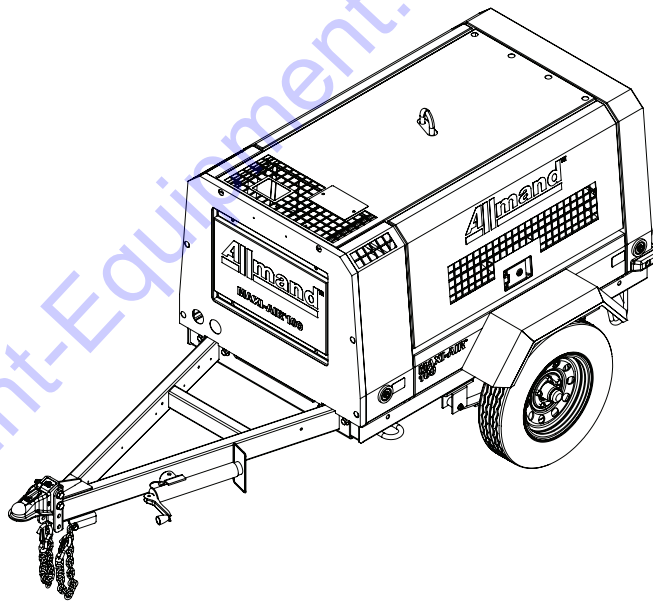
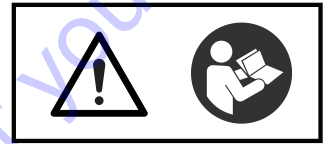




en **Operator's Manual**
Maxi-Air™
Towable Compressor
Model MA100 T4F



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Part Status:

Part Condition:

Part Material:

Part Color:

Part Weight:

Part Dimensions:

Part Notes:

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Thank you for purchasing this quality-built Allmand™ towable compressor. We are pleased that you've placed your confidence in the Allmand brand. When operated and maintained according to the instructions in this manual, your Allmand compressor will provide many years of dependable service.

This manual contains safety information to make you aware of the hazards and risks associated with towable compressors and how to avoid them. Because Allmand does not necessarily know all the applications this towable compressor could be used for, it is important that you read and understand these instructions thoroughly before attempting to start or operate this equipment. **Save these original instructions for future reference.**

Knowing the model number of your Allmand towable compressor will make it easy to order maintenance or repair parts either online or from your local dealer. The model number is generally a number stamped into metal or on a sticker directly on your product.

Towable Compressor

Model Number _____

Revision _____

Serial Number _____

Date Purchased _____

Engine

Model Number _____

Type Number _____

Code Number _____

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Operator Safety

This section explains safety cautions for safety work for operation, inspection, maintenance, installation, movement and transportation. Read these safety requirements carefully and fully understand the contents before starting the machine.


For your better understanding of the precautions in this manual and on this machine, safety precautions are classified into “DANGER”, “WARNING” and “CAUTION” message with a warning symbol  marked, according to the degree of hazards.

When one of these messages is found, please take preventive measures for safety to carry out “SAFETY OPERATION AND PROPER MAINTENANCE OF THE MACHINE”.

 DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
IMPORTANT	IMPORTANT indicates important caution messages for the performance or durability of the machine, which has no concern to injury or accident of or to a human body.

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.

PROPOSITION 65 WARNING

 **WARNING**

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust system to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary

For more information, go to www.P65warnings.ca.gov/diesel

PORTABLE COMPRESSOR

MODEL:

SER. NO.:

NORMAL OPERATING PRESSURE: MPa

NET DRY MASS: kg

OPERATING MASS: kg

A130375

Please indicate the MODEL / SER.No. on the plate of the machine when making inquiries.

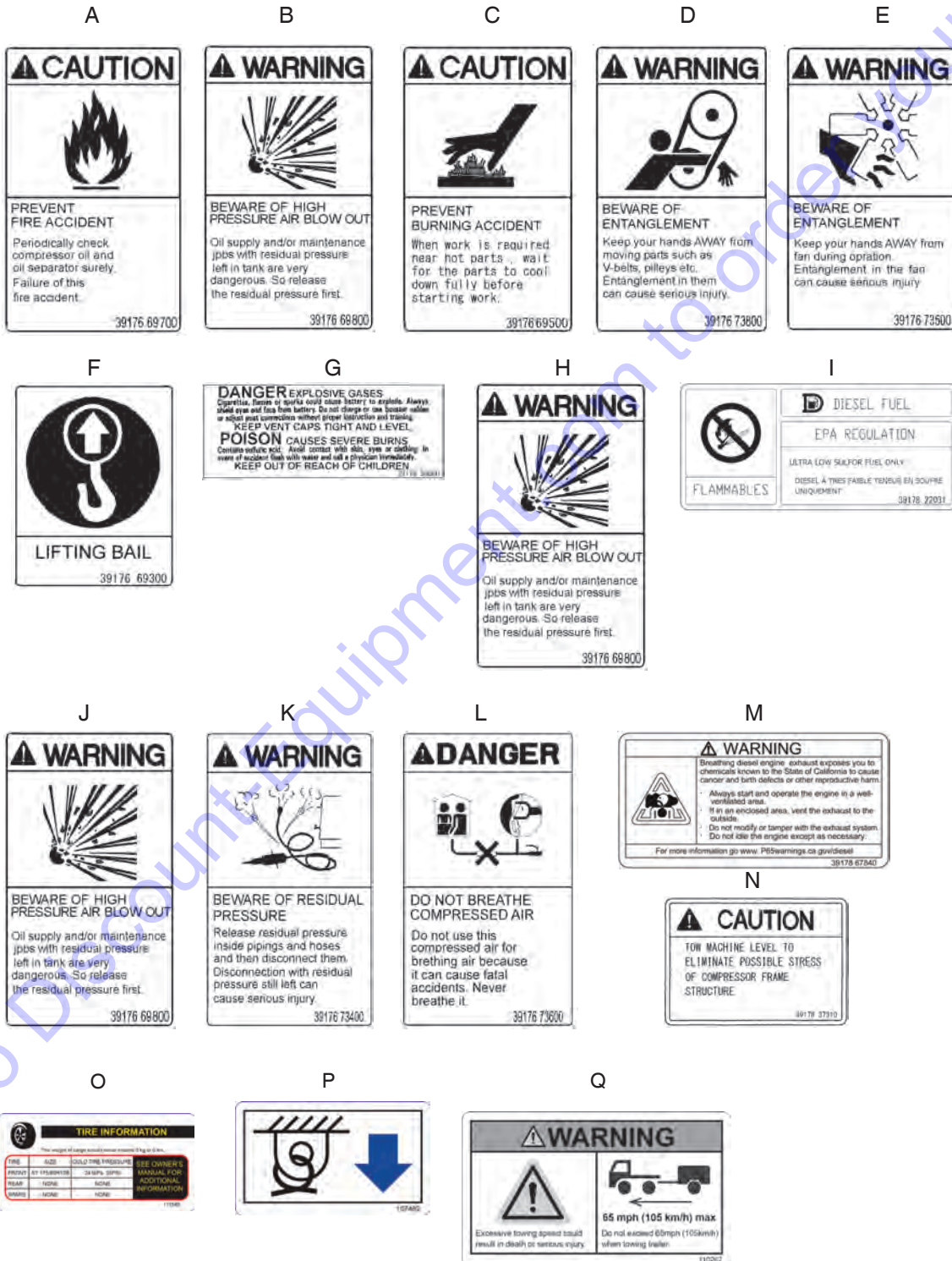
A plate stamped with the model and serial number is attached to the side of the machine.

A VIN plate is also located on the left side of the machine.

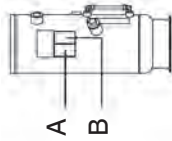
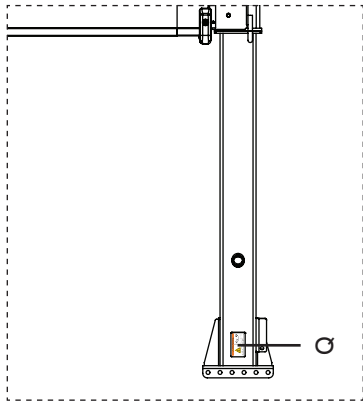
MANUFACTURED BY / FABRIQUE PAR: Allmand		DATE:	
MODEL / MODELE:		SERIAL NO.:	
GVWR/PNBV	KG (LB)		
GAWR/PNBE	KG (LB)	TIRES/PNEU	RIMS/JANTE
FRONT/ AVANT (KG (LB)		COLD INFL.PRESS./PRESS DE GONFLA FROID
			KPA (PSI/LPC) <input type="checkbox"/> <input type="checkbox"/>
INTERM/ INTERM (KG (LB)		KPA (PSI/LPC) <input type="checkbox"/> <input type="checkbox"/>
REAR/ ARRIERE (KG (LB)		KPA (PSI/LPC) <input type="checkbox"/> <input type="checkbox"/>
<p><small>THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S.FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.</small></p> <p><small>THIS VEHICLE CONFORMS TO ALL APPLICABLE STANDARDS PRESCRIBED UNDER THE CANADIAN MOTOR VEHICLE SAFETY REGULATIONS IN EFFECT ON THE DATE OF MANUFACTURE. - CE VEHICULE EST CONFORME A TOUTES LES NORMES QUI LUI SONT APPLICABLES EN VERTU DU REGLEMENT SUR LA SECURITE DES VEHICULES AUTOMOBILES DU CANADA EN VIGUEUR A LA DATE DE SA FABRICATION</small></p>			
V.I.N./N.L.V.:		TYPE/TYPE: TRA / REM	
		FD-228	

Safety Warning Labels

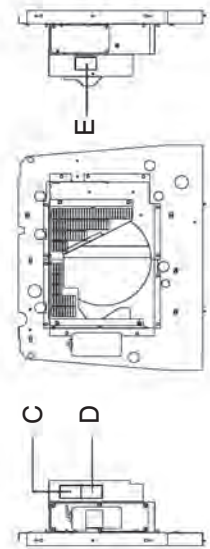
The following safety warning labels are attached to the machine. If damaged or missing, contact your dealer for replacements.



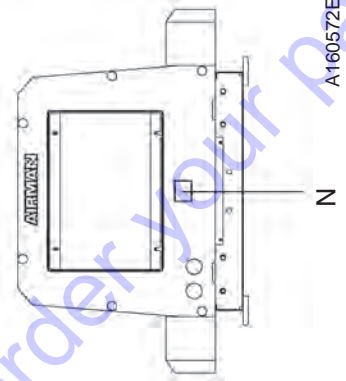
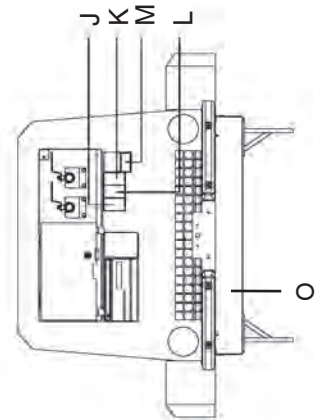
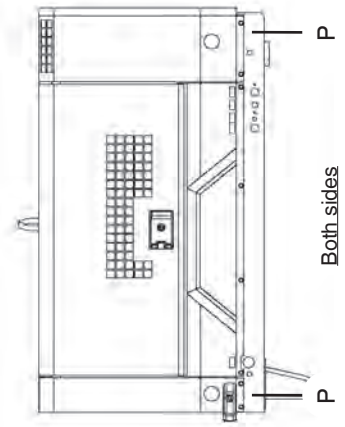
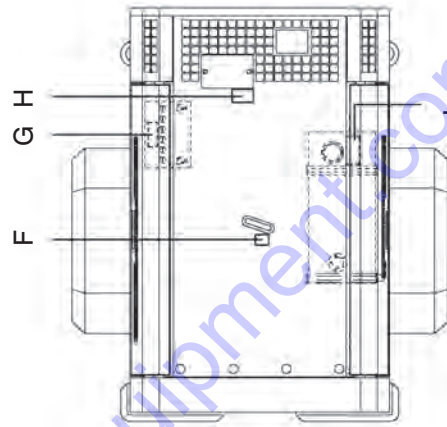
Safety Warning Label Locations




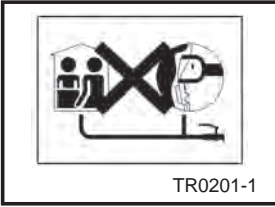
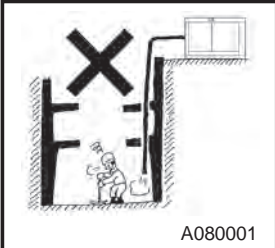

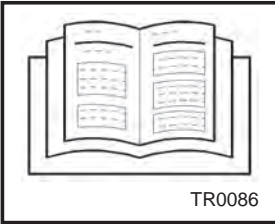


Receiver tank attachment position

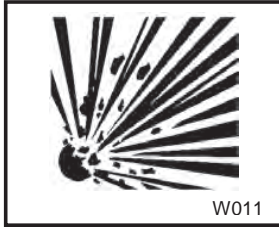


Shroud sticking position








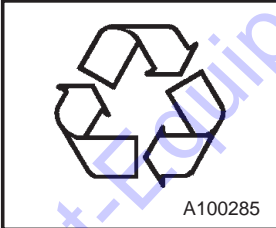
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	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  <p style="text-align: center;">TR0201-1</p> </div> <div style="width: 50%;"> <ul style="list-style-type: none"> ● Compressed air from this machine contains poisonous materials. Absorption of the compressed air can cause serious injury. Never provide this compressed air for human respiration. ● This machine is not designed to be used for working chambers pressurized by compressed air such as respiratory air provided to persons working inside wells and tunnels such as pneumatic engineering method and pneumatic caisson method. Should this machine stop operation due to trouble, it can cause death and serious injury to the working persons. Refrain from using the compressed air for such pneumatic engineering method or pneumatic caisson method. </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;">  <p style="text-align: center;">A080001</p> </div> </div>
	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  <p style="text-align: center;">TR0086</p> </div> <div style="width: 50%;"> <ul style="list-style-type: none"> ● Read each instruction plate which is displayed in the manual or on the machine carefully, understand its content and follow the indications thereof. ● Do not modify the machine without prior approval. The safety may be compromised, functions may be deteriorated, or the machine life may be shortened. ● Never use the machine for the purpose of compression of gases other than air, or as a vacuum pump. Otherwise, serious accidents may occur. </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;">  <p style="text-align: center;">TR0092</p> </div> <div style="width: 50%;"> <ul style="list-style-type: none"> ● 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. ● As compressed air contains toxic gas etc., compressed air should not be used to be blown or sprayed against food etc. </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;">  <p style="text-align: center;">TR0304</p> </div> <div style="width: 50%;"> <ul style="list-style-type: none"> ● Keep hands off from the rotating portion or belts while running. It could cause serious injuries if hands should be caught in. </div> </div>



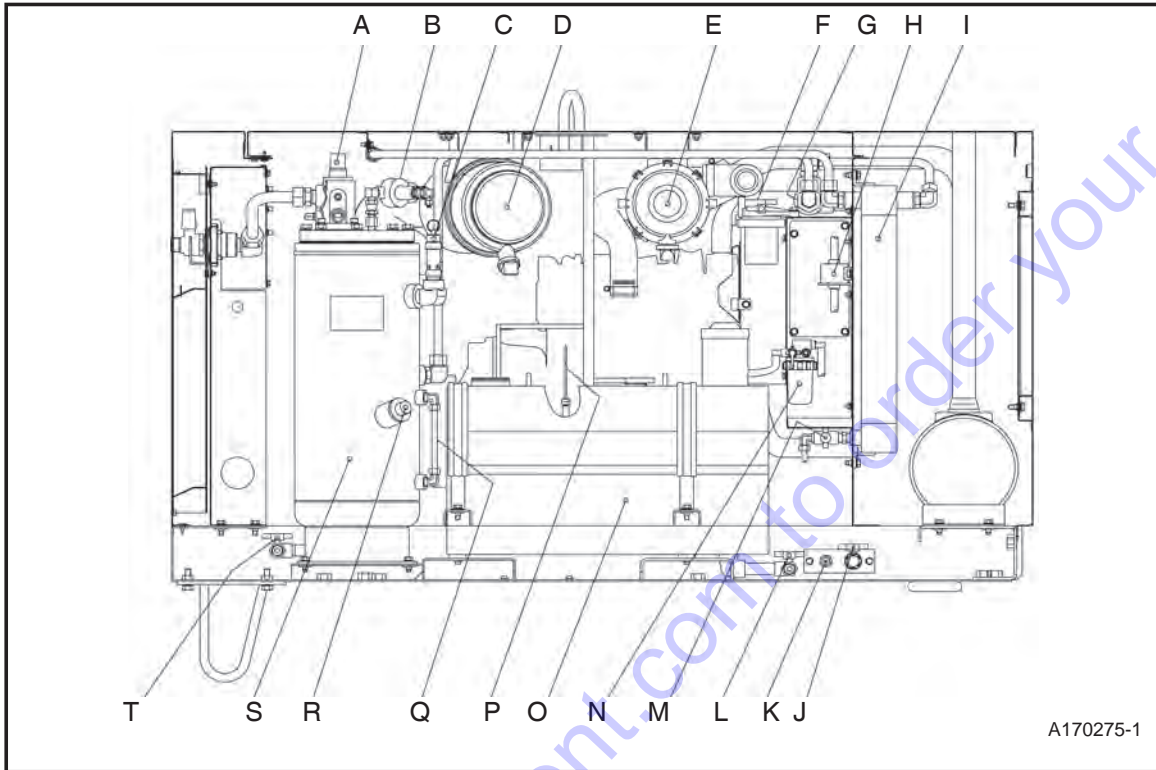
- When you refill the separator receiver tank with compressor oil, stop the engine, and make sure that the pressure gauge indicates 0 psi (0 bars) and there is no residual pressure in it, and then gradually loosen the oil filler cap for refilling oil.
- Note residual pressure in the separator receiver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

