOR

FAC-52B
FAC-52BC

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


Preface

Thank you for having selected our "FSCURTIS" product.

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

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

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

PORTABLE COMPRESSOR	
MODEL	<input type="text"/>
SER. NO.	<input type="text"/>
NORMAL OPERATING PRESSURE	<input type="text"/> MPa
NET DRY MASS	<input type="text"/> kg
OPERATING MASS	<input type="text"/> kg
 MADE IN JAPAN	

A090188

- ◆ Each illustrated figure (Fig.) has a number (for instance, A090188) at the right bottom. This number is not a part number, but it is used only for our reference number.


Table of Contents

1. Safety	1-1
1.1 Caution before Operation	1-2
1.2 Caution during Operation	1-5
1.3 Caution during Inspection and Maintenance	1-7
1.4 Safety Warning Labels	1-10
2. Part Names	2-1
2.1 Internal Components and Part Names	2-1
3. Installation	3-1
3.1 Transportation	3-1
3.2 Installation	3-2
4. Operation	4-1
4.1 Instrument Panel	4-1
4.2 Lubricating oil · Coolant · Fuel	4-2
4.3 Check before Starting Unit	4-4
4.4 Operation	4-9
4.5 Stopping	4-13
4.6 Air bleeding in fuel line	4-13
4.7 Operation of after cooler type	4-14
5. Failure cause and measures	5-1
5.1 Indicator lamp and Warning / Emergency display	5-1
5.2 Troubleshooting	5-2
6. Periodic Inspection/Maintenance	6-1
6.1 Important Items as Periodic Inspection and Maintenance or after Maintenance	6-1
6.2 Daily Inspection and Operation Log	6-2
6.3 Periodic Inspection List	6-3
6.4 Periodic Replacement of Parts	6-5
6.5 Maintenance Items	6-6
7. Storage of the Machine and Disposal of Product	7-1
7.1 Preparation for Long-term Stoppage	7-1
7.2 Disposal of Product	7-1
8. Specifications	8-1
8.1 Specifications	8-1
8.2 Outline drawing	8-2
9. Wiring Diagram	9-1
10. Piping Diagram	10-1
10.1 Air piping · Compressor oil piping	10-1
10.2 Fuel piping	10-3

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



CAUTION indicates a potential hazardous situation which may possibly only cause a minor injury to a user and damages to property only.



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.

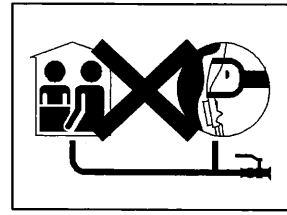
1.Safety

1.1 Caution before Operation

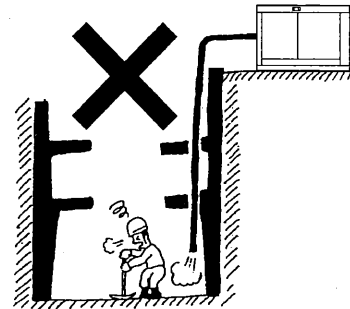
DANGER

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 serious injury to the working persons. Refrain from using the compressed air for such pneumatic engineering method or pneumatic caisson method.



TR0201-1

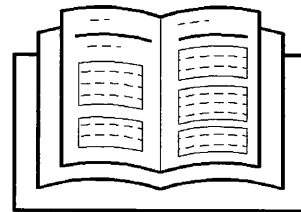


A080001

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.

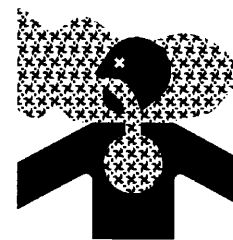


TR0086

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.



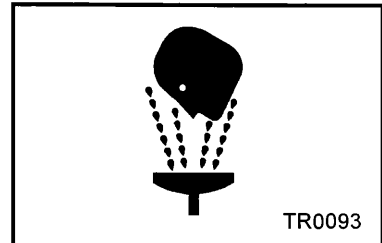
PC002

1.Safety

WARNING

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

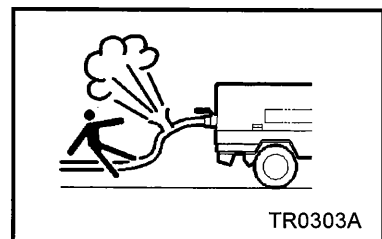
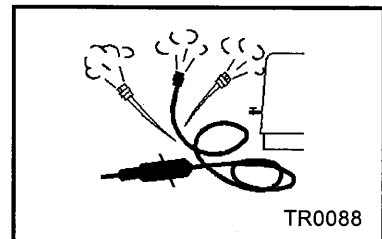
Handling battery



WARNING

Cautions of hose attachment and removal

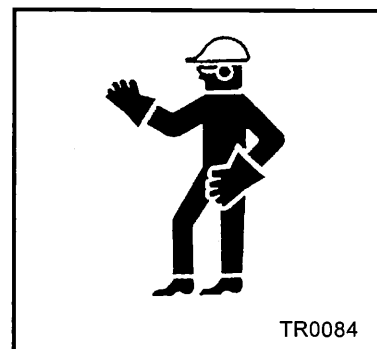
- Piping or the hose from this machine service valve should use what can be borne enough for the discharge pressure of this machine.
- Please connect piping or a hose to this machine service valve firmly before operation and during operation. If the connection part is loosening, there is a possibility 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.



WARNING

Safety outfit

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



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

- 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.

Protection equipments



TR0085

CAUTION

- 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.

Safety fittings



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.

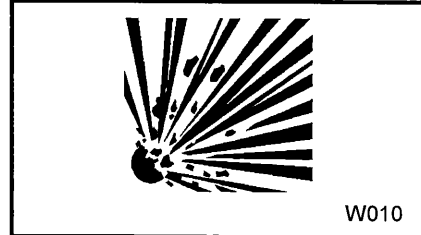
1.Safety

1.2 Caution during Operation

WARNING

Do not replenish compressor oil during operation

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



WARNING

Draining during operation prohibited

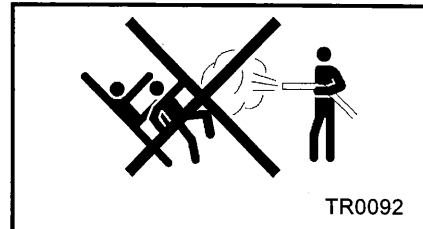
- Do not, under any circumstance, open the portions below during operation:
 - Separator receiver tank drain valve
 - Coolant drain valve and plug
 - Engine oil drain valve
 - Oil cooler drain valve
 - Fuel tank drain valve and plug



WARNING

Never direct the compressed air to people and foods

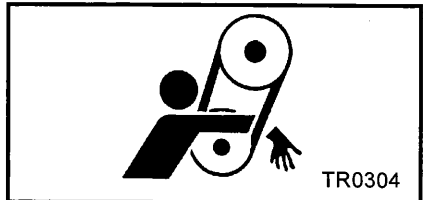
- Never blow compressed air directly at people.
Scattered impurities, dust, or foreign objects in the compressed air may cause skin and eyes to be seriously injured.
- Blowing compressed air on food is prohibited.



WARNING

Hands off from rotating parts and belts

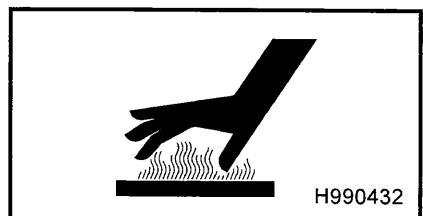
- Keep hands off from the rotating portion or belts while running.
It could cause serious injuries if hands should be caught in.



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.

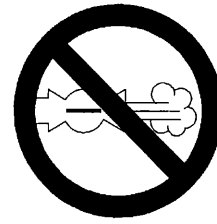


1.Safety

CAUTION

Operation with compressed air supply port opened is prohibited

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

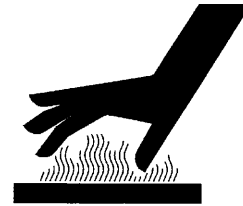


D003

CAUTION

Do not touch hot parts

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



H990432

CAUTION

Fire prevention

- Do not, under any circumstance, bring lit cigarettes or matches near such oils as engine oil and compressor oil, etc. They are extremely flammable and dangerous, so be careful when handling.
- Refilling oils should be done in an outdoor well-ventilated place.
- Refuel after stopping the engine, and never leave the fuel nearby the machine. Do not spill. It may cause a fire. When it is spilt, wipe it up completely.
- **Do not fill fuel oil up to the cap level. When fuel tank is filled up to the cap level, fuel oil will be overfilled due to volume expansion caused by rise of ambient temperature. Further, fuel will be possibly spilled from fuel tank due to vibration caused during movement and/or transportation of the machine.**
- Such parts as muffler and exhaust pipe can be extremely hot. Remove twigs, dried leaves, dried grass and waste paper, etc. from the exhaust outlet of the muffler.
- Keep a fire extinguisher available by the machine in case of a fire.



D004



H990433

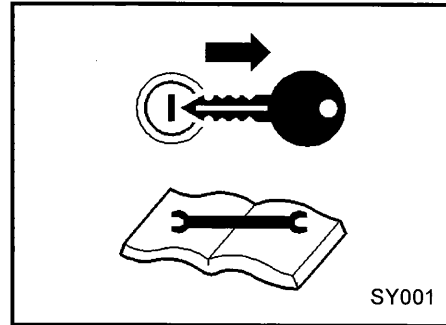
1.Safety

1.3 Caution during Inspection and Maintenance

WARNING

Hang a "Now Checking and under Maintenance" tag

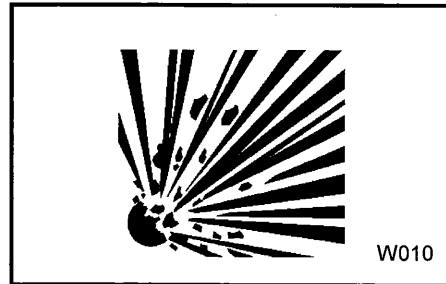
- Remove the starter key from the starter switch before starting inspection, and hang up a "Now Checking and under Maintenance" tag where it can be easily seen. The checker must keep the key during checking and maintenance.
- Remove the negative (-) side cable from the battery. If the above procedure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



WARNING

Refilling of compressor oil

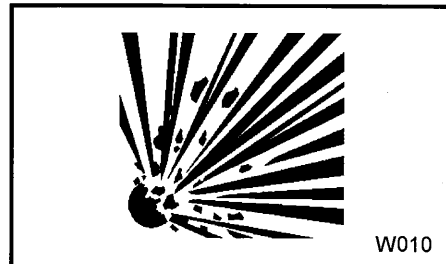
- When you refill the separator receiver tank with compressor oil, stop the engine, and make sure that the pressure gauge indicates 0MPa and there is no residual pressure in it, and then gradually loosen the oil filler cap for refilling oil.
- Note residual pressure in the separator receiver tank could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



WARNING

Be careful of high-pressurized air blowout

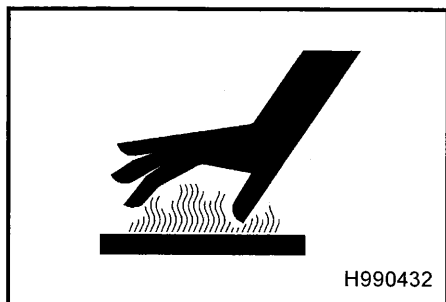
- After stopping the engine, make sure that pressure gauge indicates 0MPa. Even when the gauge shows 0MPa, open a service valve and further do not fail to make sure that there is no residual pressure in the air piping. Then start such a job as repair and maintenance.
- Residual air under pressure will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



WARNING

Draining separator receiver tank

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



1.Safety

WARNING

- 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.

Adjusting tension of belt

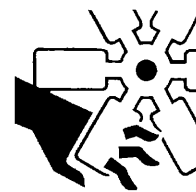


TR0304

WARNING

- 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.

Hands off from cooling fan



W009

WARNING

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

Cleaning by air-blow

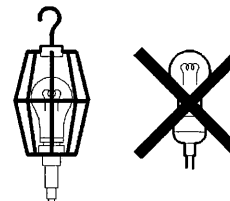


M003

CAUTION

- 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.

Lighting apparatus



TR0206

CAUTION

- 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.

Opening coolant water drain valve cap



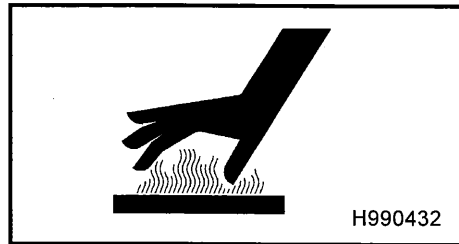
H990432

1.Safety

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.



CAUTION

Fear of fire

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



CAUTION

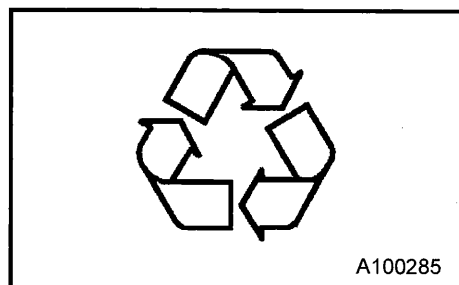
Handling of electrical equipment engine

- 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.



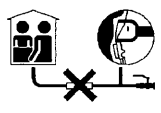




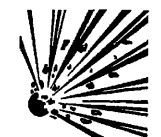

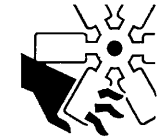

1.Safety

1.4 Safety Warning Labels

Following labels are attached to the machine.

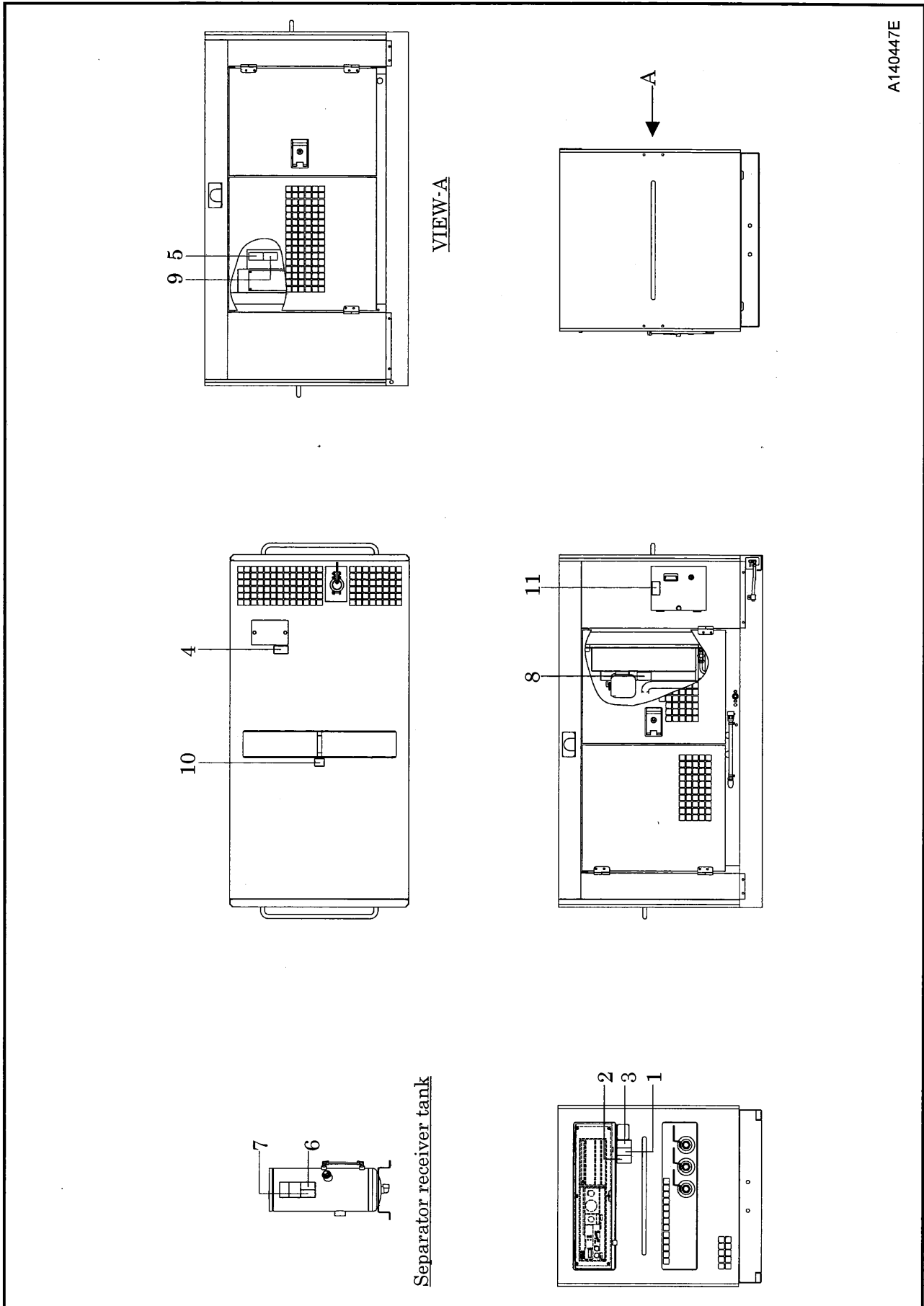
Keep them clean at all times. If they are damaged or missing, immediately place an order with your nearest dealer for replacement. Part numbers are indicated on the lower right corner of the label.

Adhere a new one to the original location.

1	2	3	4	5
▲ DANGER	▲ WARNING	▲ WARNING	▲ CAUTION	▲ CAUTION
				
DO NOT BREATHE COMPRESSED AIR Do not use this compressed air for breathing air because it can cause fatal accidents. Never breathe it.	BEWARE OF EXHAUST GASES When you operate machine INDOORS or in TUNNEL , provide good ventilation. Poor ventilation can cause fatal accident.	BEWARE OF RESIDUAL PRESSURE Release residual pressure inside pipings and hoses and then disconnect them. Disconnection with residual pressure still left can cause serious injury.	PREVENT BURNING ACCIDENT Do not open radiator cap while it is still hot.	PREVENT BURNING ACCIDENT When work is required near hot parts, wait for the parts to cool down fully before starting work.
39176 73600	39176 73300	39176 73400	39176 69600	39176 69500
6	7	8	9	10
▲ WARNING	▲ CAUTION	▲ WARNING	▲ WARNING	
				
BEWARE OF HIGH PRESSURE AIR BLOW OUT Oil supply and/or maintenance jobs with residual pressure left in tank are very dangerous. So release the residual pressure first.	PREVENT FIRE ACCIDENT Periodically check compressor oil and oil separator surely. Failure of this fire accident.	BEWARE OF ENTANGLEMENT Keep your hands AWAY from fan during operation. Entanglement in the fan can cause serious injury.	BEWARE OF ENTANGLEMENT Keep your hands AWAY from moving parts such as V-belts, pulleys etc. Entanglement in them can cause serious injury.	LIFTING BAIL
39176 69800	39176 69700	39176 73500	39176 73800	39176 69300
11				
D DIESEL FUEL	FLAMMABLES			
Do not use any fuel other than diesel fuel				
<ul style="list-style-type: none"> • Engine can be damaged if you use any fuel other than diesel fuel. • Stop operation and keep away from flammable during refueling. 				
39178 99730				

1.Safety

The pasting position of safe warning label is as follows.

