



INSTRUCTION MANUAL

PORTABLE
SCREW COMPRESSOR

FAC - 21B

FAC - 28B

FAC - 37B

FAC - 37BC

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.





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1.Safety

This manual explains and illustrates general requirements for safety.

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

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

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



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



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



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



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

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

1.Safety

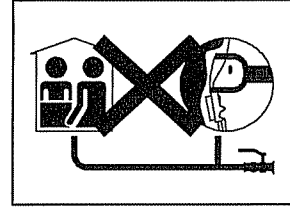
1.1 Caution before Operation



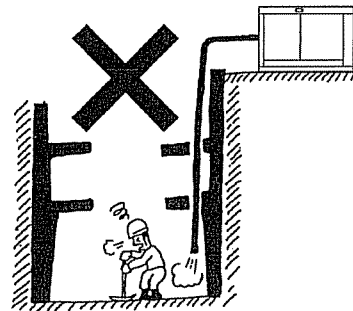
DANGER

Compressed air is prohibited to be used for human respiration

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



TR0201-1



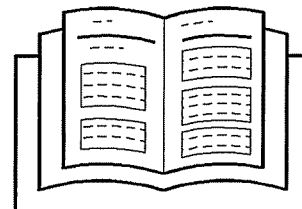
A080001



WARNING

Follow the safety instructions

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



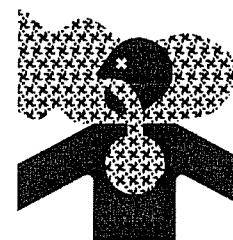
TR0086



WARNING

Ventilation

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



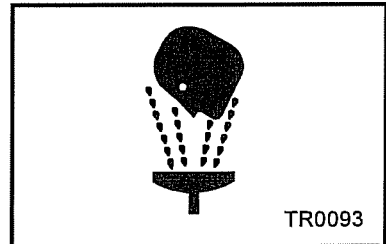
PC002

1.Safety

WARNING

- 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.

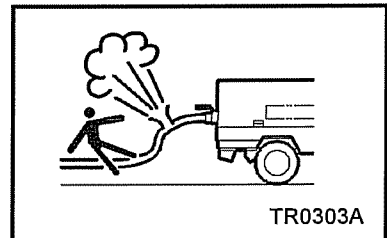
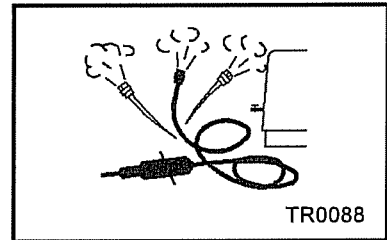
Handling battery



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 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

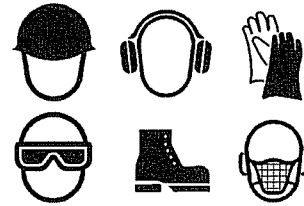
Maintain both physical and mental health

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

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.
- Place safety enclosures at the entrance of and around working site to prevent children or outside people from entering the site.

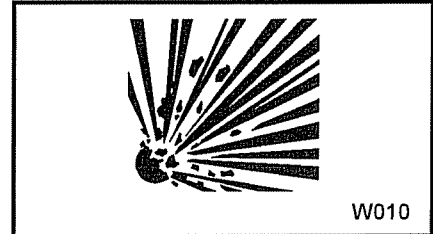
1.Safety

1.2 Caution during Operation

WARNING

Do not replenish compressor oil during operation

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



WARNING

Draining during operation prohibited

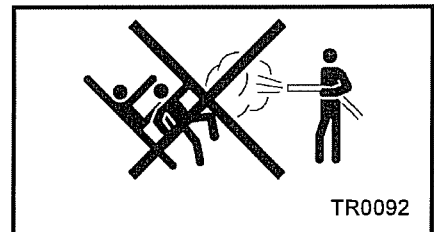
- Do not, under any circumstance, open the portions below during operation:
 - Separator receiver tank drain valve
 - Coolant drain valve and plug
 - Engine oil drain valve
 - Oil cooler drain valve



WARNING

Never direct the compressed air to people and foods

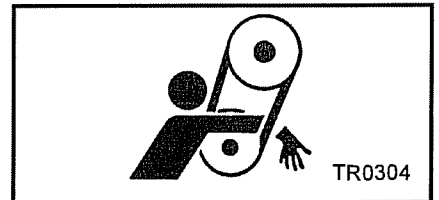
- Never blow compressed air directly at people.
Scattered impurities, dust, or foreign objects in the compressed air may cause skin and eyes to be seriously injured.
- Blowing compressed air on food is prohibited.



WARNING

Hands off from rotating parts and belts

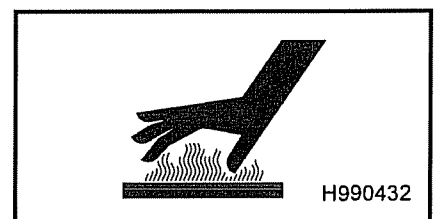
- Keep hands off from the rotating portion or belts while running.
It could cause serious injuries if hands should be caught in.



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.

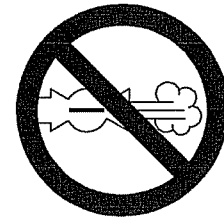


1.Safety

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, compressor, piping, separator receiver tank, and discharging pipe are especially hot, so never touch those parts, because it could cause serious burns.
- Compressor oil, coolant water, and engine oil are also very hot and dangerous to touch. Avoid checking or refilling them while the unit is running.



H990432

CAUTION

Fire prevention

- Do not, under any circumstance, bring lit cigarettes or matches near such oils as engine oil and compressor oil, etc. They are extremely flammable and dangerous, so be careful when handling.
- Refilling oils should be done in an outdoor well-ventilated place.
- Refuel after stopping the engine, and never leave the fuel nearby the machine. Do not spill. It may cause a fire. When it is spilt, wipe it up completely.
- 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.
- 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

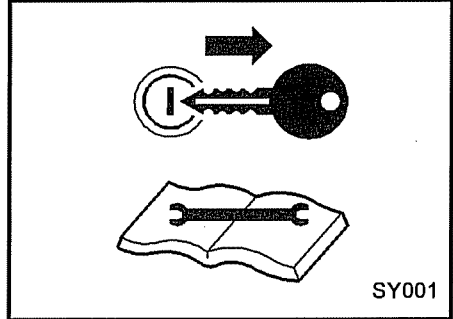
1.Safety

1.3 Caution during Inspection and Maintenance

WARNING

Hang a "Now Checking and under Maintenance" tag

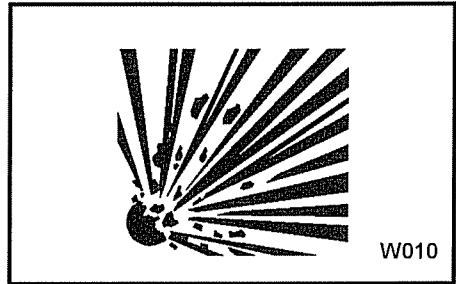
- Remove the starter key from the starter switch before starting inspection, and hang up a "Now Checking and under Maintenance" tag where it can be easily seen. The checker must keep the key during checking and maintenance.
- Remove the negative (-) side cable from the battery. If the above procedure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



WARNING

Refilling of compressor oil

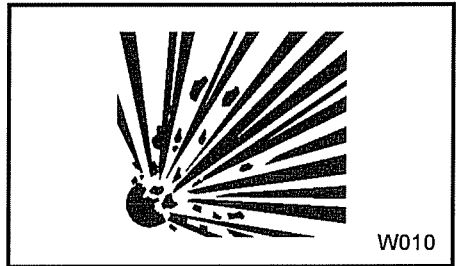
- When you refill the separator receiver tank with compressor oil, stop the engine, and make sure that the pressure gauge indicates 0MPa and there is no residual pressure in it, and then gradually loosen the oil filler cap for refilling oil.
- Note residual pressure in the separator receiver tank could 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

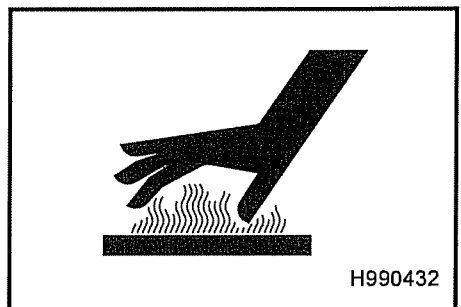
- After stopping the engine, make sure that pressure gauge indicates 0MPa. Even when the gauge shows 0MPa, open a service valve and further do not fail to make sure that there is no residual pressure in the air piping. Then start such a job as repair and maintenance.
- Residual air under pressure will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

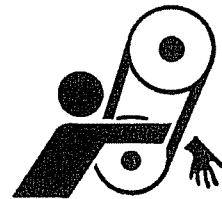


1.Safety

WARNING

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

Adjusting tension of fan belt

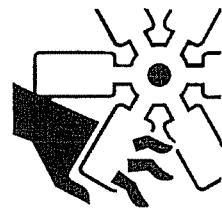


TR0304

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

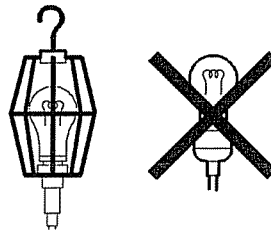


M003

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

1.Safety

CAUTION

Opening coolant water drain valve cap

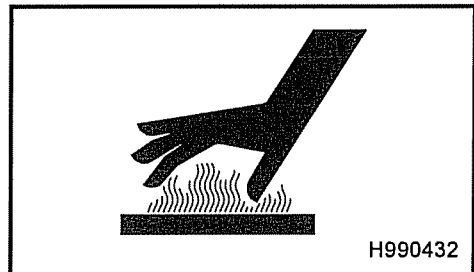
- Be sure to stop the engine, and let the coolant water sufficiently cool down before draining it.
- If the drain valve is opened before the coolant water is cooled enough, hot water could jet out, and it could cause scalding.



CAUTION

Refilling or draining of engine oil

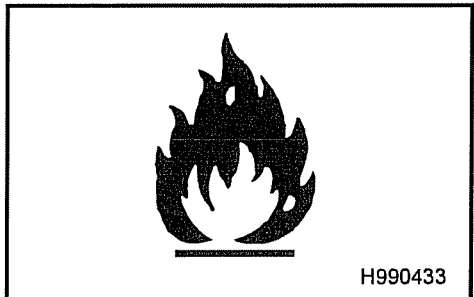
- After stopping the engine, wait for 10 to 20 minutes until the engine oil cools off. Then check the level of the engine oil, or refill or drain the oil.
- Engine oil is very hot and highly pressurized during or just after the operation. Hot oil could blow out of the tank and can cause scalding.



CAUTION

Fear of fire

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



CAUTION

Disposal of waste liquid, etc.

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

1.Safety

1.4 Safety Warning Labels

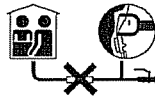
Following labels are attached to the machine.

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

Adhere a new one to the original location.

1

▲ DANGER




DO NOT BREATHE COMPRESSED AIR

Do not use this compressed air for breathing air because it can cause fatal accidents. Never breathe it.

39176 73600

2

▲ WARNING



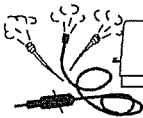
BEWARE OF EXHAUST GASES

When you operate machine **INDOORS** or in **TUNNEL**, provide good ventilation. Poor ventilation can cause fatal accident.

39176 73300

3

▲ WARNING




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.

39176 73400

4

▲ CAUTION



PREVENT BURNING ACCIDENT

Do not open radiator cap while it is still hot.

39176 69600

5

▲ CAUTION



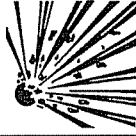
PREVENT BURNING ACCIDENT

When work is required near hot parts, wait for the parts to cool down fully before starting work.

39176 69500

6

▲ 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.

39176 69800

7

▲ CAUTION



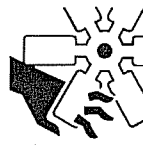
PREVENT FIRE ACCIDENT

Periodically check compressor oil and oil separator surely. Failure of this fire accident.

39176 69700

8

▲ WARNING




BEWARE OF ENTANGLEMENT

Keep your hands **AWAY** from fan during operation. Entanglement in the fan can cause serious injury.

39176 73500

9

▲ WARNING




BEWARE OF ENTANGLEMENT

Keep your hands **AWAY** from moving parts such as V-bells, pilleys etc.. Entanglement in them can cause serious injury.

39176 73800

10



LIFTING BAIL

39176 69300

11

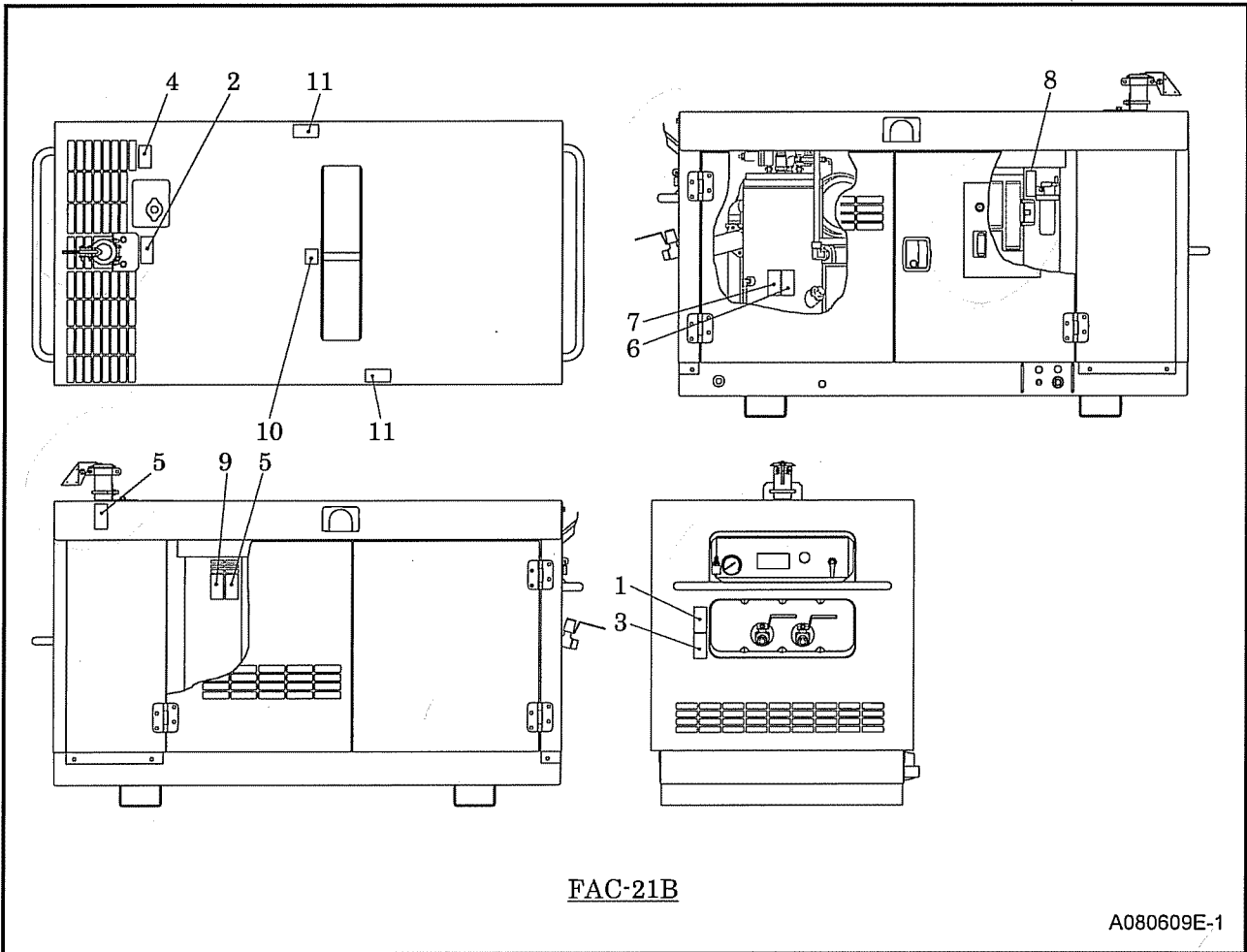
▲ CAUTION

DO NOT USE THIS FOR LIFTING BECAUSE IT BREAKS AND FALLS.