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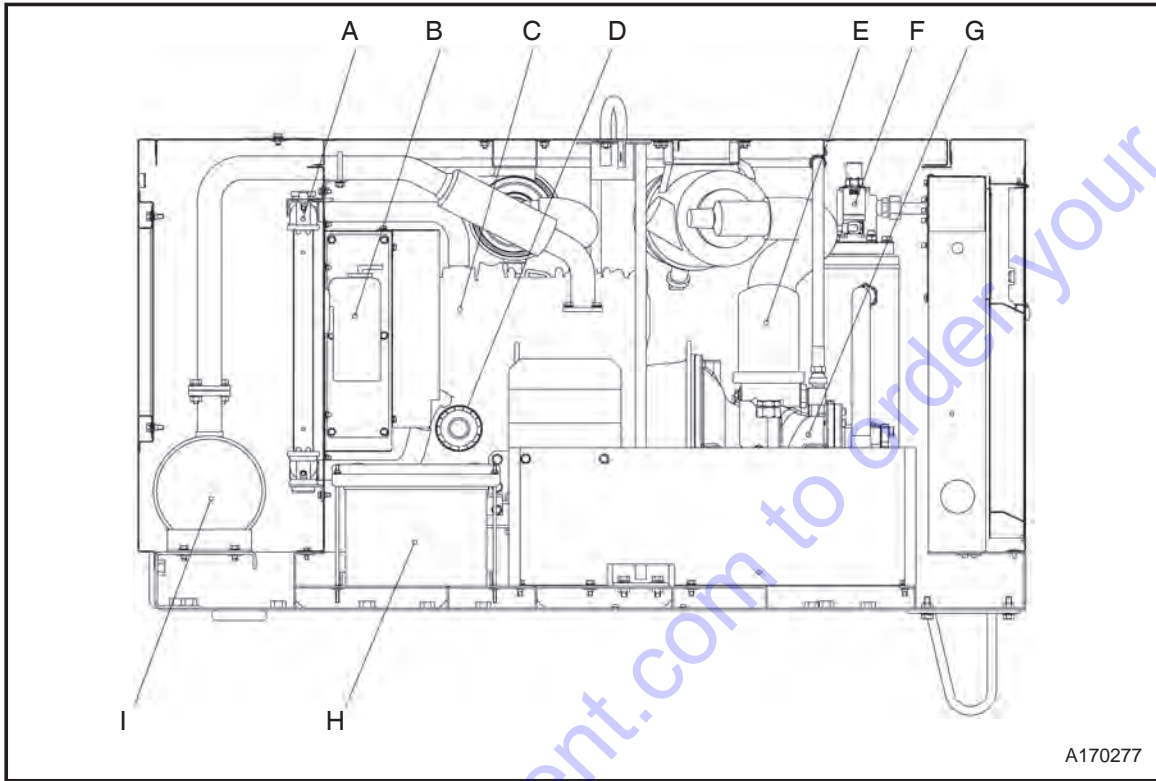
 <p>WARNING</p>	 <p>M003</p> <ul style="list-style-type: none"> ● When cleaning dust accumulated in such devices as the air-filter, by blowing compressed air, wear safety glasses, etc. to protect your eyes.
 <p>CAUTION</p>	 <p>H990432</p> <ul style="list-style-type: none"> ● Be sure to stop the engine, 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.
	 <p>W004-1</p> <ul style="list-style-type: none"> ● 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.
	 <p>A100285</p> <ul style="list-style-type: none"> ● 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.
	<ul style="list-style-type: none"> ● This machine contains sensitive electronic components. If you do welding work, remove the connector of the electronic control equipment. Failure to do this could result in damage to the electronic components.

Features and Controls

Internal Components and Part Names



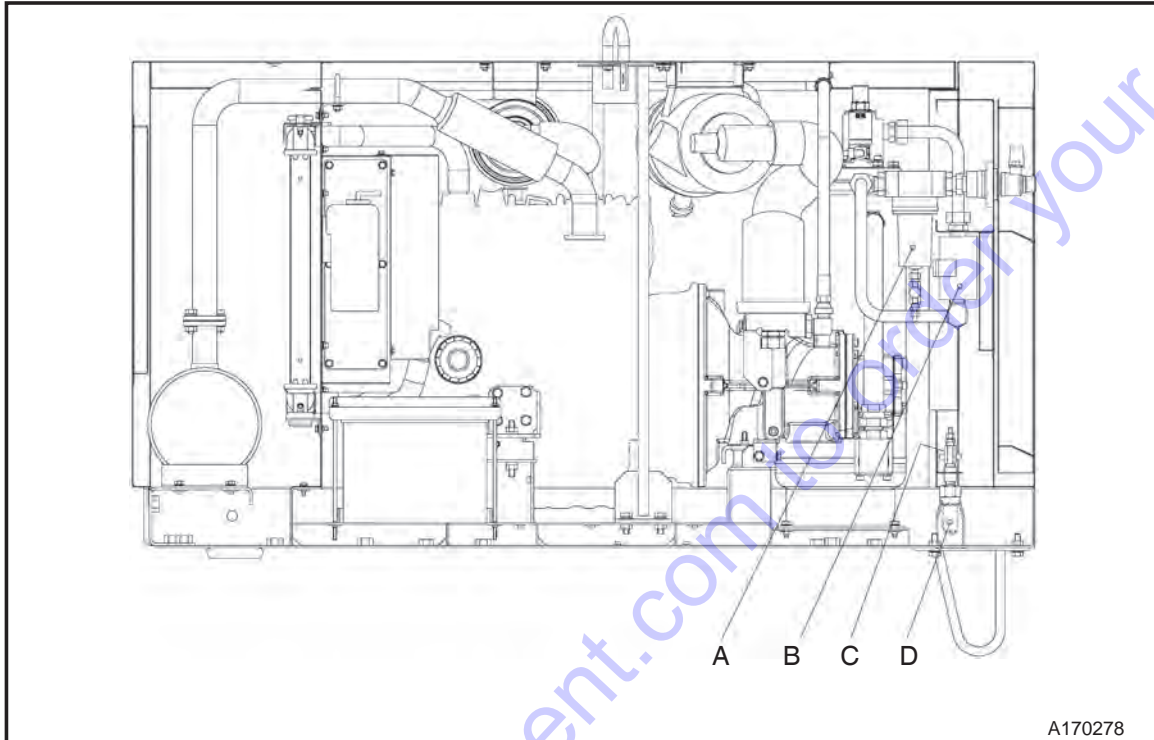
No.	Description	Function
A	Pressure control valve	For keeping the pressure in receiver tank constantly higher than a certain level in the system.
B	Pressure regulator	For controlling full load and unload operation.
C	Safety valve	For releasing compressed air to the atmosphere when the pressure rises higher than the rated pressure in the system.
D	Air filter (For compressor air-end)	For filtering the dust floating in the air in the system. Equipment to filter the dust floating in the air suction.
E	Air filter (For engine)	For filtering the dust floating in the air in the system. Equipment to filter the dust floating in the air suction.
F	Fuel filter	For filtering dusts or foreign things in fuel in the system.
G	By-pass valve	For keeping compressor oil at optimum temperature.
H	Fuel air-bleeding electromagnetic pump	For automatically bleeding air from fuel pipes in the system.
I	Oil cooler	For cooling compressor oil in the system.
J	Engine oil drain valve	For draining engine oil.
K	Radiator drain plug	For draining engine coolant.
L	Fuel tank drain valve	For draining condensates from fuel tank.
M	Oil cooler drain valve	For draining compressor oil from oil cooler and oil line.
N	Sedimenter	For filtering dust and foreign things mixed in fuel oil and also for separating water in the system.
O	Fuel tank	For storing fuel.
P	Engine oil level gauge	For checking engine oil level.
Q	Compressor oil level gauge	For checking compressor oil level.
R	Compressor oil filler port	For supplying or adding compressor oil.
S	Separator receiver tank	For separating air and oil from compressed air in the system.
T	Separator receiver tank drain valve	For draining condensed water from separator receiver tank.



No.	Description	Function
A	Radiator	For cooling the coolant for engine in the system.
B	Reserve tank	For checking coolant level and supplying it.
C	Engine	For driving the compressor in the system.
D	Engine oil filter	For filtering engine oil in the system.
E	Compressor oil filter	For filtering compressor oil in the system.
F	Solenoid valve for starting unloader	For reducing load at start-up.
G	Compressor air-end	For compressing air in the system.
H	Battery	For electrically starting engine.
I	Exhaust muffler	For silencing the noise caused before discharging the air.

After cooler type

Only options available on standard units are shown in the following figure.



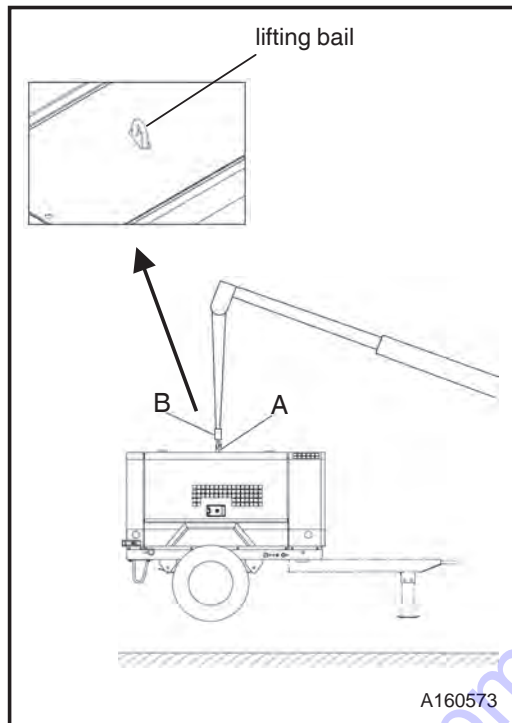
No.	Description	Function
1	Drain separator	For separating water from compressed air cooled through after cooler.
2	After cooler	For cooling compressed air.
3	Drain warming valve	For preventing freezing of water separated through drain separator when exhausting it.
4	Drain port of air pipe	For draining condensate from drain separator.

Set-Up and Installation

Transportation

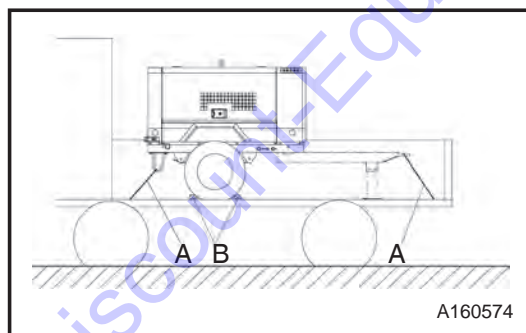
When loading and unloading the machine, be sure to use the lifting bail [A] provided on the center of the machine top.

Lifting



1. Before lifting the machine, make sure to check the lifting bail [A] for any cracks or loosened bolts.
2. Connect the hook [B] of the crane or shackle to the lifting bail eye fitted at the top center of the machine. Make sure there is no person standing around the machine. Then perform the hoisting operation.
3. In addition to the mass and dimensions listed in "Specifications", consider the mass and dimensions of an attached drawbar and an undercarriage when choosing a proper crane and truck.
4. Any crane operations must be performed by a qualified crane operator.

Mounting the machine on a truck bed



- Be sure to fasten the machine with ropes [A] as shown, and securely fix it on the truck bed.
- Place one set of chocks [B] against the wheels.

Transportation



- Never stand under the machine when lifted. Death or serious injury could result.
- Lifting the machine while still in operation could result in death or serious injury, or serious equipment damage.

Towing

Warnings for towing the machine



- Before towing the machine, make sure to check the following:
 - Proper tire pressure.
 - Tire lug nuts are not loose.
 - Tires are not worn or damaged.
- Make sure that the end of the drawbar is securely connected to the coupler of the towing vehicle, to prevent disconnection while the machine is being towed.
- Make sure there is no damage to the towing vehicle or the drawbar of the machine.
- Make sure to keep your hands away from any part of the coupling device when coupling or uncoupling.
- Make sure to drive the towing vehicle safely. Avoid dangerous situations or conditions on the road.
- Failure to obey the above instructions could result in death or serious injury, or serious equipment damage.

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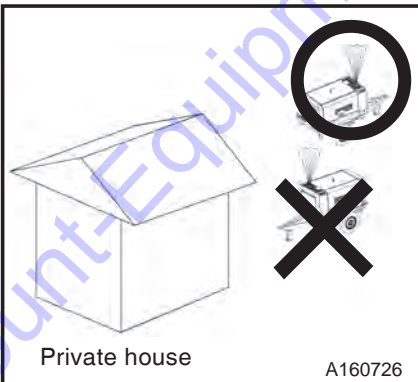
Installation conditions

The machine has to be parked horizontally on a level place.

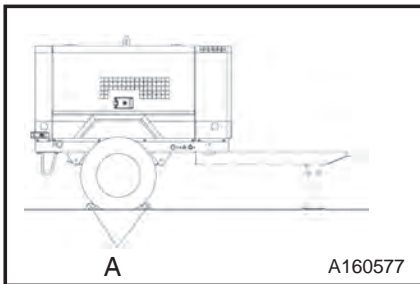
- The machine has to be parked right-angled on a slope.
- The machine has to be parked on a slope within an angle of 15°
- The machine should be operated in following conditions:
- **Ambient temperature**-----5°F to 104°(-15°C to + 40°C)
- **Humidity**----- Less than 80%
- **Altitude**----- Lower than 4921ft above sea level

Note: Using the machine outside the above conditions may cause serious failure.

- The machine has to be installed in the environment where fresh air is always available, temperature is low and ambient air is dry as much as possible.
- If more than two machines are placed parallel in operation, keep enough distance so that exhaust air from one machine does not affect the other one.
- Also, a machine has to be installed in the environment where fresh air is always available.
- Keep enough space around the machine for inspection and maintenance access.

	 <p>PC002</p>	<ul style="list-style-type: none"> ● Exhaust gas from the engine is poisonous. It could cause death or serious injury if 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.
	 <p>Private house</p> <p>A160726</p>	<ul style="list-style-type: none"> ● Do not position the exhaust gas outlet in the direction of a house. ● Exhaust from the engine is harmful. Avoid positioning it in the direction of passers-by.

Installation notes

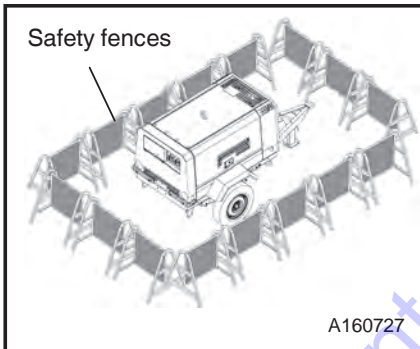


- Be sure to place chocks [A] on both sides of both wheels.

A

A160577

Placing safety fence in position

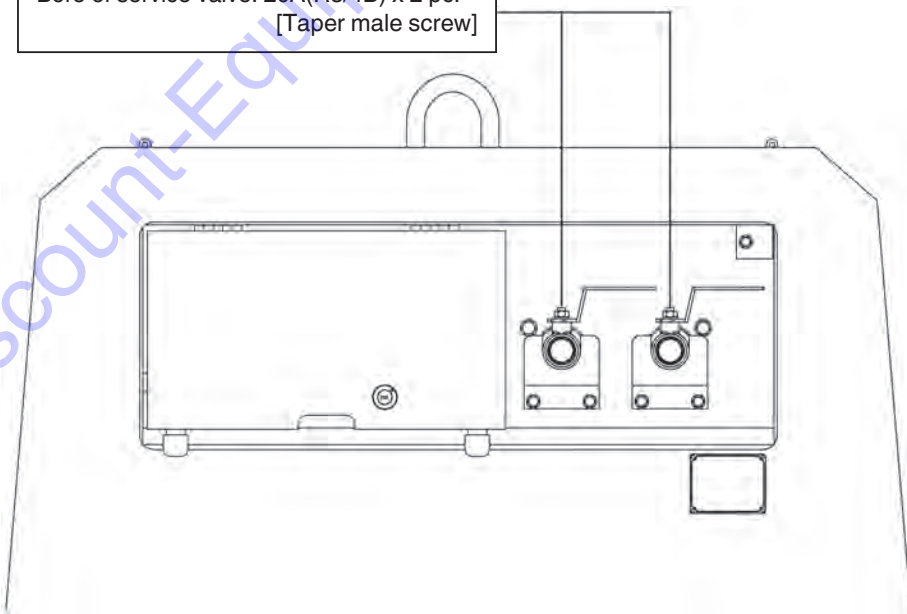


- Be sure to place a safety fence around the machine to prevent unauthorized access.

A160727


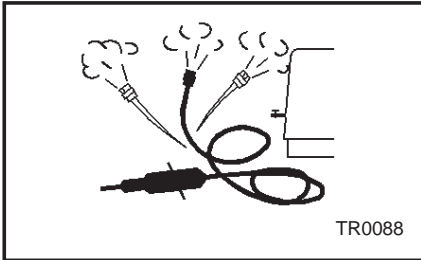

Service valve

Bore of service valve: 20A(R3/4B) x 2 pc.
[Taper male screw]





A170320

Cautions of hose attachment and removal

 <p>WARNING</p>	 <p>TR0088</p>	<ul style="list-style-type: none">● Piping or air hoses connected to the service valves of this machine must meet or exceed the discharge pressure of the machine.● Connect piping or air hoses to the service valves of this machine firmly before operation, and check during operation. A loose connection could separate and result in death or serious injury.● Close the service valves and relieve remaining pressure before removing piping or air hoses. Remaining pressure in the piping or air hoses could result in death or serious injury.● Read the operator manuals supplied with any tools or equipment used in conjunction with this machine.
	 <p>TR0303A</p>	

Operation with discharge port (compressed air supply port) opened is prohibited

 <p>WARNING</p>	 <p>D003</p>	<ul style="list-style-type: none">● Do not operate the machine with service valves and relief valve open unless connected to piping or air hoses. High-pressurized air directly from the service valves could result in death or serious injury.● If the machine must be temporarily operated with the valve open, mount a silencer to reduce noise, and wear hearing protection to prevent hearing damage.
--	---	--

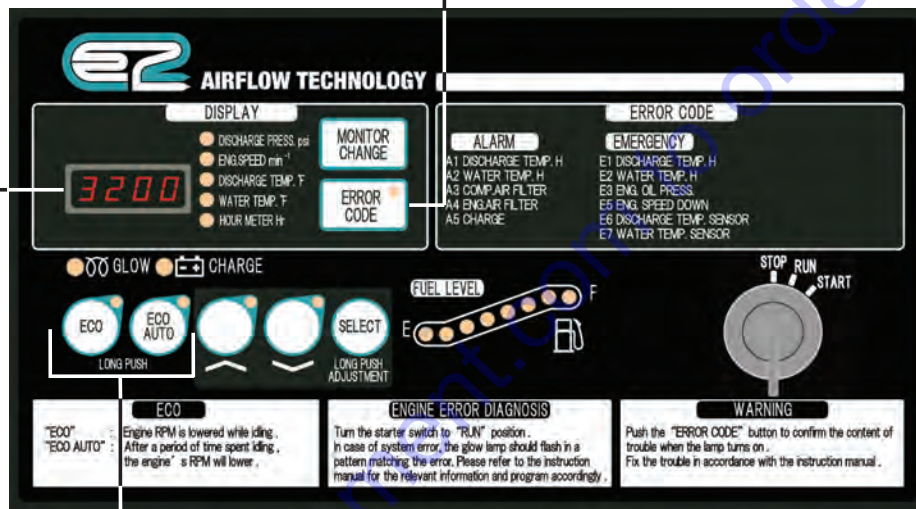
Operation

Instrument Panel

Each display of the operation panel is illustrated as follows.
Read and fully understand the instructions for safe operation.