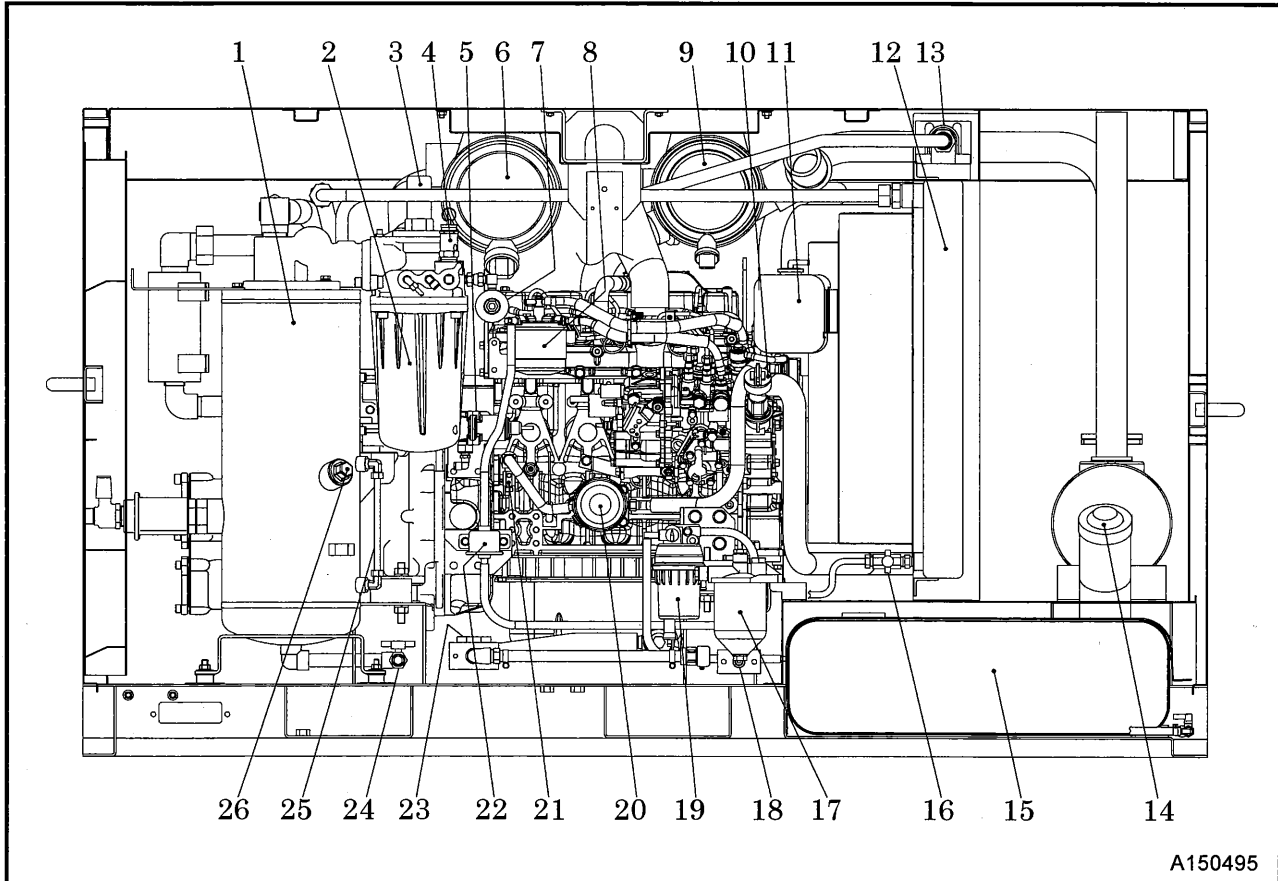


MEMO

Lined area for writing the memo.

2.Part Names

2.1 Internal Components and Part Names

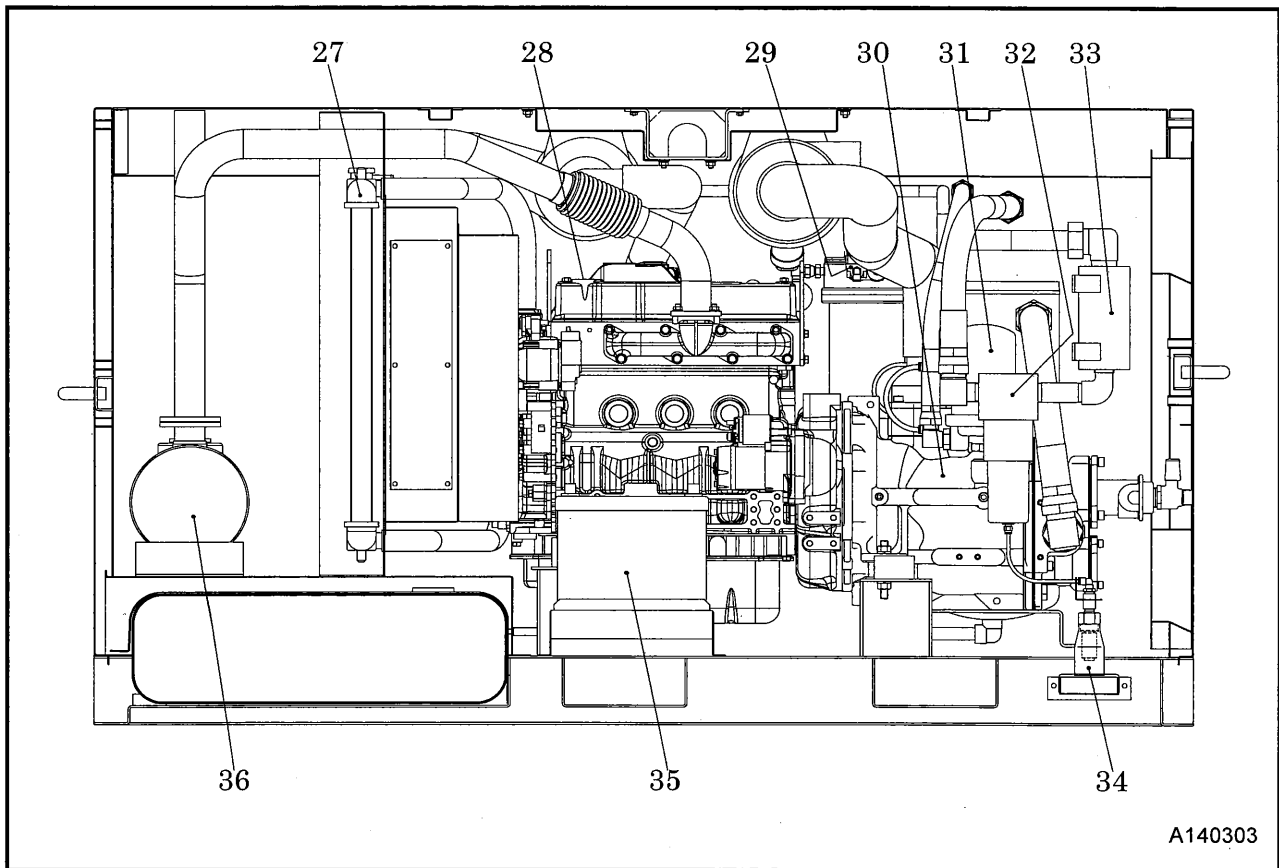


A150495

No.	Description	Function
1	Separator receiver tank	For separating air and oil from compressed air in the system.
2	Oil separator	For separating oil mist mixed in compressed air in the system.
3	Pressure control valve	For keeping the pressure in receiver tank constantly higher than a certain level in the system.
4	Safety valve	For releasing compressed air to the atmosphere when the pressure rises higher than the rated pressure in the system.
5	Speed regulator	For adjusting engine speed in the system.
6	Air filter (For compressor)	For filtering the dust floating in the air in the system.
7	Pressure regulator	For regulating the compressor pressure in the system.
8	Fuel filter	For filtering dusts or foreign things in fuel in the system.
9	Air filter (For engine)	For filtering the dust floating in the air in the system.
10	Engine oil filler port	For supplying or adding engine oil.
11	Reserve tank	For checking coolant level and supplying it.
12	Oil cooler	For cooling compressor oil in the system.
13	By-pass valve	For keeping compressor oil at optimum temperature.
14	Fuel tank filler port	For supplying or adding fuel.
15	Fuel tank	For storing fuel.
16	Oil cooler drain valve	For draining compressor oil from oil cooler and oil line.
17	Fuel pre filter	For filtering dust and foreign things mixed in fuel oil and also for separating water in the system.
18	Radiator drain plug	For draining engine coolant.
19	Sediment	For separating coolant from fuel in the system.
20	Engine oil filter	For filtering engine oil in the system.

NOTE) Please refer to page 2-2 for the function of item No.21~26.

2.Part Names



No.	Description	Function
21	Coolant drain plug	For draining coolant from engine block.
22	Fuel air-bleeding electromagnetic pump	For automatically bleeding air from fuel pipes in the system.
23	Engine oil drain valve	For draining engine oil.
24	Separator receiver tank drain valve	For draining condensed water from separator receiver tank.
25	Compressor oil level gauge	For checking compressor oil level.
26	Compressor oil filler port	For supplying or adding compressor oil.
27	Radiator	For cooling the coolant for engine in the system.
28	Engine	For driving the compressor in the system.
29	Solenoid valve for starting unloader (SV)	For controlling operation upon starting.
30	Air-end	For compressing air in the system.
31	Compressor oil filter	For filtering compressor oil in the system.
32	Drain separator	For separating water from compressed air cooled in after-cooler in the system.
33	After cooler	For cooling compressed air in the system.
34	After cooler drain outlet	For collecting condensate and draining it in the system.
34	Drain warming valve	For preventing freezing of the water separated in drain separator.
35	Battery	For electrically starting engine.
36	Exhaust muffler	For silencing the noise caused before discharging the air.

NOTE) Please refer to the previous page for installation position of item No.21~26.

3. Installation

3.1 Transportation

3.1.1 Lifting up

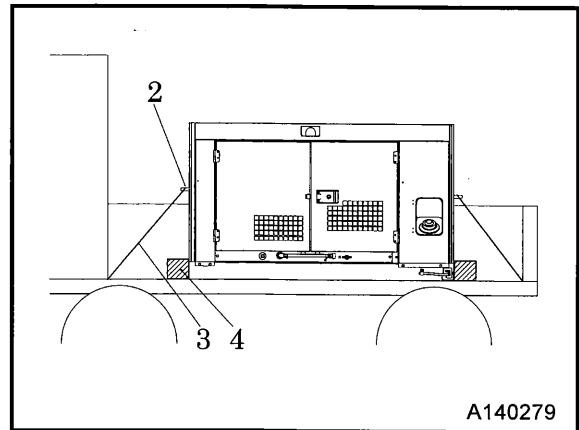
When loading and unloading the machine, be sure to use the lifting bail "1" provided on the center of the machine top.

<Procedure>

- ① Before lifting the machine up, make sure to check the lifting bail for any crack and loosened bolts.
- ② Connect the hook of the crane or shackle with lifting bail "1" 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 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.

3.1.2 Mounting the machine on the truck bed

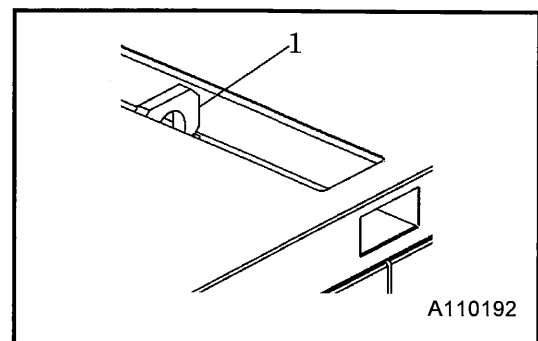
- When moving or transporting the machine from site, place it on truck bed and fix it to the truck bed with the ropes "3" using the hooks "2" fitted at front and rear, and apply the choke "4" without fail.



WARNING

- Never get under the machine which is lifted up, 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.

Transportation



3. Installation

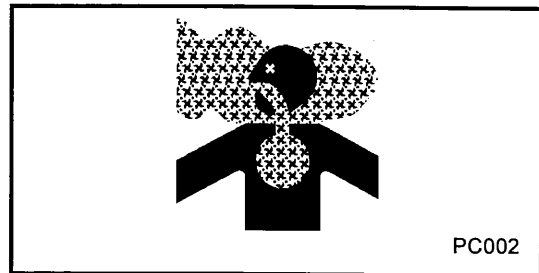
3.2 Installation

- The machine has to be parked horizontally on a level place. the machine should be installed within 10° degree inclination.
- 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 more than two 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

- Exhaust gas from the engine is poisonous, and it could cause casualties when it is inhaled. Avoid using the machine in an insufficiently ventilated building or a tunnel. When the machine is unavoidably used in such insufficiently ventilated place, ventilation devices and ventilation pipe should be provided for better ventilation.

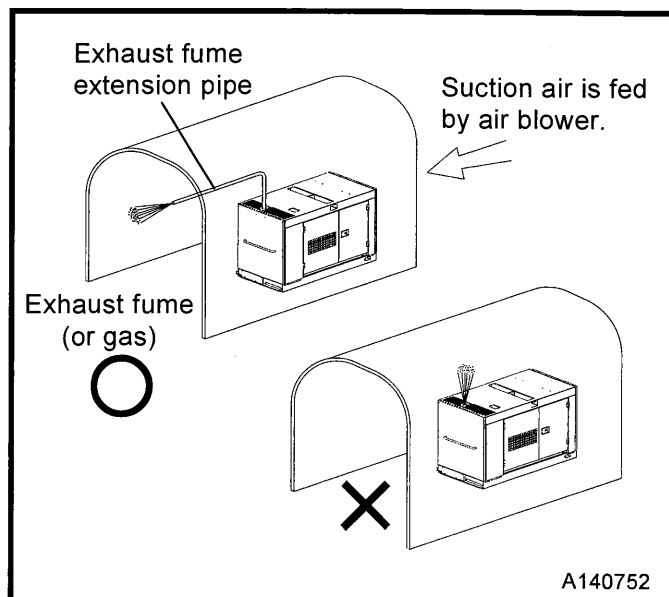
Ventilation



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.

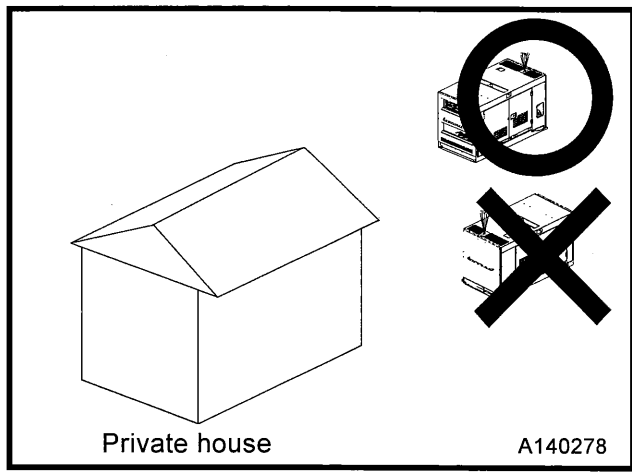


3. Installation

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.

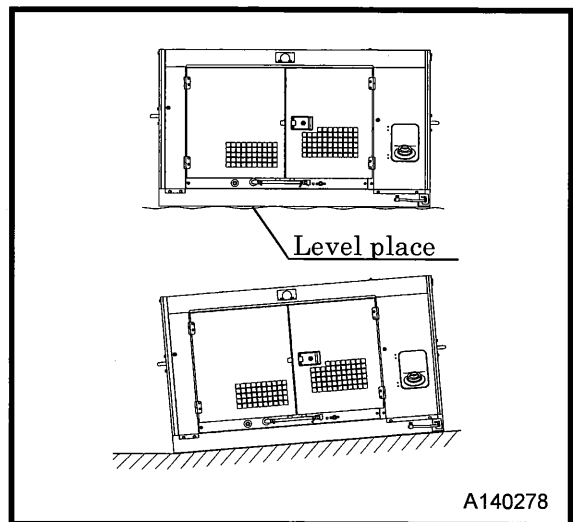
How to locate the machine



CAUTION

- When installing the machine at a sandy place, make sure that exhaust from the generator or radiator does not blow the sand up in the air, or into the machine.
- In case that the machine has to be installed inevitably on any rough and uneven ground; it is necessary to insert square wooden bars under the machine for levelling it.