39176 35400

1.Safety

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

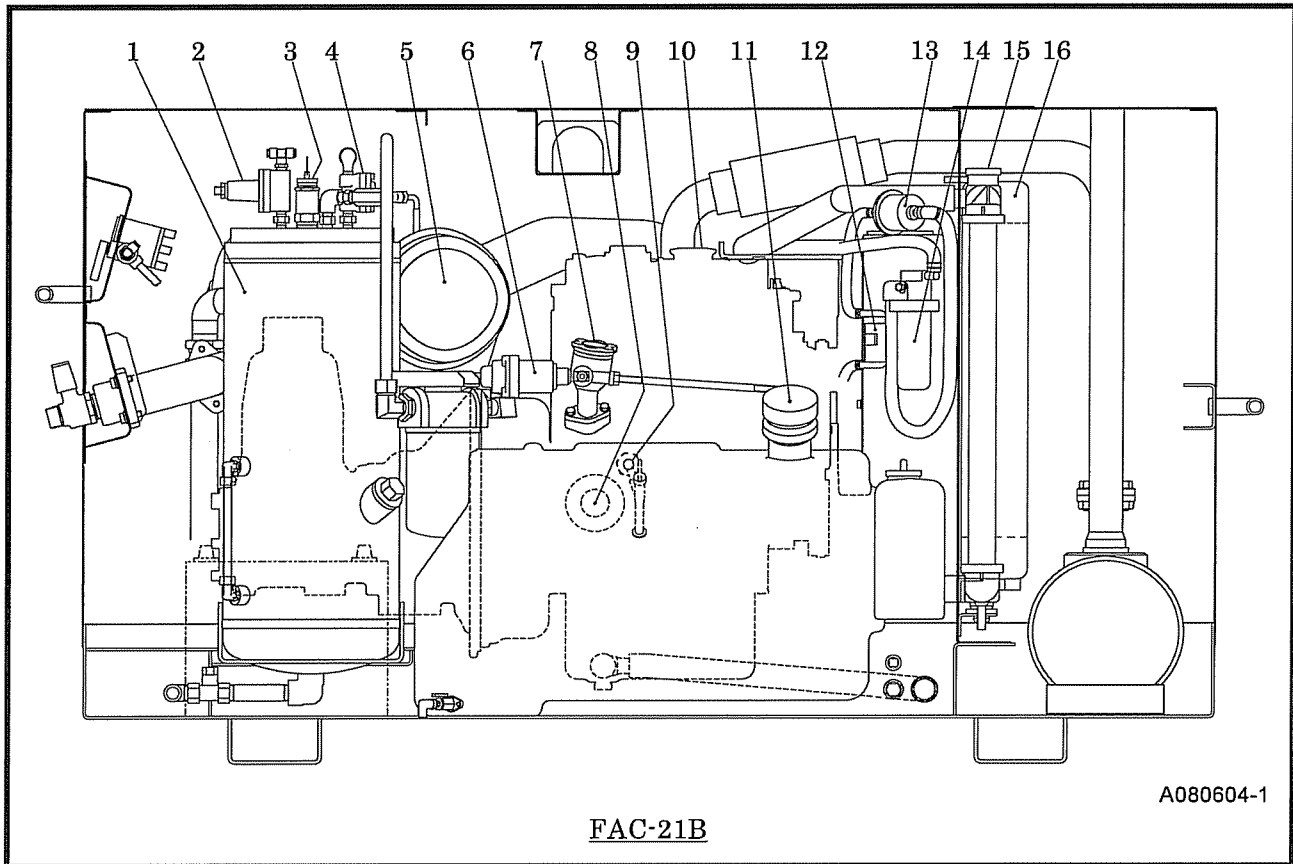


MEMO

A series of horizontal dotted lines for writing, consisting of approximately 35 lines.

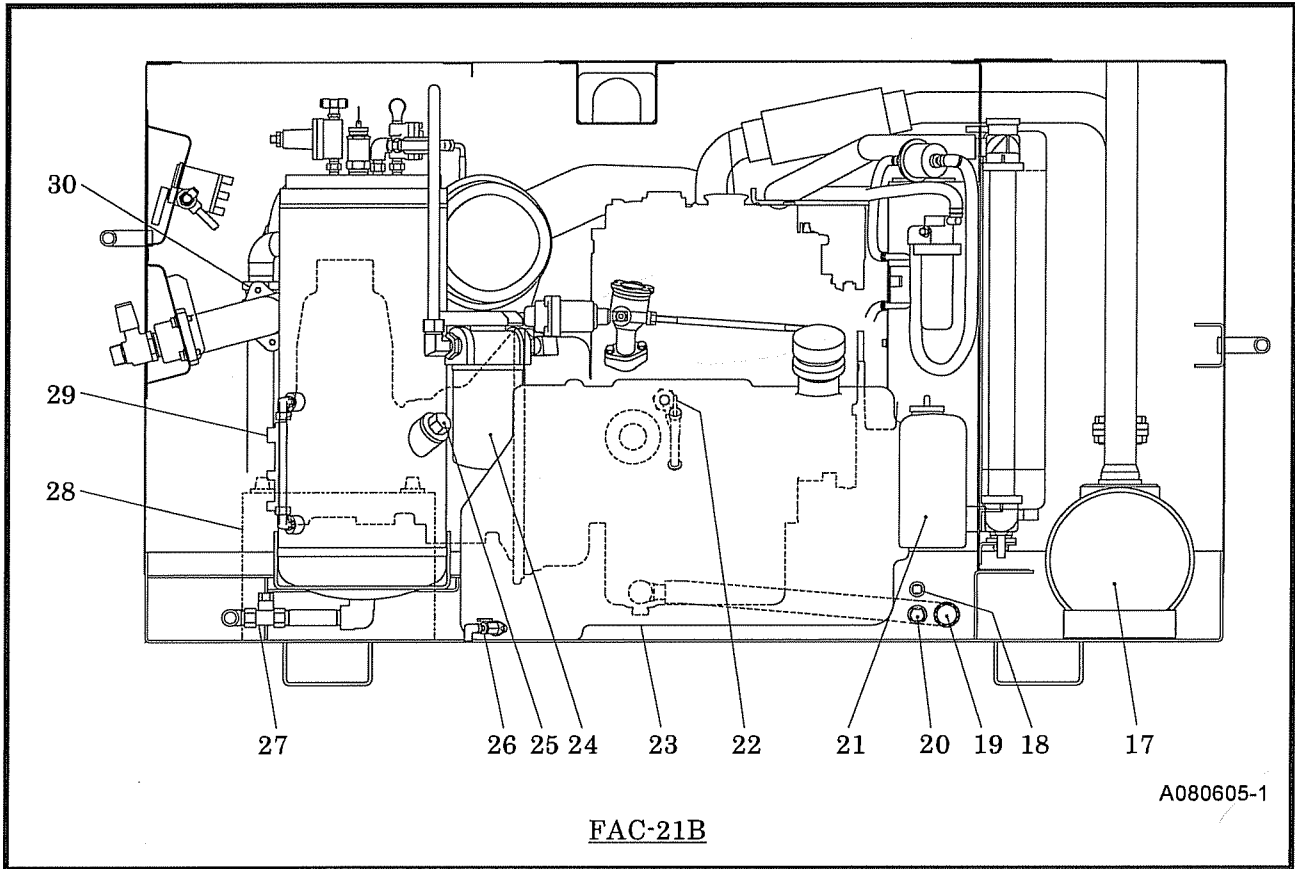
2.Part Names

2.1 Internal Components and Part Names



No.	Description	Function
1	Separator receiver tank	For separating compressor oil from compressed air sent into the tank.
2	Pressure regulator	For regulating intake air volume.
3	Safety valve	For releasing compressed air to the atmosphere when the pressure rises higher than the rated pressure.
4	Auto relief valve	For releasing the compressed air to the atmosphere. When the compressor stops.
5	Air filter	For filtering the dust floating in the intake air.
6	Speed regulator	For regulating compressor revolution speed.
7	Engine oil filler port	For supplying and replenishing engine oil to engine.
8	Engine oil filter	For filtering engine oil.
9	Coolant drain plug	For draining condensate from engine.
10	Engine	For driving the compressor.
11	Fuel tank filler port	For supplying and replenishing diesel fuel oil.
12	Filter for electromagnetic pump	For filtering dust and foreign matter mixed or to be mixed in the fuel oil.
13	Air bleeding electromagnetic pump	For feeding diesel fuel oil to engine.
14	Fuel filter (sedimenter built-in type)	For filtering dust and foreign things mixed in fuel oil and also for separating water.
15	Radiator	For cooling the coolant for engine because it is water-cooled.
16	Oil cooler	For cooling compressor oil circulating in the system.

2.Part Names



No.	Description	Function
17	Exhaust muffler	For exhausting engine emission gas.
18	Oil cooler drain plug	For draining compressor oil from oil cooler and also from oil lines.
19	Engine oil drain plug	For draining engine oil for replacement of it and for maintenance
20	Coolant drain plug	For draining condensate from engine.
21	Reserve tank	For checking engine cooling water level and for replenishing cooling water.
22	Engine oil level gauge	For checking engine oil level.
23	Fuel tank	For storing diesel fuel oil.
24	Compressor oil filter	For filtering compressor oil circulating in the system.
25	Compressor oil filler port	For supplying and replenishing compressor oil.
26	Fuel tank drain valve	For draining condensate and water accumulated at the bottom of the fuel tank.
27	Compressor oil drain valve	For draining compressor oil from separator receiver tank.
28	Battery	For electrically starting engine.
29	Air-end	For compressing intake air.
30	Pressure control orifice	For keeping receiver tank pressure above specified one constantly.

※Instrument marked 28 is provided on the other side (opposite side of maintenance).

3. Transportation and Towing the Unit

3.1 Transportation



Transportation

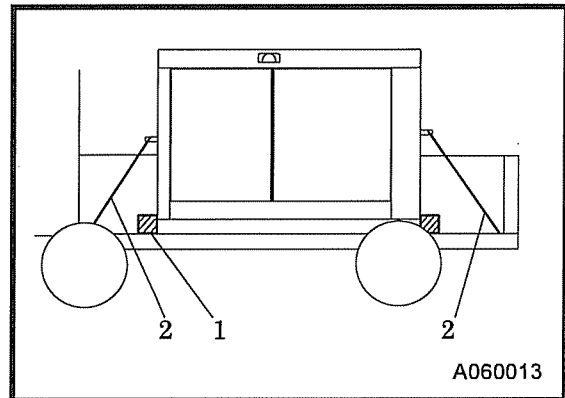
- When loading and unloading unit, be sure to use the lifting bail provided on the center of the unit top.
- Never get under the unit which is lifted up, because it is very dangerous.
- When unit is transferred or moved from working site, be sure to place it on truck bed, and fasten it by ropes at the front eye and rear stand.
- Never lift unit which is still in operation, or it could cause critical damage to each component or lead to serious accident.

3.1.1 Lifting up

- ① Before lifting the unit up, make sure to check the lifting bail for any crack and loosened bolts.
- ② Connect the hook of the crane or shackle with lifting bail eye fitted at the top center of the unit, and make sure that there is no person standing around the unit. Then perform hoisting operation.
- ③ Select a truck or a crane with capacity sufficient for weight and size of the unit by referring to the values shown in Chapter 8 “Specifications” of the manual.

3.1.2 Mounting the unit on the truck bed

- In case of box type, be sure to put chocks “1” at the front and rear frames to the machine.
- Hook the rope “2” as shown in the figure. Thus secure the unit on the truck bed.

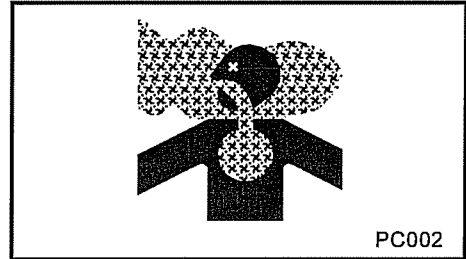


3. Transportation and Towing the Unit

3.2 Installation

WARNING

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



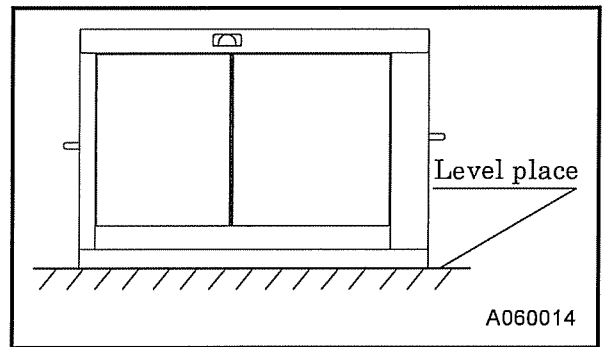
- The machine should be operated in following conditions:
 - **Ambient temperature** -15°C to +35°C
 - **Humidity** Less than 90%
 - **Altitude** Lower than 1,500 m above sea level
- Install the machine in a place with good ventilation, lower temperature and with surroundings as dry as possible.
- If more than two machines are placed parallel in operation, keep enough distance so that exhaust air from one machine does not effect the other one.
- Also, a machine has to be installed in the environment where fresh air is always available.
- Keep enough space around the unit for inspection and maintenance access.

3.2.1 Installation

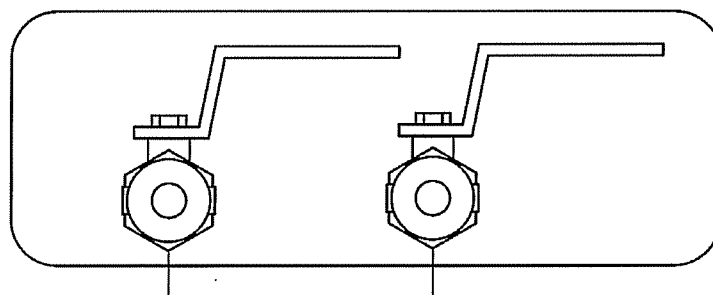
WARNING

- The machine has to be parked horizontally on a level place.
- In case the machine has to be parked on a slope, place it across grade so that the machine does not tend to roll downhill.
- Following grades on a slope for the machine are recom- mended within 10° degrees

Installation



3.2.2 Service valve



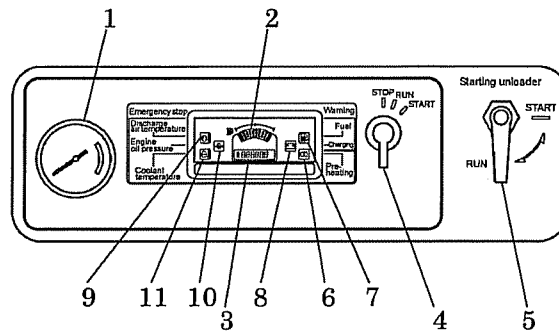
Discharge port : 20A(Rc3/4B) × 2
[Taper male screw]

A090556-1

4. Operation

4.1 Instrument Panel

1. Discharge air pressure gauge
2. Fuel level gauge
3. Elapsed time indicator
4. Starter switch
5. Starting unloader valve



- <Indicator lamp>
- 6. Preheating
- <Warning lamp>
- 7. Fuel residual level
- 8. Charging
- <Emergency stop lamp>
- 9. Discharge air temperature
- 10. Engine oil pressure
- 11. Coolant temperature

FAC-21B

A080038E

Indicator lamp

Turn the starter switch to "ON" position. Then the lamp will go on.