Error code switch

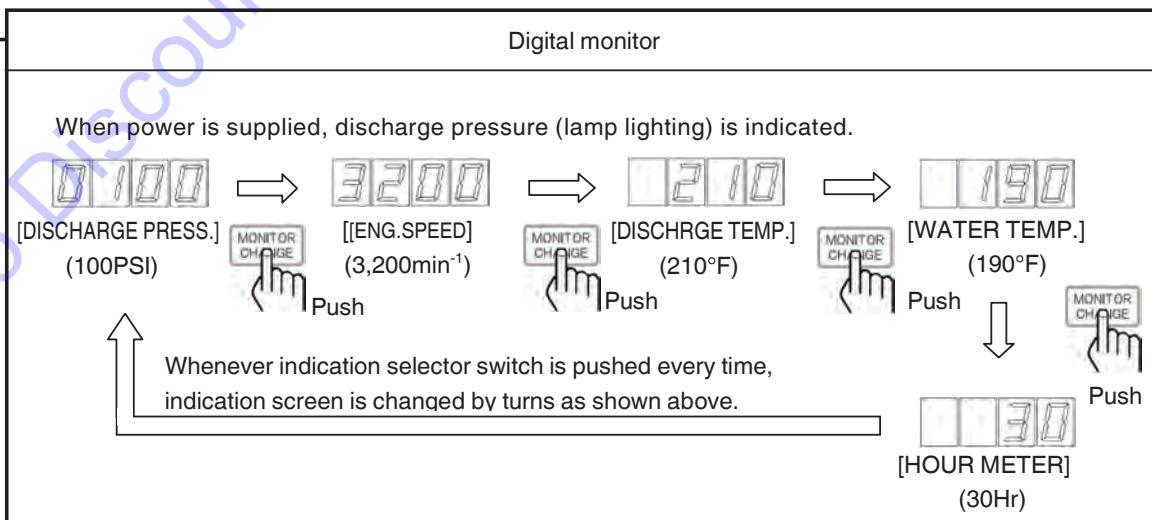
When this switch is pushed on while lamp is blinking, it shows error code.
When starter switch is placed to "STOP", displayed screen is reset.
For error code, see "Troubleshooting."



A160556

ECO / ECO AUTO Switch

The switch is used for minimizing fuel consumption at no-load operation.
(It functions when the lamp goes on.)



Lubricating oil • Coolant • Fuel

Engine oil

Use only recommended engine oil.

Be sure to use CF class or higher engine oil or superior class. (Using poor quality engine oil may shorten the life of the engine).

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

IMPORTANT

- Viscosity of engine oil greatly affects starting, performance, and oil consumption, as well as engine wear.

Ambient temperature range and oil viscosity (SAE)

A100293E

- Mixing two or more different brands of oil affects its performance. Avoid mixing oils.
- When using high-sulfur fuel oil, change the engine oil twice as frequently as recommended in the Maintenance Chart.
- **Follow the designated regulations to dispose of engine oil.**

Compressor oil

Use oil recommended in the list below.

Even continuous oil replenishment cannot improve its deteriorated condition. Be sure to change the oil according to the interval called out in the Maintenance Chart.

Maker and Brand of Recommended Oil

Maker	Brand
HULS	ANDEROL 3032
MOBIL	RARUS SHC 1024
TEXACO	SYN-STAR DE32

IMPORTANT

- Mixing different brands compressor oil could cause an increase of viscosity and make compressor oil sticky, and could result in the compressor air-end sticking. Avoid mixing different brands of oil. If compressor oil brands are mixed, the compressor air-end must be cleaned. Contact your dealer.
- **Follow the designated regulations to dispose of compressor oil.**

Coolant

Coolant freezing could cause cracks of cylinder and radiator. Be sure to always use mixture of LLC (antifreezing solution) and soft water like tap water which quality is good.

IMPORTANT	<ul style="list-style-type: none">● Using water with dirt, sand, and/or dust, or hard water such as well water (ground water) will cause deposits inside the radiator or on the cylinder head, and will cause engine overheat due to poor flow of coolant.● Adjust mixing ratio of LLC (Antifreeze) with water according to the temperature. (The machine is delivered from the factory with an LLC (Antifreeze) mixing ratio of 55%.) Use LLC (Antifreeze) mixing ratio between 30 and 60%. (If LLC (Antifreeze) in the water exceeds more than 60%, it may decrease its antifreezing effect.)															
	<p>Mixing ratio of LLC (antifreeze) (reference)</p> <table border="1"><tr><td>Outside temperature (°C)</td><td>-15</td><td>-20</td><td>-25</td><td>-30</td><td>-35</td><td>-40</td><td>-45</td></tr><tr><td>Mixing ratio (%)</td><td>30</td><td>35</td><td>40</td><td>45</td><td>50</td><td>55</td><td>60</td></tr></table> <ul style="list-style-type: none">● Follow the designated regulations to dispose of LLC (Antifreeze).	Outside temperature (°C)	-15	-20	-25	-30	-35	-40	-45	Mixing ratio (%)	30	35	40	45	50	55
Outside temperature (°C)	-15	-20	-25	-30	-35	-40	-45									
Mixing ratio (%)	30	35	40	45	50	55	60									

Fuel

- Use diesel fuel (with a cetane number not lower than 45).
- Using diesel fuel with a cetane number 45 or lower may cause engine failure.

IMPORTANT	<ul style="list-style-type: none">● Please use fuel that conforms to ASTM regulations.● Some regions prohibit the use of heavy (coal) fuel oils. Check local regulations.
	<ul style="list-style-type: none">● Follow the designated regulations to dispose of fuel.

Check before starting unit

Be sure to check the unit before operation.

If an issue is found, make sure to repair it before operating the unit.

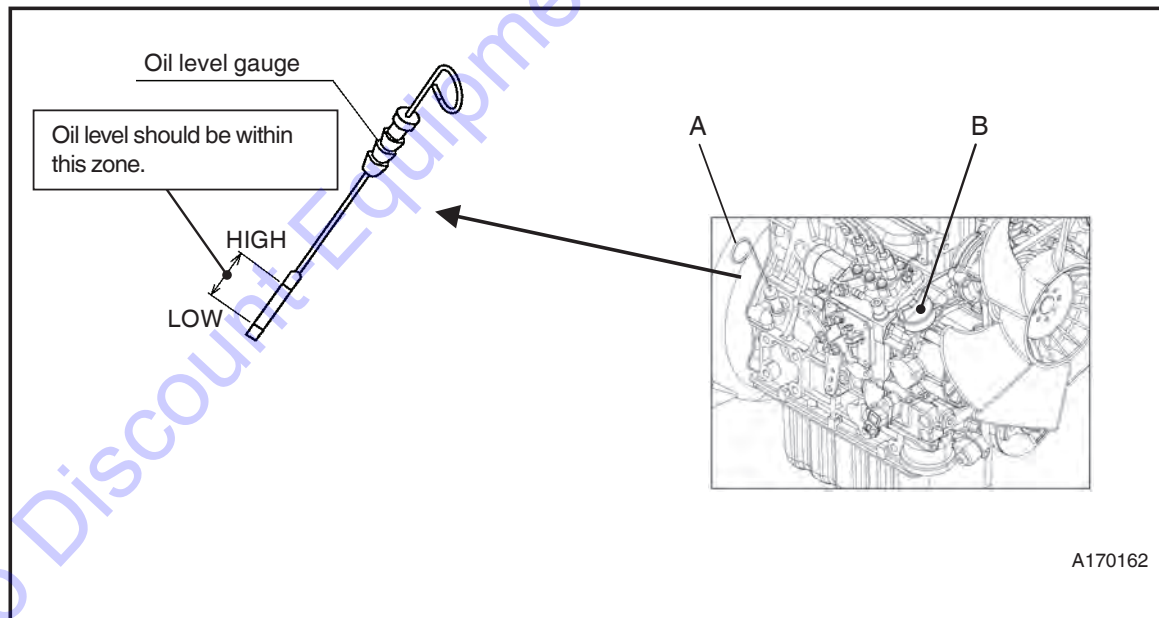
Be sure to make daily checks before operation. If the unit is operated without prior check and without noticing its abnormality, such operation could cause seizure of components or may even cause fire.

Check engine oil level

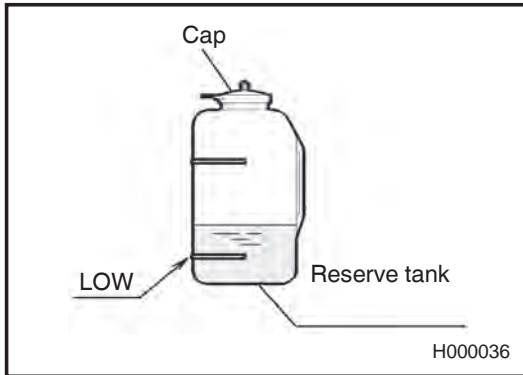
Unit should be on level before checking oil level.

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

1. Remove the oil level gauge [A] and wipe it with a clean cloth.
2. Insert the oil level gauge [A] fully and remove again. The oil level gauge should read between LOW and HIGH.
3. If the oil level is below LOW, add engine oil through the oil filler port [B].
 - While checking the oil level, check also for contamination. If the oil is dirty, or if it should be changed according to the interval called out in the Maintenance Chart, change the oil.
(See “Change Oil” in “Maintenance”)
 - Do not overfill.



Check coolant level



Check the coolant level in the reserve tank:

- If below the LOW mark, open the cap and replenish the coolant.
- If the reserve tank is empty, check the coolant level in the radiator and add as needed. Then add coolant to the reserve tank.

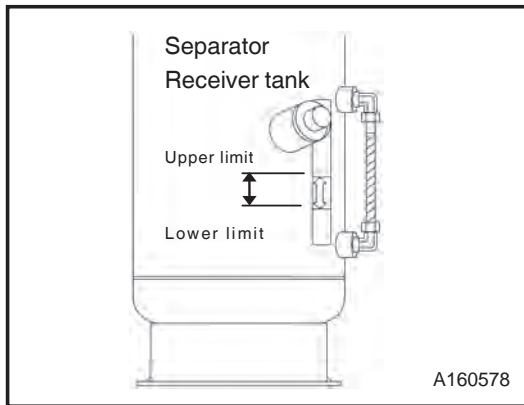
(See “Change Coolant” in “Maintenance”)

IMPORTANT


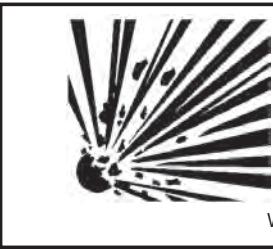
- Operating with a low coolant level could result in damage to the engine or radiator.

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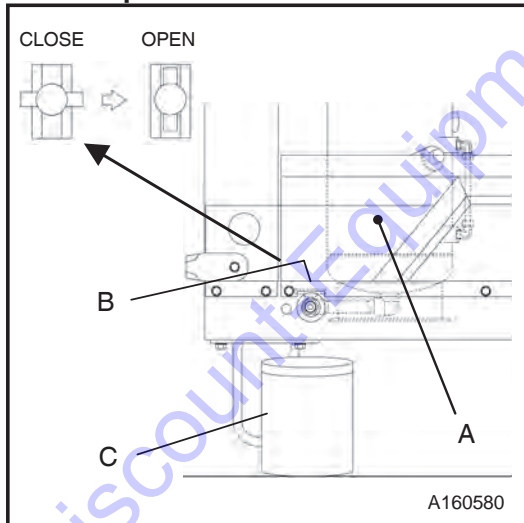
Check compressor oil level





- Place the machine on level ground.
 - Check and confirm that the residual pressure in the separator receiver tank is 0psi (0bar).
 - Check the compressor oil level. The compressor oil level should be between the LOWER LIMIT and UPPER LIMIT. Add as needed.
- (See “Change Compressor Oil” in “Maintenance”)**
 Note: Do not overfill. Excessive oil can affect oil separation performance.

	 <p>W010</p>	<ul style="list-style-type: none"> ● Hot compressed air and hot compressor oil could result in death or serious injury. ● Before adding oil into the separator receiver tank, stop the engine and make sure that the discharge pressure is 0 psi (0 bars). Then, gradually loosen and remove the filler cap.
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Drain separator receiver tank





- Slowly open the drain valve [B] under the separator receiver tank [A] as shown to drain the condensate into a container [C].
 Note: To prevent loss of oil, do not fully open the drain valve [B].
 Note: Touch the fluid and check its viscosity to determine whether it is condensate or compressor oil, as it is difficult to distinguish between the two.
- Close the drain valve [B].
- Dispose of condensate according to the designated regulations.

	 <p>H990432</p>	<ul style="list-style-type: none"> ● Hot compressed air and oil could result in death or serious injury. ● After stopping the engine, confirm that the pressure gauge indicates 0 psi (0 bars) and there is no residual pressure in it, then open the drain valve gradually to drain the compressor oil.
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Check fuel

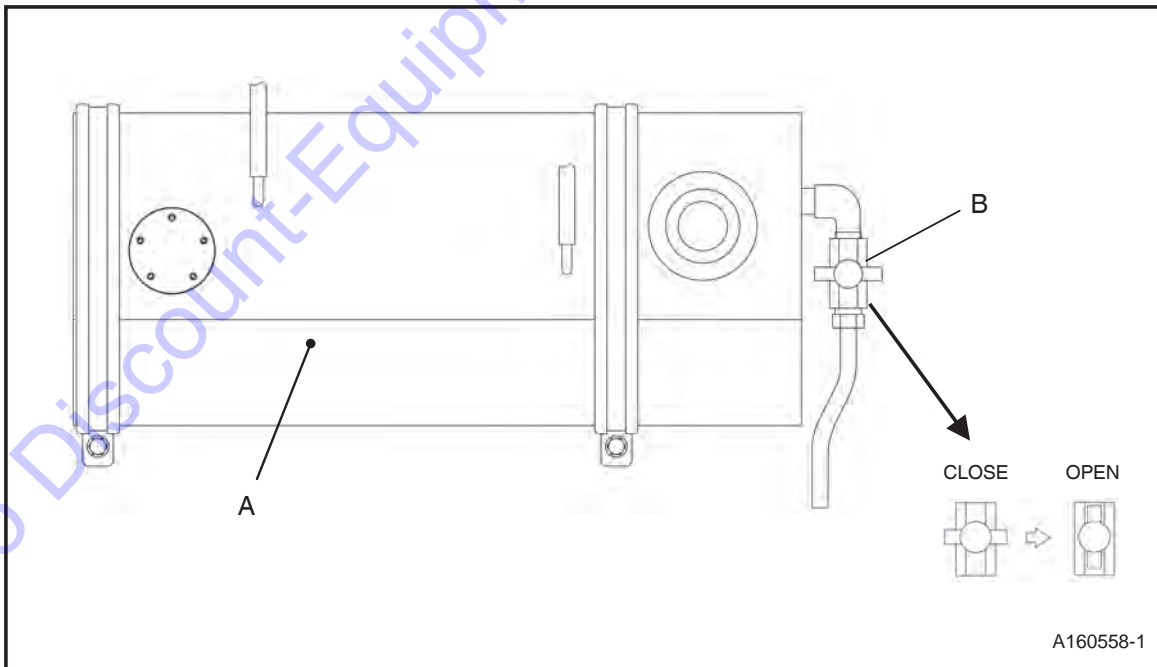
Before starting operation, make sure to check the level of residual fuel so that fuel shortage during operation can be avoided. Drain condensate accumulated at the bottom of fuel tank whenever necessary.

- **Refilling fuel tank should be done in an outdoor well-ventilated place.**
- **Never let oil reach the filler pipe of the filler port. Otherwise, high temperature may cause fuel to expand and spill out. Also, fuel may spill out due to vibrations during movement or carriage.**

	 D004	<ul style="list-style-type: none">● Do not, under any circumstance, bring lit cigarettes and/or matches to the fuel.● The fuel is extremely flammable and dangerous. Be careful of fire because it is very likely to catch fire.● Refuel only after stopping the engine, and never leave open fuel can near the machine. Do not spill. It could cause a fire. When it is spilt, wipe it up completely.● Never use alcohol-base cleaning fluid. If it sticks to such parts made of plastic, it causes degradation of liquid surface visibility, and in worst case, it leads to crack and fuel leak due to crack caused.
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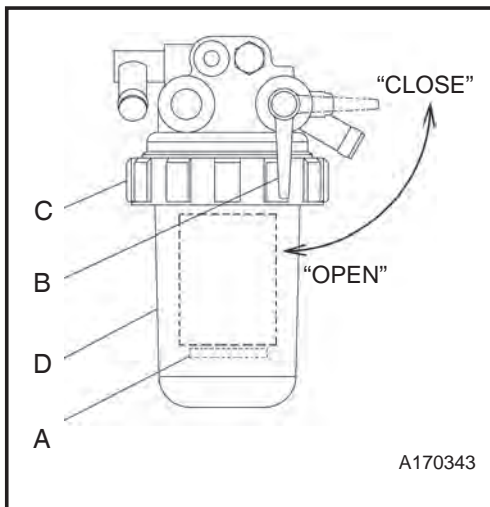
Drain fuel tank

Gradually open the drain valve [B] under the fuel tank [A] and discharge the drain into an approved container. After the drain is discharged completely, make sure to close the drain valve [B]. Dispose according to regulations.



Check for condensate of sedimenter

When the red float [A] of the fuel filter is lowered at the bottom, drain the condensate from it.



1. Move the lever [B] to the "CLOSE" position.
 2. Loosen the ring nut [C] and remove the cup [D].
 - Carefully remove the cup, as it is filled with diesel oil.
 3. After draining the condensate (water) accumulated in the cup, wash the cup in diesel oil. Then install it.
 4. After turning the lever to the "OPEN" position and filling the cup with diesel oil, carry out the air bleeding operation. (See "Air Bleeding in Fuel Line")
- Drain the condensate into an approved container, and dispose of condensate according to the designated regulations.