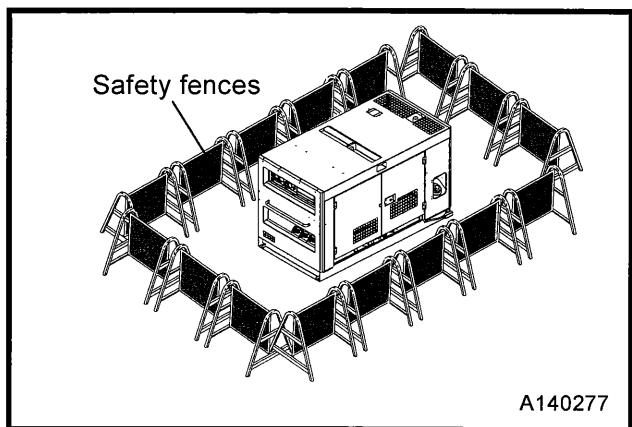
Installation



CAUTION

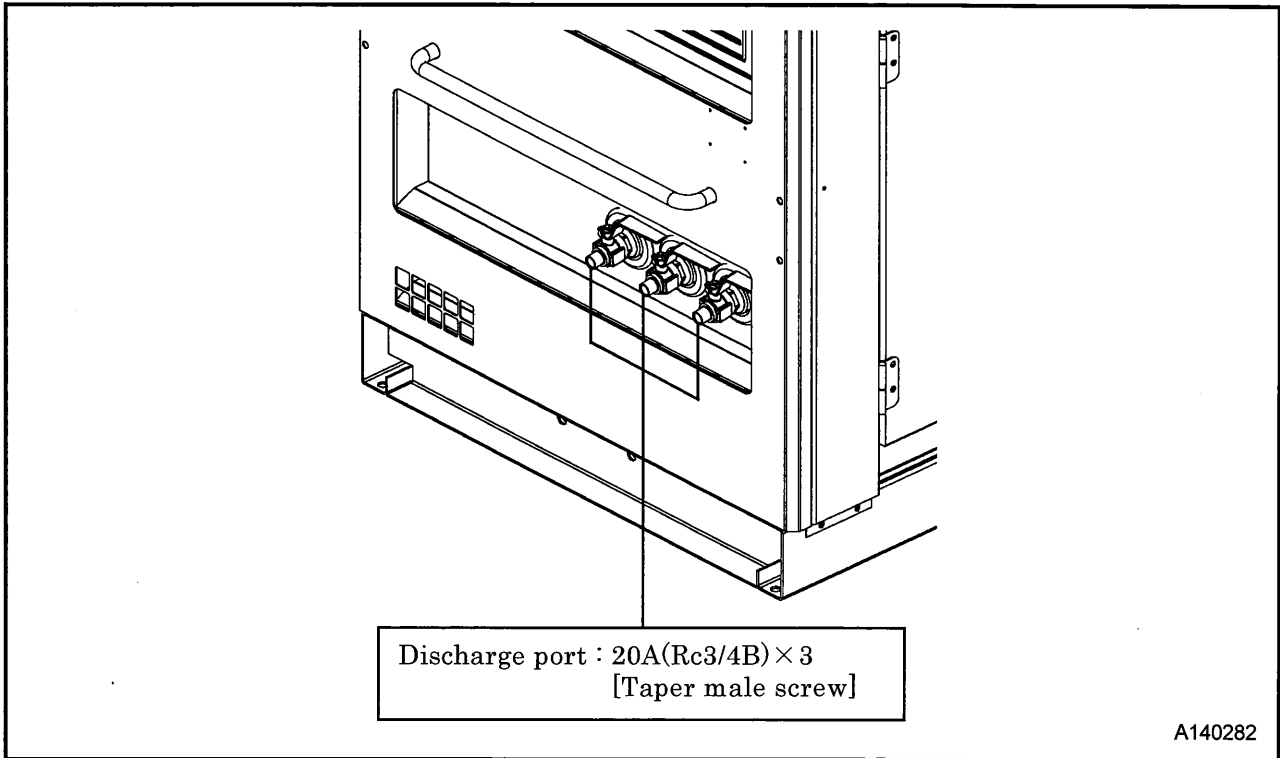
- In order to prevent from entering the jobsite or touching the equipment any other persons than the persons engaged in the job, please prepare for safety fences around the machine:

Preparation of safety fences



3.Installation

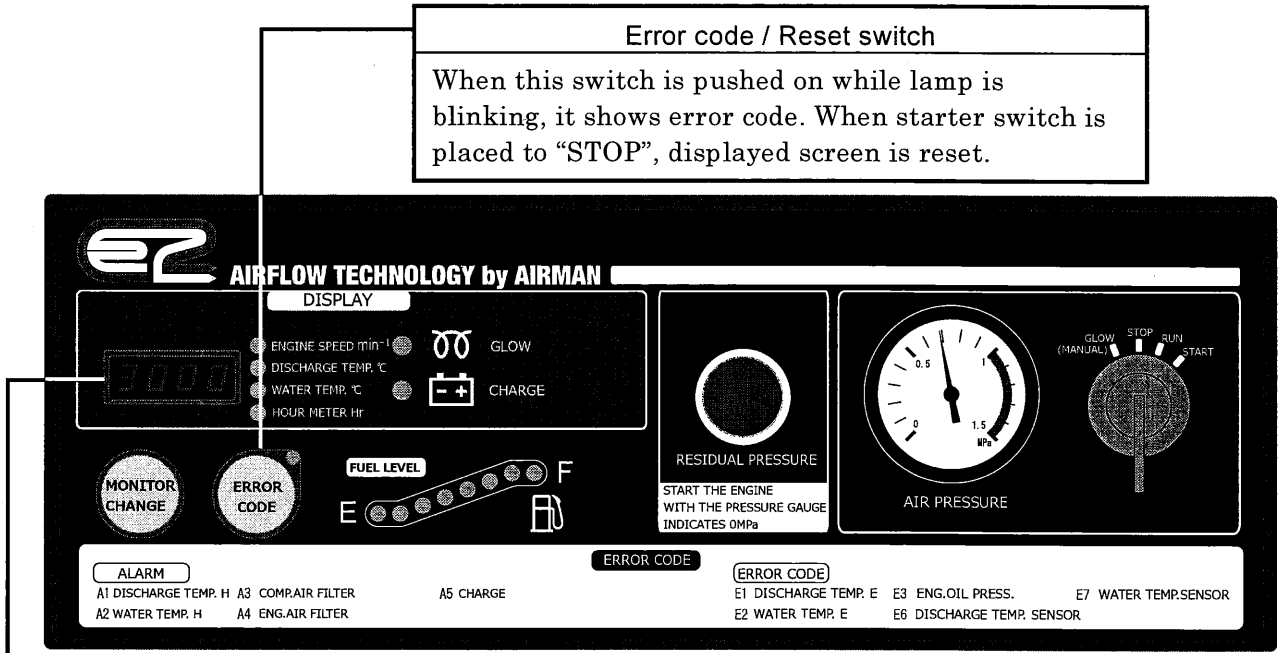
3.2.1 Service valve



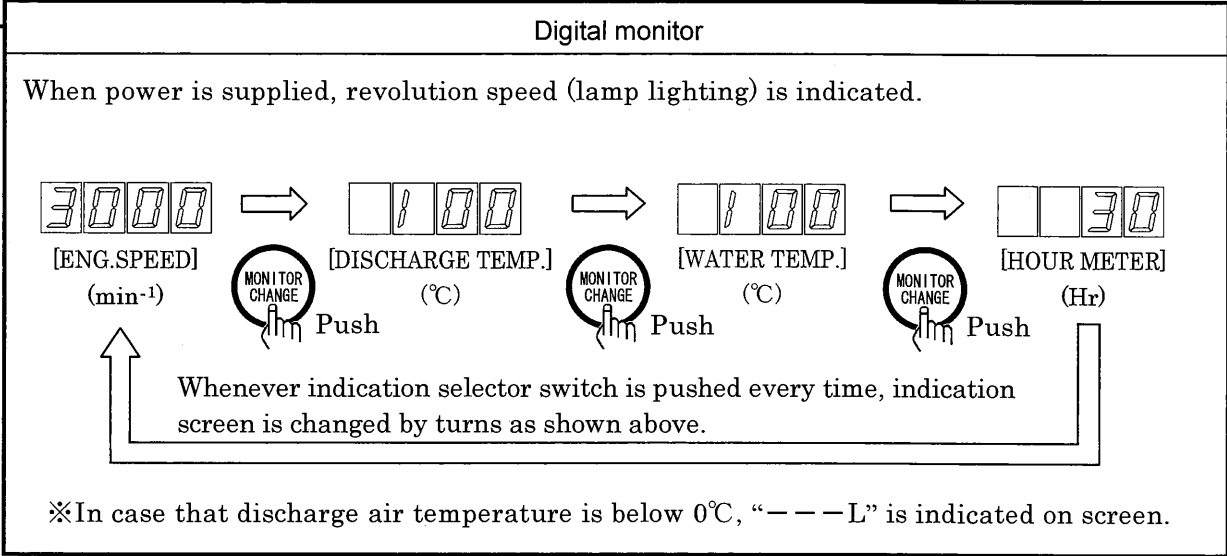
4.Operation

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:



A140425E



4.Operation

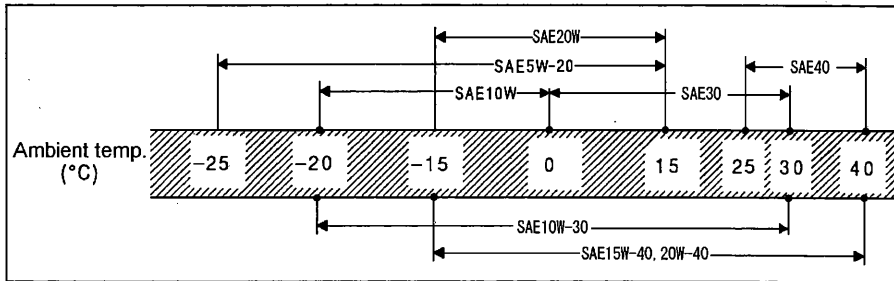
4.2 Lubricating oil · Coolant · Fuel

4.2.1 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)



A100293E

- Use engine oil recommended by us.

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.

4.2.2 Compressor oil

IMPORTANT

Do not mix compressor oil

- Be sure to use recommended oil listed below.

Maker and Brand of Recommended Oil

Maker	Brand
SHELL	SHELL CORENA S3R(VG32)
JX NIPPON OIL & ENERGY CORPORATION	FAIRCOL RA32

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

4. Operation

4.2.3 Coolant

- Use soft water of good quality such as tap water for coolant.
- When the unit is used in a cold region and possible freezing is expected, it is recommended to use LLC (Antifreeze) for the coolant. adjust mixing ratio of LLC (Antifreeze) with water according to the temperature. (When the unit 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).

4.2.4 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

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

4. Operation

4.3 Check before starting unit

Be sure to check the unit before operation.

When any abnormality is found, be sure to repair it before restarting the unit.



Check before starting unit

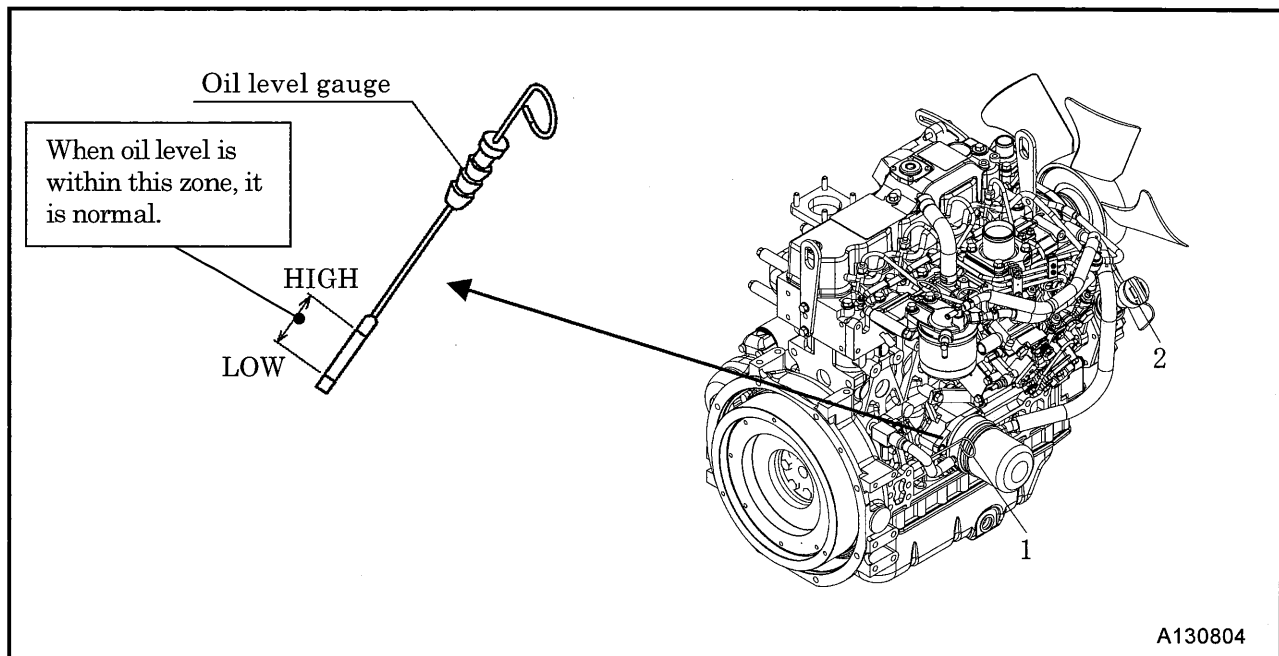
- Be sure to make daily checks before operation. If the unit is operated without prior check and without noticing its abnormality, such operation could cause seizure of components or may even cause fire.

4.3.1 Check engine oil level

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

<Procedure>

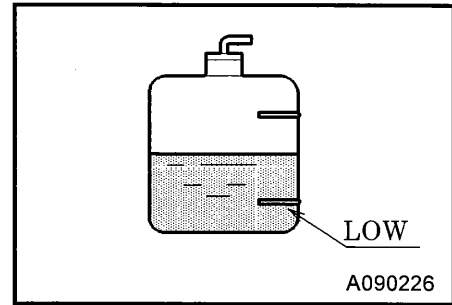
- ① Pull out the oil level gauge "1", and wipe it with a clean cloth.
 - ② Then, re-insert the oil level gauge "1" fully and pull it out again. If the oil level gauge "1" shows the oil level between LOW and HIGH, it is normal.
 - ③ When the oil level is below its LOW, add engine oil from oil filler port "2".
- While checking oil level, check also for contamination. If the oil is found dirty, contaminated or should it be changed according to the periodic inspection list, change the oil. (See 6.5.1)



4. Operation

4.3.2 Check coolant level

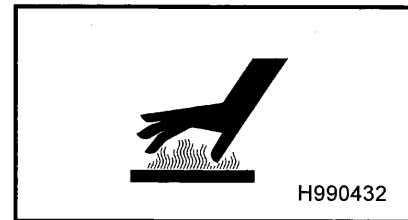
- Check the coolant level in the reserve tank. If it is lower than the limit, open the cap and replenish the coolant. (Level must be kept above LOW mark.)
- When there is a little water or no water in the reserve tank, remove the radiator cap and make sure to check the water level. Then supply coolant to the radiator and also the reserve tank, if necessary. (See 6.5.17)



CAUTION

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

Taking off the radiator cap



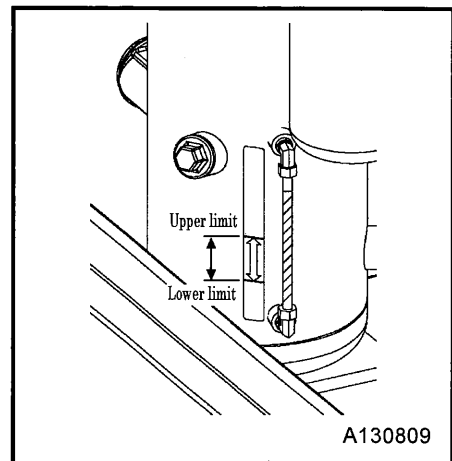
IMPORTANT

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

4.3.3 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 6.5.6)

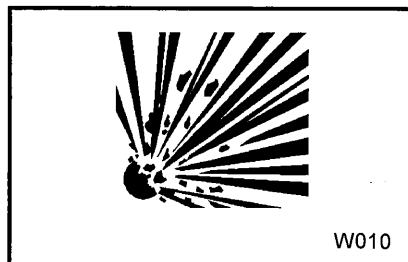
※Supply of excessive oil can cause deterioration of oil separation performance and the like. Never supply oil at a higher level than the "proper level" of oil level gauge when the machine is on standstill.



WARNING

- When you refill the separator receiver tank with compressor oil, stop the engine, and make sure that the pressure gauge indicates 0MPa and there is no residual pressure in it, and then gradually loosen the oil filler cap for refilling oil.
- Should any residual pressure be left in the separator receiver tank, hot compressed air and hot compressor oil jetting out could cause burning or serious injury to persons nearby.

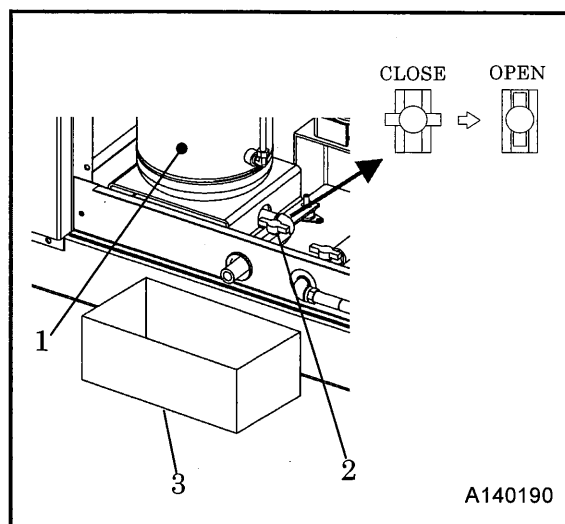
Refilling of compressor oil



4.Operation

4.3.4 Drain separator receiver tank

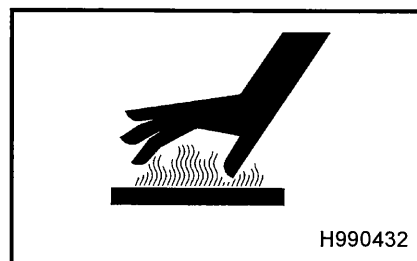
- Gradually opening the drain valve “2” fitted under the separator receiver tank “1” as shown in the fig, drain the condensate.
- Be careful not to fully open the drain valve “2” . Otherwise, much oil may be lost.
- After draining the oil completely, close the drain valve “2” firmly.
- Drain the condensate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



4.3.5 Check fuel

- Before starting operation, make sure to check the level of residual fuel so that fuel shortage during operation can be avoided.
- Drain condensate accumulated at the bottom of fuel tank whenever necessary.

CAUTION

Fire prevention

- Do not, under any circumstance, bring lit cigarettes and/or matches to the fuel.
- The fuel is extremely flammable and dangerous. Be careful of fire because it is very likely to catch fire.
- Refuel only after stopping the engine, and never leave open fuel can near the machine. Do not spill. It could cause a fire. When it is spilt, wipe it up completely.
- Refilling fuel tank should be done in an outdoor well-ventilated place.
- Do not fill fuel oil up to the cap level. When fuel tank is filled up to the cap level, fuel oil will be overfilled due to volume expansion caused by rise of ambient temperature. Further, fuel will be possibly spilled from fuel tank due to vibration caused during movement and/or transportation of machine.