Item	Trouble	Measures	Monitor
Preheating	Press starter switch "ON" and the lamp goes on and after preheating is finished, the lamp will be off.	—	

Warning lamp

When some little trouble occurs during operation, the lamp will go on.

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

Item	Trouble	Measures	Monitor
Fuel residual level	When fuel level of fuel tank becomes lower, the lamp goes on.	Add fuel oil.	
Charging	Lamp goes on when alternator is not charging.	Check wiring. Check alternator.	

Emergency stop lamp

The compressor stops when the emergency stop lamp goes on.

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

Item	Trouble	Measures	Monitor
Discharge air temperature	Lamp goes on when the air temperature at the outlet of the air-end reaches the set temperature of 120°C.	See "Troubleshooting"	
Engine oil pressure	Lamp goes on when engine oil pressure drops. The function pressure is below 98.1kPa.		
Coolant temperature	Lamp goes on when coolant temperature reaches 110°C.		

4. Operation

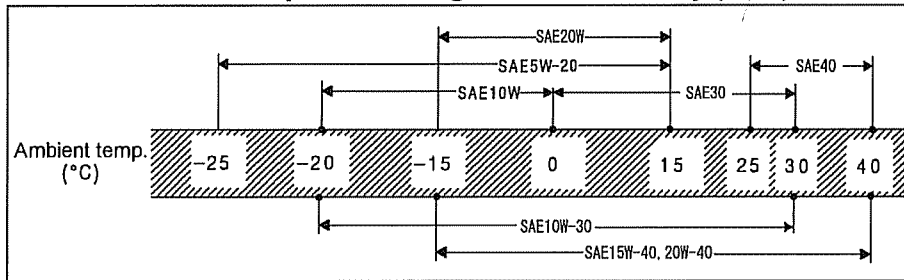
4.2 Lubricating oil · Coolant · Fuel

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)



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

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

4.2.2 Compressor oil

IMPORTANT

Do not mix compressor oil

- Be sure to use recommended oil listed below.

Maker and Brand of Recommended Oil

Maker	Brand
MOBIL	MOBIL RARUS 424
SHELL	SHELL CORENA OIL RS32
CALTEX	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

IMPORTANT

Quality of coolant and antifreeze

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

4.2.4 Fuel

IMPORTANT

Choose appropriate

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

4. Operation

4.3 Check before Starting Unit



CAUTION

Check before starting unit

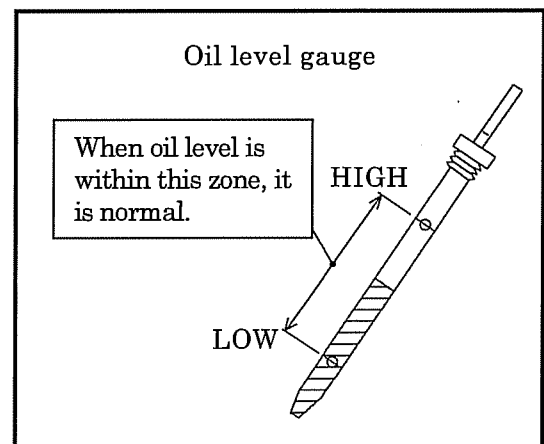
- Be sure to check the unit before operation.
When any abnormality is found, be sure to repair it before restarting the unit.
- Be sure to make daily checks before operation. If the unit is operated without prior check and without noticing its abnormality, such operation could cause seizure of components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

4.3.1 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 engine oil level gauge, and wipe it with a clean cloth.
 - ② Then, re-insert the engine oil level gauge fully and pull it out again. If the engine oil level gauge shows the oil level between LOW and HIGH limits, it is normal.
 - ③ When the oil level is below its LOW, add engine oil. (See 5.5.1)
- While checking oil level, check also for contamination. If the oil is found dirty, contaminated or should it be changed according to the periodic inspection list, change the oil. (See 5.5.1)
 - Never fill oil more than HIGH level.



4. Operation

4.3.2 Check coolant level

CAUTION

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

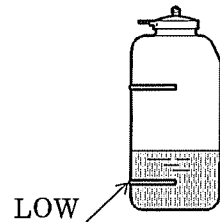
Taking off the radiator cap



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IMPORTANT

- Do not continue operation at low coolant level. Air bubble is mixed into radiator, and it causes damage to the radiator.
- Check the coolant level in the reserve tank. 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 tank, if necessary. (See 5.5.13)



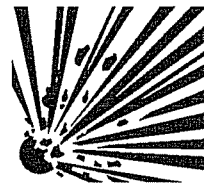
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4.3.3 Check compressor oil level

WARNING

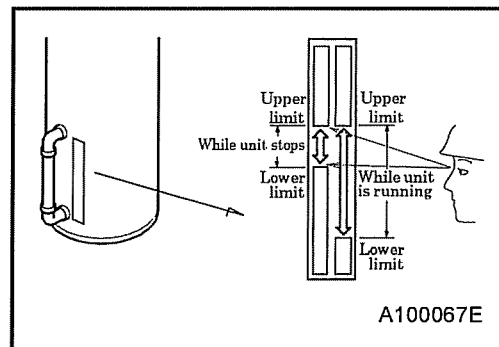
- When you refill the separator receiver tank with compressor oil, stop the engine, and make sure that the pressure gauge indicates 0MPa and there is no residual pressure in it, and then gradually loosen the oil filler cap for refilling oil.
- Should any residual pressure be left in the separator receiver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

Refilling of compressor oil



W010

- Place the machine on level ground when checking the oil level.
- Make sure to confirm that the level of compressor oil shall be higher than the lower limit of the plate "stopping". If not, replenish oil. (See 5.5.5)



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4. Operation

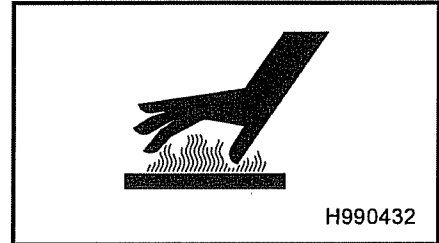
4.3.4 Drain separator receiver tank



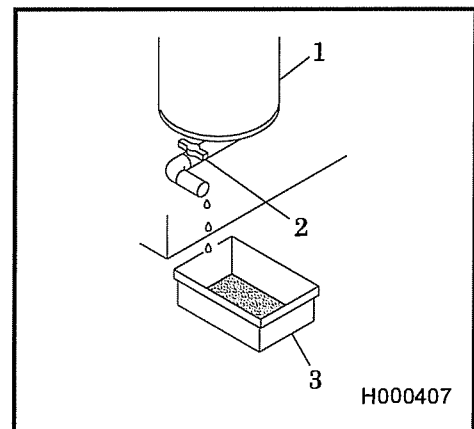
WARNING

Draining of Separator receiver tank

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

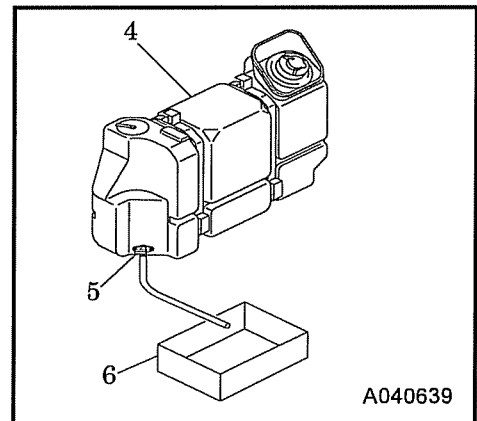


- Gradually opening the drain valve “2” fitted under the separator receiver tank “1” as shown in the fig, drain the condensate.
- Be careful not to fully open the drain valve “2”. Otherwise, much oil may be lost.
- After draining the oil completely, close the drain valve “2” firmly.
- Drain the condensate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



4.3.5 Drain fuel tank

- Opening the drain valve “5” fitted under the fuel tank “4”, drain the condensate from the tank.
- When completely drained, firmly close the drain valve “5”.
- Drain the condensate in container “6”, and then dispose of condensate according to the designated regulations.

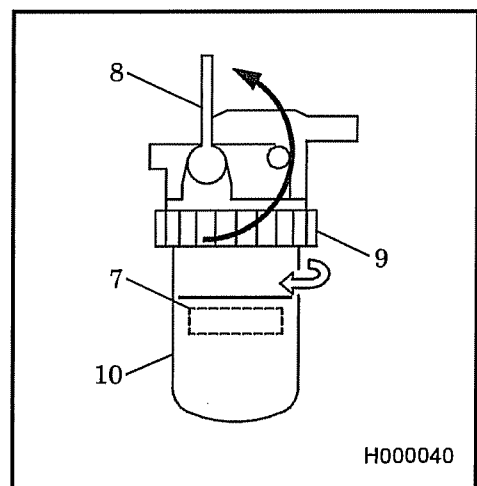


4.3.6 Drain fuel filter

Drain condensate when the red float “7” inside the fuel filter rises up to the drainage level “7”.

<Draining procedure>

- ① Turn to the position “Close” the upper lever “8” of the fuel filter.
 - ② Loosen the ring nut “9” and remove the cup “10”. In this case, carefully remove the cup because it is filled with diesel oil, so that it may not be spilled to soil the interiors.
 - ③ After draining the condensate (water) accumulated in the cup “10”, wash the cup in diesel oil. Then install it.
 - ④ After turning the lever “8” to “Open” position and filling the cup “10” with diesel oil, carry out the air bleeding operation. (See 4.4.3)
- Drain the condensate in container, and then dispose of condensate according to the designated regulations.



4. Operation

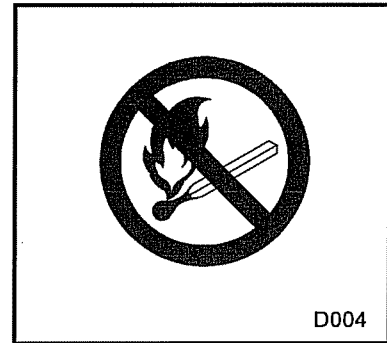
4.3.7 Check fuel

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

CAUTION

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

Fire prevention



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4.3.8 Check V-belt tension

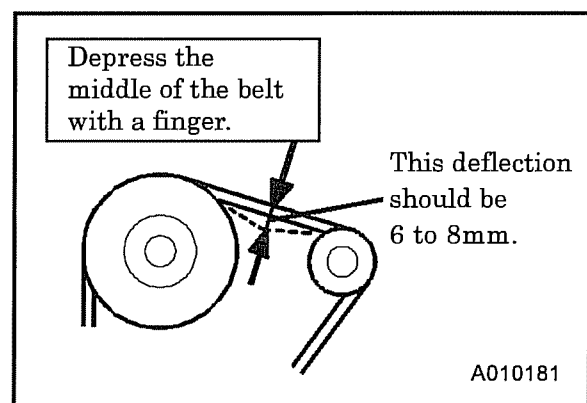
IMPORTANT

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

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

<Procedure>

- ① Adjust the tension by gradually loosening the fastening bolt of the alternator.
- ② Visually check if there are any cracks or tears in the belt.
- ③ Adjust the belt tension by loosening the fixing bolt of the alternator so that the belt can deflect 6 to 8mm when pressed at the center of the belt with approx.49N·m (5kgf·m) force.
- ④ Be careful not to leave any grease or LLC on a belt while changing it. If any such material is left, wipe it off completely.



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4.3.9 Check wiring of each part

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

4.3.10 Check piping of each part

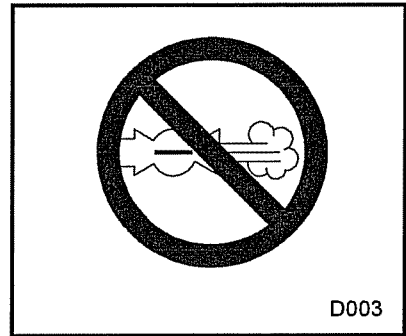
Check each piping for any loose connection and also check each hose and pipe for any tear and leaks.

4. Operation

4.4 Procedure to Operation

CAUTION

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



Quick Glow System

- Since this equipment is provided with a quick glow system (quick preheating device), **you do not have to turn the starter switch counterclockwise from STOP position.**
- Turn the starter switch to the "RUN" position, and the preheating will be completed in several seconds and the preheating lamp will go out. Then, turn the Starter Switch to the Start position to start up the engine.
- When the engine is already warm, the preheating operation is automatically omitted. Even though the preheating lamp lights up momentarily, ignore the lamp status, and start up the engine.

WARNING – Because of the quick glow system, never use ether to start engine.

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.



4. Operation

4.4.1 Procedure to start the unit

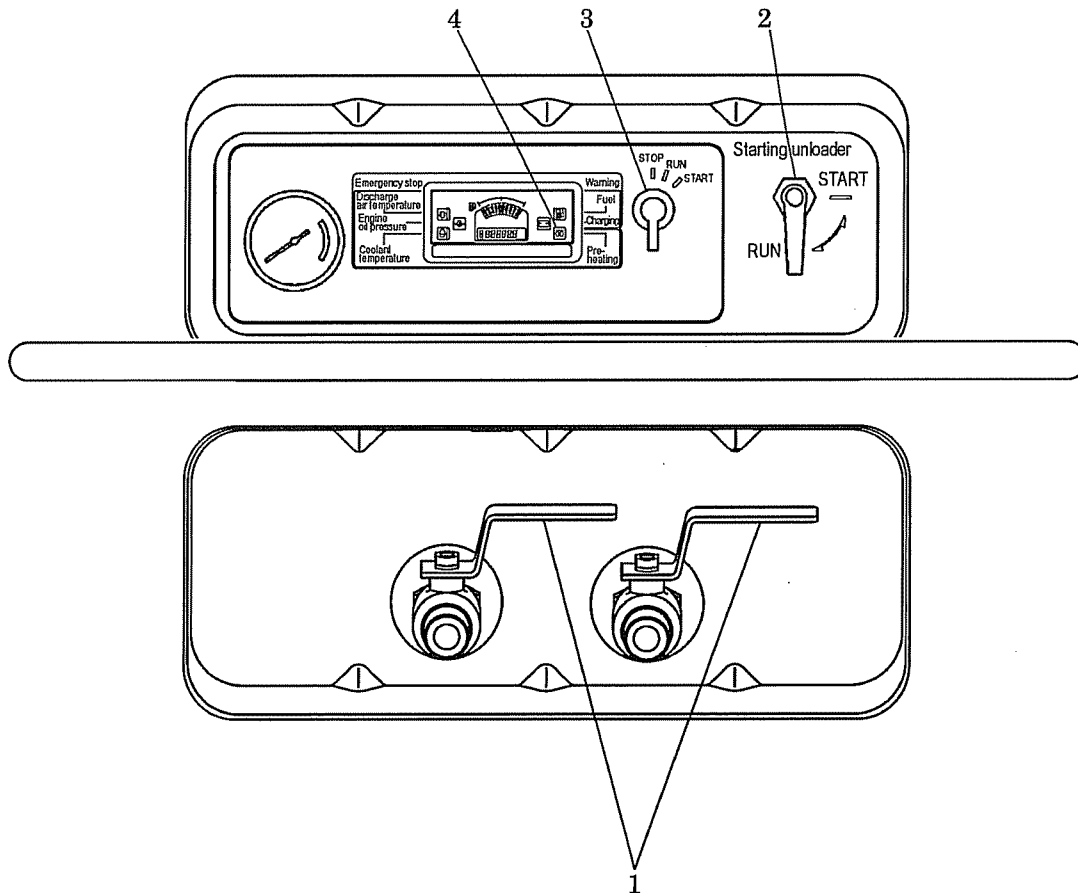
IMPORTANT

Be sure to warm-up

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

<Procedure>

- ① Close fully service valves "1" .
 - ② Set the starting unloader valve "2" to "START" position.
 - ③ Turn the starter switch "3" to "RUN" position, and the preheating lamp "4" goes on.
 - ④ As soon as the preheating lamp "4" has gone out, turn the starter switch "3" fully clockwise to start up the engine.
 - ⑤ Once the engine has started up, leave it running to warm-up for 5 minutes. The discharge air pressure in this condition ranges from 0.4 to 0.7MPa.
 - ⑥ After warm-up of the unit, put the starting unloader valve "2" back to its "RUN" position, and open the service valve "1" . The unit is now ready to operate.
- Be sure to turn the starting unloader valve "2" to "RUN" position prior to work. The discharge pressure does not increase as long as the starting unloader valve "2" stays at "START" position.