Check wiring of each part

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

Check piping of each part

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

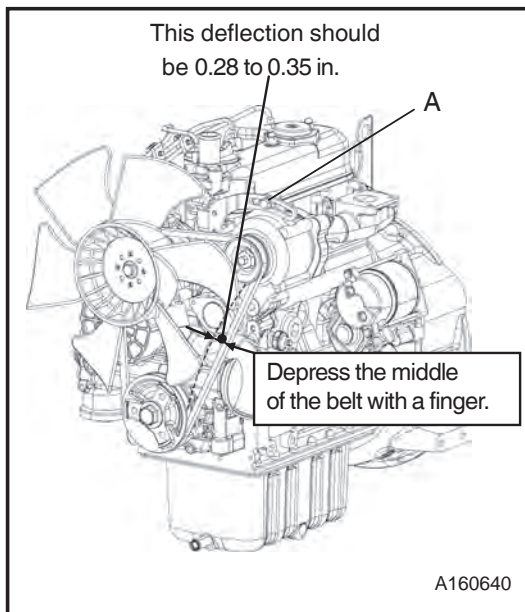
Check in the machine

	<ul style="list-style-type: none">● Be sure to wear protection such as a helmet, protective glasses, earplugs, safety shoes, gloves, and a dust mask.● Remove combustibles such as woodchips, dead leaves, waste paper, etc., near the muffler, exhaust valve and other components that become hot during operation.● Make sure a fire extinguisher is near the machine.● Keep emergency contact numbers handy for fire, EMT, urgent care clinic, etc.
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Check belt tension

Follow the procedure below to adjust tension of belt.

Adjust the tension by gradually loosening the fastening bolt or nut [A] of the alternator.





1. Visually check if there are any cracks or tears in the belt.
2. Adjust the belt tension by loosening the fixing bolt [A] of the alternator so that the belt can deflect 0.28 to 0.35 in. (7 to 9mm) when pressed at the center of the belt with approx. 22lbf (98N) force.
3. Be careful not to leave any grease or LLC on a belt while changing it. If any such material is left, wipe it off completely.

WARNING	<p>TR0304</p>	<ul style="list-style-type: none">● Attempting to adjust the belt while the machine is in operation could result in death or serious injury.● Stop the engine and remove the starter key whenever the tension of the belt is to be adjusted.● Remove the negative (-) side cable from the battery.
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IMPORTANT	<ul style="list-style-type: none">● Too much belt tension could damage shaft and shorten bearing life. Too little belt tension could result in premature belt wear and engine damage.
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Operation

Pull the handle forward to open the door.
Be sure to close and latch the door.

	 D003	<ul style="list-style-type: none"> ● 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.
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Procedure to start the unit

When warming up operation, be sure to check if there is no loosening in each part of machine or any leaks of water, oil, fuel and air. Also check putting out of the lamp "GLOW / TROUBLE".

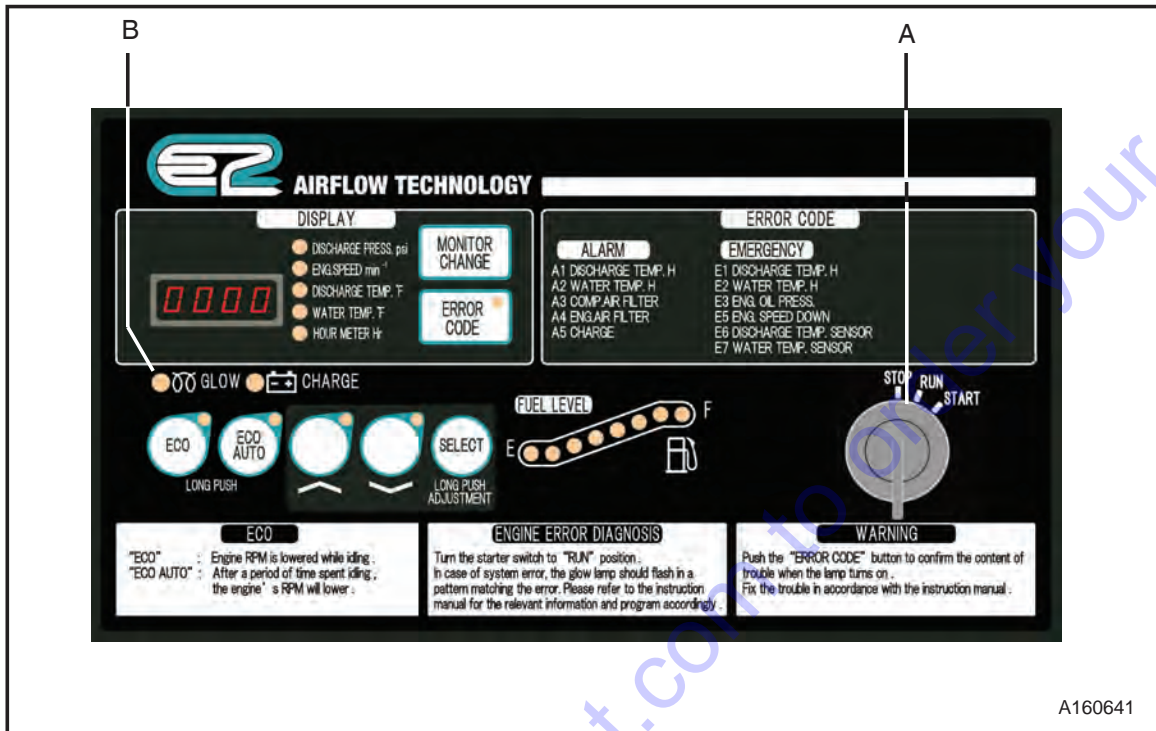
1. Make sure that the pressure gauge indicates 0psi (0bar).
2. Fully close the service valve.
3. Turn the starter switch [A] to the "RUN" position. The glow lamp [B] will go on.
4. As soon as the glow lamp [B] goes out, turn the starter switch [A] fully clockwise to start the engine.

Limit the time of operating the starter switch to 30 seconds. (Operating said switch for more than 30 seconds activates the emergency engine stop.) Wait at least one minute for any subsequent starting operation; otherwise, the starter motor may overheat and become damaged.

- See the table below for required time for starting unloader operation. It varies according to discharge air temperature.

Discharge air temperature	Required time for starting unloader operation
Lower than 50°F(10°C)	It exceeds 120 seconds or certain seconds until discharge air temperature becomes 140°F or more degrees which comes first.
Higher than 50°F(10°C)	30 seconds

5. Once the engine has started, allow 5 minutes for warm-up.
The discharge air pressure gauge in this condition ranges from 44 to 102psi (3 to 7bar)
6. After warm-up is complete, open the service valve to start the service job.




IMPORTANT	<ul style="list-style-type: none"> ● 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.
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Operating procedures when engine fails to start up on first attempt

When the engine fails to start even after performing the startup procedures 1 to 4, do not keep the starter running, but set the starter switch back to the "STOP" position and wait approximately 60 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 items.


- No fuel
- Lack of air bleeding in fuel line (See "Air Bleeding in Fuel Line")
- Clogging of fuel filter
- Discharge of battery (Low cranking speed)

	<ul style="list-style-type: none">● Do not operate the starter more than 30 or more seconds at one operation. (See "Starting Procedure")● If you do starting manipulation successively, the starter will not stop fully and it causes damages to pinion ring gear and breakdown of the starter.
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How to start the machine at low temperature

- Use engine oil of a viscosity that meets the ambient temperature according to "Engine Oil."
- Use LLC (antifreeze). Use correct amount to provide freeze protection, according to the ambient temperature.
- Battery should always be kept fully charged.

1. Fully close the service valve.
2. Do the normal starting procedure to start the engine.




	<ul style="list-style-type: none">● When operating in cold weather, use types of engine oil, compressor oil, LLC (antifreeze), or fuel designed for use in cold weather.
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Gauge indication while operating

Be sure to check at times to see if gauges or each component of the unit are properly working, or if there is any air-leak, oil-leak, water-leak or fuel-leak etc.

During normal operation, each indication of instruments is shown in the table below. Refer to the table for daily checks.

- The above table gives standard values. They may vary slightly depending on the operating conditions and other factors.

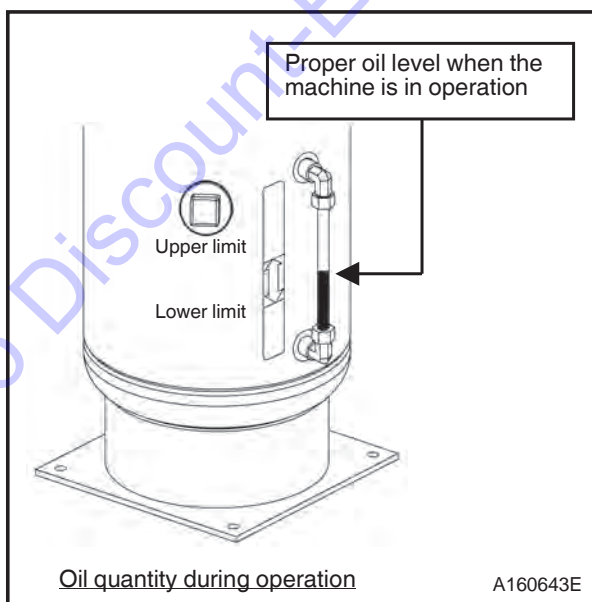
Protection device		Indicator lamp			
		GLOW/TROUBLE	CHARGE	ECO	ECO AUTO
Monitor				ECO	ECO AUTO
Before startup	Starter switch set to "RUN" position	● OFF ※1 · ※2	 ON	● OFF ※3	● OFF ※3
		In operation		● OFF ※3	● OFF ※3

※1: Turn OFF after 3 to 10 seconds (It varies by ambient temperature).



※2: GLOW lamp blinks when engine trouble.


※3: Push SELECT switch long to select ON/OFF (until operation mode is changed).

		Discharge pressure indication
In operation	No load (Unload)	58 to 100psi (4.0 to 6.9bar)
	Full load	112 to 131psi (7.7 to 9.0bar)



- When the machine is in operation under load, check to see that the compressor's oil level falls within the range between the lower limit and upper limit of the level gauge. If the level is found to be insufficient, replenish the oil.
- ※ Keep the operation log to record constant inspection of each component, so that trouble of the machine can be easily discovered and preventive measures can be taken.

		<ul style="list-style-type: none"> ● Do not open the valves below listed when operating. ● Separator receiver tank drain valve ● Coolant drain plug ● Engine oil drain valve ● Oil cooler drain valve ● Fuel tank drain valve
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	<ul style="list-style-type: none"> ● Minimum discharge air pressure is 58psi (4bar) during operation. ● 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.
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Stopping

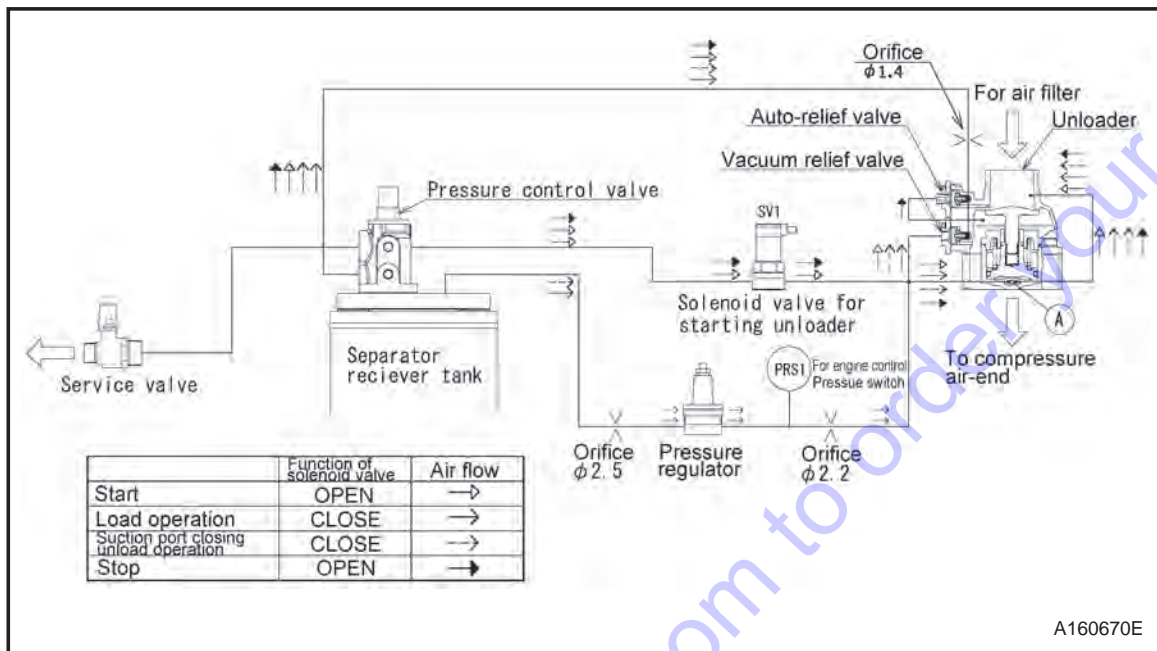
1. Close the service valve completely and operate the machine about 5 minutes, until it cools down.
 2. Turn the starter switch to "STOP" position to stop the engine.
 3. Remove the key from the compressor every time when you stop the engine. Keep the key and be careful not to lose it.
- Unless all the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

Air bleeding in fuel line

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

1. Replenish fuel.
2. When the starter switch is turned to the "RUN" position, an electromagnetic pump starts to automatically bleed air from the fuel line.
3. Air bleeding is completed in about one minute.

Capacity Control Device



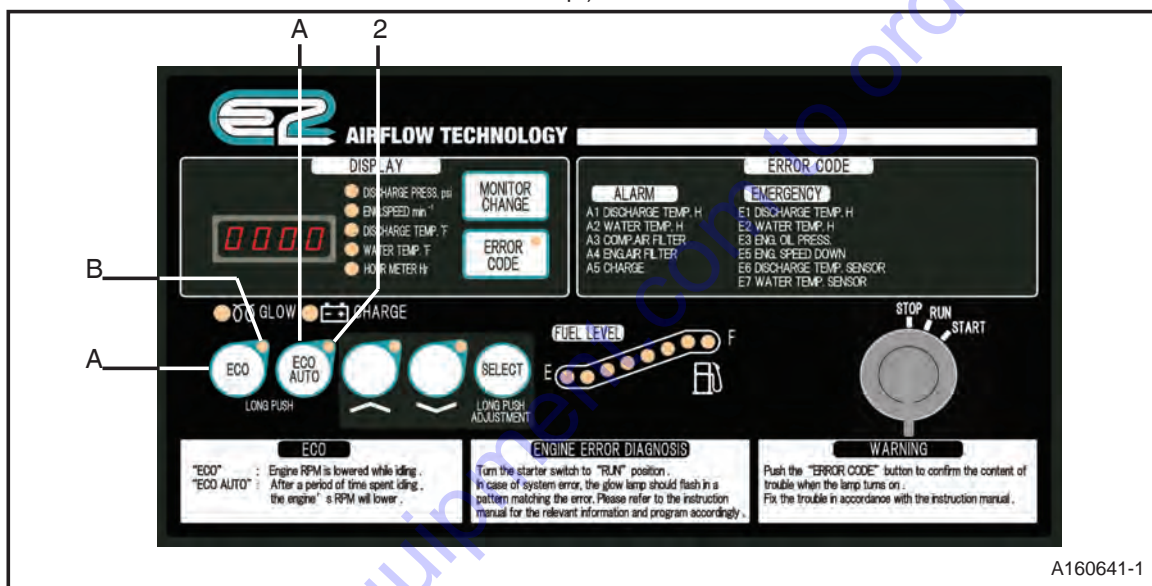
Step	Response
Start	Compressed air flows into unloader chamber (A) because solenoid valve for starting unloader SV1 is opened at start-up. The pressure in chamber (A) rises soon to close unloader valve (A) fully and accordingly it can reduce the load at start-up.
Load operation	After start-up, automatic unloader operation is complete before SV1 is closed. Any change in the discharge pressure causes the pressure regulator to change the airflow into chamber (A) so as to change the degree of openness of the unloader valve. The speed of the engine changes according to the pressure detected by pressure switch PRS1 for engine control so as to automatically and continuously control the air volume within the range from 0 to 100%.
Suction port closing unload operation	As the pressure exceeds the rated limit due to a decrease in consumption air volume, PRS1 detects the pressure, and the system reduces the engine speed in proportion to the increased pressure. At the same time, airflow from the pressure regulator to the chamber (A) increases, and the unloader valve is closed. If the interior of the compressor becomes rendered as an area of high vacuum pressure during unloading operation, a vacuum noise sounds. To prevent such noises, the secondary pressure of the pressure regulator is utilized to open the vacuum relief valve so as to prevent the interior of the compressor from becoming an area of high vacuum pressure.
Stop	When stopping operation, it opens Auto relief valve to relieve the compressed air in separator receiver tank to atmosphere, detecting the pressure inside compressor air-end.

ECO/ECO AUTO mode

This machine features ECO/ECO AUTO modes. These modes are suitable if you want to minimize fuel consumption during continuous no-load operation with less air consumption. Referring to the table below, choose a mode according to your usage. Select the operation mode via the ECO or ECO AUTO switch on the operation panel.



Each mode is available according to the consumption of compressed air.

1. Push ECO and ECO AUTO switch [A] long when operation.
2. The indicator of ECO or ECO AUTO [B] turns on, with each mode selected.
3. Push the ECO or ECO AUTO switch [A] for an extended time to release the mode. (If you don't release it, the selected mode remains active at next start-up.)



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Each mode function

Mode selection	ECO/ECO AUTO lamp status
<ul style="list-style-type: none"> ● Normal mode Unload revolving speed will be 1,800min⁻¹. Suitable for usage that requires responsiveness like chippings. 	 <p>ECO/ECO AUTO lamp OFF. It shows the switch is not pushed.</p>
<ul style="list-style-type: none"> ● ECO mode Unload revolving speed will be 1,400min⁻¹. You can lower fuel consumption and noises. 	 <p>ECO lamp ON. It shows ECO switch is pushed.</p>

- ECO AUTO mode

If unloader revolving speed is kept 1,800min⁻¹ for a certain time, you have good responsiveness and smooth working. Then you stop working, it will be 1,800 to 1,400min⁻¹ and you can lower fuel consumption and noises.



ECO AUTO lamp ON. It shows ECO AUTO switch is pushed.