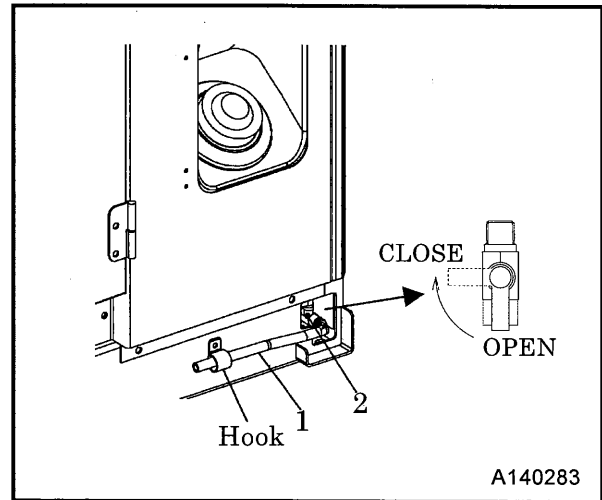


4.Operation

4.3.6 Drain fuel tank

<Procedure>

- ① Open the drain valve "2" from Remove the drain hose "1" from the hook, please discharge the drain that has accumulated in the fuel tank.
 - ② After drainage all been discharged, please attach the drain hose to hook it securely close the drain valve.
- Drain the condensate in container, and then dispose of condensate according to the designated regulations.

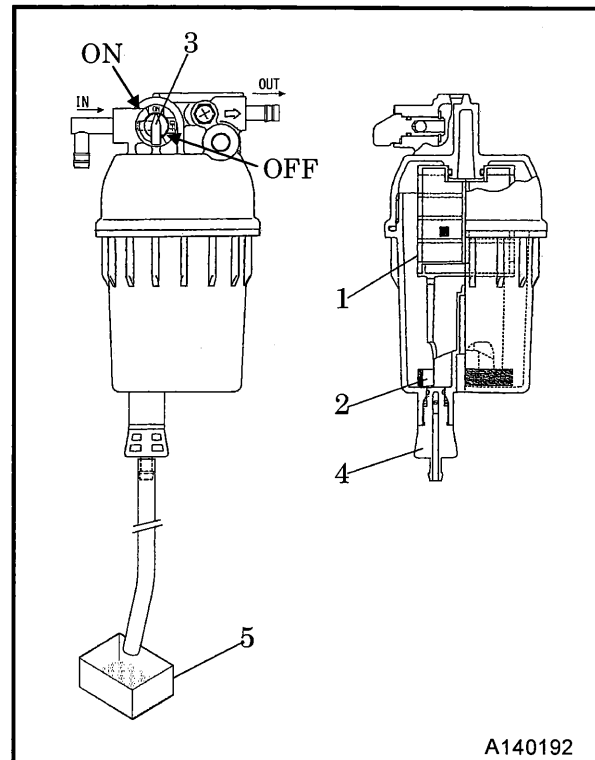


4.3.7 Check sedimenter for condensate

When red float "2" under element "1" in fuel filter is raised up to upper level, drain water.

<Procedure>

- ① Turn fuel selector valve "3" to "OFF" position.
 - ② Loosen the drain valve "4" and drain out condensed water inside.
 - ③ Make sure to tighten the drain valve "4" securely, after draining the condensate.
- Drain the condensate in container "5", and then dispose of condensate according to the designated regulations.



4.3.8 Check wiring of each part

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

4.3.9 Check piping of each part

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

4.3.10 Check in the machine

Please check that there are no unnecessary things or anything combustible dust on machine.

When there is a combustible material, such as dead leaves, wood, waste paper in the vicinity, please remove the muffler and exhaust pipe, which can become very hot.

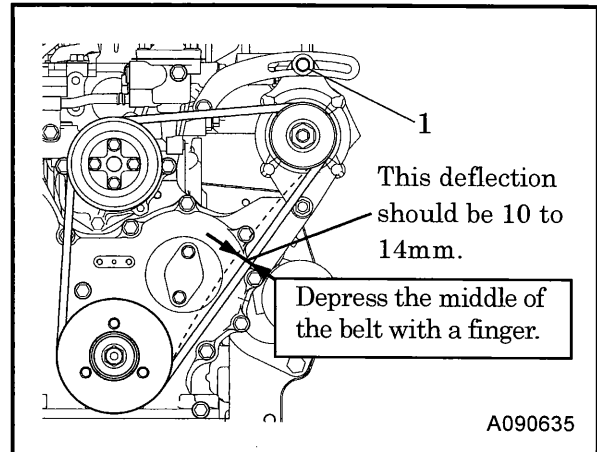
4.Operation

4.3.11 Check belt tension

- Follow the procedure below to adjust tension of belt.
- Adjust the tension by gradually loosening the fastening bolt of the alternator.

<Procedure>

- ① Visually check if there are any cracks or tears in the belt.
- ② Adjust the belt tension by loosening the fixing bolt "1" of the alternator so that the belt can deflect 10 to 14mm when pressed at the center of the belt with approx.98N·m (10kgf·m) force.
- ③ Be careful not to leave any grease or LLC on a belt while changing it. If any such material is left, wipe it off completely.



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.Operation

4.4 Operation

4.4.1 Procedure to start the unit

<Procedure>

- ① Make sure that the pressure gauge indicates 0MPa.
- ② Close fully service valve.
- ③ Turn the starter switch "1" to "RUN" position, and the glow lamp "2" goes on.
- ④ As soon w lamp "2" has gone out, turn the starter switch "1" fully clockwise to start up the engine.

After starting, unload operation automatically begins.

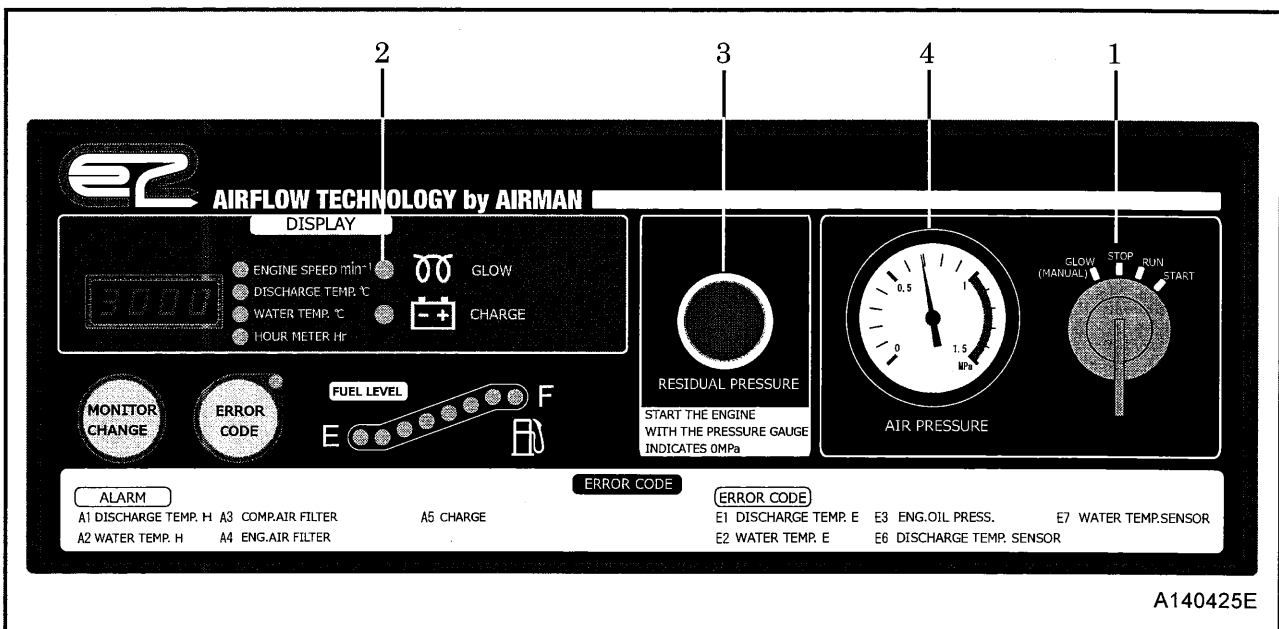
(Never hold the key in the "START" position for longer than 15 seconds or the starter motor will overheat.)

- When any residual pressure be left in the separator receiver tank, residual pressure start lamp "3" turn on, and a starter doesn't revolve even if the starter switch is turned to the position of "START".
- The speed of engine revolution will be approx. $1,400 \text{ min}^{-1}$ ($1,300$ to $1,500 \text{ min}^{-1}$) at the time of starting unload operation.

According to engine cooling water temperature, the times in the following table are required.

Engine coolant temperature	Required time for preheating	Required time for starting unloader operation
Higher than 0°C	2 sec	10 sec
Lower than 0°C	20 sec	Shorter time either 120 seconds or the time when engine coolant temperature becomes higher than 0°C.

- ⑤ Once the engine has started up, leave it running to warm-up for 5 minutes.
The discharge air pressure gauge "4" in this condition ranges from 0.3 to 0.9MPa.
 - ⑥ After finishing warming up operation, open the service valve provided at the outlet of compressed air and start service job.
- ※ It is useful to detect abnormality of the machine in early stages when operation conditions and a daily checking result etc. are recorded in diary.



4. Operation

WARNING

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

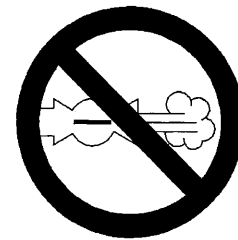


PK0028

CAUTION

Operation with compressed air supply port opened is prohibited

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



D003

IMPORTANT

Be sure to warm-up

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

4. Operation

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

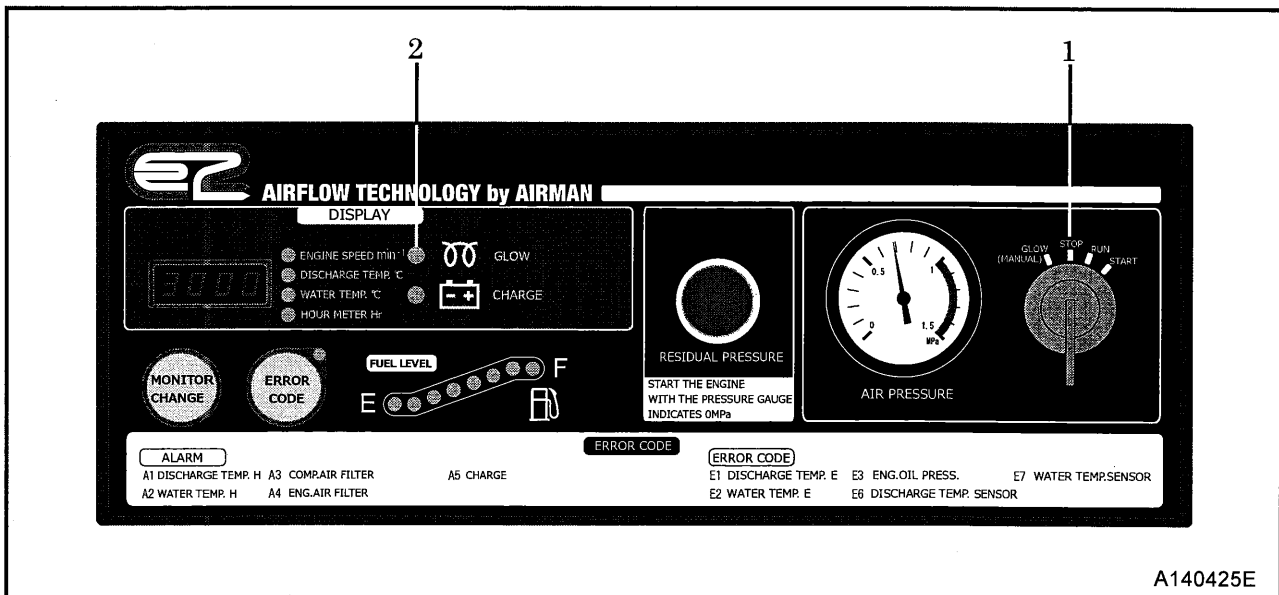
- When the engine fails to start up even after performing the startup procedures ① to ④, do not keep the starter running, but set the starter switch back to "STOP" and wait about 30 seconds. Then, repeat the startup procedure once again.
- If the repeated procedure does not allow the engine to run, the following causes are suspected. Therefore, check the following:
 - No fuel
 - Clogging of fuel filter
 - Discharge of battery (Low cranking speed)
 - Ambient temperature is too low.

4.4.3 How to start the unit at low temperature

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

<Procedure>

- ① Close fully service valve.
- ② Turn starter switch "1" to "GLOW" position for preheating.
(In this case, preheating lamp "2" doesn't turn on)



CAUTION

- Never try this procedure continuously longer than 15 seconds.
- Should change a different types of engine oil, compressor oil, LLC, or fuel when operating a machine in cold weather.

IMPORTANT




Operation under Cold Weather Conditions below -5°C

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

4. Operation

4.4.4 Gauge Indication while operating

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

Protection device		Indicator lamp	
		GLOW	CHARGE
Monitor			
Starting	Starter switch set to "RUN" position	● OFF ※	 ON
	In operation	● OFF	

		Discharge pressure gauge
In operation	No load (Unload)	0.72 to 0.9 MPa
	Full load	0.4 to 0.7 MPa

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

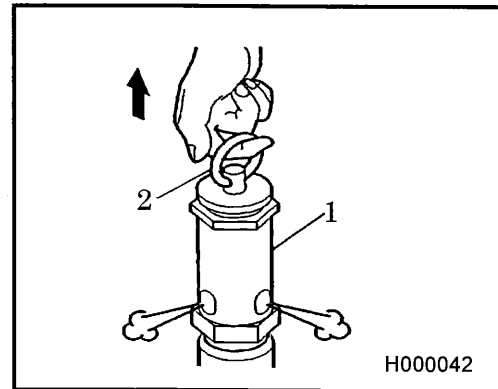
IMPORTANT

- Continuing equipment operation at a lower pressure than 0.4MPa may cause overheating, since it affects the separation of lubricating oil inside the oil separator and reduces the oil flow to the compressor air-end, resulting in temperature rise.

4. Operation

4.4.5 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 ring “2” of the safety valve “1” to check the performance. It is performing normally when the compressed air jets out with slight force at a discharge pressure between 0.72 to 0.9MPa. Wear safety glasses.
- Pressure setting for safety valve is 1.0MPa.



WARNING

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

4.5 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.
(Starting unloader valve should stop with “RUN” position.)
 - 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.

4.6 Air bleeding in fuel line

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

<Procedure>

- ① Replenish fuel.
- ② When starter switch is turned to “RUN” position, electromagnet pump starts to automatically bleed air in fuel line.
- ③ Air bleeding is completed about 1 minute.

IMPORTANT

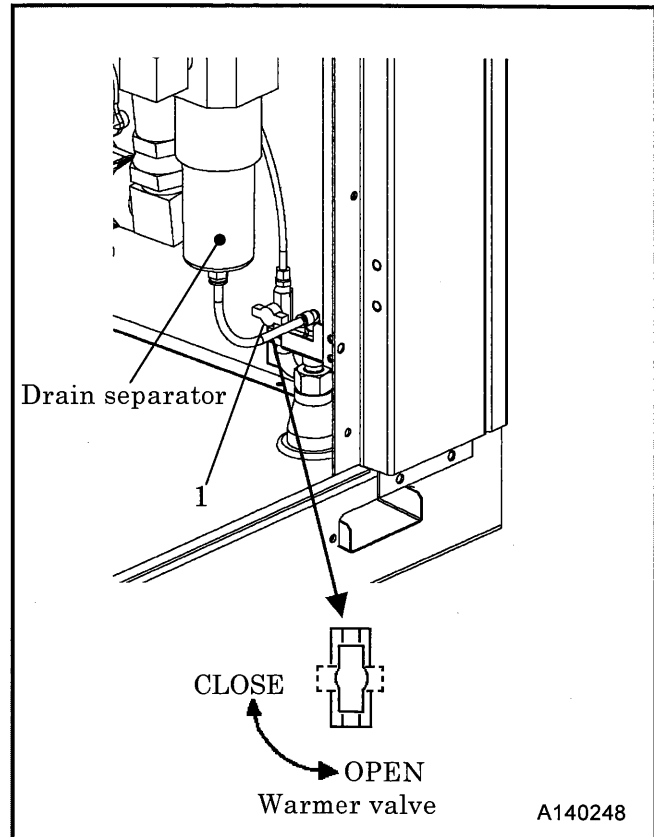
- Engine will never startup until finish air breeding even though starter switch is turned to “START” position.
- Never hold the key in the “START” position for longer than 15 seconds or the starter motor will overheat.
- When the engine fails to startup even after performing the startup procedures, 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.

4. Operation

4.7 Operation of after cooler type

4.7.1 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°C. But when freezing is impossible, the machine can be operated more efficiently if the valve is closed.



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 “RUN” 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	A1	Lamp flickers when the air temperature at the outlet of the air-end reaches 115°C.	See “Troubleshooting”
WATER TEMP.H	A2	Lamp flickers when coolant temperature reaches 105°C.	
COMP. AIR FILTER	A3	Lamp flickers when air filter gets clogged and suction resistance increases. [Actuating resistance is more than 6.2kPa.]	Clean Replace
ENG. AIR FILTER	A4		
CHARGE	A5	Belt loosened and/or cut Faulty generation of alternator	See “Troubleshooting”

[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	E1	Lamp displays when the air temperature at the outlet of the air-end reaches 120°C.	See “Troubleshooting”
WATER TEMP.E	E2	Lamp displays when coolant temperature reaches 110°C.	
ENG. OIL PRESS.	E3	Lamp goes on when engine oil pressure drops. [The function pressure is below 0.05MPa.]	
DISCHARGE TEMP.SENSOR	E6	It is displayed when air temperature sensor at the outlet port of compressor air end is disconnected.	
WATER TEMP.SENSOR	E7	It is displayed when engine coolant temperature sensor is disconnected.	