FAC-21B

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4. Operation

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

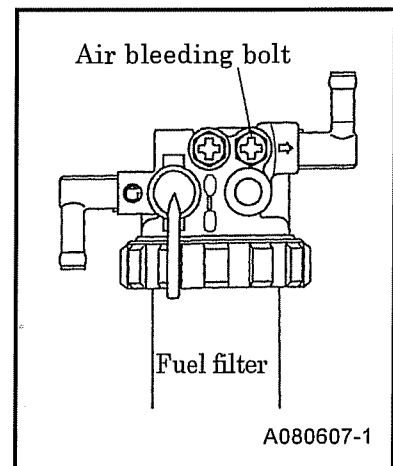
- When the engine fails to start up even after performing the startup procedures ① to ④, do not keep the starter running, but set the starter switch back to "STOP" and wait about 30 seconds. Then, repeat the startup procedure once again.
- If the repeated procedure does not allow the engine to run, the following causes are suspected. Therefore, check the following:
 - No fuel
 - Clogging of fuel filter
 - Clogging of filter inside the fuel air bleeding electromagnetic pump (FAC-37B, BC only)
 - Discharge of battery (Low cranking speed)

4.4.3 EFPA (Electrical fuel primer and air bleed)

The electromagnet pump automatically bleeds the air remaining in the pipes, after the filter for electromagnet pump and fuel filter elements are replaced or after emergency stop due to drop of fuel residual level.

<Procedure>

- ① Turn the starter switch to its "RUN" position. The electromagnet pump starts pumping and automatically bleeds air caught in the fuel pipes.
 - ② Air bleeding will be completed within 20 to 30 seconds.
 - ③ Start the machine following the starting procedures mentioned in 4.4.1. If starting fails one time, repeat the abovementioned procedures.
- In case air still remains, loosen air bleeding screw to bleed the air, leaving the starter switch placed "Run" position.
 - After finishing the air bleeding operation, never leave the starter switch placed on "RUN" position because the battery is discharging.



4. Operation

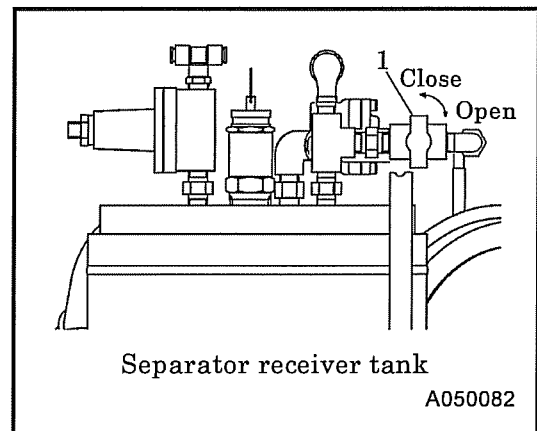
4.4.4 How to start the unit at low temperature

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

[FAC-21, 28B]

<Procedure>

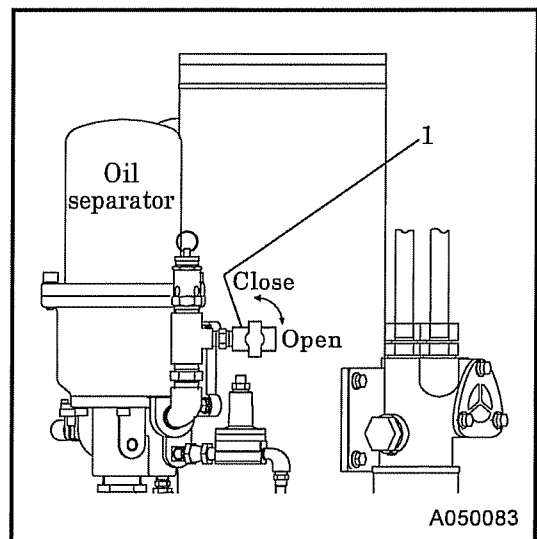
- ① Close all the service valves and set the starting unloader valve to the starting position.
- ② Fully open the relief valve "1" on the separator receiver tank.
- ③ Turn the starter switch to the starting position and perform cranking 4 to 5 seconds two times.
- ④ Perform usual starting operation. When the engine starts, gradually close a relief valve "1", watching engine revolution rise. In the state after the valve is fully closed, perform warming-up operation.



[FAC-37B,BC]

<Procedure>

- ① Close all the service valves and set the starting unloader valve to the starting position.
- ② Fully open the relief valve "1" just in front of a oil separator.
- ③ Turn the starter switch to the starting position and perform cranking 4 to 5 seconds two times.
- ④ Perform usual starting operation. When the engine starts, gradually close a relief valve "1", watching engine revolution rise. In the state after the valve is fully closed, perform warming-up operation.



IMPORTANT

Operation under Cold Weather Conditions below -5°C







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

4. Operation

4.4.5 Gauge indication while operating

IMPORTANT

- During operation, keep the discharge air pressure gauge indicating higher pressure.
 - FAC-21, 28B -----than 0.5MPa
 - FAC-37B, BC -----than 0.4MPa
 - Continuing equipment operation at a lower pressure than the above pressure may cause overheating, since it affects the separation of lubricating oil inside the oil separator and reduces the oil flow to the compressor air-end, resulting in temperature rise.
- Be sure to check at times to see if gauges or each component of the unit are properly working, or if there is any air-leak, oil-leak, water-leak or fuel-leak etc.
 - During normal operation, each indication of instruments is shown in the table below. Refer to the table for daily checks.
 - The above table gives standard values. They may vary slightly depending on the operating conditions and other factors.

Protection device	Emergency stop Lamp			Warning Lamp		Indicator lamp
	Discharge air temperature	Engine oil pressure	Coolant temperature	Fuel residual level	Charging	Preheating
Monitor						
Starting	● OFF	☀ ON	● OFF	● OFF	☀ ON	● OFF ※
In Operation	● OFF					

Note : The lamp marked ※ will go off within 0 to 10 seconds depending upon the ambient temperature.

		Model	Discharge air pressure gauge
In operation	Unload	FAC-21, 28B	0.69~0.9 MPa
		FAC-37B, BC	0.7~0.9 MPa
	Full load	FAC-21, 28B	0.5~0.69 MPa
		FAC-37B, BC	0.4~0.7 MPa

4. Operation

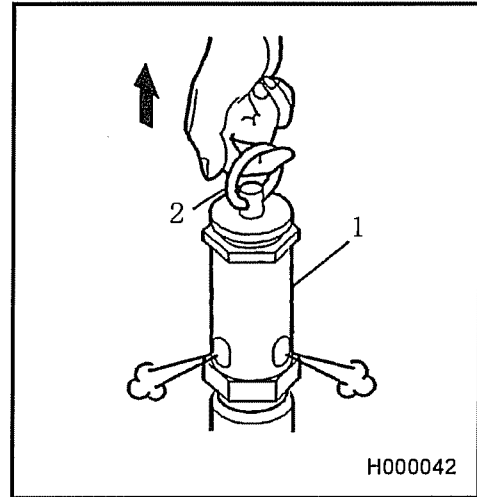
4.4.6 Performance check of safety valve

WARNING

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

IMPORTANT

- Be sure to check the safety valve "1" performance once a day.
- Close the service valves completely and pull the test ring "2" to check the performance. The function is good when the discharge air blows off with a slight force in the following conditions.
- FAC-21, 28B 0.69~0.9MPa
- FAC-37B,BC 0.7~0.9MPa
- Pressure setting for safety valve is 1.0MPa.



4.5 Procedure to 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 "operation" 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 service valves.

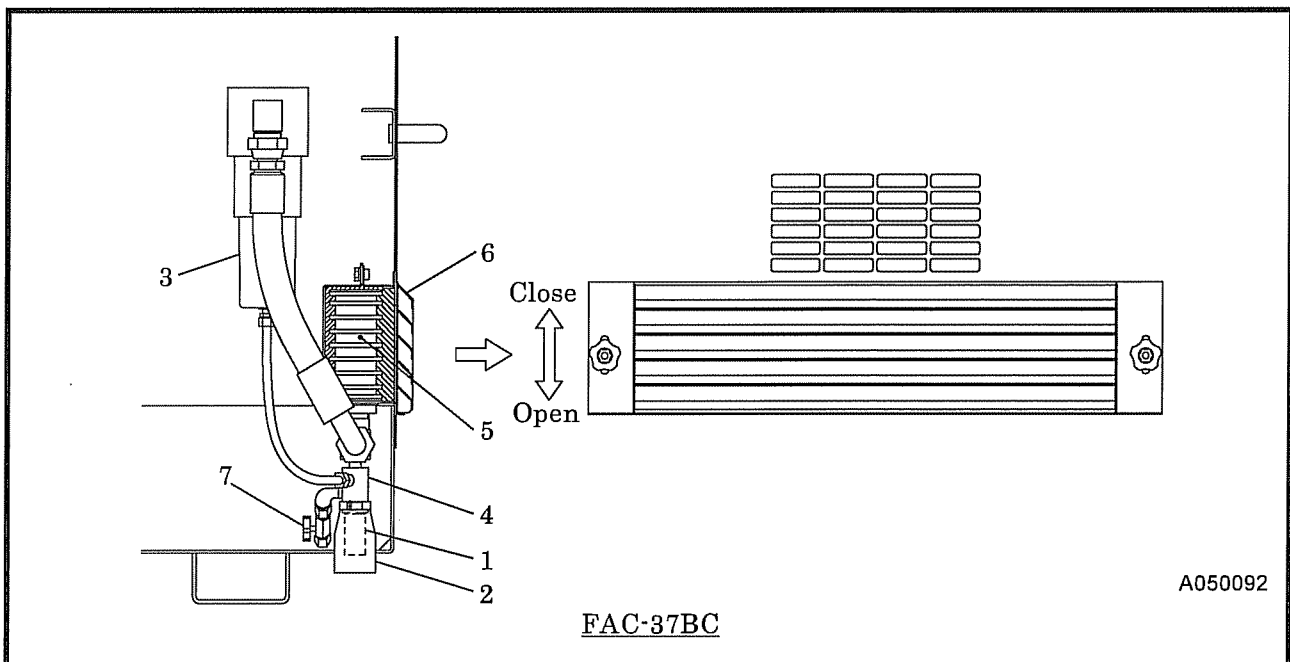
4. Operation

4.6 Precautions for Handling the Machine Provided with After-Cooler

4.6.1 Air line drain

- Oil is mixed in the drain water. Be careful of the oil contamination due to the drain water.
- When water is found mixed in the discharge air
Check whether air is being discharged from the drain outlet of air line during operation. (Carry out the following jobs after stopping the operation and also confirming that there is no residual pressure in the air line.)
 - ① In case no air is discharged,
It is possibly caused owing to the clogging of air silencer "1". Remove the rubber cover "2" which covers the silencer "1", and clean the inside of the silencer "1".
 - ② When air is being discharged,
It is possibly caused owing to the dust accumulated in the pipes and nipples "4" between the drain separator cup "3" and silencer "1". Remove the drain separator cup "3", the pipes and nipple "4" to clean them. Also make sure to clean filter screwed at the top of nipple "4".

If even after carrying out the said ① ② cleaning jobs, water is still found mixed in the discharged air, contact us or your nearest distributor.



4.6.2 Drain warming valve

- This valve "7" is also provided to prevent freezing of condensate water which takes place when discharging the water separated through drain separator. So when the ambient temperature is lower than 5°C, use the unit with the drain valve open. But when it is not feared that it freezes, the unit can be more efficiently used with the valve closed.

4.6.3 Handle machine in cold weather

- When the atmospheric temperature is below the freezing point, the after cooler "5" could freeze, resulting in damage. Be sure to close the intake cover "6" under the handle for running the machine. (In this case, poor water separation will occur.)

5. Periodic Inspection/Maintenance

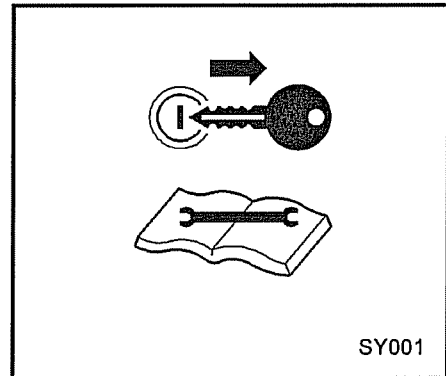
5.1 Important Items at Periodic Inspection and Maintenance or after Maintenance

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

WARNING

Hang a "Now Checking and under Maintenance" tag

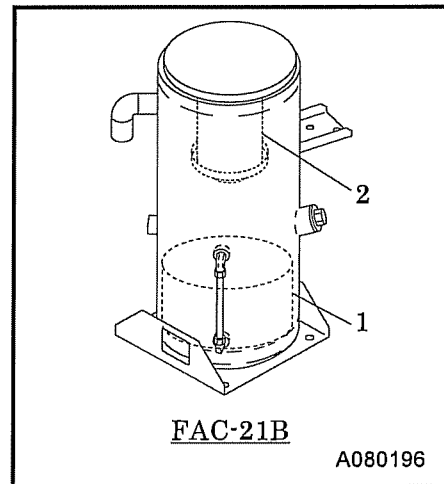
- Remove the starter key from the starter switch before starting inspection, and hang up a "Now Checking and under Maintenance" tag where it can be easily seen. The checker must keep the key during checking and maintenance.
- Remove the negative (-) side cable from the battery. If the above procedure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



CAUTION

Prevention of oil separator from catching fire

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



5. Periodic Inspection/Maintenance

IMPORTANT

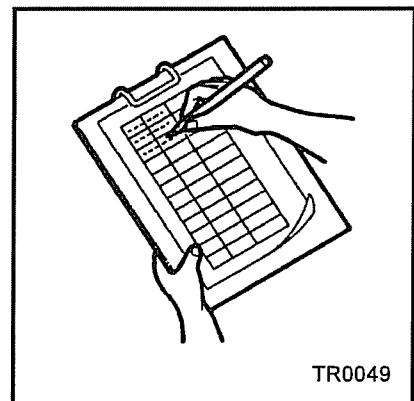
Directions: Prohibition of any other jobs or works than directed herein

- 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.

5.2 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.



5. Periodic Inspection/Maintenance

5.3 Periodic Inspection List

(Unit:Hour)

Maintenance	Daily	Every 250	Every 300	Every 500	Every 1,000	Every 2,000	Every 3,000	Page
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 performance of gauge and indication lamps.	○							4-12
Performance check of safety valve.	○							4-13
Change compressor oil.			※1○	○				5-7
Change compressor oil filter.			※1○		○			5-8
Clean strainer in the scavenging orifice.				○				5-8
Clean and change air filter element.		○ (Clean)		○ (Change)				5-9
Clean outside of the oil cooler.					○			5-10
Clean outside of the after cooler. (after cooler type)					○			5-10
Check and Clean the Silencer provided at the discharge port of air line. (after cooler type)				○				5-10
Change speed regulator diaphragm.					☆●			
Change oil separator.						●		5-12
Change nylon tubes.						●		
Change unloader of o-ring.							★●	
Change spacer of unloader.					※2○		★●	
Change pressure regulator.							●	
Check hoses.							★●	
Check o-ring and needle valve of auto-relief valve.							★●	

Compressor

Such items marked ○ shall be carried out by customers.