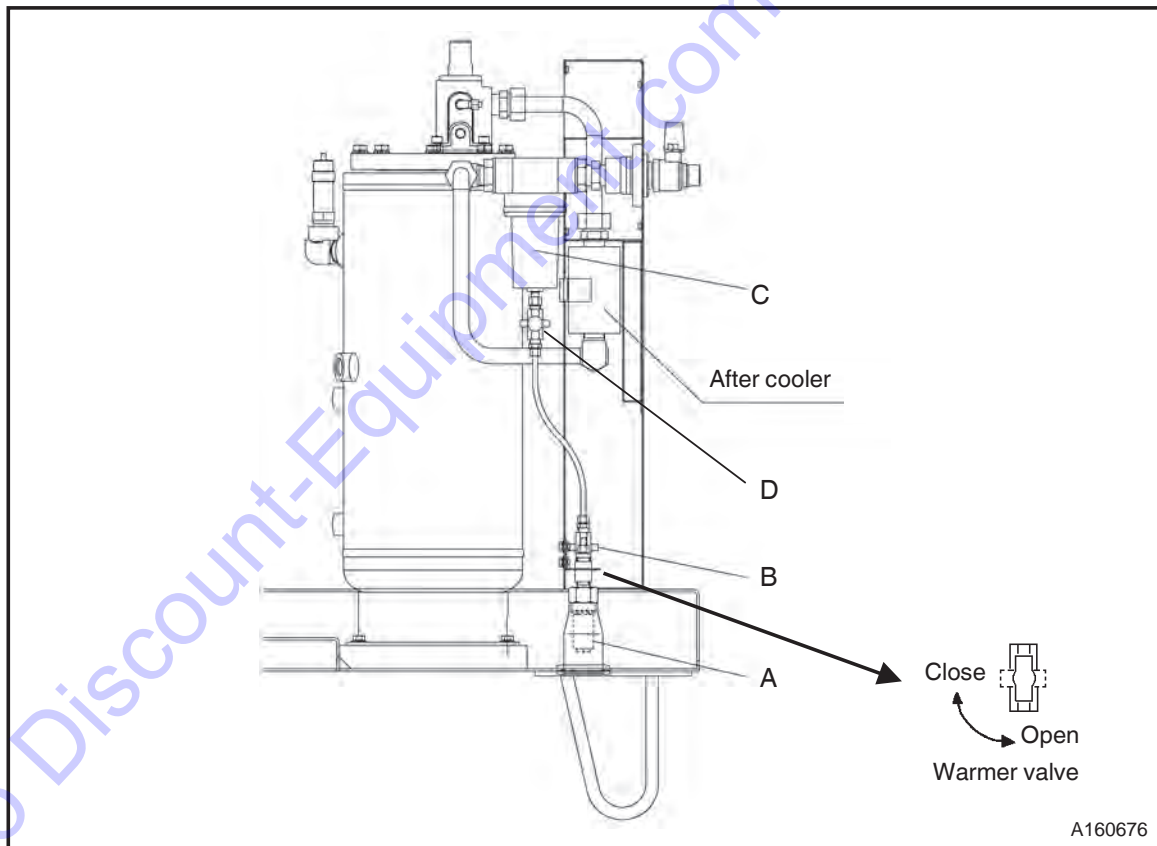
Operation of after cooler type

Draining after cooler

The condensed water drained from after-cooler contains oil. Dispose according to regulations.
[In case that any condensate is found in discharged air]

- Be sure to check air discharge from after cooler drain outlet when operating. If condensate is found in discharged air, clean silencer [A] at outlet. If it is dirty, replace it.

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



Drain warmer valve

The valve [B] is installed for drain antifreezing when discharging water separated at drain separator [C]. Be sure to use with the valve opened if ambient temperature is 5 degrees or less. If there is no risk of freezing, use with the valve [B] closed.

Drain valve

Be sure to use the valve [D] always opened. In case discharge air is dried, you can use the valve [D] closed.

To prevent freezing



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

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Troubleshooting

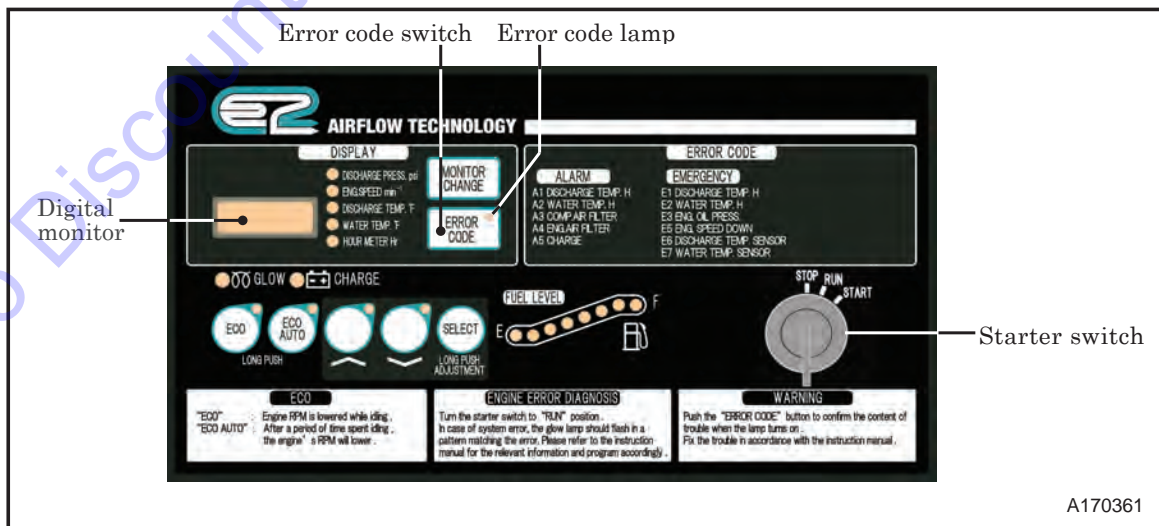
Indicator lamp and Warning / Emergency display

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

Item	Contents	Measures	Monitor
Glow	Press starter switch “RUN” and the lamp goes on and after preheating is finished, the lamp will be off.	—	
Charge	Lamp goes on when alternator is not charging.	Check wiring. Check alternator.	

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

Item	Failure code	Contents	Measures
DISCHARGE TEMP.H	A-1	Lamp flickers when the air temperature at the outlet of the air-end reaches 239°F(115°C).	See “Troubleshooting Chart”
WATER TEMP.H	A-2	Lamp flickers when coolant temperature reaches 221°F(105°C).	
COMP. AIR FILTER	A-3	Lamp flickers when air filter gets clogged and suction resistance increases.	Clean or Replace
ENG. AIR FILTER	A-4	[Actuating resistance is more than 6.2kPa.]	
CHARGE	A-5	Belt loosened and/or cut Faulty generation of alternator	See “Troubleshooting Chart”



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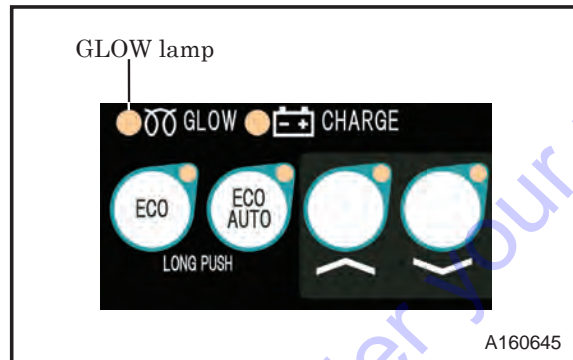
[Emergency display] When any trouble takes place during operation, this displays and it stops as an emergency stop.

When any abnormality happens, a trouble code lamp flickers. In this time when trouble code switch is pressed, a failure code will be displayed.

Item	Failure code	Contents	Measures
DISCHARGE AIR TEMP. E	E-1	When the air temperature at the outlet of the air-end reaches 248°F (120°C), lamp comes on.	See "Troubleshooting Chart"
WATER TEMP. E	E-2	When coolant temperature reaches 230°F (110°C), lamp comes on.	
ENGINE OIL PRESS	E-3	The lamp comes on when engine oil pressure drops. [The function pressure: 98.1kPa.]	
ENG. SPEED DOWN	E-5	The lamp comes on when engine revolution speed is slow down. [Operation speed: less than 950min ⁻¹]	
DISCHARGE AIR TEMP. SENSOR DISCONNECTION	E-6	The lamp comes on when the air temperature sensor at the outlet port of compressor air end is disconnected.	
COOLANT TEMP. SENSOR DISCONNECTION	E-7	The lamp comes on when the engine coolant temperature sensor is disconnected.	

Engine emergency stop

- When the machine detects any trouble listed on below table, its engine will stop and GLOW lamp will flicks. You can find which trouble occurs by its flickering pattern.



Trouble	Detective way and contents	Flickering pattern	Note
Engine over-rotation	Number of revolution exceeds 115% (3,875min ⁻¹) which is maximum number of revolution in operation range.	L1 and S1	Engine stops immediately
Drop of engine oil pressure	After engine starts, oil pressure switch turns "ON" for 1 or more seconds.	L1 and S2	Engine stops after 10 or more seconds later than started.
Battery charging faulty	After engine starts, alternator "L" terminal keeps no voltage status (0V) for more than 1 or more seconds.	L1 and S3	Engine stops after 10 or more seconds later than started.
Water temperature emergency	Coolant temperature exceeds 239°F (115°C) for 1 or more seconds.	L1 and S6	Engine stops after 10 or more seconds later than started.
Emergency stop	The No.35 pin of the Controller (ECU) turns on for 0.1 seconds or longer (+B connection).	L1 and S5	Engine stops immediately
Malfunction of RPM sensor	Even though the alternator L terminal supplies voltage after the engine starts, the RPM is indicated as "0 min ⁻¹ ."	L2 and S1	Engine stops after 10 or more seconds later than started.
Trouble of solenoid	Detect by solenoid driver IC or current value.	L2 and S2	Engine stops immediately
Trouble of coolant temperature sensor	Disconnection detected (becoming -104°F [-40°C] or lower)	L2 and S4	Engine stops after 10 or more seconds later than started.
	Short circuit detected (becoming 284°F [140°C] or higher)	L2 and S5	
Trouble of alternator L terminal	After key is "ON" (engine does not start), alternator "L" terminal has voltage although number of revolution is 0min ⁻¹	L2 and S6	Engine stops after 10 or more seconds later than started. (It can start even on error)
Excessive voltage	Power source voltage exceeds 18V or more.	L3 and S1	Engine stops immediately
Trouble of power source for sensor	Detect short circuit at power source (analog 5V drops to 4 or less V)	L2 and S7	Engine stops after 10 or more seconds later than started.
Protection of starter	Starter keeps "ON" for 30 or more seconds.	L1 and S7	Engine stops immediately
Detection of engine stoppage	After engine starts, number of revolution is 0 and no oil pressure.	L3 and S2	
Trouble of accelerator sensor	Detect open circuit (0.244 or less V) Detect short circuit (4.432 or more V)	L3 and S3	Engine stops after 10 or more seconds later than started.

※When engine is brought to emergency stop, some of the above flashing patterns is indicated. L and S mean Long time and short time alternatively. Also the numbers of each L and S mean repeated time of flickering lamp.

Troubleshooting Chart

If any trouble occurs during operation, do not leave it. Investigate the cause and take appropriate measures. Read the manual carefully and fully understand what to do in case of trouble.

- The better you understand the construction and function of the machine, the faster you can find a problem and solution.
- This chapter describes the symptom, cause and countermeasures of important troubles in detail:

Symptom	Cause	Countermeasures
Low starter revolution speed.	(1)Faulty battery. (2)Failure of battery charging (3)Failure of alternator (4)Failure of starter	Check battery → Charge Change
Starter rotates normally but engine does not start up.	(1)No fuel (2)Air entry into fuel line system (3)Fuel filter clogging. (4)Clogging of sedimenter (5)Nozzle clogging	Fuel replenishment Bleed the air Disassemble, clean, and change Disassemble, clean, and change Disassemble/Clean
The discharge air pressure will not rise 100psi (6.9bar).	(1)Pressure regulator insufficient adjustment. (2)Trouble of solenoid valve for starting unloader	Re-adjust (Fasten) Change
The engine does not reach the rated revolution speed.	(1)Faulty engine controller (2)Engine trouble. (3)Fuel filter clogging (4)Sedimenter clogging (5)Water is accumulated in sedimenter (6)Air filter element clogging.	Call your nearest dealer Call your nearest dealer Disassemble/Change Disassemble/Change Drain water Clean or change of element
If the discharge pressure will not increase to the specified one, RPM will drop.	(1)Pressure regulator insufficient adjustment. (2)Trouble of pressure regulator	Re-adjust (Fasten) Change
Engine does not reach minimum revolution at unload.	(1)Faulty engine controller (2)Trouble of emergency controller	Call your nearest dealer Call your nearest dealer
Safety valve relieves at unload.	(1)Pressure regulator insufficient adjustment. (2)Unloader valve damaged/Faulty seat (3)Faulty safety valve (4)Faulty engine speed sensor (5)Faulty of pressure switch	Re-adjust (loosen) Call your nearest dealer Change Call your nearest dealer Change
Oil mixes in air. (poor oil separation)	(1)Scavenging orifice strainer clogging (2)Excessive oil in separator receiver tank (3)Low discharge pressure (4)Oil separator element deteriorated	Disassemble/Clean Drain to its proper level Unloader disassembly/inspection Check/Change

Symptom	Cause	Countermeasures
Water found mixed in air. (Condensate separation malfunctioned.) For after-cooler type only	(1) Drain valve under drain separator is closed (2) Clogging of silencer at after cooler drain outlet (3) Orifice garbage clogging	Open valve Disassemble/Clean/Change Disassemble/Clean
Insufficient free air delivery.	(1) Air filter element clogging (2) Unloader valve cannot fully open (3) Engine does not reach rated speed	Clean or change of element Call your nearest dealer (See.4-4 pages)
It is indicated that engine oil pressure is abnormal, and engine stops.	(1) Engine oil shortage (2) Engine oil filter clogging (3) Loose wiring, connectors and disconnection. (4) Faulty oil pressure switch	Replenish oil Change Check/Fasten Change
It is indicated that coolant temperature is abnormal, and engine stops.	(1) Low coolant level. (2) Belt slippage. (3) Radiator clogging. (4) Faulty thermostat. (5) Loose wiring, connectors and disconnection. (6) Faulty coolant temp. sensor (7) Coolant temp. sensor is disconnected.	Replenish Re-adjust tension Clean Change Check/retighten Change Repair and replace
It is indicated that discharge air temperature is abnormal, and engine stops.	(1) Shortage of compressor oil. (2) Slippage of belt. (3) Oil cooler clogging. (4) Oil filter clogging. (5) Loose wiring connectors and disconnection. (6) Faulty discharged air temp. sensor. (7) Discharge air temp. sensor is disconnected.	Replenish oil Re-adjust tension Clean Change Check/Fasten Disassemble/Check Repair and replace
Engine failure lamp glows.	(1) Engine in trouble	※1

※1: Contact your dealer.

- Contact your dealer if you find it difficult to repair.
- Refer to the engine manual for issues concerning the engine.


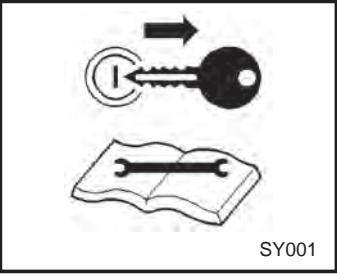
Maintenance

Important Items at Periodic Inspection and Maintenance or after Maintenance


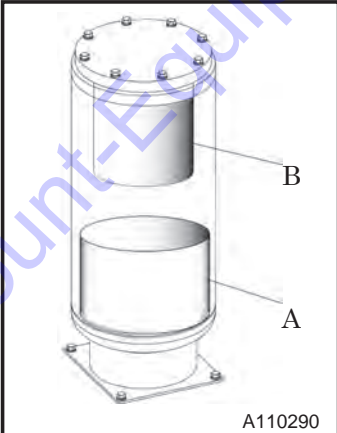
The following table shows the inspection and maintenance intervals under normal operation conditions. When used or operated under hard environmental conditions, it is impossible to warrant the unit even if the above conditions are performed according to the intervals listed in the above table.

- 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.
- Do not touch hot portions of the machine while inspecting the machine when running. Such parts as engine, exhaust manifold, exhaust pipe, muffler, radiator, oil cooler, air-end, pipe, separator receiver tank, and discharging pipe are especially hot, so never touch those parts, because it could cause serious burns.

Hang a "Now Checking and under Maintenance" tag

	 <ul style="list-style-type: none">● 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.
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Prevention of oil separator from catching fire

	 <ul style="list-style-type: none">● Be sure to perform following periodic inspection and maintenance:<ul style="list-style-type: none">A. Check and change compressor oil quantityB. Change oil separator
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IMPORTANT	<p style="text-align: center;"><i>Directions: Prohibition of any other jobs or works than directed herein</i></p> <ul style="list-style-type: none">● 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.
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Periodic Inspection List

(Unit:Hour)

Maintenance	Daily	Every 250	Every 300	Every 500	Every 1,000	Every 2,000	Every 3,000
Check compressor oil level.	○						
Drain separator receiver tank.	○						
Check looseness in pipe connecting part, and wear and tear of pipe.	○						
Check oil, water, fuel and air leak.	○						
Check functions of all instruments and devices.	○						
Check and clean clogging of air filter element.		○					
Change compressor oil.			※○	○			
Change compressor oil filter.			※○		○		
Change air filter element.				○			
Clean strainer in the scavenging orifice.				○			
Clean outside of the oil cooler.					○		
Change oil separator.						●	
Change nylon tubes.						☆●	
Change rubber hose						☆●	
Change o-ring of unloader.							★●
Check consumable parts of the auto-relief valve.							★●
Check consumable parts of the vacuum relief valve.							★●
Change pressure regulator.							●
Performance check of pressure control valve.							●
Check and change o-ring and piston of pressure control valve.							●
Change solenoid valve							●
Change oil seal and bearing.							●

Such items marked ○ shall be carried out by customers.

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

※**First replacement timing**

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.

※The indicated replacement periods are rough estimates. Depending on the usage conditions or environment, inspection/maintenance should be conducted earlier.

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

For the details, contact our office nearby or distributor.