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 unit, the faster you can find a problem and solution.
- This chapter describes the state, cause and countermeasures of important troubles in detail:

Symptom	Cause	Countermeasures
Low starter revolution speed.	(1) Battery malfunction.	Check battery→ Charge, change
Starter rotates but engine does not start.	(1) Fuel filter clogging. (2) Malfunction of fuel stop solenoid. (3) No fuel.	Disassemble, clean, and change Check fuse Change solenoid Check connector Replenish fuel
Discharge air pressure does not reach 0.7MPa.	(1) Pressure regulator insufficient adjustment. (2) Pressure regulator trouble.	Re-adjust (fasten) Change
Engine does not reach its maximum speed.	(1) Improper length in speed regulator rod. (2) Unloader orifice clogging. (3) Malfunction speed regulator. (4) Engine trouble. (5) Fuel filter clogging. (6) Water is accumulated in sedimenter. (7) Air filter element clogging.	Re-adjust Disassemble/Clean Disassemble/Check Call your nearest dealer Disassemble/Change Drain water Clean or change of element
Revolution drops before discharge air pressure reaches 0.7MPa.	(1) Pressure regulator insufficient adjustment. (2) Trouble of pressure regulator. (3) Unloader orifice clogging.	Re-adjust (fasten) Change Disassemble/Check
Engine does not reach minimum revolution at unload.	(1) Improper length in speed regulator rod. (2) Malfunction speed regulator.	Re-adjust Disassemble/Check
Safety valve relieves at unload.	(1) Pressure regulator insufficient adjustment. (2) Speed regulator diaphragm damaged. (3) Unloader valve damaged·Faulty seat (4) Faulty safety valve. (5) Improper length of speed regulator rod	Re-adjust (loosen) Change Change Change Re-adjust (elongate)
Oil mixes in air. (poor oil separation)	(1) Scavenging orifice strainer clogging. (2) Excessive oil in receiver tank. (3) Low discharge pressure. (4) Oil separator deteriorated.	Disassemble/Clean Drain to its proper level Disassemble and check of pressure control valve Check /Change
Insufficient free air delivery.	(1) Air filter element clogging. (2) Unloader valve cannot fully open. (3) Engine does not reach rated speed.	Clean or change of element Call your nearest dealer Call your nearest dealer

5 Failure cause and measures

Symptom	Cause	Countermeasures
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 switch. (4) Loosened or disconnected wiring or connector.	Replenish oil Change Change Check/Fasten
Water found mixed in air. (Condensate separation malfunctioned.) For after-cooler type only	(1) Silencer fitted at draining portion of air pipe clogged. (2) Inside of piping between drain separator and silencer clogged with dust.	Disassemble/Clean/Change Disassemble/Clean
It is indicated that coolant temperature is abnormal, and engine stops.	(1) Radiator clogging. (2) Faulty thermostat. (3) Faulty coolant temp. switch. (4) Low coolant level. (5) Belt slippage. (6) Loose wiring, connectors and disconnection. (7) Coolant temp. sensor is disconnected.	Clean Change Change Replenish Re-adjust tension Check/retighten Repair and replace
It is indicated that discharge air temperature is abnormal, and engine stops.	(1) Oil cooler clogging. (2) Oil filter clogging. (3) Faulty discharged air temp. switch. (4) Loose wiring connectors and disconnection. (5) Slippage of belt. (6) Shortage of compressor oil. (7) Discharge air temp. sensor is disconnected.	Clean Change Disassemble/Check Check/retighten Re-adjust tension Replenish oil Repair and replace

- 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

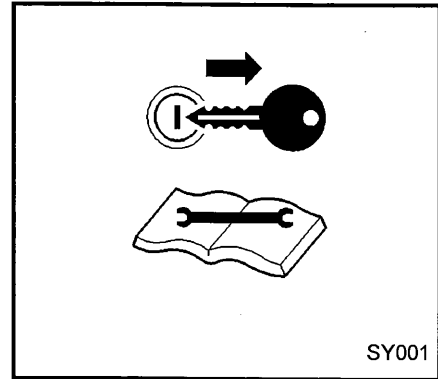
6.1 Important Items at Periodic Inspection and Maintenance or after Maintenance

The following table shows the inspection and maintenance intervals under normal operation conditions. When used or operated under hard environmental conditions, it is impossible to warrant the unit even if the above conditions are performed according to the intervals listed in the above table.

WARNING

Hang a "Now Checking and under Maintenance" tag

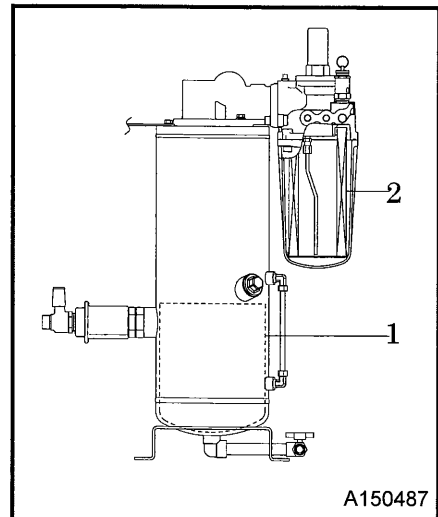
- Remove the starter key from the starter switch before starting inspection, and hang up a "Now Checking and under Maintenance" tag where it can be easily seen. The checker must keep the key during checking and maintenance.
- Remove the negative (-) side cable from the battery. If the above procedure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



CAUTION

Prevention of oil separator from catching fire

- Running the unit with old and deteriorated compressor oil will cause damage to bearings, or serious accident like ignition in a separator receiver tank. Be sure to change the oil completely at every scheduled interval. Be sure to perform oil change basically according to the specified interval. But if such oil is found much more contaminated before the interval, change the oil even before the specified period comes. In doing so, replace the oil completely and use our recommended oil.
- Be sure to perform following periodic inspection and maintenance:
 1. Check and change compressor oil
 2. Change oil separator
- Never mix the oil of different brands, or the mixed oil may deteriorate the oil quality.



6.Periodic Inspection/Maintenance

IMPORTANT

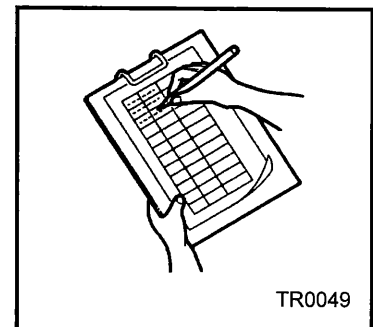
Directions: Prohibition of any other jobs or works than directed herein

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

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 your nearest dealer for information.

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



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

6.Periodic Inspection/Maintenance

6.3 Periodic Inspection List

(Unit:Hour)

Maintenance	Daily	Every 250	Every 300	Every 500	Every 1,000	Every 2,000	Every 3,000	Page	
Compressor	Check compressor oil level.	○						4-5	
	Drain separator receiver tank.	○						4-6	
	Check looseness in pipe connecting part, and wear and tear of pipe.	○						4-7	
	Check oil, water, fuel and air leak.	○						4-12	
	Check functions of all instruments and devices.	○						4-12	
	Performance check of safety valve.	○						4-12	
	Check and clean clogging of air filter element		○					6-10	
	Change compressor oil.			○ First time	○			6-11	
	Change compressor oil filter.			○ First time		○		6-12	
	Clean strainer in the scavenging orifice.				○			6-12	
	Change air filter element.				○			6-13	
	Check and clean drain outlet port of after cooler.				※1○			6-14	
	Clean outside of the oil cooler.					○		6-15	
	Clean outside of the after cooler.					○		6-15	
	Change diaphragm of speed regulator.					☆●		6-15	
	Change oil separator element.						●	6-17	
	Change nylon tubes.						☆●	6-17	
	Change pressure regulator.							●	6-17
	Change o-ring of unloader.							★●	6-18
	Check rubber hose.							★●	6-18
	Check consumable parts of the auto-relief valve.							★●	6-19
	Check consumable parts of the vacuum relief valve.							★●	6-19
	Performance check of pressure control valve.							★●	6-19
Check and change o-ring and piston of pressure control valve.							★●	6-19	

Such items marked ○ shall be carried out by customers.

For the following items or clauses marked ●, contact us directly or our distributors because they require expert technical knowledge on them.

Regarding the item marked ※1:When water is found mixed in the discharged air, perform cleaning work even before the specified interval comes.

The items or parts marked ☆ should be replaced every 2 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 3 years.

6.Periodic Inspection/Maintenance

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

(Unit:Hour)

Maintenance	Daily	Every 50	Every 250	Every 500	Every 1,000	Every 2,000	Every 3,000	Every 6,000	Page
Check engine oil level.	○								4-4
Check coolant level.	○								4-5
Check fuel.	○								4-6
Drain fuel tank.	○								4-7
Check sedimenter for condensate.	○								4-7
Check looseness in pipe connectors, terminals and tear in wiring.	○								4-7
Check belt tension.	○								4-8
Change engine oil.		○ First time	○						6-6
Change engine oil filter.		○ First time	○						6-7
Check battery electrolyte.			○						6-7
Check and clean clogging of air filter element.			○						6-10
Change fuel filter.				○					6-12
Change air filter element.				○					6-13
Clean of element in sedimenter.				○					6-13
Change of element inside fuel pre-filter.				○					6-14
Clean outside of radiator.					○				6-15
Change coolant.						☆○			6-16
Clean inside of radiator.					●				6-15
Change fuel hose.						☆●			6-17
Clean inside of fuel tank.						●			
Change radiator hoses.							☆●		6-18
Change wiring harness.								●	

The items or parts marked ☆ should be replaced every 2 years even if they are not in disorder within their periodical maintenance interval because their materials will change or become degraded as time passes.

6.Periodic Inspection/Maintenance

6.4 Periodic Replacement of Parts

- Part number changes upon modification. For replacement of parts, make sure whether the part number is correct or applicable.

Part Name		Part Number	Quantity
Engine oil filter		41290 01100 (YANMAR 119005-35151)	1
Compressor oil filter		37438 08900	1
Air filter element	For compressor	32143 13000 (Inner element)	1
		32143 11800 (Outer element)	1
	For engine	32143 12900 (Inner element)	1
		32143 11700 (Outer element)	1
Fuel filter		43543 01400 YANMAR 129907-55801	1
Element in sedimenter	Element	YANMAR 129242-55730	1
	O-ring (For element)	YANMAR 24311-000160	1
	O-ring (For body)	YANMAR 24321-000750	1
Element in fuel pre-filter	Element "3"	43541 02400 YANMAR 41650-550800	1
	Gasket "4"	YANMAR 123325-35140	1
	O-ring "5"	YANMAR 24311-000120	1
Oil separator	Element	34224 03000	1
	O-ring	03402 15145	1
Diaphragm for speed regulator		36437 01500	1
Pressure regulator		36400 19000	1
Auto-relief valve & vacuum relief valve	O-ring "1"	21221 02100	2
	O-ring "2"	03402 25021	2
	O-ring "3"	03402 25008	2
Unloader valve	O-ring "1"	03402 10125	2
	O-ring "2"	03402 10070	1
	O-ring "3"	21441 04800	1
	O-ring "4"	21441 04900	1
Pressure control valve	O-ring "1"	03402 15075	1
	O-ring "2"	03402 25032	1
	Spring "3"	22144 07700	1
	Piston "4"	35303 03300	1
Solenoid valve	For starting unloader	46811 24100	1

6.Periodic Inspection/Maintenance

6.5 Maintenance Items

6.5.1 Change engine oil

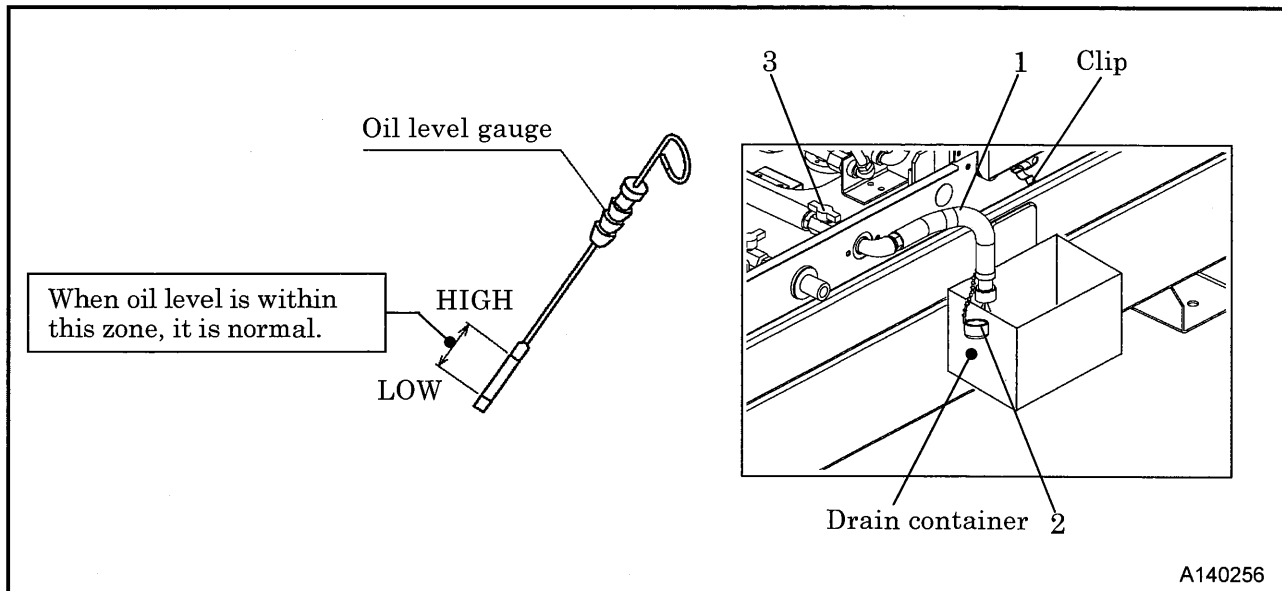
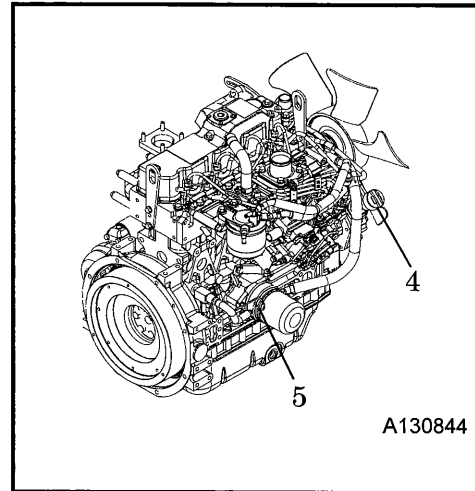
At 50 hours for the first change and at every 250 hours thereafter

<Procedure>

- ① Loosen the drain valve "3" located inside of the frame to drain out the used oil to drain container after take off a drain hose "1" from the clip and take off a cap "2" from hose end.
- ② When the oil is completely drained, close the drain valve and return the drain hose to clip after put the cap back on the hose end. Refill new engine oil through the oil filler "4" after finished oil drain.

[Quantity of oil : approx. 7.4L]

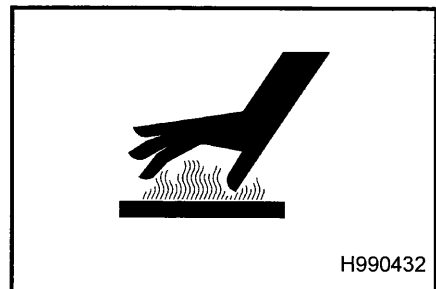
- ③ After supplying oil, pull out the oil level gauge "5" and wipe it out.
- ④ Then, re-insert the oil level gauge fully and pull it out again. If the dipstick shows the oil level between LOW and HIGH, it is normal.



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.



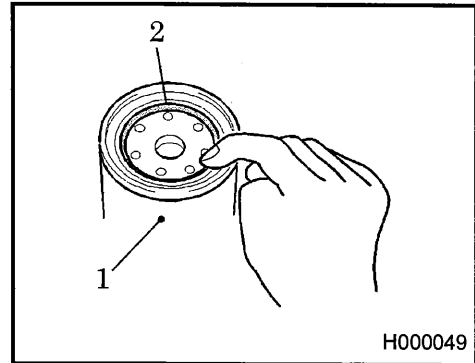
6.Periodic Inspection/Maintenance

6.5.2 Change engine oil filter

At 50 hours for the first change and at every 250 hours thereafter

<Procedure>

- ① Remove the oil filter "1", using a filter wrench.
- ② Screw in the new oil filter with the packing "2" coated slightly with oil. (For part number, see 6.4)
- ③ After the packing touches the sealing face, tighten another 3/4 times by hand.
- ④ After installing the oil filter, check it for any leak during operation.



6.5.3 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 6.5.4. for method of specific gravity measurement and recharging the battery.

2. Enclosed type battery:

Check the indicator on top surface of the battery.

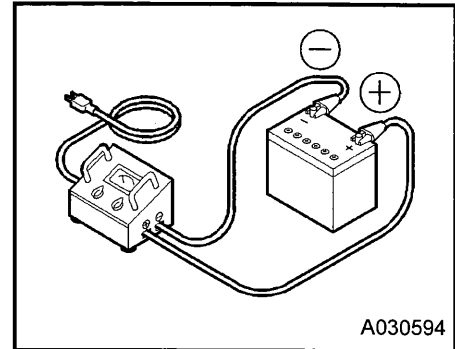
If the indicator shows that charge is needed, recharge the battery immediately.

6.Periodic Inspection/Maintenance

6.5.4 Maintenance of battery

[Charge battery]

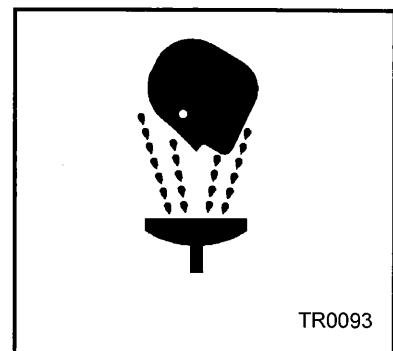
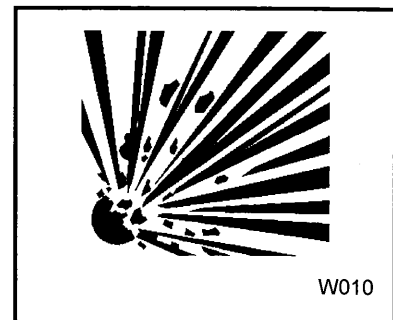
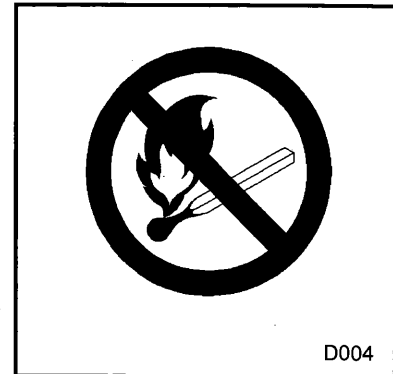
- Be sure to read the operation manual of the battery charger to know if it is applicable, before using it.
- Disconnect the cable between battery and the unit, and charge the battery with a 12V battery charger. Do not charge two batteries at the same time.
- Be sure not to connect (+) and (-) terminals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



WARNING

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

Handling battery

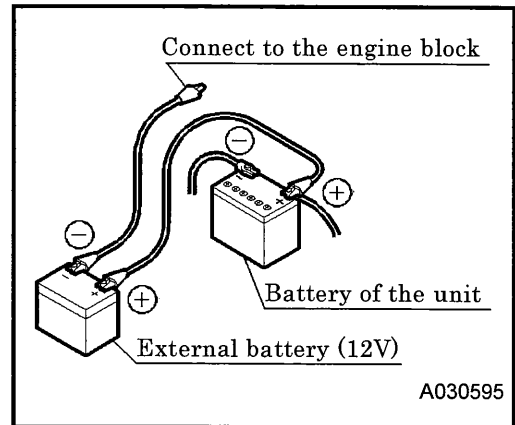


6.Periodic Inspection/Maintenance

[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.