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

The following table shows the inspection and maintenance intervals under normal operation conditions. In case the unit is operated under harsh environmental conditions and operation conditions, the intervals should be shortened.

The items or parts marked ※1 show that they should be replaced primarily.

Regarding the item marked ※2, check the function of the unloader. In case the unloader malfunctions, change O-ring or bushing of unloader. This is because either of both parts may be worn out.

The items or parts marked ☆ should be replaced every 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.

5. 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	Page
Drain fuel tank (Including sedimenter)	○							4-6
Check fuel.	○							4-7
Check engine oil level.	○							4-4
Check coolant level.	○							4-5
Check looseness in pipe connectors, terminals and tear in wiring.	○							4-7
Check V-belt tension.	○							4-7
Change engine oil.		※○	○					5-5
Change engine oil filter.		※○		○				5-5
Check battery electrolyte.			○					5-6
Clean and change air-filter element.			○ (Clean)	○ (Change)				5-6
Change fuel filter element and O-ring.				○				5-9
Change filter for air bleeding electromagnetic pump.				○				5-10
Change coolant.					☆○			5-11
Clean outside of radiator.					○			5-10
Change fuel hose.						★●		5-12
Clean inside of fuel tank.						●		
Change radiator hoses.							★●	

The items or parts marked ※ show that they should be replaced primarily.

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.

5.4 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
		FAC-21B	FAC-28B	FAC-37B,BC	
Engine oil filter		SHIBAURA 140517020	SHIBAURA 140517020	SHIBAURA 140517020	1
Compressor oil filter		37438 05300	37438 05300	37438 05201	1
Air filter element		32143 11700	32143 11800	32143 11800	1
Filter for electromagnetic pump		43540 08000	43540 08000	43540 08000	1
Fuel filter	Element "4"	SHIBAURA 360720060	SHIBAURA 360720060	SHIBAURA 360720060	1
	O-ring "5"	SHIBAURA 052100440	SHIBAURA 052100440	SHIBAURA 052100440	1
Oil separator	Separator "1"	34220 12301	34220 12301	34220 13000	1
	Gasket "2"	03737 16802	03737 16802	—	2
	O-ring "4"	—	—	03402 15140	1

5. Periodic Inspection/Maintenance

5.5 Maintenance Items

5.5.1 Change engine oil

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



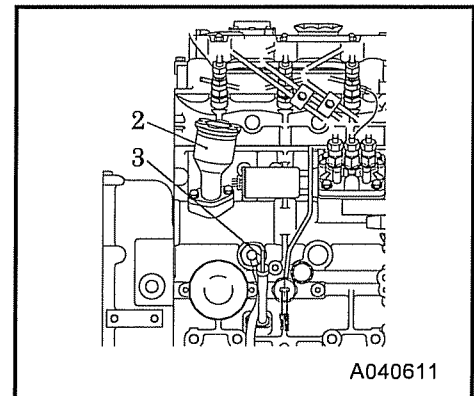
Caution in filling or discharging engine oil

- 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.



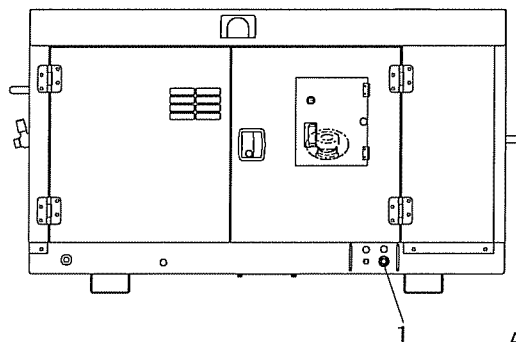
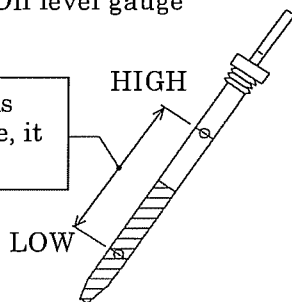
<Procedure>

- ① Loosen the drain plug "1" located inside of the frame to drain out the used oil.
- ② When the oil is completely drained, close the drain plug "1" firmly and refill new engine oil through the engine oil filler "2".
- ③ After supplying oil, pull out the oil level gauge "3" and wipe it out.
- ④ Then, re-insert the oil level gauge "3" fully and pull it out again. If the dipstick shows the oil level between HIGH and LOW, it is normal.



Oil level gauge

When oil level is within this zone, it is normal.



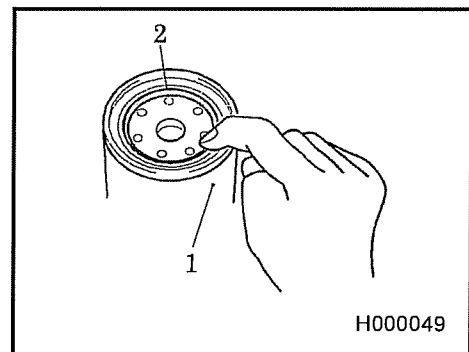
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5.5.2 Change engine oil filter

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

<Procedure>

- ① Remove the cartridge "1", using a filter wrench.
- ② Screw in the new cartridge "2" with the packing coated slightly with oil. (For part number, see 5.4)
- ③ After the packing touches the sealing face, further tighten it by turning it 3/4 times with the filter wrench.
- ④ After installing the oil filter, check it for any leak during operation.



5. Periodic Inspection/Maintenance

5.5.3 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 6.1. for method of specific gravity measurement and recharging the battery.

2. Enclosed type battery:

Check the indicator on top surface of the battery.

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

5.5.4 Check and clean air filter element [Every 250 hours]

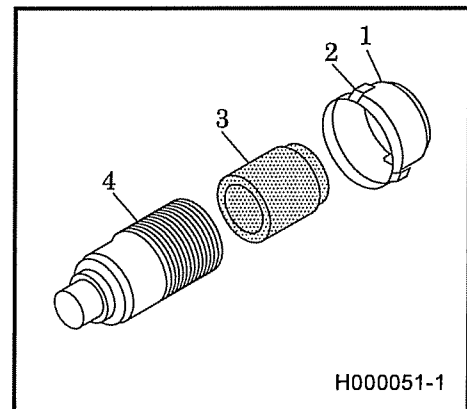
IMPORTANT

Cleaning of Air Filter Element should be perfectly performed

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

<Procedure>

- ① After removing the cap "1" by loosening its latch "2", clean its interior properly.
- ② Remove the element "3", and clean it.
- ③ When installing the cap "1" after finishing the cleaning job, push the element into the case "4" surely by hand, and then make sure that the latch "2" fixing the cap surely hooks the case "4". Finally tighten it.
- ④ If the element is found heavily dusty, replace it with a new one. (For part number, see 5.4)



5. Periodic Inspection/Maintenance

5.5.5 Change compressor oil

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



WARNING

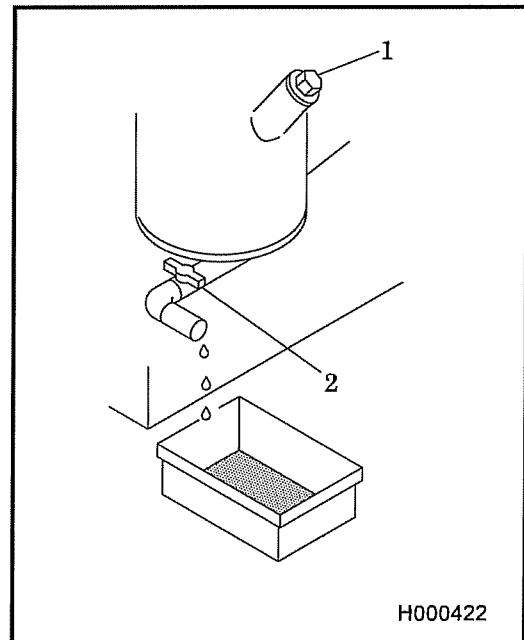
Refilling of compressor oil

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



<Procedure>

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



H000422

5. Periodic Inspection/Maintenance

5.5.6 Change compressor oil filter

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

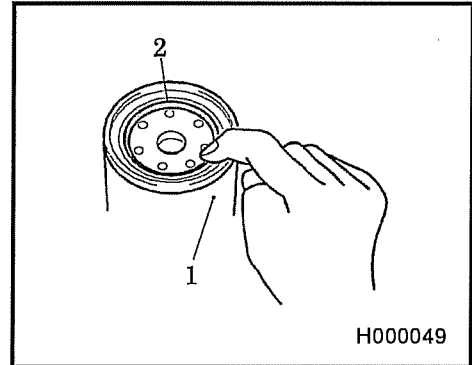
IMPORTANT

Use our genuine oil filter

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

<Procedure>

- ① Remove the cartridge "1", using a filter wrench.
- ② Screw in the new cartridge "2" with the packing coated slightly with oil. (For part number, see 5.4)
- ③ After the packing touches the sealing face, further tighten it by turning it 3/4 times with the filter wrench.
- ④ After installing the oil filter, check it for any leak during operation.



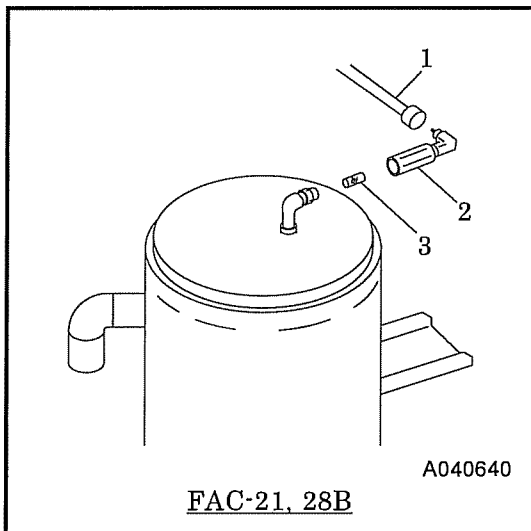
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5.5.7 Clean strainer in the scavenging orifice

[Every 500 hours]

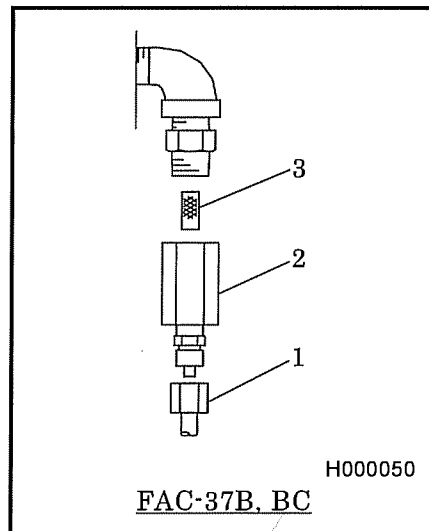
<Procedure>

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



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FAC-21, 28B



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FAC-37B, BC

5. Periodic Inspection/Maintenance

5.5.8 Change air filter element [Every 500 hours]

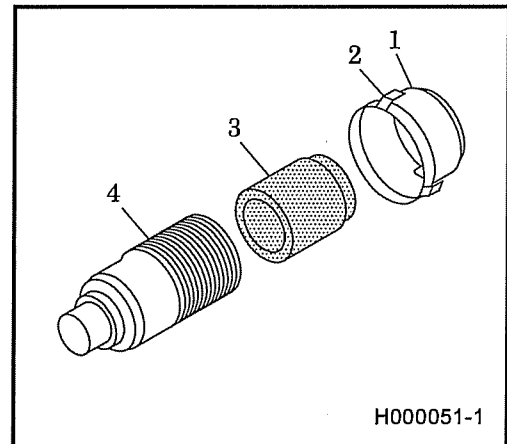
IMPORTANT

Use our genuine part

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

<Procedure>

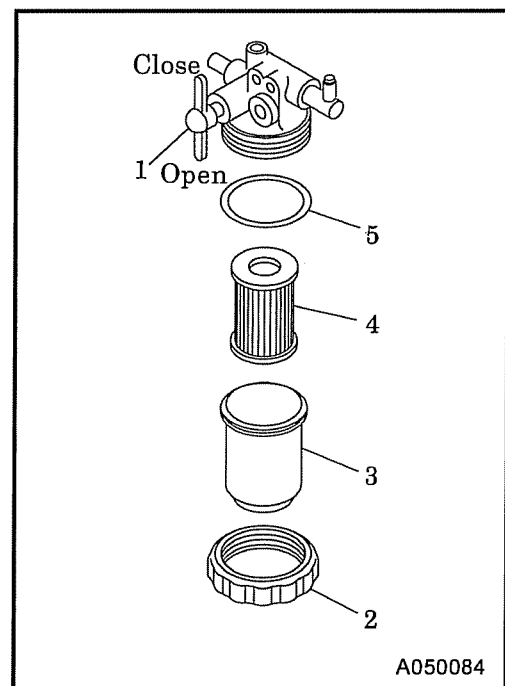
- ① After removing the cap "1" by loosening its latch "2", clean its interior properly.
- ② Remove the element "3" and then replace it with a new one. (For part number, see 5.4)
- ③ When installing the cap "1" after replacing it, properly push the element into the case "4" by hand and then make sure that the hooks for fixing the cap are surely set. Finally tighten it.



5.5.9 Change fuel filter element and o-ring [Every 500 hours]

<Procedure>

- ① Turn the lever "1" of "FUEL VALVE" of fuel filter to the direction of "CLOSE" mark to cut off the fuel flow.
- ② Loosen the ring nut "2" to remove cup "3", take out the element "4".
- ③ Clean the cup "3", fit a new element "4" in, and install a new O-ring "5". (For part number, see 5.4)
- ④ After installing the cup "3" with the element "4" built in to the body, securely fasten it by the ring nut "2".
- ⑤ After pouring the fuel into the cup by turning the lever "1" of "FUEL VALVE" to the direction of "OPEN", bleed the air. (See 4.4.3)

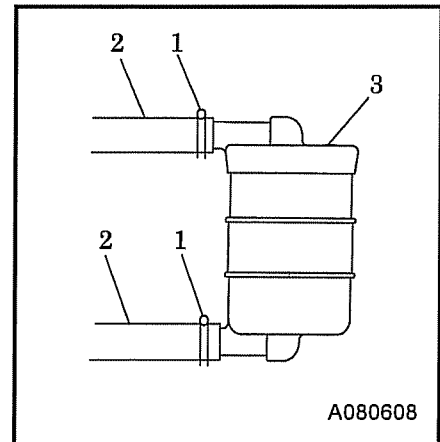


5. Periodic Inspection/Maintenance

5.5.10 Change filter for air bleeding electromagnetic pump [Every 500 hours]

<Procedure>

- Remove hose clip "1" and pull out hose "2" from filter "3".
- When disassembling prepare a saucer to receive fuel leaking from hose "2" beforehand.
- Replace filter "3" by a new one. (For part number, see 5.4)



5.5.11 Check and Clean the Silencer provided at the discharge port of air line (After-cooler type) [Every 500 hours]

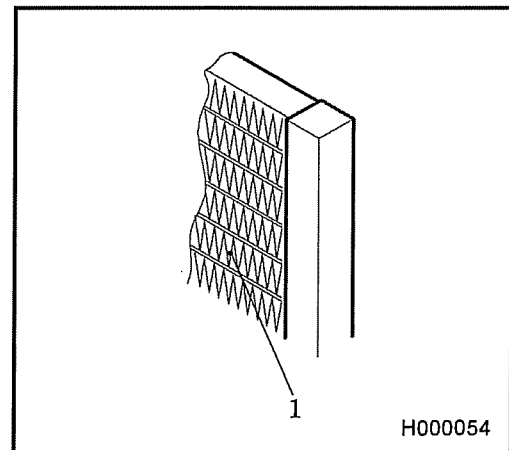
IMPORTANT

Don't fail to clean silencer fully and properly

- When no air is discharged from the silencer, the silencer may possibly be fully clogged. Perform periodical maintenance and clearing.
- For silencer handling, refer to 4.6.1 Draining Air Line.