(Unit:Hour)

Maintenance		Daily	Every 50	Every 250	Every 500	Every 1,000	Every 2,000	Every 3,000
Engine	Check engine oil level.	○						
	Check coolant level.	○						
	Check fuel.	○						
	Drain fuel tank.	○						
	Drain check inside fuel filter.	○						
	Check looseness in pipe connectors, terminals and tear in wiring.	○						
	Check belt tension.	○						
	Change engine oil.		※○	○				
	Change engine oil filter.		※○	○				
	Check battery electrolyte.			○				
	Check and clean clogging of air filter element.			○				
	Check specific gravity of battery electrolyte.				○			
	Change air filter element.				○			
	Change fuel filter element.				○			
	Change sedimenter element.				○			
	Clean inside of radiator.				●			
	Clean outside of radiator.					○		
	Change coolant.					☆○		
	Clean inside of fuel tank.						●	
	Change fuel hose.						☆●	
Change radiator hoses.							★●	

※First replacement timing

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.

※The indicated replacement periods are rough estimates. Depending on the usage conditions or environment, inspection/maintenance should be conducted earlier.

(Unit:Hour)

Maintenance		Daily	250	300	500	1,000	2,000	3,000
Undercarriage	Supply grease to trailer hub bearing.					●		
	Supply grease to leaf spring pin.					●		
	Check and confirm that the fixing bolts for the drawbar are properly tightened			○ Every 3 months				
	Check and confirm that the bolts with which undercarriage brackets are fixed are properly tightened.			○ Every 3 months				
	Check and confirm that the nuts with which tires are fixed are properly tightened.			○ Every 3 months				

Replacement Parts

Part number changes upon modification.

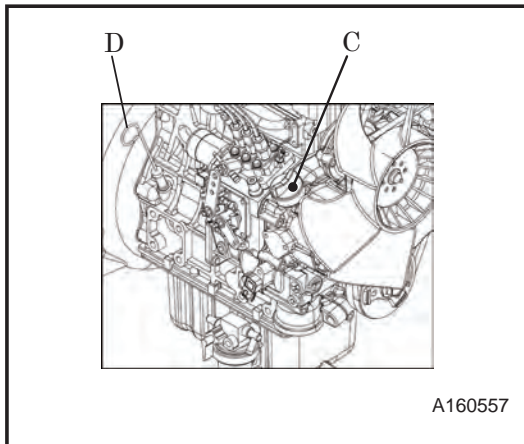
For replacement of parts, make sure whether the part number is correct or applicable.

Part Name		Part Number	Quantity
Engine oil filter		41290 01700 KOBOTA 16271-32092	1
Air filter element	Compressure air-end	32143 11700	1
	Engine side	32143 11500	1
Compressure oil filter		37438 08900	1
Fuel filter	Element“4”	43541 01300 KUBOTA RA211-51281	1
	O-ring“5”	KUBOTA 04811-50650	1
	O-ring“6”	KUBOTA 04816-00160	1
Sedimenter	Element“4”	43541 02600 KUBOTA RD819-51281	1
	O-ring“5”	KUBOTA 1G311-43571	1
Solenoid valve for starting unloader		46811 31700	1
Oil separator	Separator“1”	34220 09400	1
	Gasket“2”	03737 17401	2
Pressure control valve	O-ring “1”	03402 25042	1
	O-ring “2”	03402 25020	2
	Spring “3”	22144 07500	1
	Piston “4”	35303 02900	1
Pressure regulator		36400 19000	1
Belt		KUBOTA 15659-72532	1

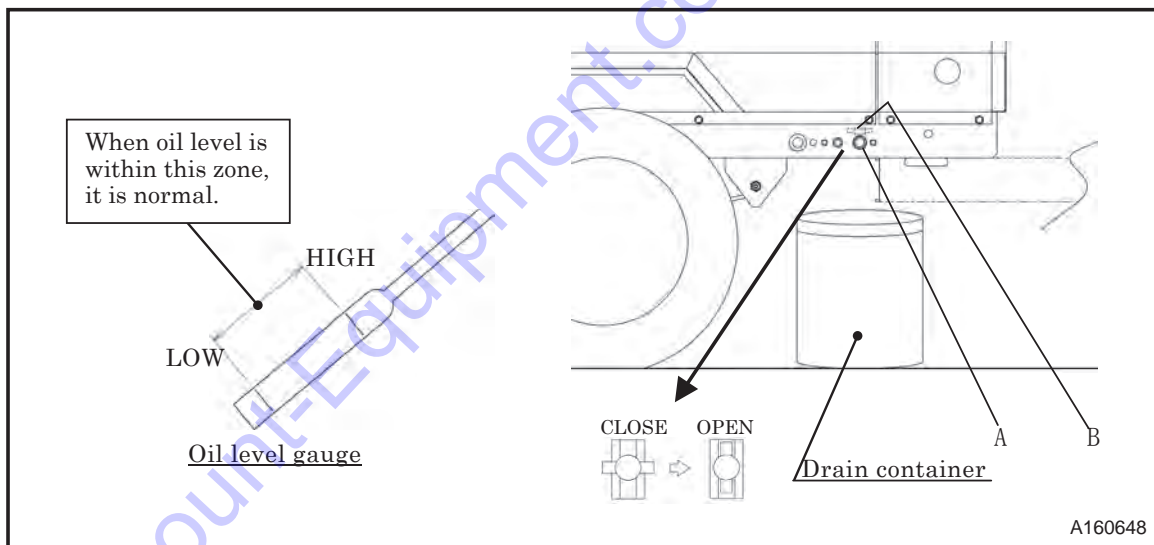
Maintenance Items

Change engine oil

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



- ① Remove the drain plug [A] attached outside the plane, open a drain valve [B] inside the plane, and discharge engine oil drain.
- ② After drainage of used engine oil has been completed, close drain plug [A] and drain valve [B], and supply new engine oil through the oil filler port [C] which is used as oil level gauge also.
[Quantity of oil : approx. 4.5L]
- ③ After supplying oil, pull out the oil level gauge [D] and wipe it out.
- ④ Then, re-insert the oil level gauge fully and pull it out again. If the dipstick shows the oil level between LOW and HIGH, it is normal.
- ⑤ As you finish refilling, make sure to close filler port [C] and to firmly reinsert oil level gauge [D].



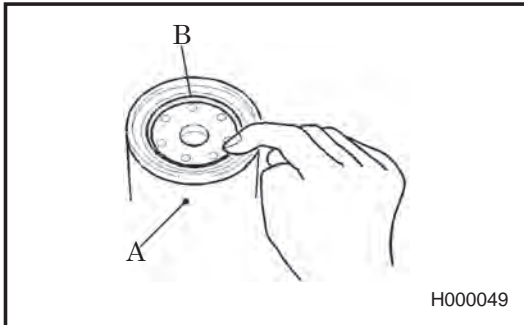
Caution in filling or discharging engine oil



- After stopping the engine, wait for 10 to 20 minutes until the engine oil cools off. Then check the level of the engine oil, or refill or drain the oil.
- Engine oil is very hot and highly pressurized during or just after the operation. Hot oil could blow out of the tank and can cause scalding.
- Never supply more engine oil than the proper level. Too much oil could cause white smoke out of the exhaust, and it can cause damage and accident to engine.

Change engine oil filter

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



- Remove the oil filter [A], using a filter wrench.
- Screw in the new oil filter with the packing [B] coated slightly with oil.
(For part number, See Replacement Parts)
- After the packing touches the sealing face, tighten another 1 times by hand.
- After installing the oil filter, check it for any leak during operation.

Check battery electrolyte and specific gravity of battery electrolyte

Battery electrolyte : every 250 hours

Specific gravity of battery electrolyte : every 500 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:

● 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 Battery Maintenance for method of specific gravity measurement and recharging the battery.

● Enclosed type battery:

Check the indicator on top surface of the battery.

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

If specific gravity of battery electrolyte does not rise in spite of replenishing distilled water or charging battery, be sure to replace battery with new one quickly.

Battery Maintenance





Battery may generate hydrogen gas and may explode.

Therefore, recharging should be done at a well-ventilated place.

- 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 LEVEL” and “LOWER LEVEL” without any delay.

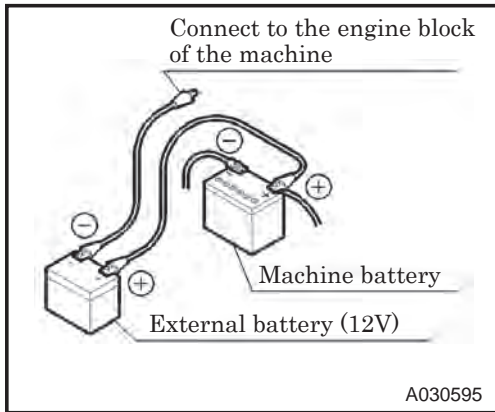
- Wear protective gloves and safety glasses when handling a battery.
 - When such battery electrolyte contacts your clothes or skin, wash it away with large amount of water immediately.
 - If the battery electrolyte gets into your eyes, wash it away immediately with plenty of water and seek medical attention.

Handling battery		
	 D004	<ul style="list-style-type: none">● Keep flames away from battery.● Do not spark near the battery nor light a match, nor bring lit cigarette and match close to the battery.● Do not charge a 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.● Dispose of battery, observing local regulations.
	 W010	
	 TR0093	

[Charge battery]

- Use only a battery charger designed for the type of battery being charged.
- Disconnect the cable between battery and the machine, and charge the battery with a 12V battery charger. Do not charge two batteries at the same time.
- Be sure not to connect (+) and (-) terminals backwards.

[How to use booster cable]



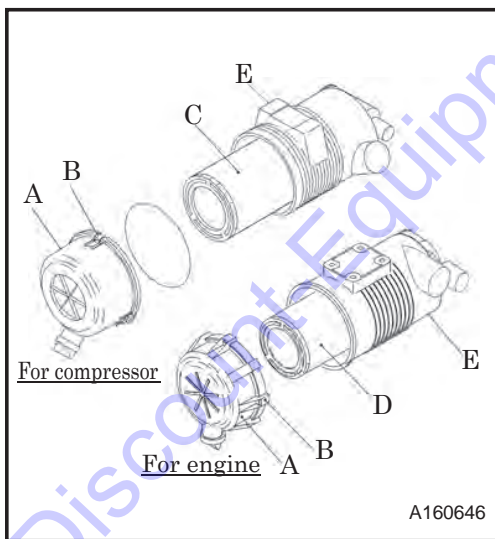
<Procedure for using a booster cable>

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

	<p style="text-align: center;">Do not reverse the cable connection</p> <ul style="list-style-type: none"> ● When a booster cable has to be used or when cables are connected again after a battery is replaced, be careful not to connect (+) and (-) terminals backwards. Such wrong-connection will cause spark and damage to each component.
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Check and clean clogging of air filter element

Every 250 hours



<Procedure>

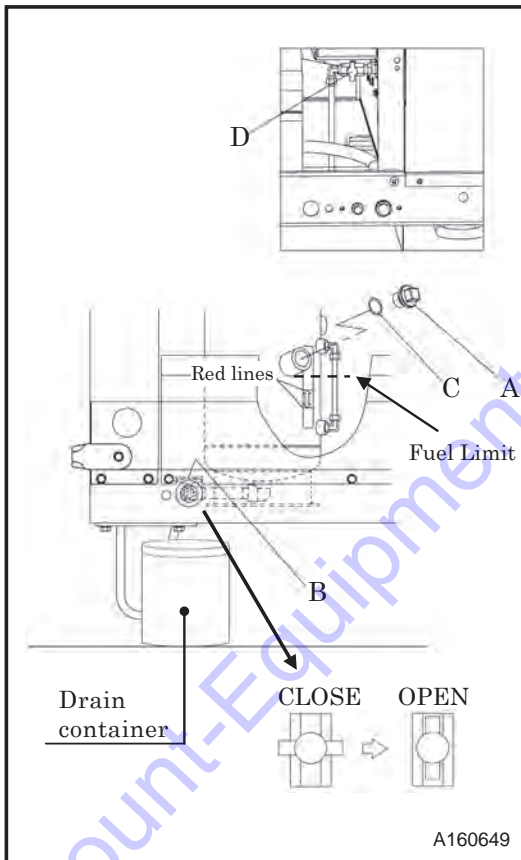
- ① After removing the cap [A] by loosening its cap [A] fixing latch [B] clean its interior properly.
 - ② Remove the element [C], and clean it.
 - ③ When installing the cap after finishing the cleaning job, push the element into the case [E] surely by hand, and then make sure the cap fixing latch surely hooks the case. Finally tighten it.
- If the element is found heavily dusty, replace it with a new one. **(For part number, See Replacement Parts)**

	<ul style="list-style-type: none"> ● When an element that is clogged or has holes or cracks is used, dust or foreign material will get in the engine. This causes accelerated wear in each sliding part of the engine. Be sure to make daily check and cleaning so that the life of the engine will not be shortened.
--	--

Change compressor oil

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

- For prevention of fire caused due to deteriorated oil separator, in principle change of compressor oil is to be performed in accordance with the schedule mentioned in the regular maintenance table. However, it is heavily influenced by operation conditions and environmental conditions. If it has been found more dirty and corrupted, it should be changed.
- If machine is continuously operated in such bad conditions, it could damage bearings and degraded oil sticks oil separator to cause accumulated oxidation heat of reaction to lead oil separator fire. For this reason, regular maintenance work should be done surely and perfectly.
- Conduct changing compressor oil after checking machine stoppage for about 2-3 minutes and dropping pressure of separator receiver tank to zero.



1. After stopping the machine, wait for the complete release of the pressure in the separator receiver tank. Then, remove filler cap [A] slowly and open drain valve [B] to discharge the compressor oil. Open drain valve [D] of the oil cooler to discharge the oil in the cooler.
2. After draining compressor oil, securely retighten drain valve [B] and [D].
3. Fill the tank with new compressor oil up to the height indicated by the dotted line (Fuel Limit). Then, close filler cap [A]. Inspect o-ring [C] of filler cap [A] and replace it with a new one if any hardening or damage is found.
4. After starting operation, check and confirm that oil level is within red lines of oil level gauge.

Quantity of oil between the red lines	Approx.1.3L
Quantity of change oil	Approx.10L

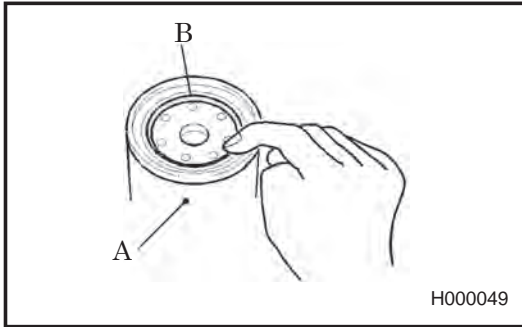
IMPORTANT

- Mixture of different brands compressor oil could cause an increase of viscosity and make compressor oil sticky. In the worst case, it could cause sticking trouble of compressor air-end "Compressor air-end will not turn". Also repairing of such air-end needs expensive cost. Therefore, be sure to avoid mixing different brands oil. In case compressor oil brand in use has to be unavoidably changed, it is absolutely necessary to completely clean up the interior of compressor air-end. In such a case, contact your dealer.
- Follow the designated regulations to dispose of compressor oil.

Change compressor oil filter

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

Be sure to use genuine oil filter.



- ① Remove the cartridge [A], using a filter wrench.
- ② Screw in the new oil filter with the packing [B] coated slightly with oil.

(For part number, See Replacement Parts)

- ③ After the packing touches the sealing face, tighten another 3/4 to 1 turn with a filter wrench.
- ④ After installing the oil filter, check it for any leak during operation.

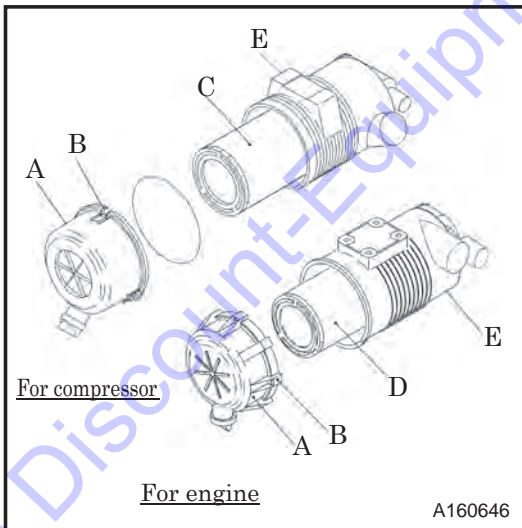
IMPORTANT

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

Change air filter element

Every 500 hours

Be sure to use genuine air filter element.



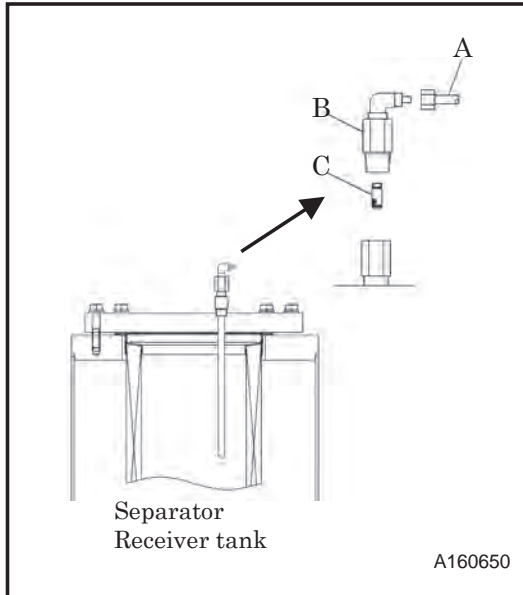
- ① After removing the cap [A] by loosening its fixing latch [B], clean its interior properly.
 - ② Remove the element [C], [D] and then replace it with a new one.
- (For part number, See Replacement Parts)**
- ③ When installing the cap after finishing the change, push the element into the case [E] surely by hand, and then make sure the cap fixing latch surely hooks the case. Finally tighten it.
- When used or operated under bad conditions, it is better to remove all the elements, check them, clean them and replace them earlier before the intervals listed in maintenance table, if they are found difficult to be repaired.