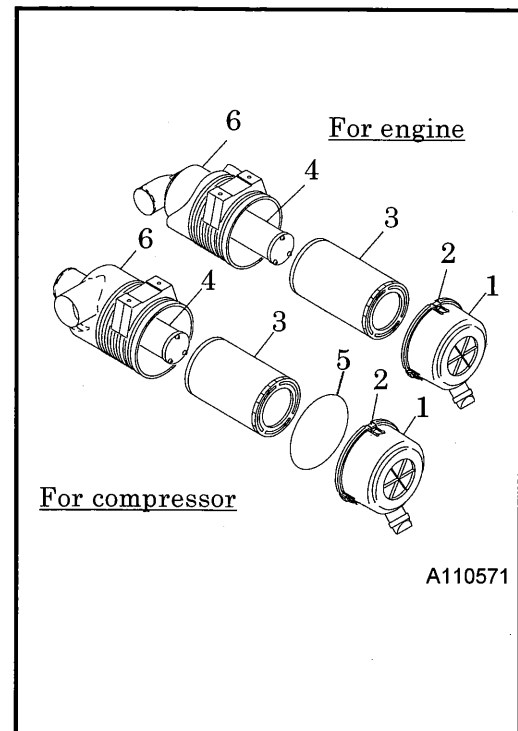
6.Periodic Inspection/Maintenance

6.5.5 Check and clean clogging of air filter element

Every 250 hours

<Procedure>

- ① After removing the cap "1" by loosening its fixing latch "2", clean its interior properly.
 - ② Take out outer element "3" only, and clean it.
Be sure to never remove the inner element "4" at the same time because it is impossible to use twice the inner element even if it clean.
 - ③ Be sure to replace the inner element at once when replace the outer element. The inner element should be replaced once about every 4 times in replace the outer element.
 - ④ It is impossible to use twice the inner element even if it clean. Be sure to prevent the dust go into the inside inner element when replace the inner element.
 - ⑤ When installing cap after cleaning it, hold O-ring "5" to the case "6" with a hand so that O-ring may not come out, and then tighten it after confirming that the hook of cap fixing latch is engaged.
- Not limited to the above, be sure to replace a element new one in case of it became dirty extremely.
(For part number, see 6.4)



IMPORTANT

Cleaning of Air Filter Element should be perfectly performed

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

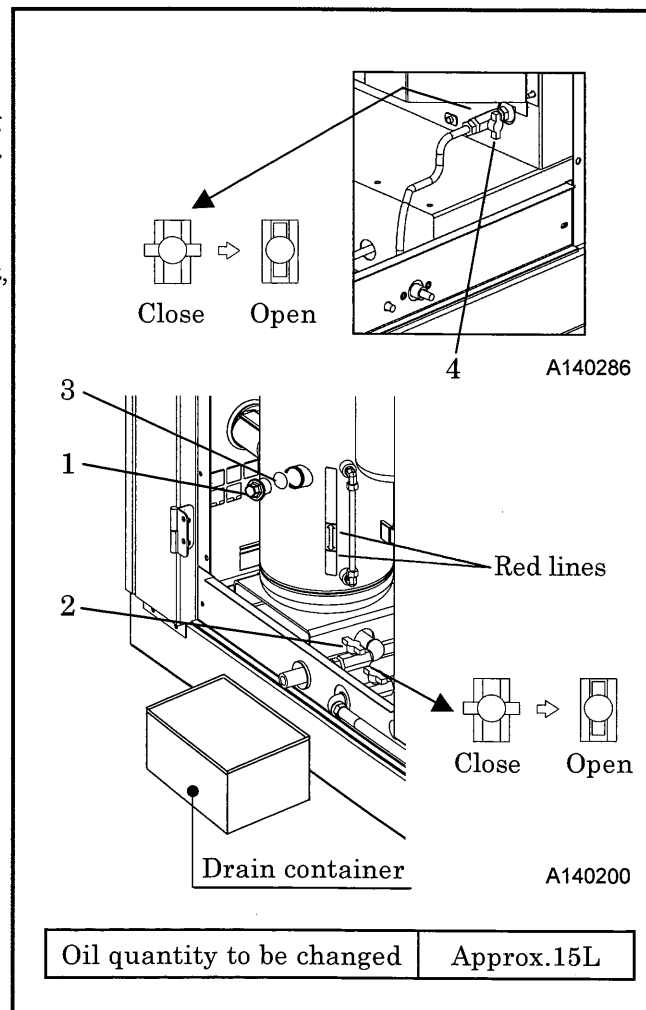
6.Periodic Inspection/Maintenance

6.5.6 Change compressor oil

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

<Procedure>

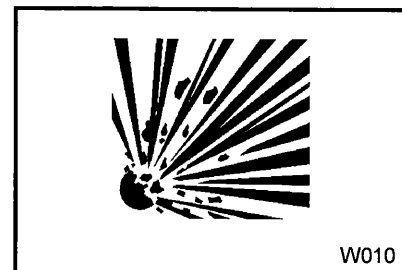
- ① After residual pressure is completely relieved from separator receiver tank, remove oil filler cap "1" and open drain valve "2" for draining oil. And then open drain valve "4" of oil cooler for draining also the oil accumulated in bottom of oil cooler.
 - ② After compressor oil is completely drained out, close drain valve "2" and "4" for sure.
 - ③ After refilling fresh compressor oil up to the upper limit of level gauge, close oil filler cap. Check o-ring "3" of oil filler cap whether it is hardened and/or damaged. If it is found damaged or hardened, replace it with a new one.
 - ④ Start the engine for a short while, then replenish the oil to fill shortage. After this operation is repeated 1 or 2 times, check and confirm that oil level at full load is between red lines of oil level gauge. Be careful not to overfill the oil.
- If oil is cold when it is changed, it takes a longer time to drain oil completely. But make sure to drain oil completely.



WARNING

- When you refill the separator receiver tank with compressor oil, stop the engine, and make sure that the pressure gauge indicates 0MPa and there is no residual pressure in it, and then gradually loosen the oil filler cap for refilling oil.
- Note residual pressure in the receiver tank could force both extremely hot compressed air and oil to jet out and you may be scalded or seriously injured.
- Even continuous oil replenishment cannot improve its deteriorated condition. Be sure to change the oil completely at every scheduled interval.
- Do not mix it with other brand oil, or it will cause poor performance and shorten the life of the compressor oil. (But fresh compressor oil could accept a mixture of small amount of different brands.)
- Running the unit with old and deteriorated compressor oil will cause damage to bearings, or serious accident like ignition in a separator receiver tank. Be sure to change the oil completely at every scheduled interval.
- Follow the designated regulations to dispose of compressor oil.

Refilling of compressor oil



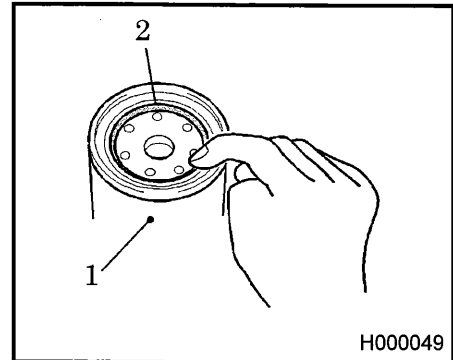
6.Periodic Inspection/Maintenance

6.5.7 Change compressor oil filter

At 300 hours for the first change and every 1,000 hours thereafter

<Procedure>

- ① Remove the cartridge "1", using a filter wrench.
- ② Screw in the new oil filter with the packing "2" coated slightly with oil. (For part number, see 6.4)
- ③ After the packing touches the sealing face, tighten another 3/4 to 1 turn with a filter wrench.
- ④ After installing the oil filter, check it for any leak during operation.



IMPORTANT

Use our genuine oil filter

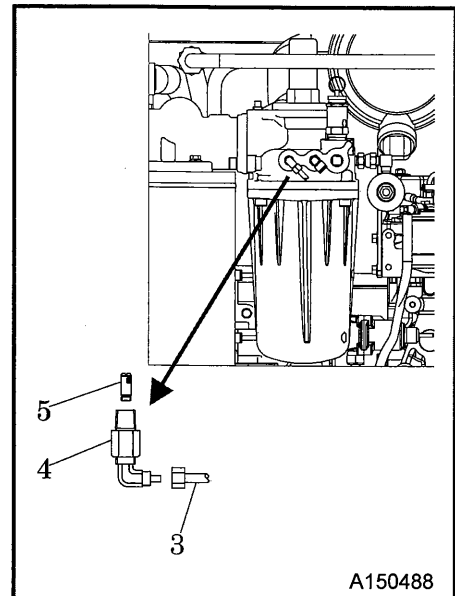
- Poor quality oil filters do not trap dust sufficiently and will cause damage to the bearings in a short period.

6.5.8 Clean strainer in the scavenging orifice

Every 500 hours

<Procedure>

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

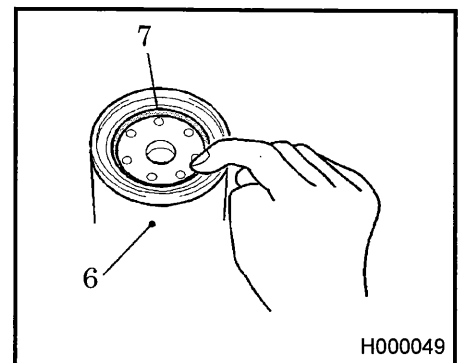


6.5.9 Change fuel filter

Every 500 hours

<Procedure>

- ① Remove the fuel filter "6", using a filter wrench.
- ② Install the new fuel filter after applying oil to the surface of gasket "7" of fuel filter.
(For part number, see 6.4)
- ③ After the packing touches the sealing face, tighten another 1 turn by hand.
- ④ After installing the fuel filter, check it for fuel leak during operation.



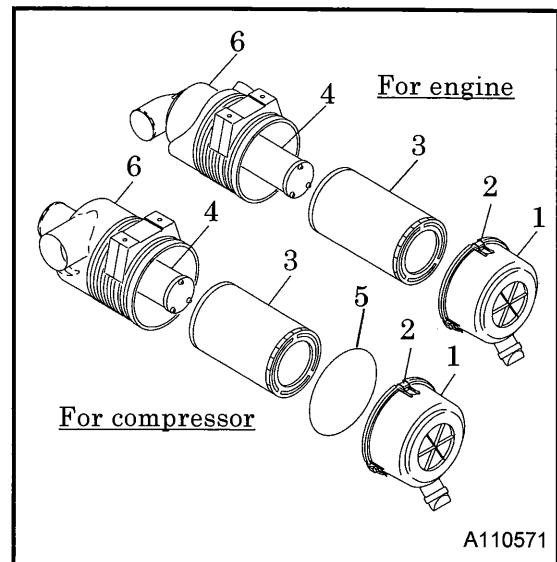
6.Periodic Inspection/Maintenance

6.5.10 Change air filter element

Every 500 hours

<Procedure>

- ① After removing the cap "1" by loosening its fixing latch "2", clean its interior properly.
 - ② Remove the element "3" and "4" then replace it with a new one. (For part number, see 6.4)
 - ③ When installing cap after replacing it, hold O-ring "5" to the case "6" with a hand so that O-ring may not come out, and then tighten it after confirming that the hook of cap fixing latch is engaged.
- When used or operated under bad conditions, it is better to remove all the elements, check them, clean them and replace them earlier before the intervals listed in maintenance table, if they are found difficult to be repaired.



IMPORTANT

Use our genuine part

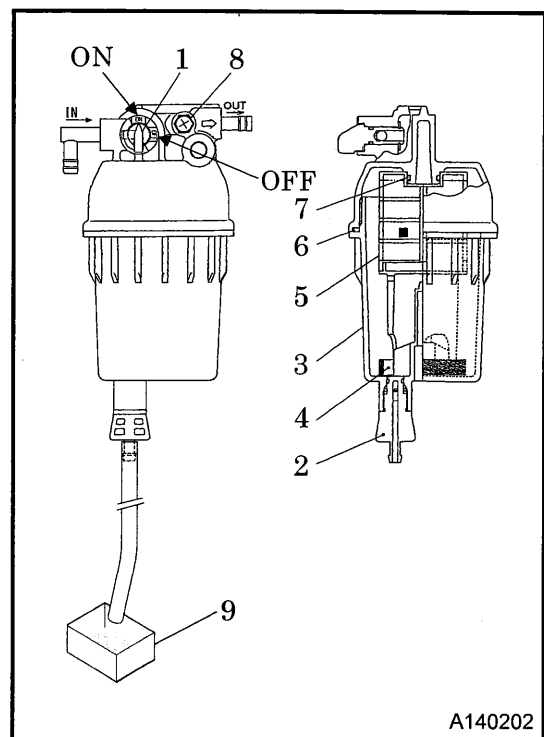
- Air filter is an important part which is crucial to machine's performance and life. Be sure to use genuine parts.

6.5.11 Clean of element in sedimenter

Every 500 hours

<Procedure>

- ① Turn fuel selector valve "1" to "OFF" position.
 - ② Loosen the drain valve "2" and drain out condensed water inside.
 - ③ Turn the cup "3" to the left and remove it. Be careful to remove the cup, because it is filled with fuel. Wipe out split fuel completely.
 - ④ Remove float "4" inside cup.
 - ⑤ Washing element "5" and the cup inside with new fuel.
 - ⑥ Replace element and o-ring "6", "7" if they are found broken or damaged. (For part number, see 6.4)
 - ⑦ After finishing clean, assemble it in reverse procedure.
- If air is found still in fuel pipe, place starter switch to "RUN" position and loosen air bleeding bolt "8" to bleed air. After finishing air bleeding, tighten the air bleeding bolt "8".
 - Drain the condensate in container "9", and then dispose of condensate according to the designated regulations.



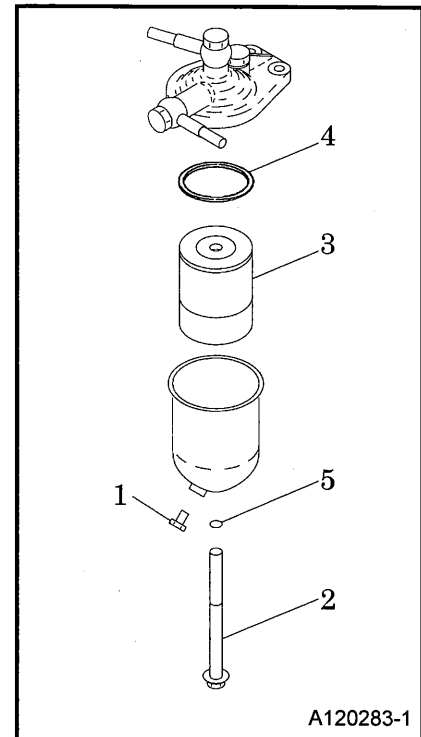
6.Periodic Inspection/Maintenance

6.5.12 Change of element inside fuel pre-filter

Every 500 hours

<Procedure>

- ① Loosen drain plug "1" and drain oil.
 - ② Remove center bolt "2" and take out element "3".
 - ③ Replace element by new element, and replace gasket "4" or O-ring "5", if it is broken or damaged.
(For part number, see 6.4)
 - ④ After finishing check and change, assemble it in reverse order.
- Drain the condensate in container, and then dispose of condensate according to the designated regulations.



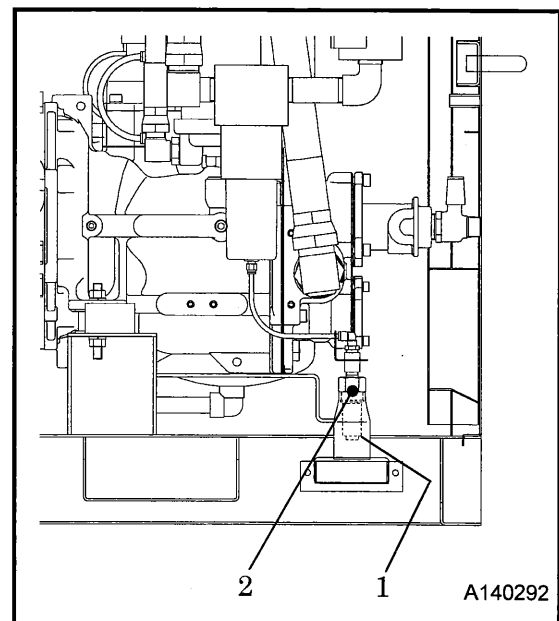
6.5.13 Check and clean drain outlet port of after cooler

Every 500 hours

- The condensed water drained from after-cooler contains a little bit of oil. So take care how to dispose of it.

[In case that any condensate is found in discharged air]

- Check and confirm that air is emitted from the drain port of after-cooler during operation. When any condensate is found mixed in the air, clean the silencer "1" at the discharge port and the orifice "2". If heavily stained, replace them.
When cleaning and 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 compressed air, silencer and air pipe could be clogged. Periodically carry out inspection and cleaning of it.