5.5.12 Clean outside of the radiator·oil cooler and after cooler [Every 1,000 hours]

- When the fin tubes diaphragm "1", of a radiator, and an oil 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 diaphragm "1", even before maintenance schedule.
- Do not use a high pressure washer to protect fin tubes diaphragm "1", from being damaged.



5. Periodic Inspection/Maintenance

5.5.13 Change coolant [1,000 hours or every 2 years]



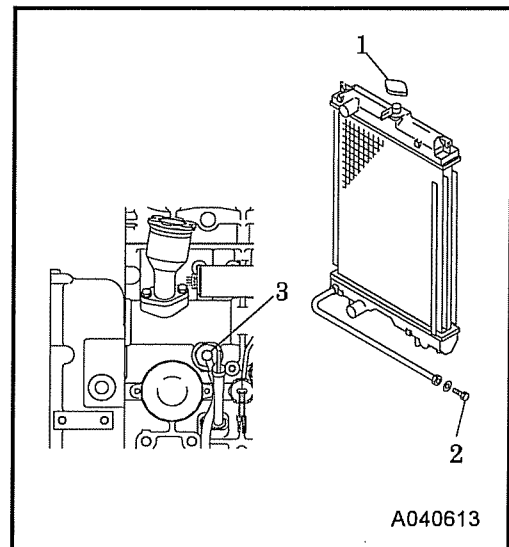
Caution in filling or discharging engine oil

- 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.
- When a person has drunk LLC (Antifreeze) by accident, make him vomit and see a doctor immediately.
- When a person gets LLC (Antifreeze) in his eyes, wash the eyes with clean running water and make him see a doctor immediately.
- When LLC (Antifreeze) is stored, put it in a container with an indication saying "LLC (Antifreeze) inside" and seal it up, then keep it in a place away from children.
- Beware of flames.



<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 valve "3" provided on engine to drain engine.
- ③ When the drainage has been completed, fasten drain plug "2" , "3" again and fill coolant into the radiator through its filler port.
- 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.

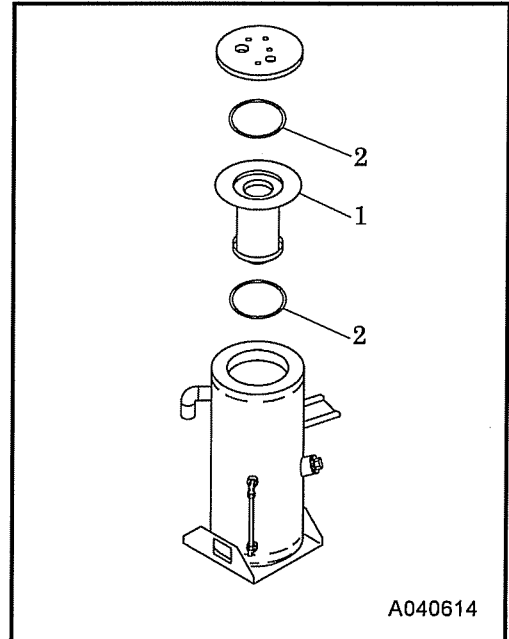


5. Periodic Inspection/Maintenance

5.5.14 Change oil separator [Every 2,000 hours]

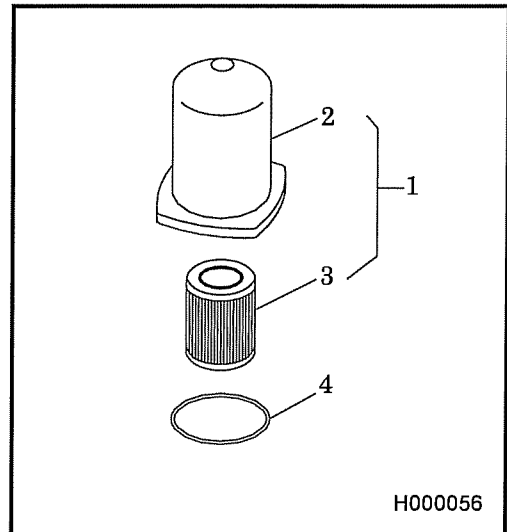
[FAC-21, 28B]

- If even before scheduled interval operation, consumption of compressor oil is unusually high, or some oil is found in discharged air, replace the oil separator. When changing oil separator "1", be sure to replace cover "2".
(For part number, see 5.4)
- When replacing oil separator, contact directly us or distributor because it requires expert technical knowledge.



[FAC-37B, BC]

- If even before scheduled interval operation, consumption of compressor oil is unusually high, or some oil is found in discharged air, replace the oil separator.
- When changing oil separator "1", be sure to replace cover "2" and element "3", O-ring "4".
(For part number, see 5.4)
- When replacing oil separator, contact directly us or distributor because it requires expert technical knowledge.



5.5.15 Change fuel hose [2,000 hours or every 3 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. Maintenance/Adjustment

6.1 Maintenance of Battery

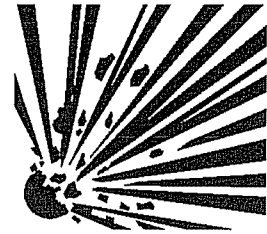


- Keep flames away from battery.
- Battery may generate hydrogen gas and may explode.
- Therefore, recharging should be done at a well-ventilated place.
- Do not spark near the battery nor light a match, nor bring lit cigarette and match close to the battery.
- Do not check the battery by short-circuiting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

Handling battery



D004



W010

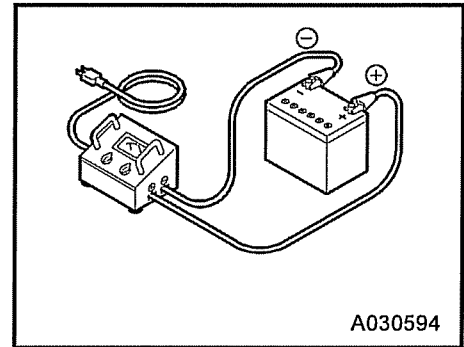


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6. Maintenance/Adjustment

6.1.1 Charge Battery

- Be sure to read the operation manual of the battery charger to know if it is applicable, before using it.
- Disconnect the cable between battery and the unit, and charge the battery with a 12V battery charger. Do not charge 2 batteries at the same time.
- Be sure not to connect (+) and (-) terminals backwards.



6.1.2 How to Use Booster Cable



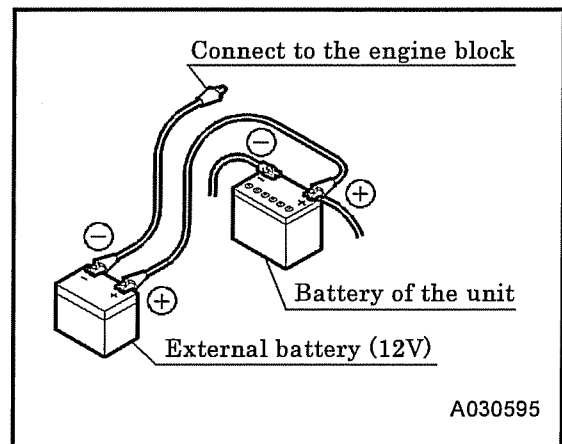
CAUTION

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.

<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.



6. Maintenance/Adjustment

6.2 Troubleshooting

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

Symptom	Cause	Countermeasures
Low starter revolution speed.	(1) Battery malfunction.	Check battery→ Charge, change
Starter rotates but engine does not start.	(1) Fuel filter clogging. (2) Malfunction of fuel cut motor stopper. (3) No fuel.	Disassemble, clean, and change Check fuse Change motor stopper Check connector Replenish fuel
Discharge air pressure will not rise.	(1) Pressure regulator insufficient adjustment. (2) Starting unloader valve is left at its start position.	Re-adjust (Fasten) Place it at "RUN" position
Engine does not reach its maximum speed.	(1) Improper length in speed regulator rod. (2) Unloader orifice clogging. (3) Faulty speed regulator. (4) Engine trouble. (5) Fuel filter clogging.	Re-adjust Disassemble/Clean Disassemble/Check Call your nearest dealer Disassemble/Change
While the discharge pressure will not rise up to the specified one, RPM will drop.	(1) Pressure regulator insufficient adjustment. (2) Trouble of pressure regulator. (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) Faulty 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 and seat malfunction. (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) Low discharge pressure. (3) Oil separator deteriorated.	Disassemble/Clean Disassemble unloader and check Disassemble/Change
Insufficient free air delivery.	(1) Air filter element clogging. (2) Unloader valve cannot fully open. (3) Engine does not reach rated speed.	Clean element or change Call your nearest dealer Call your nearest dealer

6. Maintenance/Adjustment

Symptom	Cause	Countermeasures
Water found mixed in discharged. (Poor water separation)	(1) Drain outlet portion and silencer of air line clogged. (2) Pipes between drain separator and silencer clogged with dust.	Disassemble/Clean or replace Disassemble/Clean
Engine oil pressure lamp goes on.	(1) Engine oil shortage. (2) Engine oil deteriorated. (3) Engine oil filter clogging. (4) Malfunction of engine oil pump (5) Faulty oil pressure switch. (6) Loosened or disconnected wiring or connector.	Replenish oil Change Change Change Change Check/Fasten
Coolant temperature lamp goes on.	(1) Radiator clogging. (2) Faulty thermostat. (3) Faulty coolant temp. switch. (4) Low coolant level. (5) Fan belt slippage. (6) Loose wiring, connectors and disconnection.	Clean Change Change Replenish Re-adjust tension Check/retighten
Discharge air temperature lamp goes on.	(1) Oil cooler clogging. (2) Oil filter clogging. (3) Faulty discharged air temp. switch. (4) Loose wiring connectors and disconnection. (5) Slippage of fan belt. (6) Shortage of compressor oil.	Clean Change Check/inspect Check and retighten Re-adjust tension Replenish oil
Fuel residual level lamp goes on.	(1) Fuel runs short. (2) Malfunction of sending unit for fuel oil level drop. (3) Loosened and disconnected wiring connection and connectors.	Add fuel oil Inspect/replace Inspect/retighten

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

7. Storage of the Unit

7.1 Preparation for Long-term Storage

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

<Procedure>

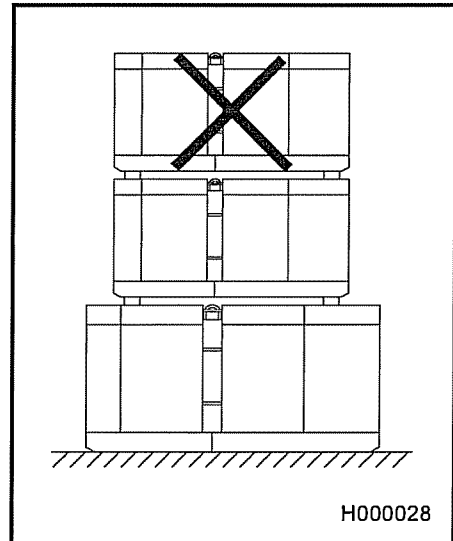
- ① Drain existing lubricant from the engine oil pan. Pour new lubricant in the engine to clean its inside. After running it for a while, drain it again.
- ② Spread lubricant on moving parts like speed regulator and rod end, beforehand.
- ③ Completely charge the battery and disconnect grounding wires.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



WARNING

Cautions on stacking up box type machines

- When stacking up the machines for storage, only two units stacking are acceptable. The mass of the lower machine should be larger than that of the upper one.
- Select a leveled floor with sufficient strength.
- Before stacking the machines up, check the machine for deformation of bonnet, looseness or missing of bolts, and other parts.
- When stacking them, be sure to securely fix them as shown in the figure so that the balanced weight is applied to each squared lumber "1" for preventing a sideslip or a collapse.
- Never operate the machines with stacking conditions. It is very dangerous.
- When stacking units for storage, enough safety precautions should be paid to the storage place, because earthquake can cause sideslip or collapse of the stacked unit.



8. Specifications

8.1 Specifications

Model		FAC-21B	
Compressor	Type	Single-stage oil cooled, screw type compressor	
	Free air delivery	m ³ /min 2.1	
	Working pressure	MPa 0.69	
	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 11	
Engine	Model	SHIBAURA S753-D	
	Type	Water-cooled 4-cycle swirl chamber type	
	Number of cylinders, bore stroke	3-75mm × 72 mm	
	Total displacement	L 0.954	
	Rated output	kW/min ⁻¹ 15.2 / 3,500	
	Lubricating oil capacity	L	4.2 (The amount of initial filling)
			Approx. 3.6 (The amount of exchange)
	Coolant capacity (including radiator)	L 4.3	
	Battery	80D26R or 85D26R (12V)	
	Fuel tank capacity	L 28	
	Overall length	mm 1,580	
	Overall length (Bonnet only)	mm 1,460	
	Overall width	mm 750	
	Overall height	mm 865	
	Net dry mass	kg 425	
Operating mass	kg 465		

8. Specifications

Model		FAC-28B	
Compressor	Type		Single-stage oil cooled, screw type compressor
	Free air delivery	m ³ /min	2.8
	Working pressure	MPa	0.69
	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	11
Engine	Model		SHIBAURA S773L-D
	Type		Water-cooled 4-cycle swirl chamber type
	Number of cylinders, bore stroke		3-77mm × 81 mm
	Total displacement	L	1.131
	Rated output	kW/min ⁻¹	19.0 / 3,500
	Lubricating oil capacity	L	4.5 (The amount of initial filling)
			Approx. 4.0 (The amount of exchange)
	Coolant capacity (including radiator)	L	4.5
	Battery		80D26R or 85D26R (12V)
	Fuel tank capacity	L	28
	Overall length	mm	1,580
	Overall length (Bonnet only)	mm	1,460
	Overall width	mm	750
	Overall height	mm	865
	Net dry mass	kg	435
Operating mass	kg	475	