IMPORTANT

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

Clean strainer in the scavenging orifice

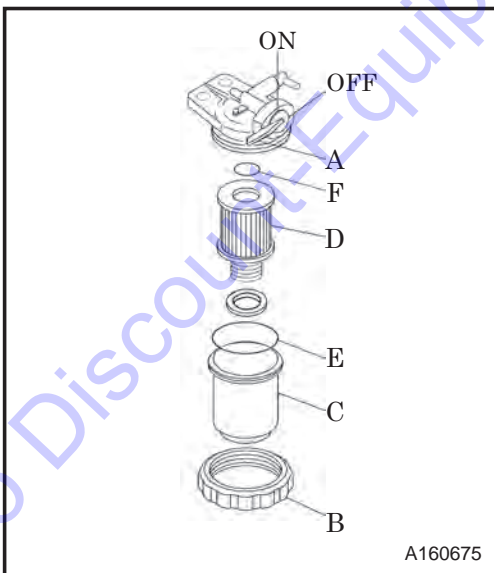
Every 500 hours



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

Change fuel filter element

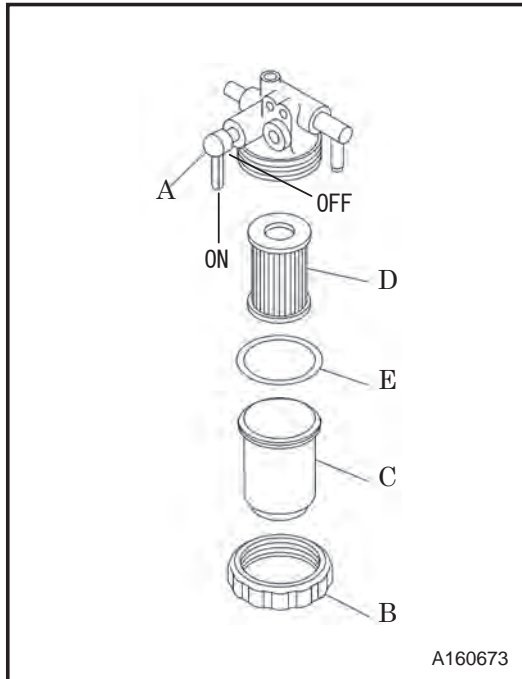
Every 500 hours



- ① Turn the lever [A] of fuel filter to “OFF” and cut off fuel supply.
- ② Remove the cup [C] after loosening the ring nut [B], and then take off the element [D] from the inside.
- ③ Clean the cup and then install the new element and O-ring [E], [F].
(For part number, See Replacement Parts)
- ④ Install to the body the element equipped with the element. Then tighten the ring nut securely.
- ⑤ Turning lever of fuel filter to “ON” position, supply fuel in the cup. Then bleed air completely from fuel system.
(See Air Bleeding in Fuel Line in Operation)

Change Sedimenter element

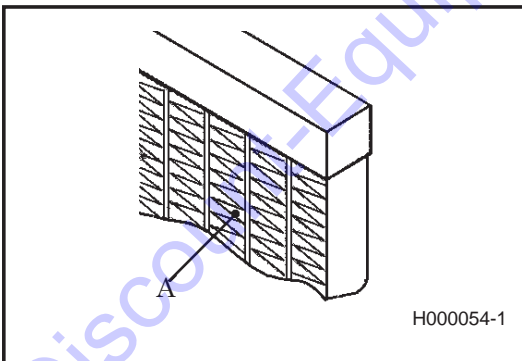
Every 500 hours



1. Turn the lever [A] of "FUEL VALVE" of sedimenter to the direction of "CLOSE" mark to cut off the fuel flow.
2. Loosen the ring nut [B] to remove cup [C], take out the element [D].
3. Clean the cup [C], fit a new element [D] in, and install a new O-ring [E].
(For part number, See Replacement Parts)
4. After installing the cup [C] with the element "4" built in to the body, securely fasten it by the ring nut [B].
5. After pouring the fuel into the cup by turning the lever [A] of "FUEL VALVE" to the direction of "OPEN", bleed the air.
(See Air Bleeding in Fuel Line in Operation)

Clean the outside of the radiator / oil cooler / after-cooler (after-cooler models)

Every 1,000 hours



- When the fin tubes [A] of a radiator, an oil cooler, or an after cooler are clogged with dust or other foreign materials, the heat exchange efficiency drops. This will raise coolant temperature and discharge air temperature. These tubes and fins should be cleaned regularly.
- To protect fin tubes [A] from being damaged, do not use a high pressure washer.

Check and clean drain outlet port of after cooler (After-cooler models)

Every 1,000 hours

See Draining After Cooler in Operation.

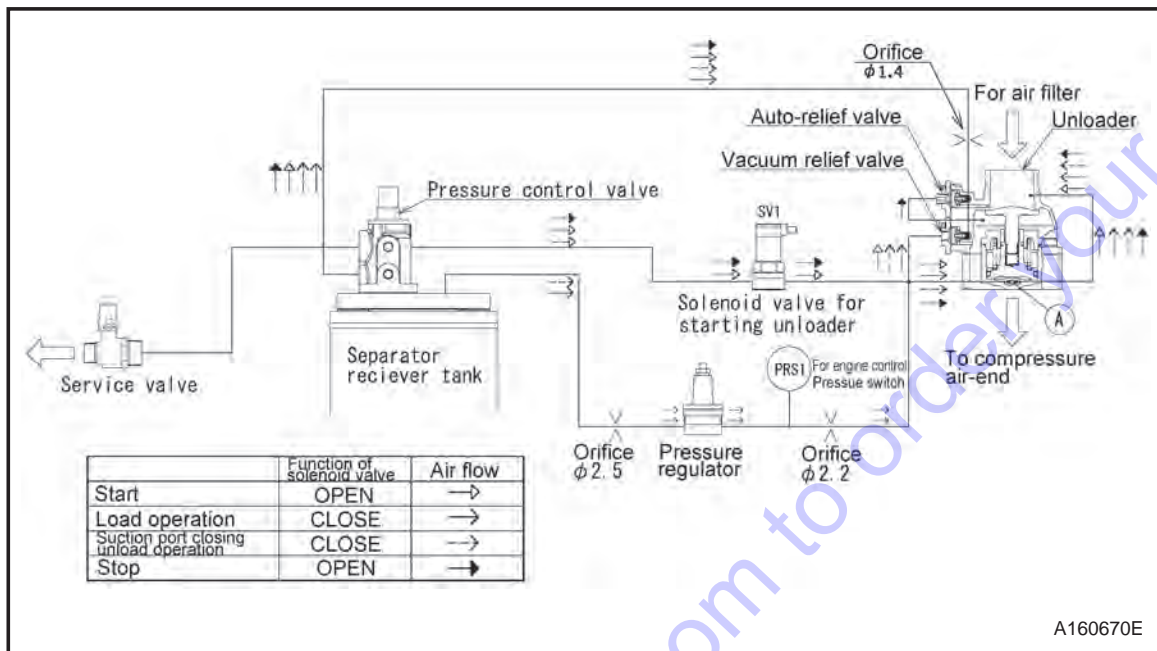
Cleaning it completely and keeping it cleaned

IMPORTANT

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

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Capacity Control Device



Step	Response
Start	Compressed air flows into unloader chamber (A) because solenoid valve for starting unloader SV1 is opened at start-up. The pressure in chamber (A) rises soon to close unloader valve (A) fully and accordingly it can reduce the load at start-up.
Load operation	After start-up, automatic unloader operation is complete before SV1 is closed. Any change in the discharge pressure causes the pressure regulator to change the airflow into chamber (A) so as to change the degree of openness of the unloader valve. The speed of the engine changes according to the pressure detected by pressure switch PRS1 for engine control so as to automatically and continuously control the air volume within the range from 0 to 100%.
Suction port closing unload operation	As the pressure exceeds the rated limit due to a decrease in consumption air volume, PRS1 detects the pressure, and the system reduces the engine speed in proportion to the increased pressure. At the same time, airflow from the pressure regulator to the chamber (A) increases, and the unloader valve is closed. If the interior of the compressor becomes rendered as an area of high vacuum pressure during unloading operation, a vacuum noise sounds. To prevent such noises, the secondary pressure of the pressure regulator is utilized to open the vacuum relief valve so as to prevent the interior of the compressor from becoming an area of high vacuum pressure.
Stop	When stopping operation, it opens Auto relief valve to relieve the compressed air in separator receiver tank to atmosphere, detecting the pressure inside compressor air-end.

Storage and Disposal

Preparation for Long-term Storage

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

- Put the machine in a temporary cabin if it is stored outside. Avoid leaving the machine outside with a sheet cover directly on the paint for a long time, or this will cause rust to the machine.
- Perform the following treatments at least once every three months.
 1. Drain existing lubricant from the engine oil pan. Pour new lubricant in the engine to clean its inside. After running it for a while, drain it again.
 2. Completely charge the battery and disconnect grounding wires. Remove the battery from the machine, if possible, and store it in a dry place. (Charge the battery at least once every month.)
 3. Drain coolant and fuel from the machine.
 4. Seal the engine, air-intake port and other openings like the muffler with a vinyl sheet, packing tape, etc., to prevent moisture and dust from entering the machine.
 5. Be sure to repair any breakdowns and maintain the machine so that it will be ready for the next operation.

Disposal of Product

- When disposing of this machine, first drain the coolant and oils.
Contact your dealer for further information regarding disposal.

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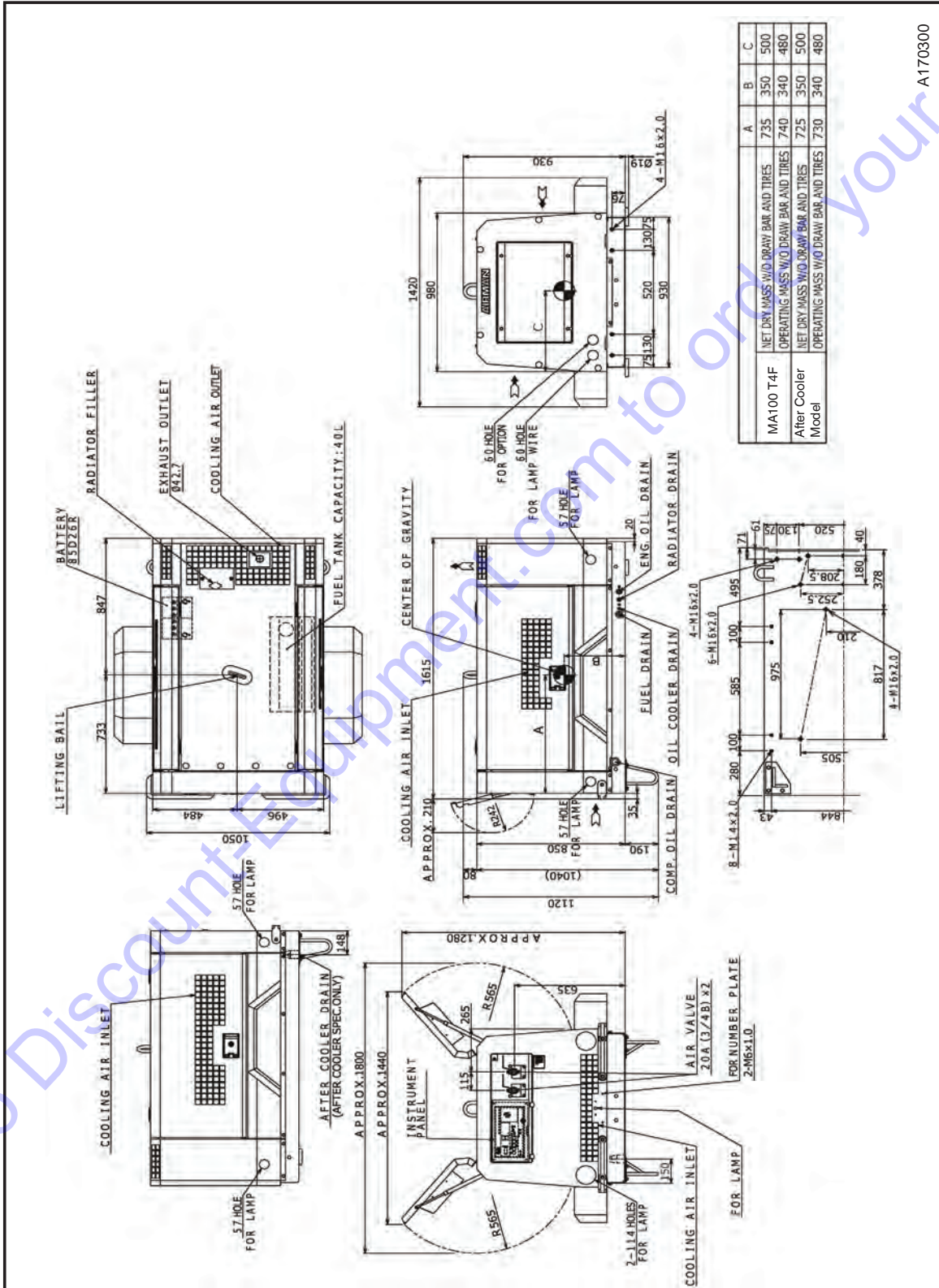
Specifications

Specifications

Model			MA100 T4F	MA400 T4F (After Cooler)
Compressor	Type		Single-stage oil cooled, screw type compressor	
	Free air delivery	cfm (m ³ /min)	100 (2.8)	
	Working pressure	psi (bar)	100 (6.9)	
	Lubricating system		Forced Lubrication by compressed pressure	
	Driving system		Direct driving with gear coupling	
	Receiver tank capacity	cu in. (m ³)	1,221 (0.020)	
	Lubricating oil capacity	gal. (L)	2.6 (10)	
Engine	Model		KUBOTA D1005-E4B	
	Type		Water-cooled 3-cycle direct injection	
	Number of cylinders, bore stroke	in. (mm)	3-2.99in. × 2.89in. (3- 76mm × 73.6 mm)	
	Total displacement	cu in. (L)	61.1 (1.001)	
	Rated output(GROSS)		18.5 / 3,200	
	Rated output(NET)	kW/min ⁻¹	17.1 / 3,200	
	Lubricating oil capacity	gal.(L)	1.2 (4.5) (The amount of initial filling)	
			Approx. 1.2 (4.5) (The amount of exchange)	
	Coolant capacity (including radiator)	gal. (L)	1.1 (4.1)	
	Battery		85D26R (12V)	
Fuel tank capacity	gal. (L)	10.6 (40)		
General Specifications	Overall length (Bonnet only)	in. (mm)	63.6 (1,615)	
	Overall width	in. (mm)	55.9 (1,420)	
	Overall height	in. (mm)	36.6 (930)	
	※Net dry mass	lb (kg)	1,179 (535)	1,201 (545)
	※Operating mass	lb (kg)	1,289 (585)	1,311 (595)

※The mass and dimensions indicated above exclude those of the drawbar and the undercarriage.