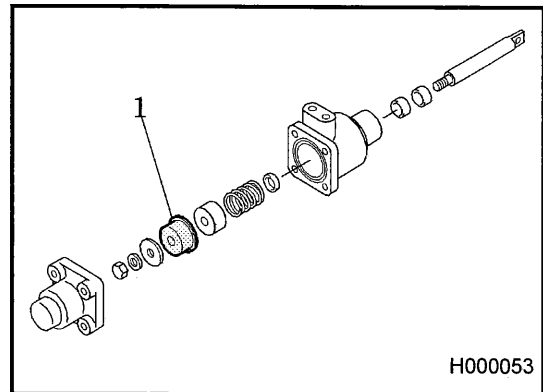
6.Periodic Inspection/Maintenance

6.5.14 Change diaphragm of speed regulator

Every 1,000 hours

<Caution during diaphragm replacement>

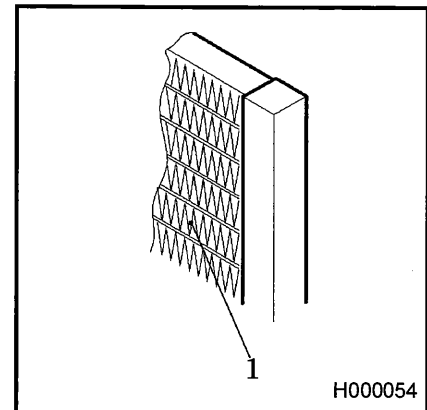
- When installing diaphragm “1”, be sure to use the special jig to prevent it from twisting.
- Before installing diaphragm, be sure to apply molybdenum disulfide (paste spray) to inside of the diaphragm.
- Install it so that its outside surface should be rubber and its inside cloth.
(For part number, see 6.4)
- When replacing it, contact directly us or distributor because it requires expert technical knowledge.



6.5.15 Clean outside of the radiator·oil cooler and after cooler

Every 1,000 hours

- When the fin tubes “1” of a radiator, oil cooler and an after-cooler are clogged with dust or other foreign materials, the heat exchange efficiency drops and this will raise coolant temperature and discharge air temperature. These tubes and fins should be cleaned depending on the state of clogged tubes, even before maintenance schedule.
- Do not use a high pressure washer to protect fin tubes from being damaged.



6.5.16 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 directly us or distributor because it requires expert technical knowledge.

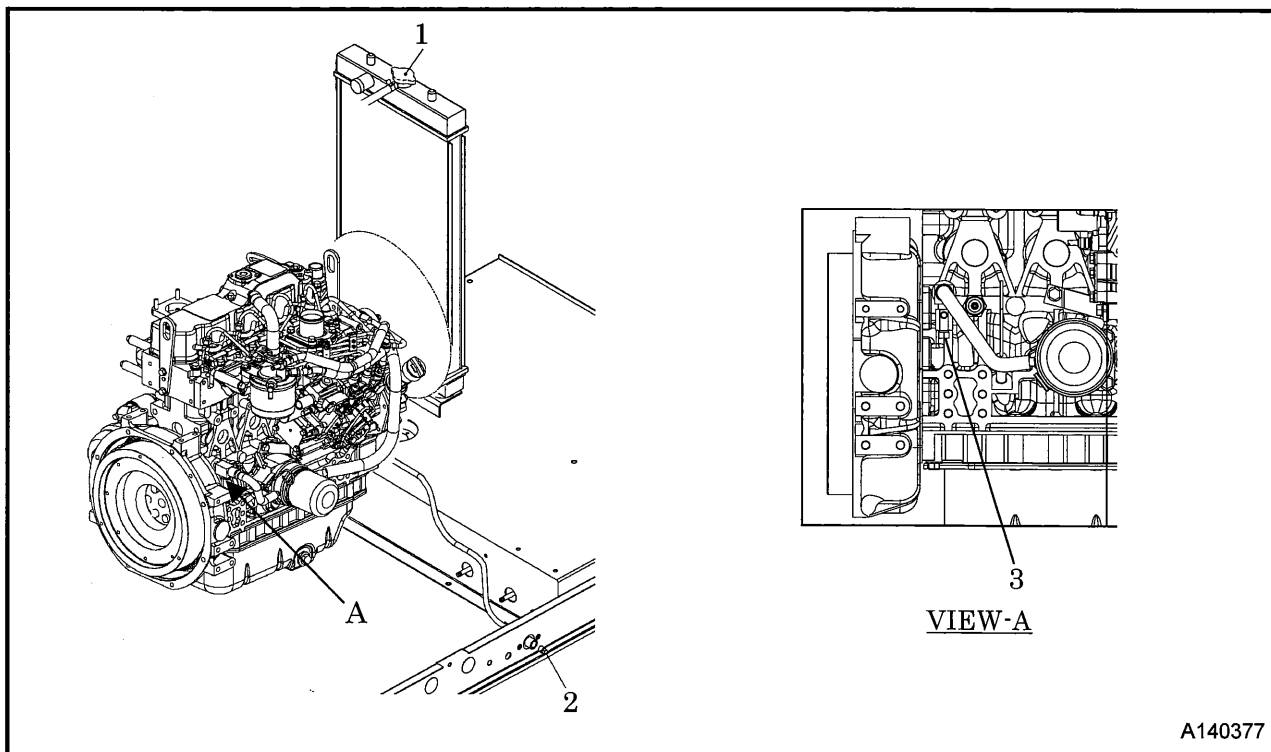
6.Periodic Inspection/Maintenance

6.5.17 Change coolant

2,000 hours or every 2 years

<Procedure>

- ① To drain coolant, first unfasten and take off the cap "1" of the radiator, then remove the drain plug "2" .
- ② Loosen the drain plug "3" provided on engine to drain engine.
- ③ When the drainage has been completed, fasten drain plug "2" and "3" again and fill coolant into the radiator through its filler port. **[Quantity of water : approx. 6.8L]**
- ④ After changing the coolant, operate the machine for 2 to 3 minutes at the unloaded condition and stop it. Then check the coolant level again, and replenish if it is short.



CAUTION

Caution in filling or discharging engine oil

- 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.

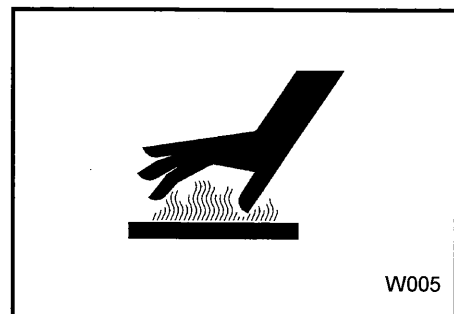
- LLC (Antifreeze) is a toxic material.

- 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.



6.Periodic Inspection/Maintenance

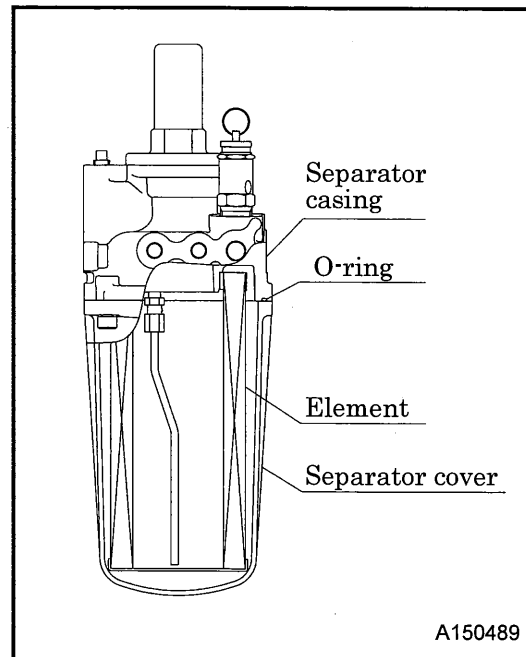
6.5.18 Change oil separator element

Every 2,000 hours

- Even before the periodic interval time of replacement, replace the oil separator element whenever the oil consumption increases and also oil is found mixed in the discharge air.

<Procedure>

- ① Remove separator cover bolts 4 pieces.
 - ② Replace element and O-ring by a new one.
 - ③ Install O-ring to separator casing slot, after coating it with thin film of grease.
 - ④ After installing element, be sure to check for oil leak during the operation.
- When consumption of the oil is still unusual even after cleaning strainer in the scavenging orifice (See 6.5.8), change the oil separator element with a new one. (For Replacement parts, See 6.4)
 - When replacing oil separator, contact directly us or distributor because it requires expert technical knowledge.



IMPORTANT

- When changing the oil separator element, O-ring sure replaced with new ones.

6.5.19 Change nylon tubes

Every 2,000 hours

- Replace nylon tubes used for the oil and air pipings.
- When replacing it, contact directly us or distributor because it requires expert technical knowledge.

6.5.20 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 hoses, contact directly us or distributor because it requires expert technical knowledge.

6.5.21 Change pressure regulator

Every 3,000 hours

- Remove pressure regulator and rebuild or replace with a new unit. (For part number, see 6.4)

6.Periodic Inspection/Maintenance

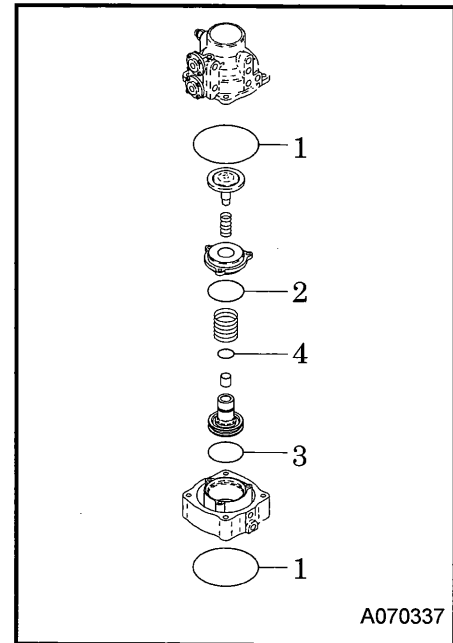
6.5.22 Change o-ring of unloader

3,000 hours or every 3 years

<Caution during O-ring replacement>

Supply grease to O-ring "1" , "2" , "3" , "4" after replacement.

(For part number, see 6.4)



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.

6.5.23 Check rubber hose

3,000 hours or every 3 years

- Check hoses used for oil piping for any crack or tear, and replace when an abnormality is found.
- When replacing hoses, contact directly us or distributor because it requires expert technical knowledge.

6.5.24 Change radiator hoses

3,000 hours or every 2 years

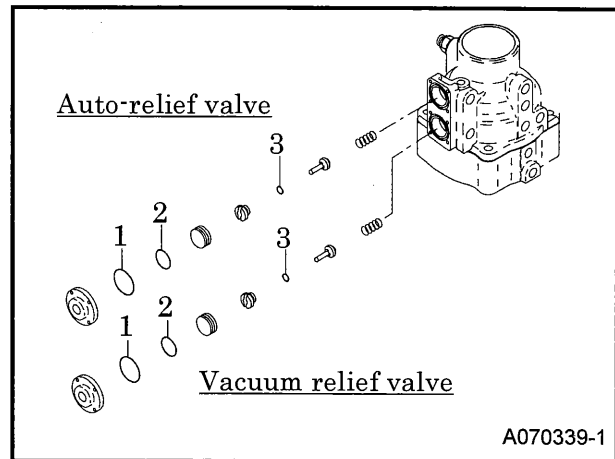
- When any crack or wear is found on the hoses, change it even before the scheduled time.
- When replacing it, contact directly us or distributor because it requires expert technical knowledge.

6.Periodic Inspection/Maintenance

6.5.25 Check consumable parts of auto-relief valve and vacuum 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, if hardened.
(For part number, see 6.4)



IMPORTANT

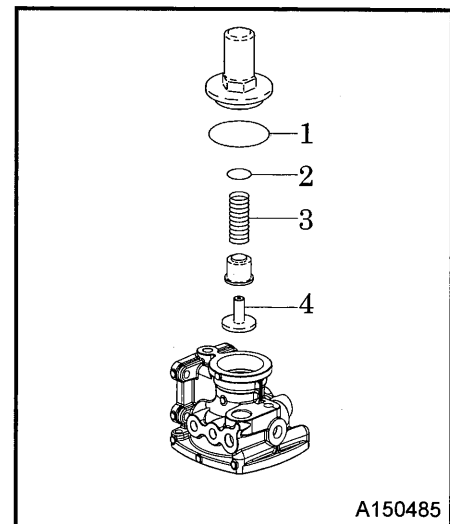
- When reassembling, apply sufficient grease to O-ring Slot/O-ring and sliding surface.
Use CALTEX MULTIFAK EP1 grease or equivalent. Grease of poor quality will deteriorate the material.

6.5.26 Performance check of pressure control valve

3,000 hours or every 3 years

<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 0.34 to 0.47MPa.
- ② When the pressure is lower than 0.34MPa, replace spring "3" with a new one. (For part number, see 6.4)
- 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.



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.

6.5.27 Check and change o-ring and piston of pressure control valve

3,000 hours or every 3 years

- After disassembling and cleaning pressure control valve, check O ring "1", "2" and piston "4".
When the rubber of these parts is found hardened, or damaged, replace them.
(For part number, see 6.4)
- When replacing it, contact directly us or distributor because it requires expert technical knowledge.
- After replacement, run the machine to check its function (See 6.5.26), air-leak or any disorder.

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 Spread lubricant on moving parts like speed regulator and rod end, beforehand.
- ③ Completely charge the battery and disconnect grounding wires. Remove the battery from the machine, if possible, and store it in a dry place. (Charge the battery at least once every month.)
- ④ Drain coolant and fuel from the machine.
- ⑤ Seal the engine, air-intake port and other openings like the muffler with a vinyl sheet, packing tape, etc., to prevent moisture and dust from entering the machine.
- ⑥ 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

- When disposing of this product, be sure to remove the coolant and grease from it. When you have anything unclear or you want to advise us, contact our office nearby or distributor.

8. Specifications

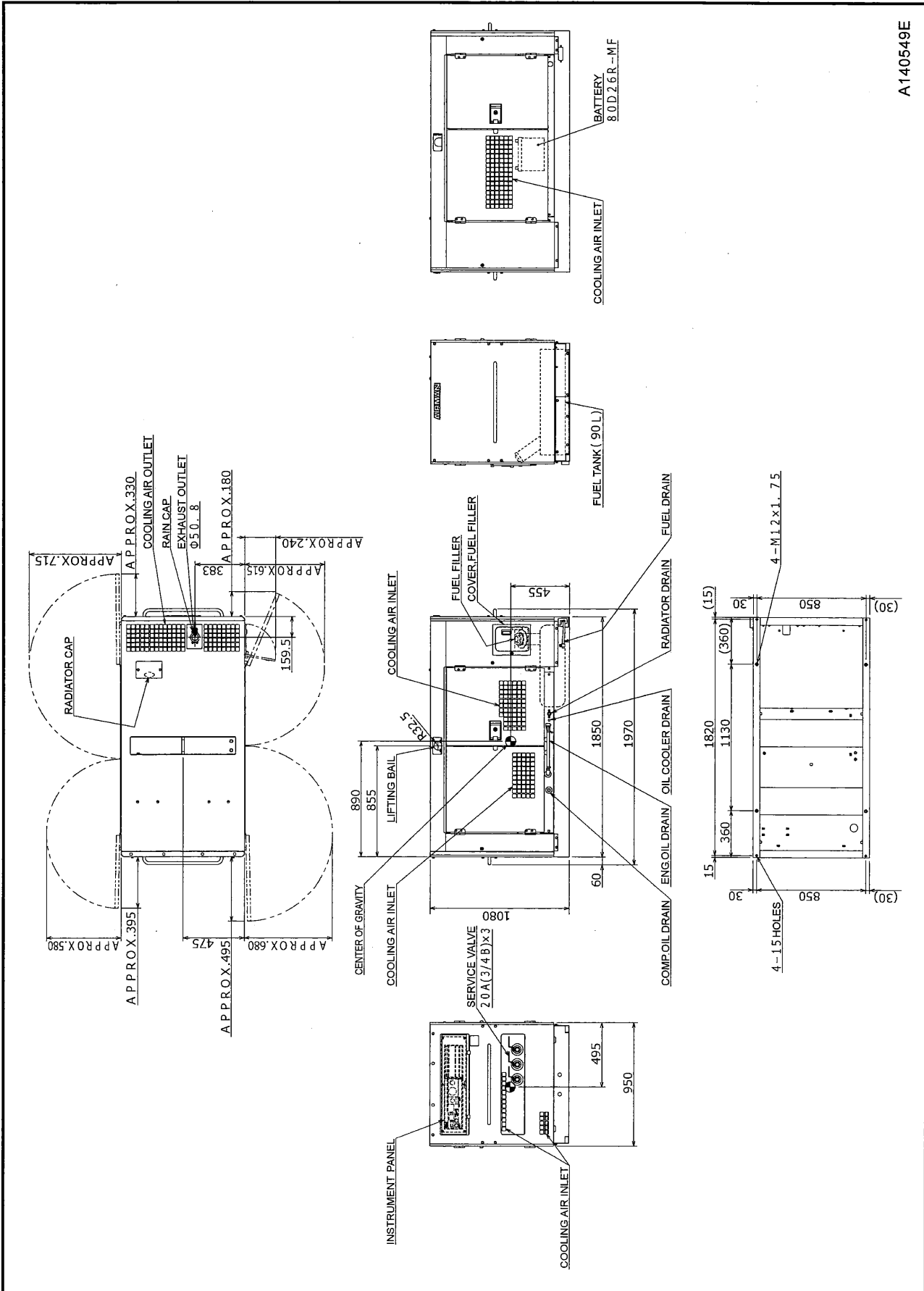
8.1 Specifications

Model		FAC-52B	FAC-52BC (After-cooler type)	
Compressor	Type	Single-stage oil cooled, screw type compressor		
	Free air delivery	m ³ /min	5.2	
	Working pressure	MPa	0.70	
	Lubricating system	Forced Lubrication by compressed pressure		
	Driving system	Direct driving with gear coupling		
	Receiver tank capacity	m ³	0.020	
	Lubricating oil capacity	L	15 (The amount of initial filling) Approx. 14.5 (The amount of exchange)	
Engine	Model	YANMAR 4TNV88-BXDHKSR1		
	Type	4-cycle, water-cooled, direct injection type		
	Number of cylinders, bore stroke	4 - 88mm × 90 mm		
	Total displacement	L	2.189	
	Rated output	kW/min ⁻¹	34.9 / 3,000	
	Lubricating oil capacity	L	7.4 (The amount of initial filling) Approx. 7.0 (The amount of exchange)	
	Coolant capacity (including radiator)	L	5.8	
	Battery	80D26R (12V) equivalent		
	Fuel tank capacity	L	90	
Weight • Mass	Overall length	mm	1,970	
	Overall width	mm	950	
	Overall height	mm	1,080	
	Net dry mass	kg	760	770
	Operating mass	kg	855	865