8. Specifications

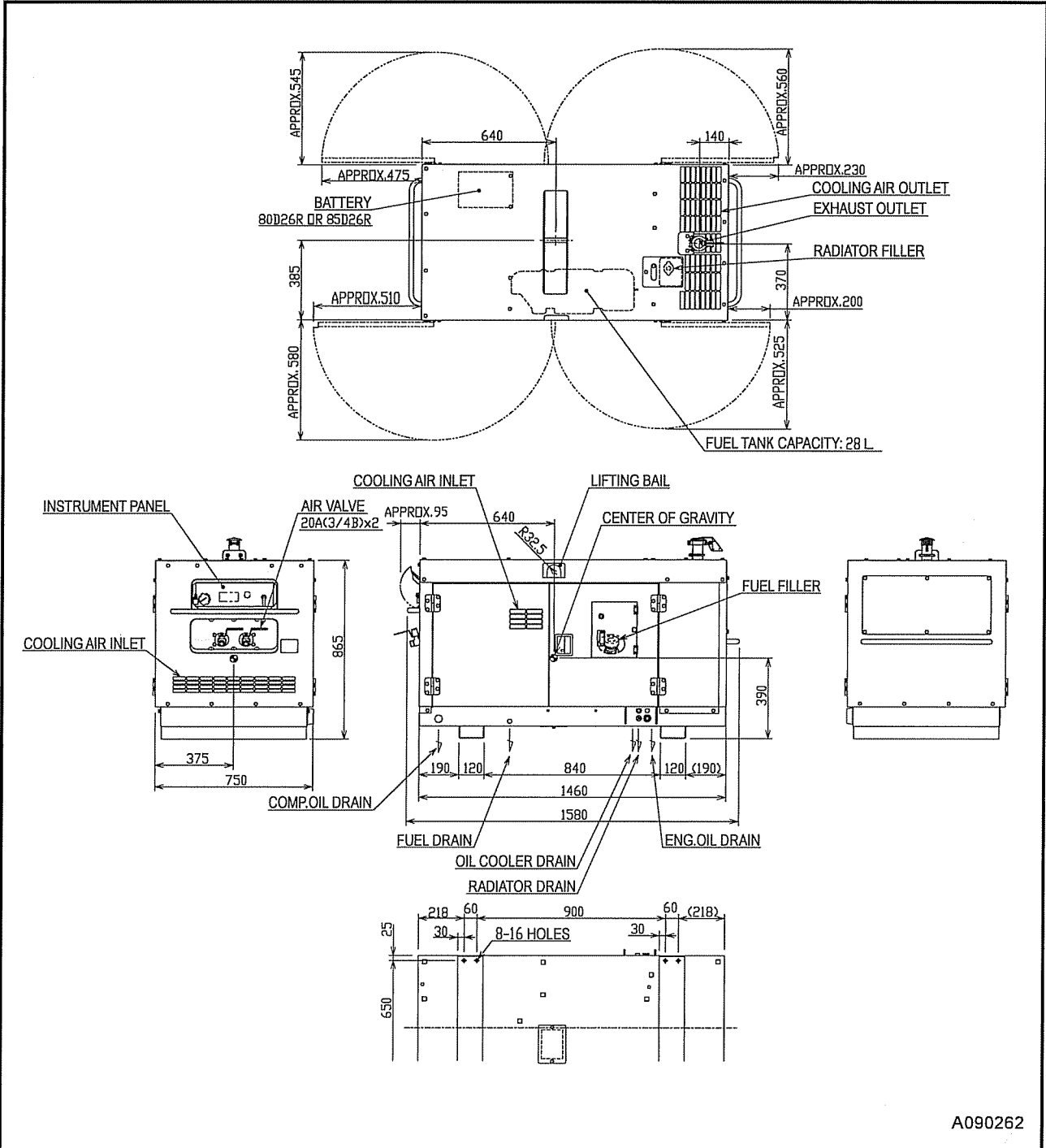
Model		FAC-37B	FAC-37BC	
Compressor	Type	Single-stage oil cooled, screw type compressor		
	Free air delivery	m ³ /min	3.7	
	Working pressure	MPa	0.7	
	Lubricating system	Forced Lubrication by compressed pressure		
	Driving system	Direct driving with gear coupling		
	Receiver tank capacity	m ³	0.030	
	Lubricating oil capacity	L	14	
Engine	Model	SHIBAURA N843L		
	Type	Water-cooled 4-cycle swirl chamber type		
	Number of cylinders, bore stroke	3-84mm × 100 mm		
	Total displacement	L	1.662	
	Rated output	kW/min ⁻¹	28 / 3,000	
	Lubricating oil capacity	L	6.5 (The amount of initial filling)	
			Approx. 5.5 (The amount of exchange)	
	Coolant capacity (including radiator)	L	6.6	
	Battery	80D26R or 85D26R (12V)		
	Fuel tank capacity	L	70	
	Overall length	mm	1,700	
	Overall length (Bonnet only)	mm	1,580	
	Overall width	mm	890	
	Overall height	mm	1,060	
	Net dry mass	kg	665	680
Operating mass	kg	745	760	

8. Specifications

8.2 Outline drawing

FAC-21B

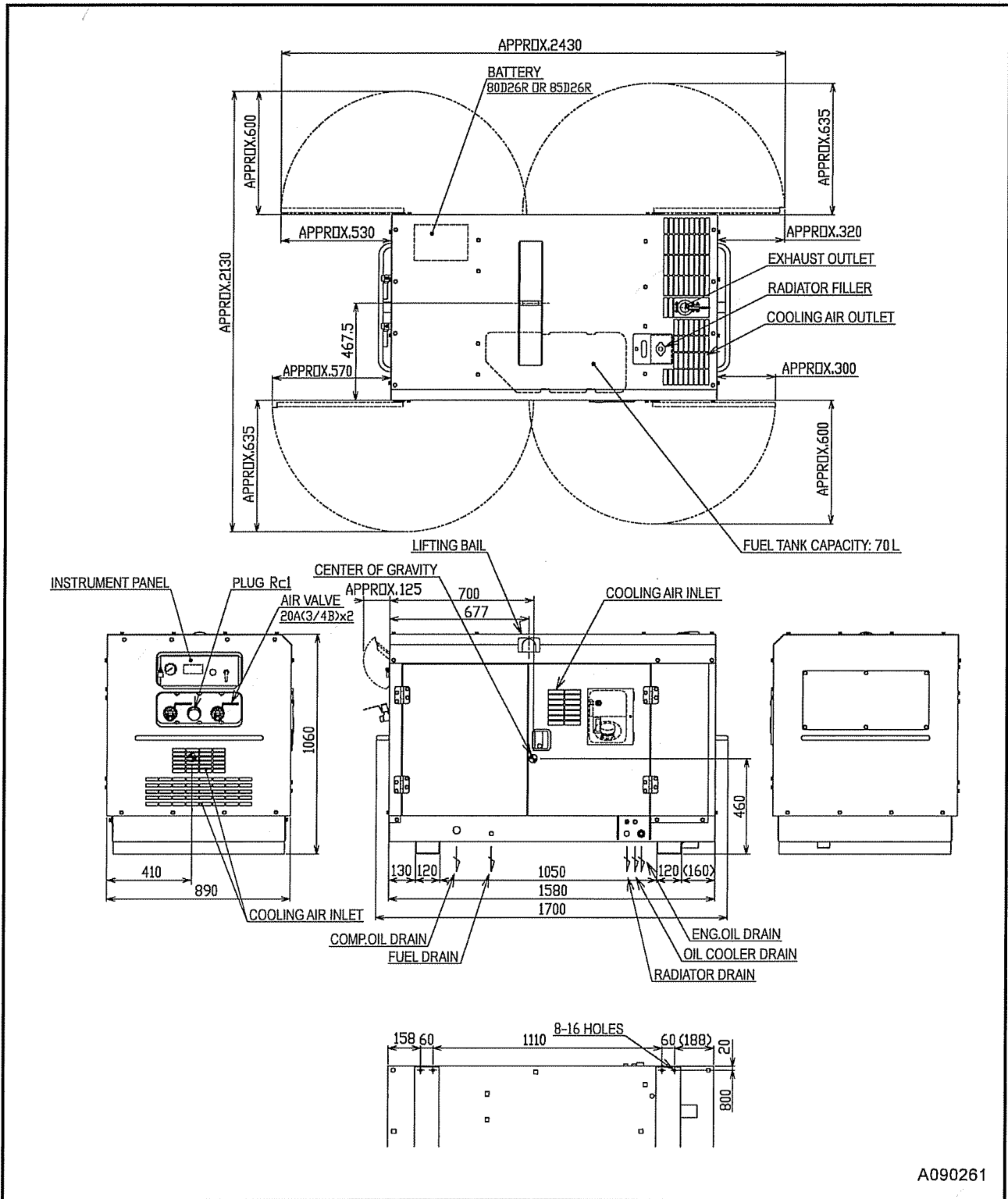
FAC-28B



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8. Specifications

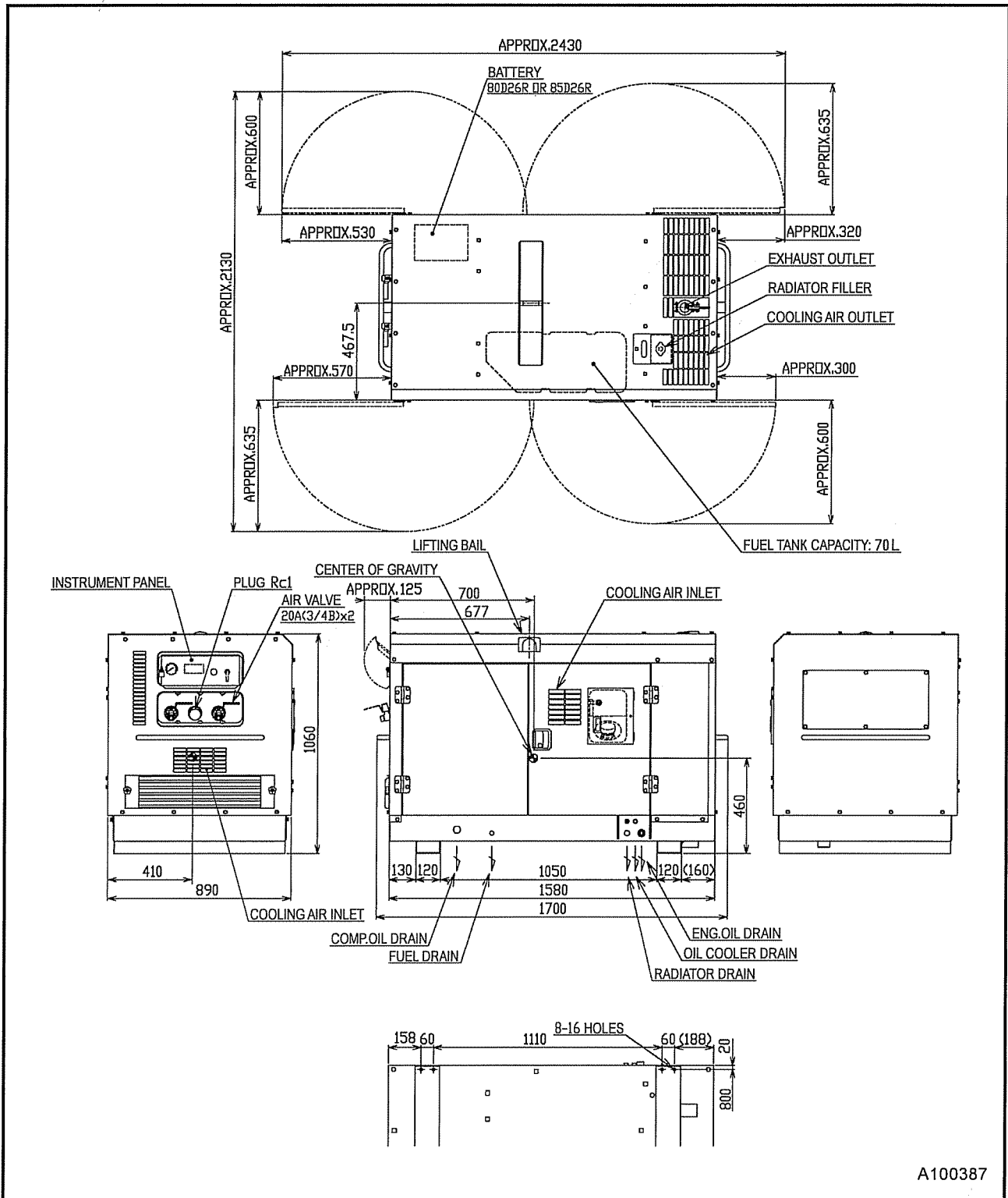
FAC-37B



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8. Specifications

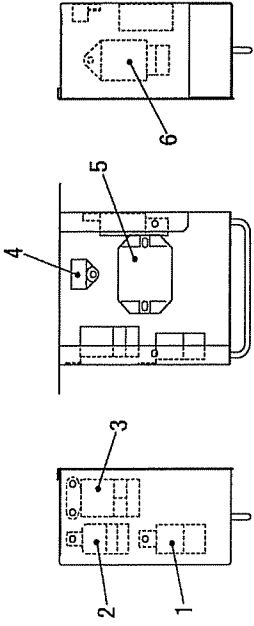
FAC-37BC



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9. Wiring Diagram

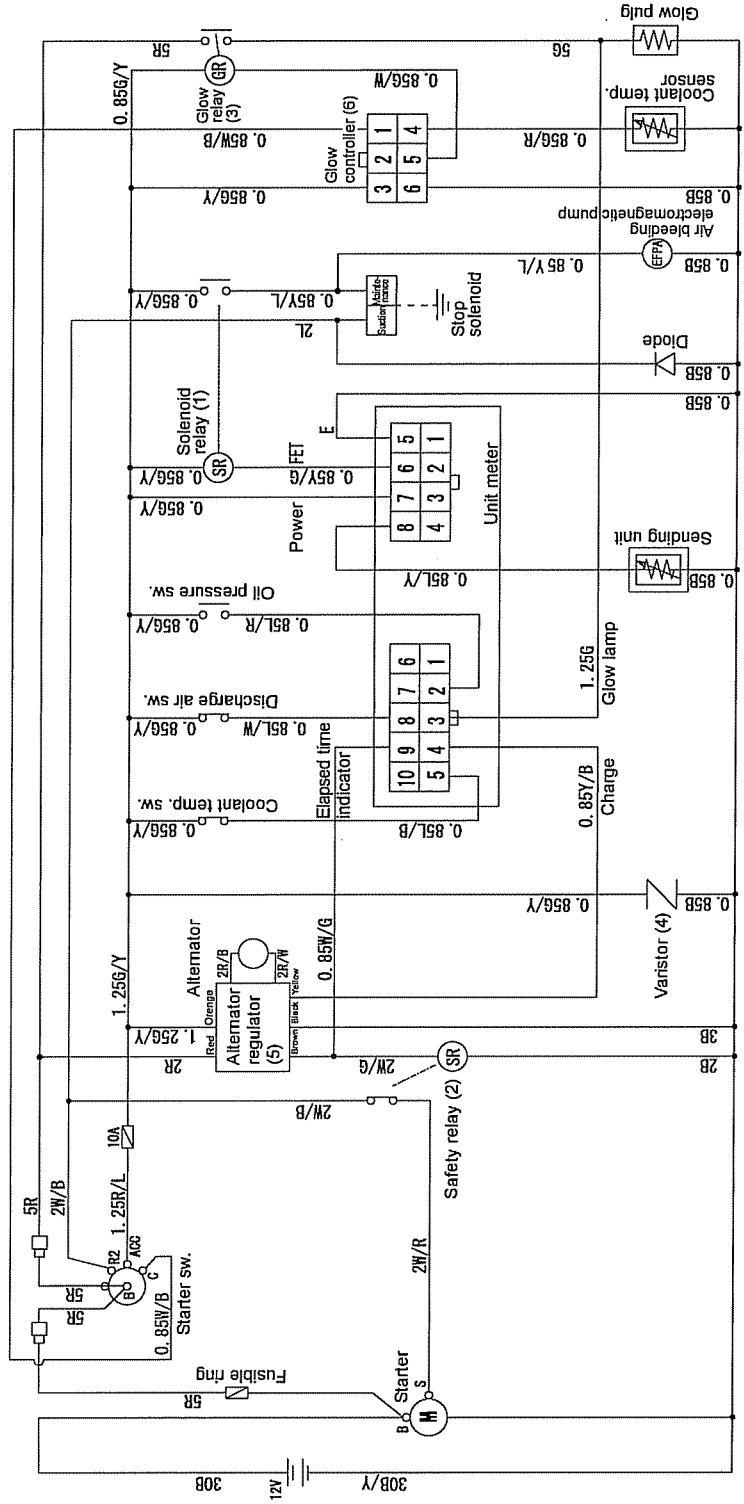
FAC-21B
FAC-28B



Mounting position of the bracket on switch panel

Contact capacity	(sec)	Con- tact nu- tion	30	30	50
OFF	(A)	10	2.5	20	50
ON					
ST					
	B	ACC	BR	C	R2

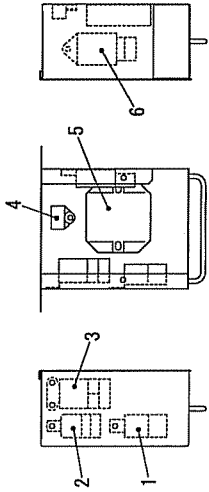
NO.	Part No.	Part name	Type
1	44346 13800	Solenoid relay	SHIBAURA 185206480
2	44346 12700	Safety relay	SHIBAURA 185206220
3	44346 14800	Glow relay	SHIBAURA 185206410
4	46948 00700	Varistor	SHIBAURA 185596050
5	44323 06600	Alternator regulator	SHIBAURA 185516170
6	44346 12500	Glow controller	SHIBAURA 385870960