Outline drawing

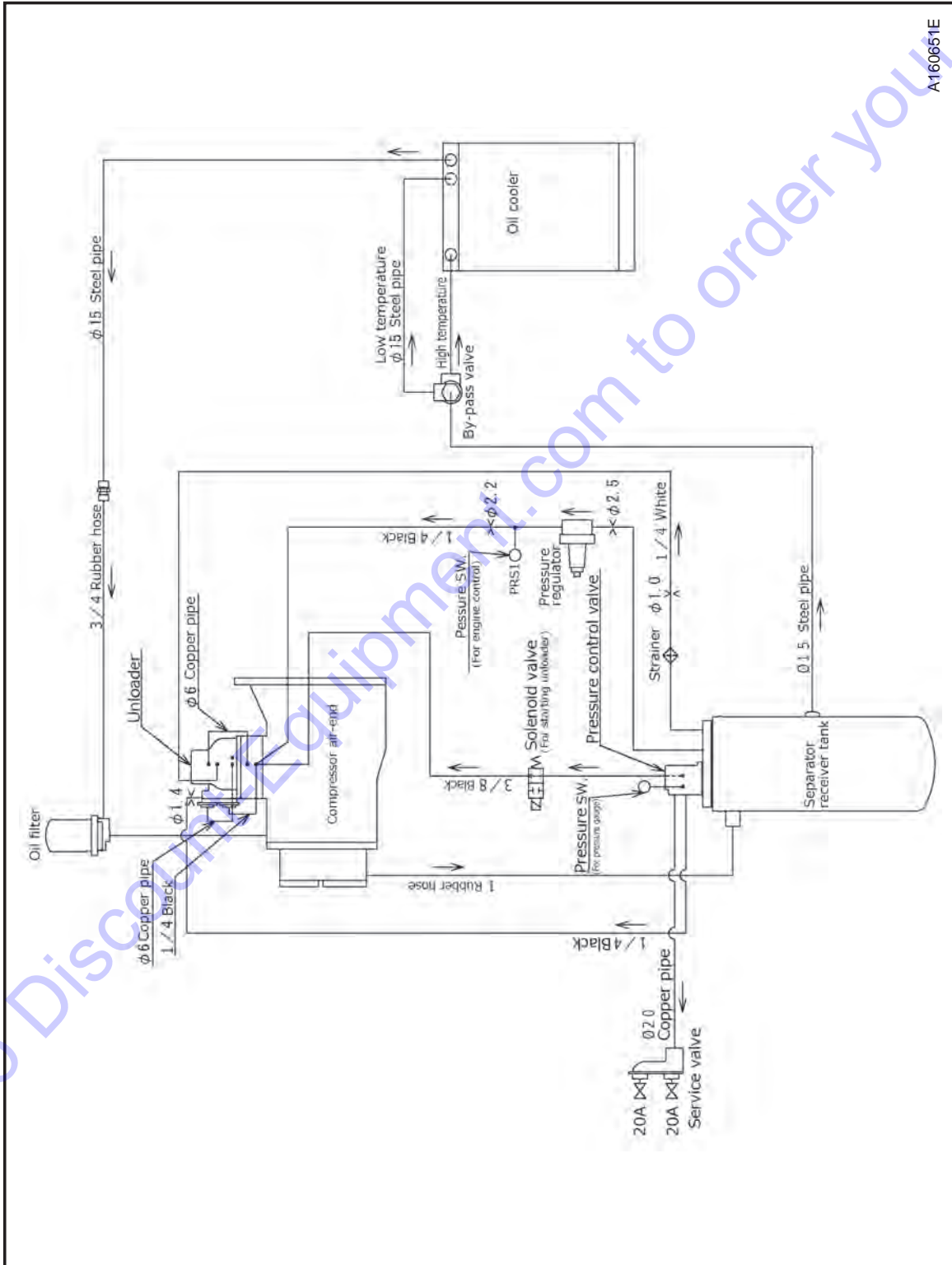


A170300

Piping Diagram

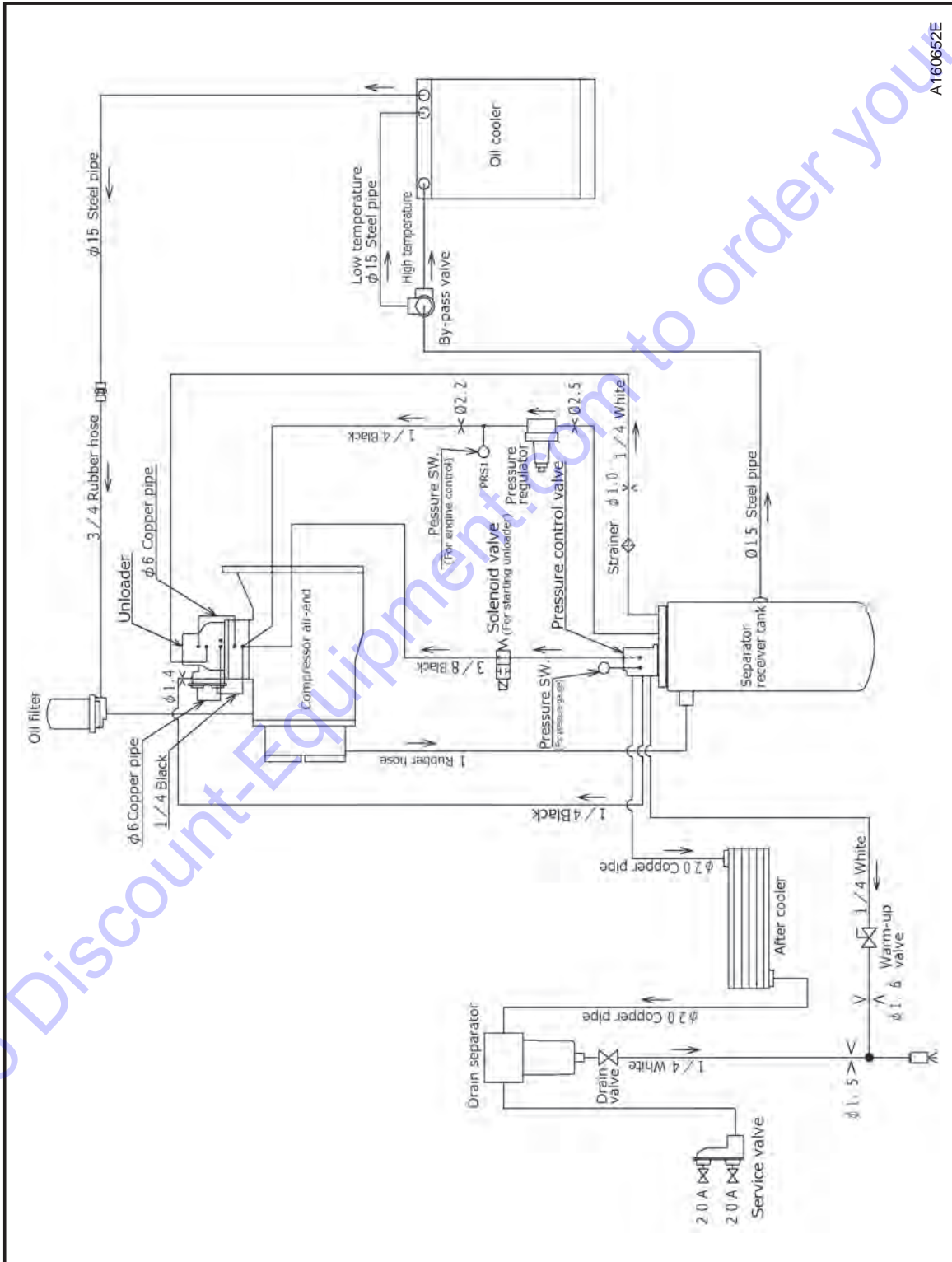
Compression air / Compressor oil

MA100 T4F



A160651E

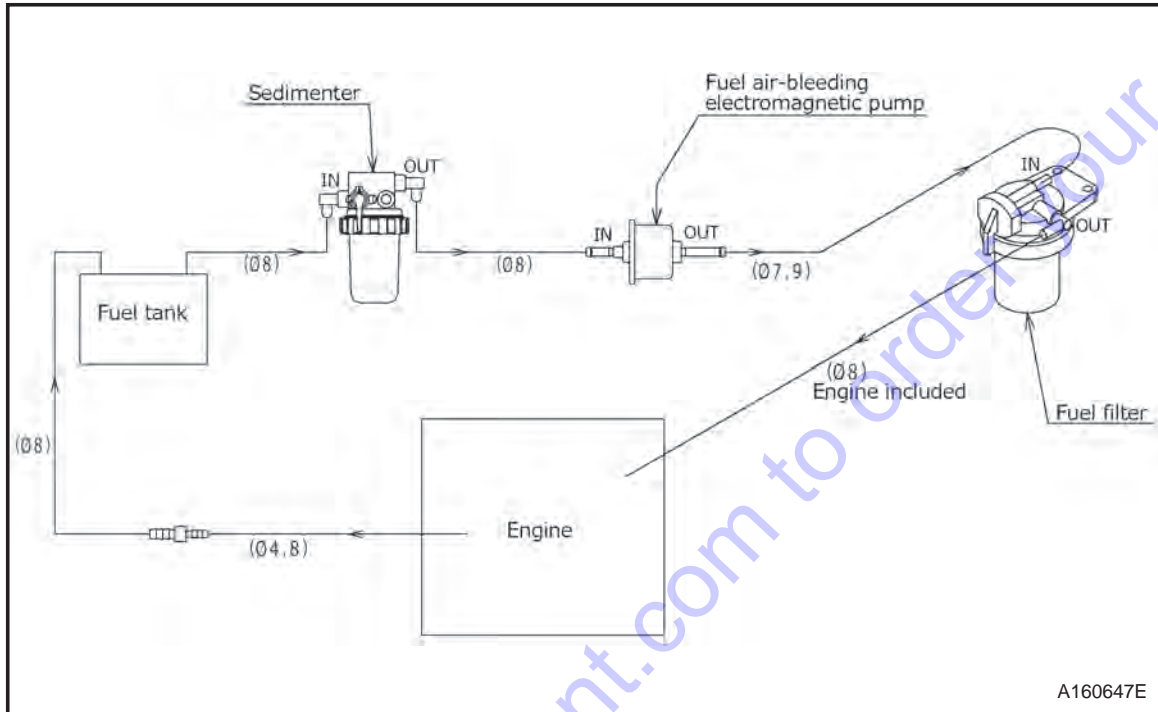
MA100 T4F (After-cooler model)



A160652E

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Fuel Piping

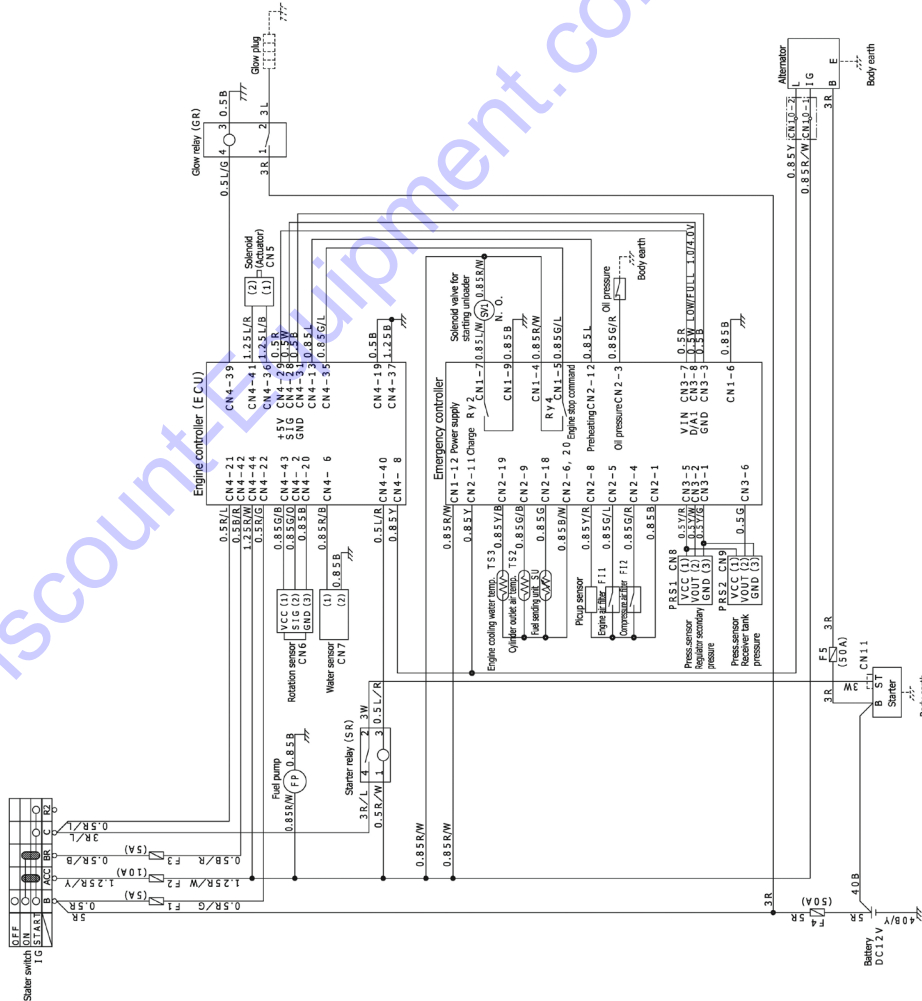
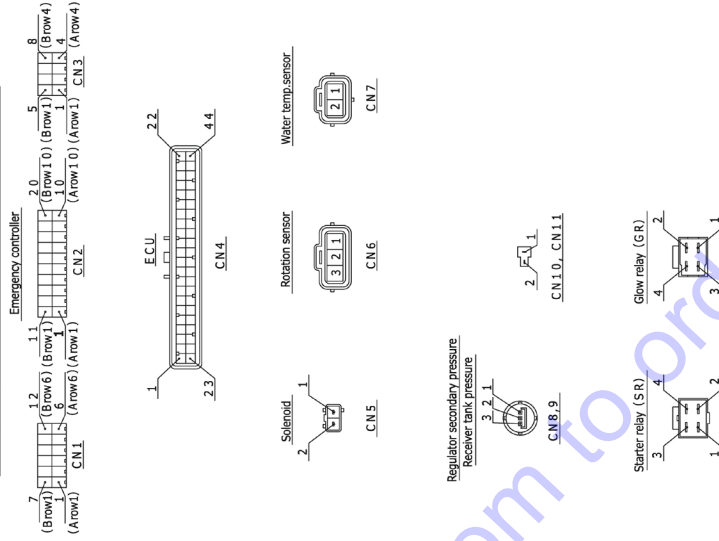


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Wiring Diagram

Connector terminal arrangement

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



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OPERATION LOG

OPERATION DATE	OPERATION TIME		TOTAL OPERATION HOURS (h)	DISCHARGE AIR PRESS. [psi]	AMBIENT TEMP.(°F)	DISCHARGE AIR TEMP. (°F)	COOLANT TEMP.(°F)	RATED RPM (rpm,min ⁻¹)	ENG.OIL REPLACEMENT HOUR (h)	COMP.OIL SUPPLY(L)	REMARKS (INSPECTION/PART CHANGE HISTORY ETC.)
	START TIME	STOP TIME									
. . .	:	:									
. . .	:	:									
. . .	:	:									
. . .	:	:									
. . .	:	:									
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Noise Emission

This section pertains only to machines distributed within the United States.

WARNING

Tampering with Noise Control System Prohibited

Federal law prohibits the following acts or the causing thereof:

1. The removal or rendering inoperative by any persons, other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new compressor for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; or
2. the use of the compressor after such device or element of design has been removed or rendered inoperative by any person.

Among those acts included in the prohibition against tampering are these:

3. Removal or rendering inoperative any of the following:
 - a.the engine exhaust system or parts thereof
 - b.the air intake system or parts thereof
 - c.enclosure or parts thereof
4. Removal of any of the following:
 - a.fan shroud
 - b.vibration mounts
 - c.sound absorption material
5. Operation of the compressor with any of the enclosure doors open.

Compressor Noise Emission Control Information

- A. The removal or rendering inoperative, other than for the purpose of maintenance, repair, or replacement of any noise control device or element of design incorporated into this compressor in compliance with noise control act;
- B. The use of this compressor after such device or element of design has been removed or rendered inoperative.

NOTE: The above information applies only to units that are built in compliance with the U.S. Environmental Protection Agency.

The Manufacturer reserves the right to make changes or add improvements without notice and without incurring any obligation to make such changes or add such improvements to products sold previously.

The Purchaser is urged to include the above provisions in any agreement for any resale of this compressor.

Noise Emission Control Maintenance Log

COMPRESSOR MODEL _____
SERIAL NO. _____
USER UNIT NO. _____

UNIT IDENTIFICATION	DEALER OR DISTRIBUTOR FROM WHOM PURCHASED:
Engine Make & Model: _____	_____
Serial No.: _____	_____
Purchaser or Owner: _____	_____
Address: _____	Date Purchased: _____

The Noise Control Act of 1972 (86 Stat. 1234) prohibits tampering with the noise control system of any compressor manufactured and sold under the above regulations, specifically the following acts or the causing thereof:

(1) the removal or rendering inoperative by any persons, other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into new compressor for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; or (2) the use of the compressor after such device or element of design has been removed or rendered inoperative by any person.

Noise Emission Warranty

The manufacturer warrants to the ultimate purchaser and each subsequent purchaser that this air compressor was designed, built and equipped to conform at the time of sale to the first retail purchaser, with all applicable U.S. EPA Noise Control Regulations.

This warranty is not limited to any particular part, component, or system of the air compressor. Defects in the design, assembly or in any part, component, or system of the compressor which, at the time of sale to the first retail purchaser, caused noise emissions to exceed Federal Standards are covered by this warranty for the life of the air compressor.

Introduction

The unit for which this Maintenance Log is provided conforms to U.S. E.P.A. Regulations for Noise Emissions, applicable to Portable Air Compressors.

The purpose of this book is to provide (1) the Maintenance Performance Schedule for all required noise emission controls and (2) space so that the purchaser or owner can record what maintenance was done, by whom, where and when. The Maintenance Schedule and detailed instructions on the maintenance items are given on following page.

Maintenance Schedule

Item	Area	Period
A.	Compressed Air Leaks	As Detected
B.	Safety and Control Systems	As Detected
C.	Acoustic Materials	Daily
D.	Fasteners	100 hours
E.	Enclosure Panels	100 hours
F.	Air Intake & Engine Exhaust	100 hours
G.	Cooling Systems	250 hours
H.	Isolation Mounts	250 hours
I.	Engine Operation	See Operator's Manual
J.	Fuels & Lubricants	See Operator's Manual

A. Compressed Air Leaks

Correct all compressed air leaks during the first shutdown period after discovery. If severe enough to cause serious noise problems and efficiency loss, shut down immediately and correct the leak(s).

B. Safety and Control Systems

Repair or replace all safety and control systems or circuits as malfunction occurs. No compressor should be operated with either system bypassed, disabled, or nonfunctional.

C. Acoustic Materials

In daily inspections, observe these materials. Maintain all acoustic material as nearly as possible in its original condition. Repair or replace all sections that have: 1) sustained damage, 2) have partially separated from panels to which they were attached, 3) are missing, or have otherwise deteriorated due to severe operating or storage conditions.

D. Fasteners

All fasteners such as hinges, nuts, bolts, clamps, screws, rivets, and latches should be inspected for looseness after each 100 hours of operation. They should be retightened, repaired, or if missing, replaced immediately to prevent subsequent damage and noise emission increase.

E. Enclosure Panels

Enclosure panels should also be inspected at 100 hour operational intervals. All panels that are warped, punctured, torn, or otherwise

deformed, such that their noise containment function is reduced, should be repaired or replaced before the next operation interval. Doors, access panels, and hatch closures especially, should be checked and adjusted at this time to insure continuous seating between gasket or acoustic material and the mating frame.

F. Air Intake and Engine Exhaust

Engine and compressor air intake and engine exhaust systems should be inspected after each 100 hours of operation for loose, damaged, or deteriorated components. Repairs or replacements should be made before the next period of use.

G. Cooling Systems

All components of the cooling system for engine water and compressor oil should be inspected every 250 hours of use. Any discrepancies found should be corrected before placing the unit back in operation. Unrestricted airflow over the radiator and oil cooler must be maintained at all times during operation.

H. Isolation Mounts

Engine/air end isolation mounts should be inspected after each 250 hours of operation. Those mounts with cracks or splits in the molded rubber, or with bent or broken bolts due to operation or storage in severe environments, all should be replaced with equivalent parts.

I. Engine Operation

Inspect and maintain engine condition and operation as recommended in the manuals supplied by the engine manufacturer.

J. Fuels and Lubricants

Use only the types and grades of fuels and lubricants recommended in the Equipment and Engine Manufacturer's Operator and Maintenance Manuals.

Maintenance Record For Noise Emission Control

Item No.	Description Of Work	Hourmeter Reading	Maint / Inspect Date	Location City / State	Work Done By (Name)

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Addendum A - Unit Options

Block Heater

The optional block heater keeps the engine block heated while the unit is stored or not in use.

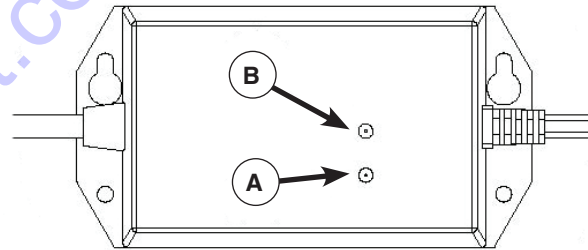
The block heater should be used whenever the unit is stored or not in use in temperatures below 32° F (0° C).

1. Plug the cord of the block heater into the female end of a heavy-duty power cord (not supplied).
2. Plug the male end of the power cord into a standard 120V outlet.
3. Unplug the block heater before putting the unit into operation.

Battery Charger

The optional battery charger keeps the battery charged while the unit is stored or not in use.

1. Plug the cord of the battery charger into the female end of a heavy-duty power cord (not supplied).
2. Plug the male end of the power cord into a standard 120V outlet.
3. The red light (**A**) on the battery charger module indicates the battery is charging. The green light (**B**) indicates full charge. (The battery charger can stay plugged in after the battery reaches full charge without damaging the battery.)
4. Unplug the battery charger before putting the unit into operation.



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Enter your information to help us find the right parts manual for your machine.

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Manual? Request Help
by Manufacturer,
Model & Description**

Parts Order Form

Please fill in the following information to help us find the right part for your machine.

Manufacturer:	<input type="text"/>
Model:	<input type="text"/>
Description:	<input type="text"/>
Part Number:	<input type="text"/>
Quantity:	<input type="text"/>
Notes:	<input type="text"/>

Submit

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