8. Specifications

8.2 Outline drawing

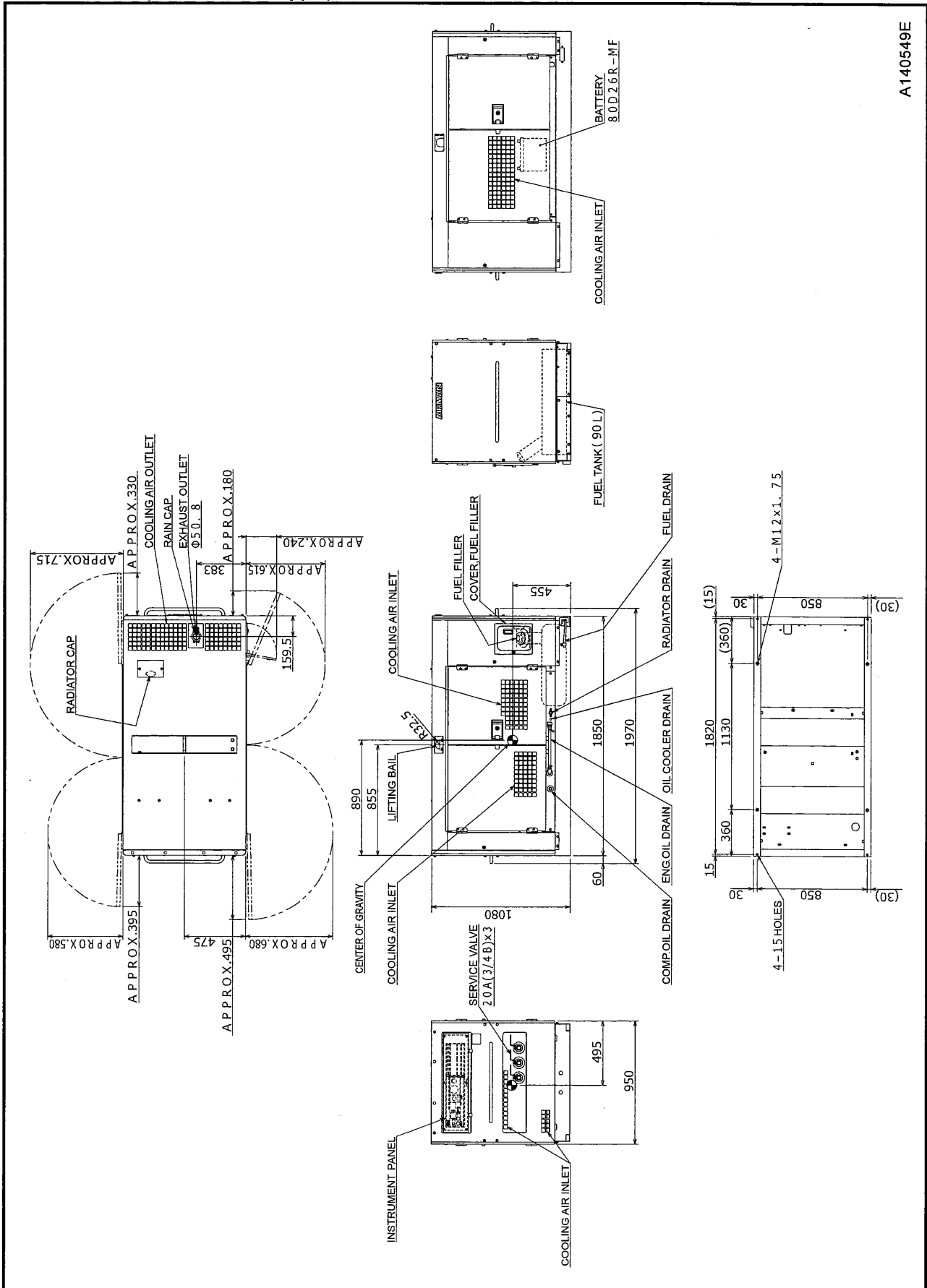
FAC-52B



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8. Specifications

FAC-52BC (After-cooler type)

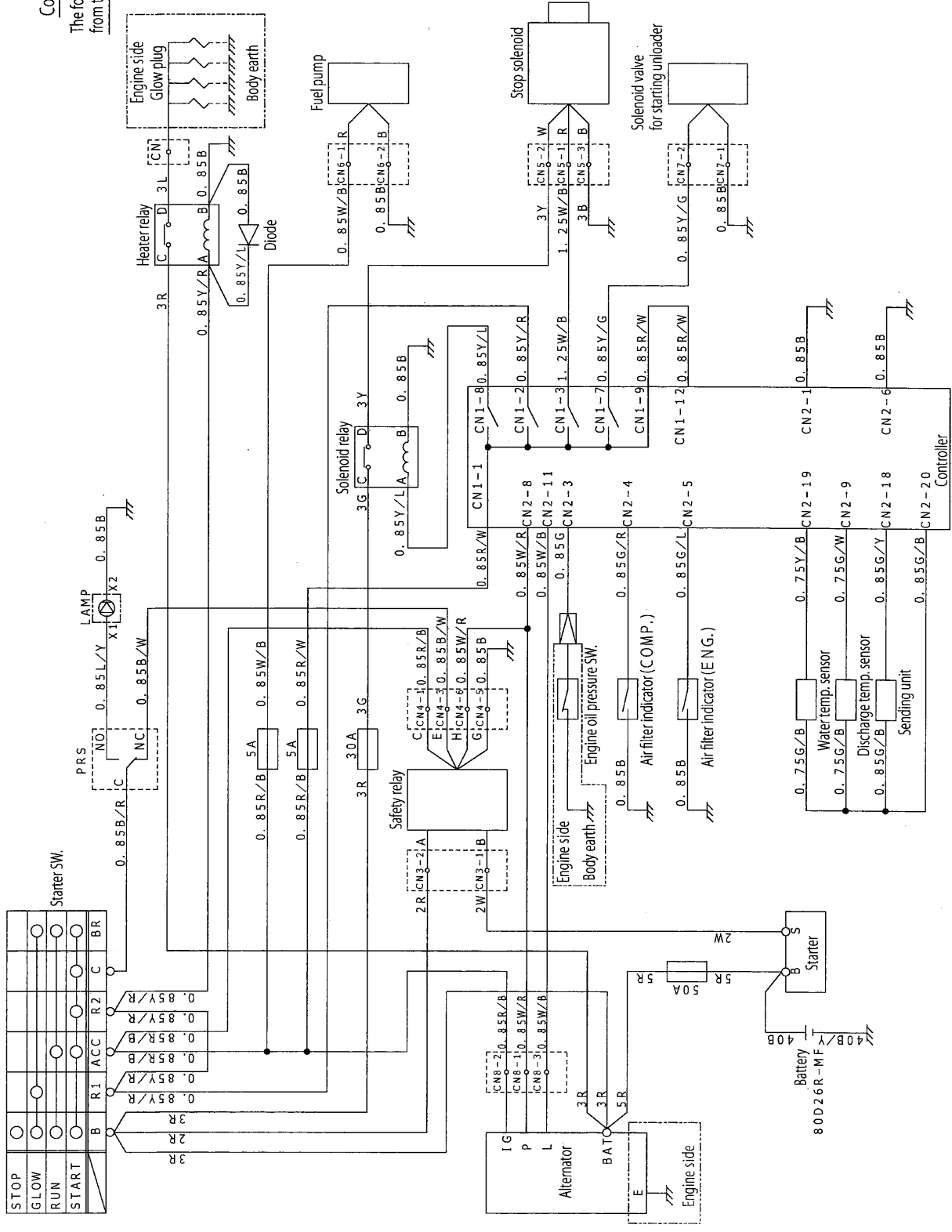
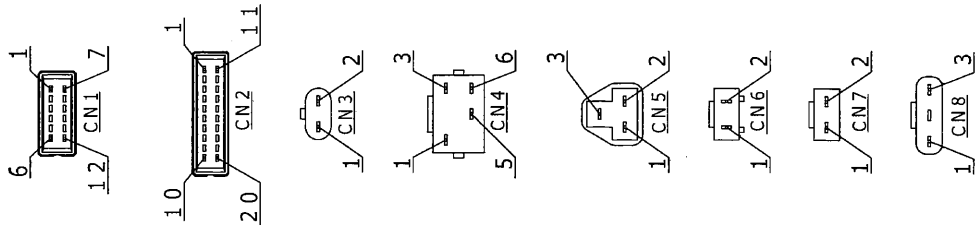


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9.Wiring Diagram

Connector terminal arrangement

The following arrangement is seen from the side of the connector inserting port.

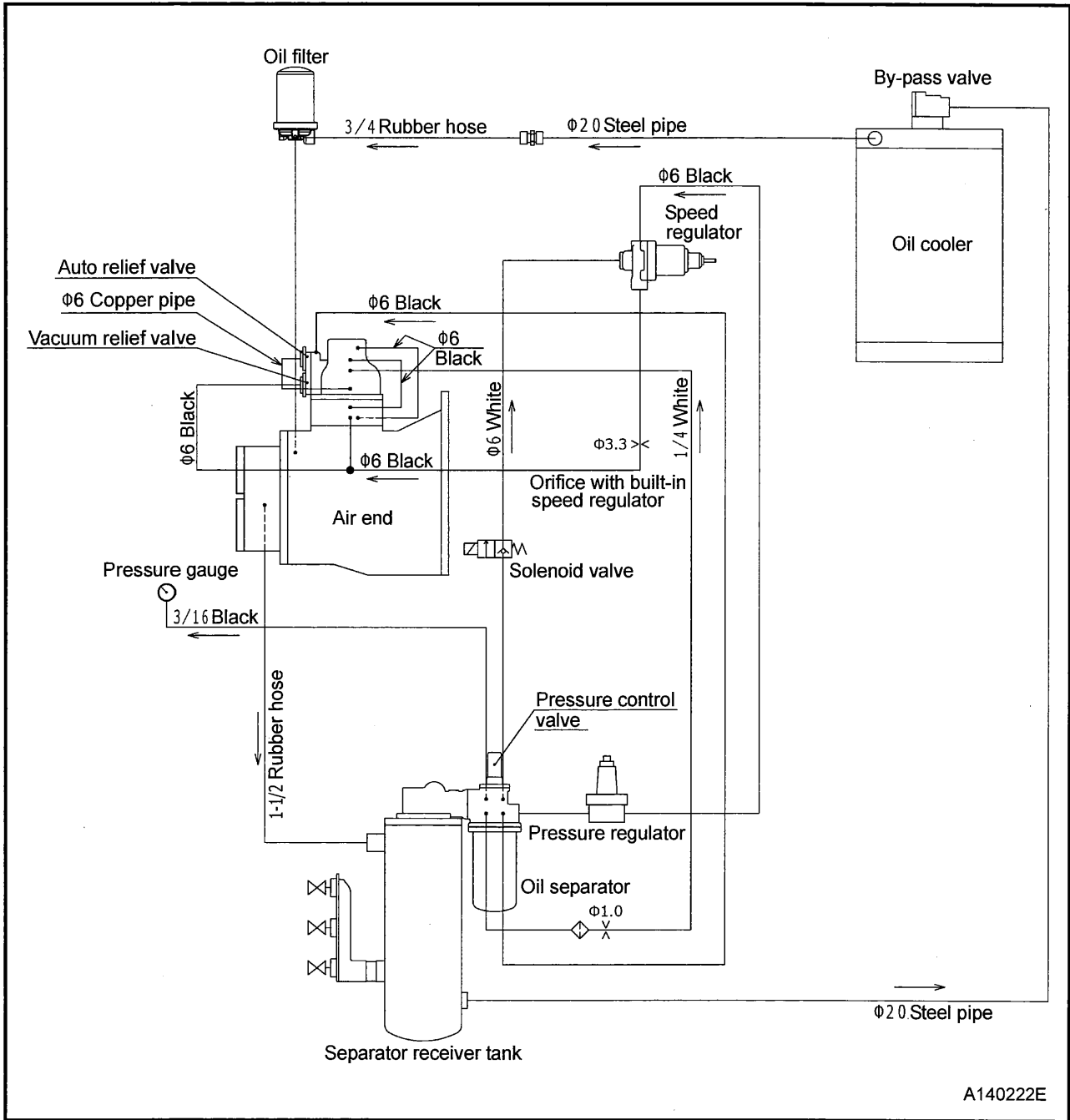


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10.Piping Diagram

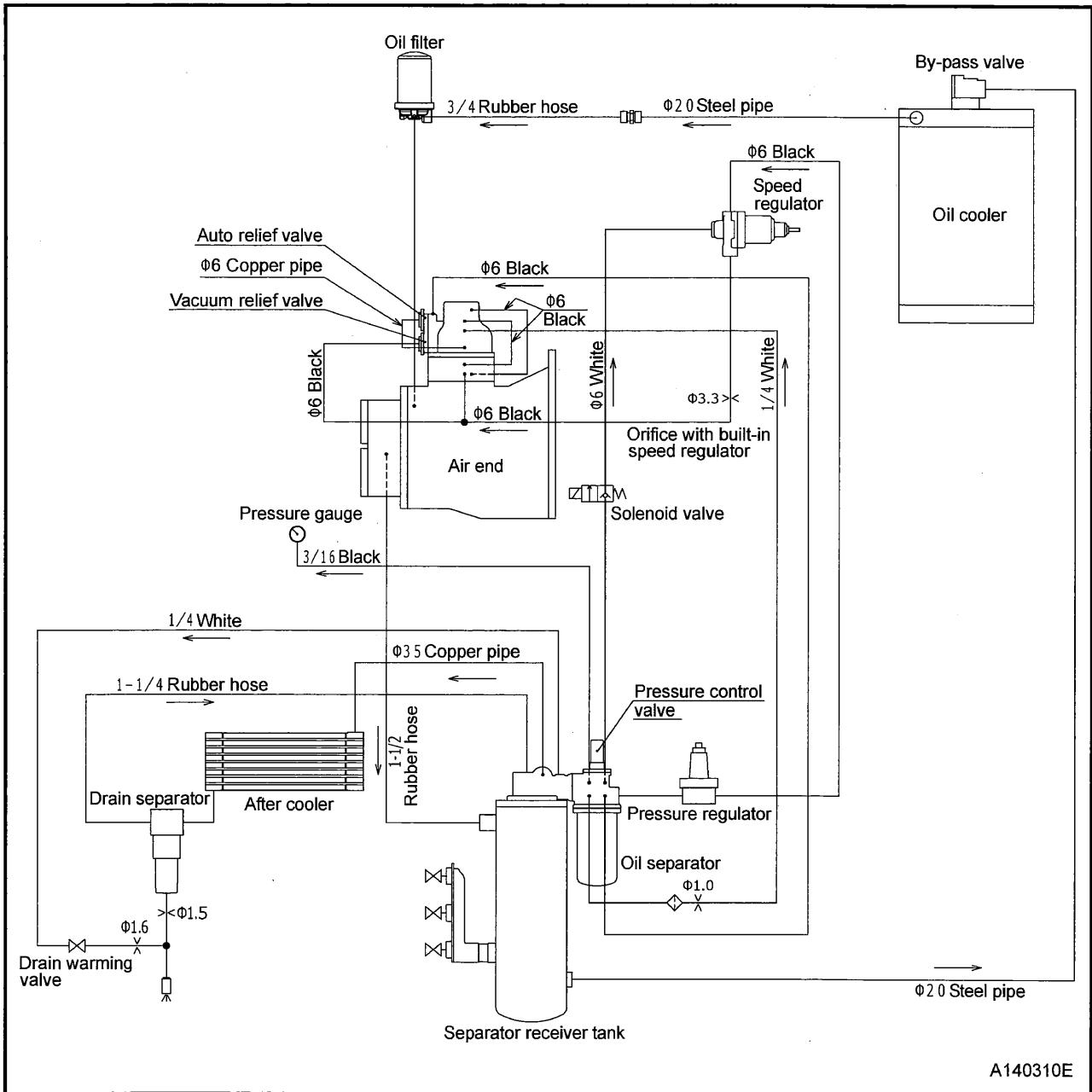
10.1 Air piping · Compressor oil piping

FAC-52B



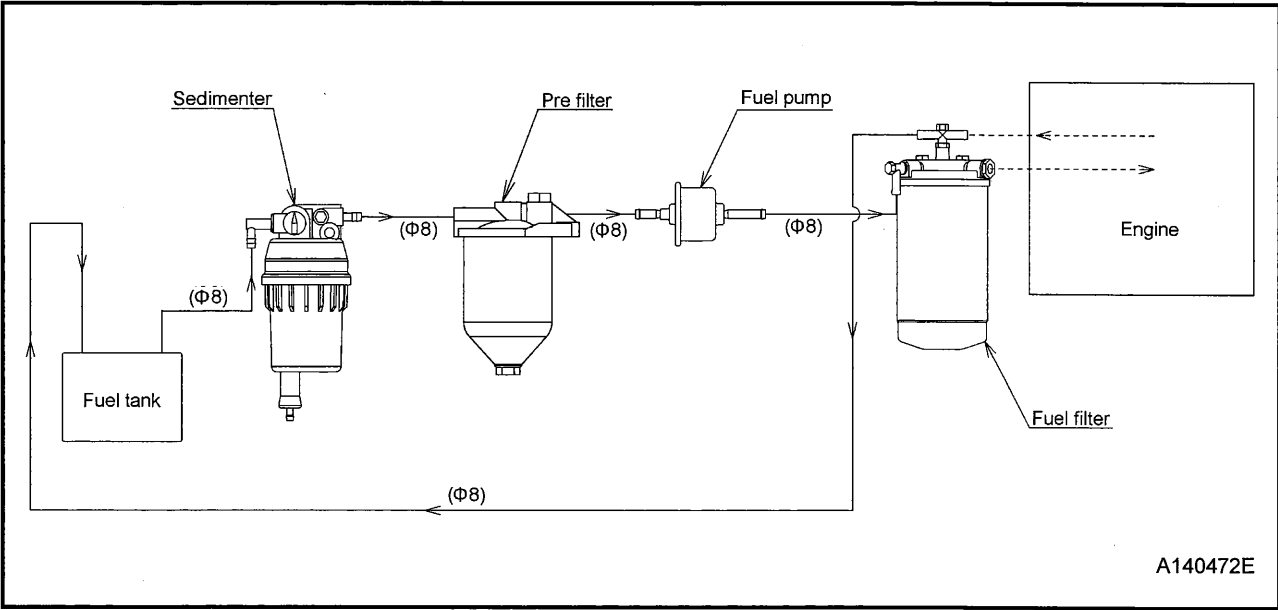
10.Piping Diagram

FAC-52BC (After-cooler type)



10.Piping Diagram

10.2 Fuel piping



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Printed NOV. 2015