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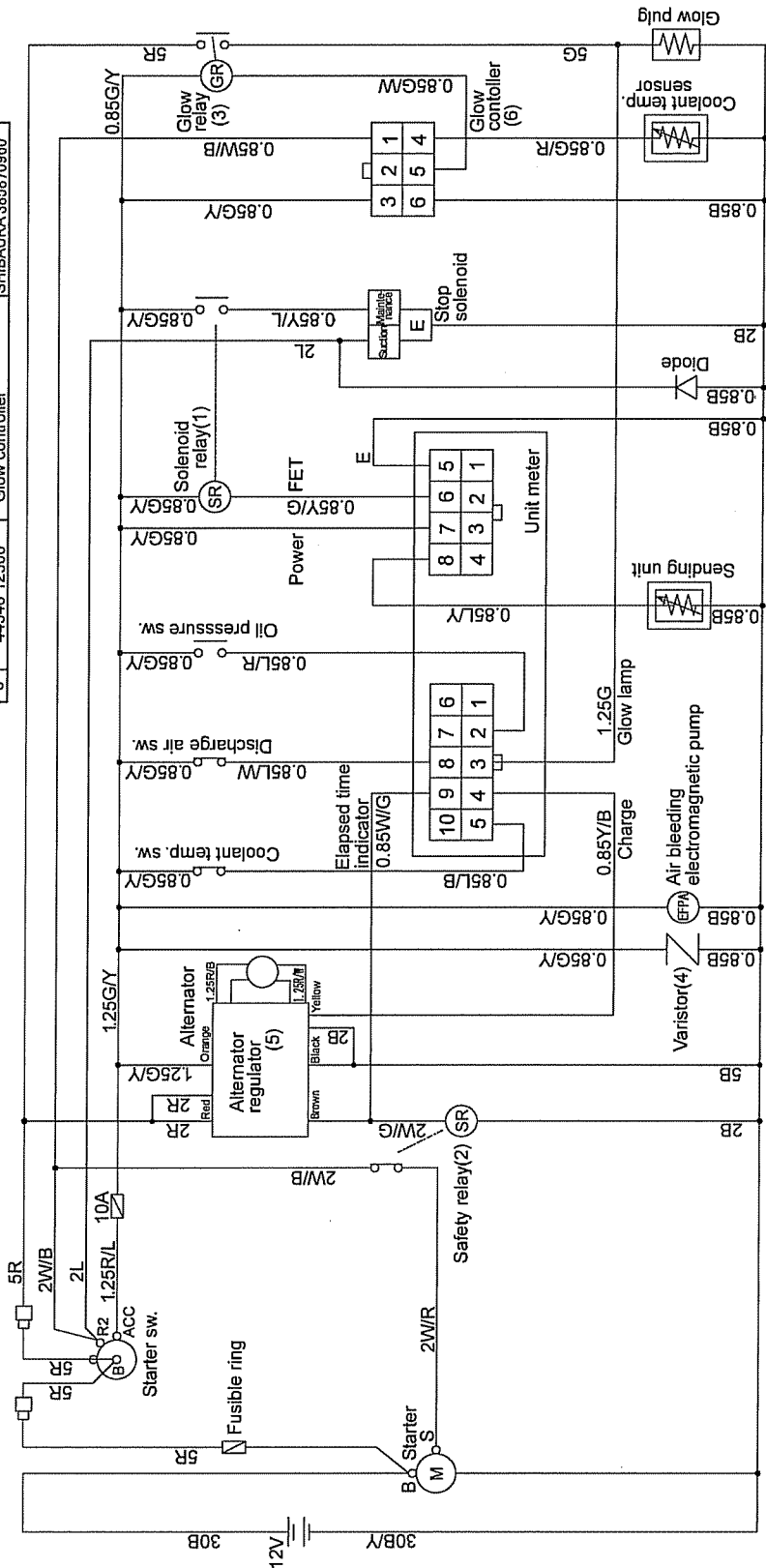
9. Wiring Diagram

FAC-37B
FAC-37BC



Mounting position of the bracket on switch panel

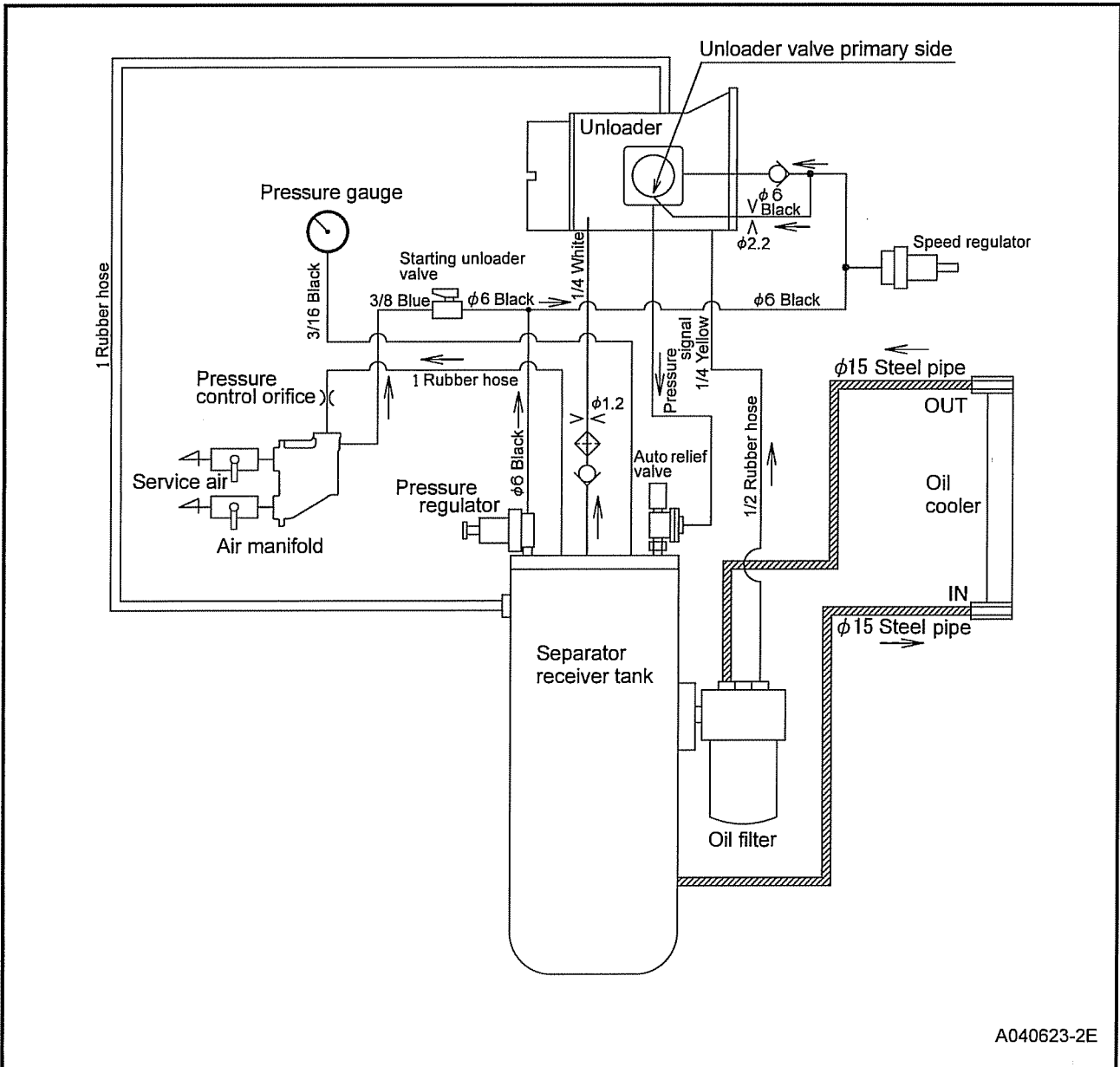
No.	Part No.	Part name	Type
1	44346 06300	Solenoid relay	SHIBAURA 185206300
2	44346 12700	Safety relay	SHIBAURA 185206220
3	44346 14800	Glow relay	SHIBAURA 185206410
4	46948 00700	Varistor	SHIBAURA 185596050
5	44323 08900	Alternator regulator	SHIBAURA 185516180
6	44346 12500	Glow controller	SHIBAURA 385870960



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10. Piping Diagram

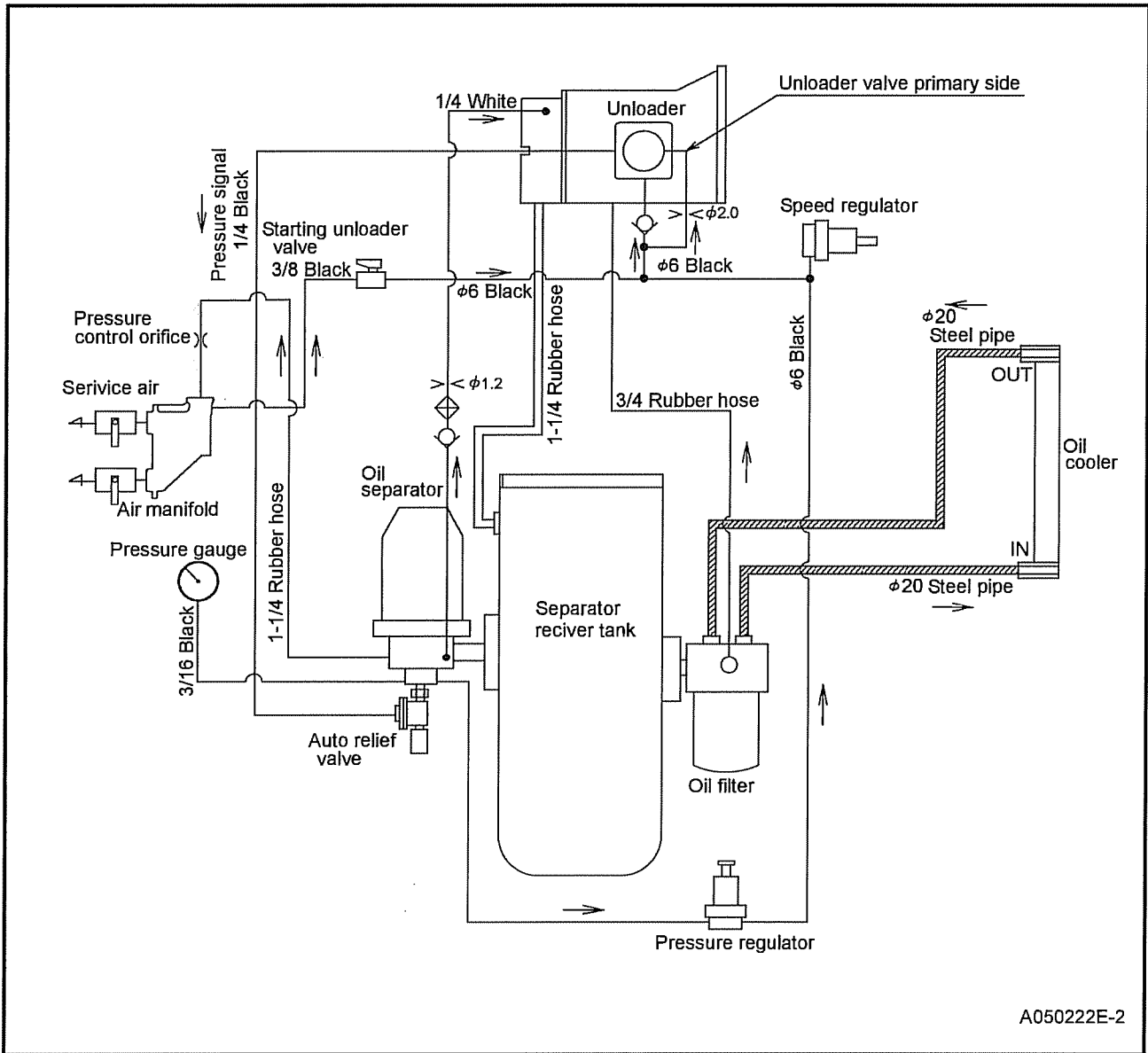
FAC-21B
FAC-28B



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10. Piping Diagram

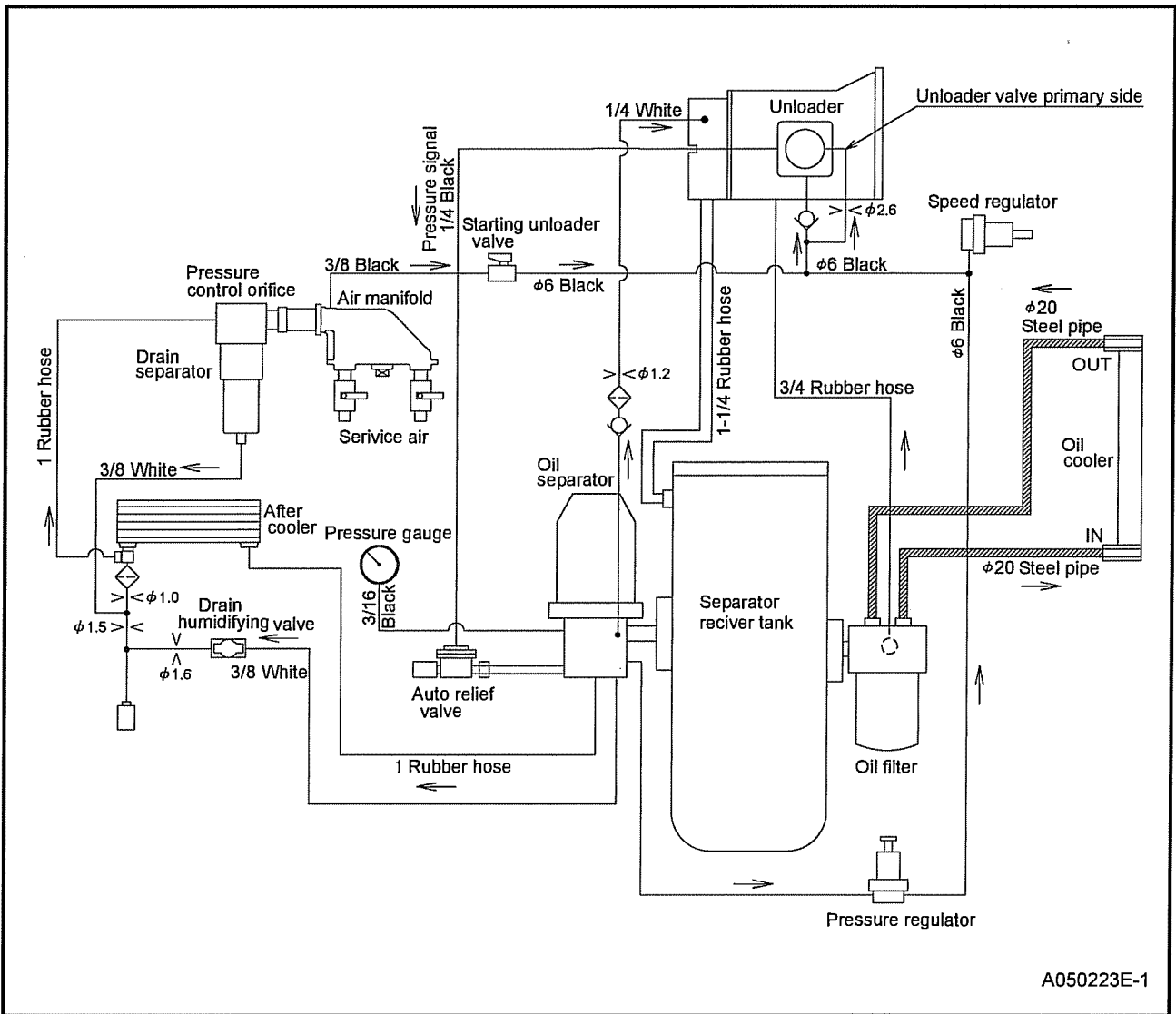
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10. Piping Diagram

FAC-37BC



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