ORION

Operating Manual

ORION Oil Free Pump

KCP100D-V-01A
KCP150D-V-01A
KCP150D-VH-01A
KCP250D-V-01A

Photo: KCP150D

CAUTION

- This product is for industrial use only. Please take all necessary precautions during installation and handling.
- Read operating manual thoroughly before operating this equipment.
- Be sure to retain the operating manual for future reference.

The product warranty is printed at the end of this manual.
Be sure to keep it in a safe place.

This manual consists of two parts : Operation Guide / Installation Guide.

03087433010
Translation of original instructions

Thank you for purchasing this ORION product.

Thank you for purchasing this ORION product. To ensure proper and safe operation of this product, be sure to carefully read and follow the directions in this Operating Manual.

Safety Precautions

Before using the product, be sure to read the section, "Important Safety Guidelines" and operate the product according to those guidelines. The purpose of this safety information is to help insure proper installation and operation of the product in order to avoid personal injury to you or others, and also to avoid property damage.

Important safety precautions are classified into three categories, ⚠DANGERS, ⚠WARNINGS, and ⚠CAUTIONS.

⚠DANGER	Failure to follow instruction contained in a DANGER warning could result in death or serious injury to the operator.
⚠WARNING	Failure to follow instruction contained in a WARNING might possibly result in death or serious injury to the operator.
⚠CAUTION	Failure to follow instructions contained in a CAUTION may result in injury to the operator or damage to property.

Note that even items covered under a ⚠CAUTION could result in more serious consequences depending on particular conditions. DANGERS, CAUTIONS and WARNINGS must all be heeded to ensure adequate safety.

- After reading this Operating Manual, be sure to keep it in a place where anyone needing to refer to it may find it.
- When either transferring or loaning out this product, keep the Operating Manual affixed to it in a clearly visible place so that the new user can refer to it to ensure safe and proper operation.

■ Warning Symbols

	⚠ symbols inform you of WARNINGS or CAUTIONS to observe. The illustration within, or indications near the triangle show the nature of the precaution and the action to be avoided. (For example, the symbol at the left indicates danger of electric shock.)
	⃠ symbols indicate prohibited actions. The illustration within the circle shows the nature of the action which is prohibited. (The example to the left indicates that user disassembly is prohibited.)
	● symbols indicate actions which must be taken. The illustration within indicates the action to be followed. For example, the symbol at the left indicates that the power cord should be pulled out by the plug, not by pulling the cord.
	▬ symbols indicate important points other than cautions or warnings.

Although model KCP150D is used as description pictures and figures in the manual, the other models in the KRF-series are operated the same way as KCP150D if there is no note.

Be sure to read through the safety information.

Operation Guide

Operator Technical Level: Experience with operation, inspection, maintenance, etc. of industrial machines, and understanding of operating manuals.
※ Please contact your dealer as some work needs to be carried out trained personnel.

Table of Contents

Important Safety Guidelines

Operating Warnings (DANGERS / WARNINGS)

⚠ DANGER

Failure to follow instructions contained in a DANGER warning may result in death or serious injury to the operator.

Intake of combustible or explosive gases is prohibited.

Do not allow combustible or explosive gases to enter the product. And never operate the product where combustible or explosive gases may be present. Failure to follow this warning could result in an explosion or fire.

⚠ WARNING

Failure to follow instructions contained in a WARNING might possibly result in death or serious injury to the operator.

Do not operate with a blocked outlet pipe.

Do not operate the pump with the outlet piping blocked. Doing so may cause an abnormal rise in pressure and temperature which could cause pump components to fail or to burst which could in turn lead to serious injury or damage.

Do not attempt to clean paper elements using organic solvents.

Do not clean paper elements and such parts using thinner, alcohol, benzene, gasoline, or kerosene. Failure to follow this warning could result in an explosion or fire.

Never remove the product cover.

Do not operate with the cover removed. The centrifugal fan and coupling are moving at high speed and coming into contact with them could lead to serious injury.

Do not damage the power cord.

Do not cause damage to, forcibly bend, pull, or bundle the power cord. Also, do not place objects on the cord or sandwich the cord between things; doing so could damage the cord and could result in electric shock or fire.

Do not expose to water.

Do not get water directly on the pump or motor and do not clean the product with water. Do not use in areas where the product may come into contact with water or other liquids. Doing so can result in electric shocks, fire, or product breakdown.

Electric Shock Warning

Do not touch the power cord plug or other electrical components with wet hands. And do not operate controls with wet hands. Failure to follow this warning can lead to electric shock.

Never operate without the terminal box cover.

When using a motor that has a terminal box cover, do not operate without the cover. Failure to follow this warning can lead to electric shock.

Do not modify the product.

Do not modify this product. Modifications can result in improper operation which can lead to injury, electric shock, or fire.

Important Safety Guidelines

Operating Warnings (WARNINGS)

⚠ WARNING

Failure to follow instructions contained in a WARNING might possibly result in death or serious injury to the operator.

Shut down the product if operation seems abnormal.

If abnormal operation is observed, stop the product, remove the power plug or cut of the main power, and contact your dealer or a qualified repair person. Continued operation when the product is performing abnormally can lead to electric shock or fire.

Cut off the power source when cleaning or during inspection.

Always remove the power source before cleaning, servicing, or inspecting this product. Place a sign on the main power switch that indicates, "POWER OFF FOR CLEANING, SERVICE, INSPECTION". Failure to post such a warning can lead to electric shock or injury.

Periodically inspect the power plug.

For products with a plug on the power cord, periodically inspect the plug for dust and make sure it is inserted all the way in the socket leaving no gap between the plug and socket. Dusty or improperly inserted plugs can lead to electric shock or fire.

Contact your dealer or another qualified person in case the earth leakage breaker is tripping.

Consult with your dealer or another qualified person in case the earth leakage breaker is tripping. Forced recovery of the power source can lead to electric shock or fire.

Completely wipe up any spilled oil.

When lubricating the product, wipe up any spilled oil with a rag. If any oil gets inside the product cover, remove the cover and wipe up the oil. Operating the product without cleaning off any oil can result in smoking or fire.

Do the following if oil gets on skin or in eyes, or is ingested:

Oil on the skin: Wash off the oil with soap and water. Oil splashed on eyes: Rinse eyes with clean water for 15 minutes and then have the eyes checked by a doctor. Oil ingested: Do not induce vomiting and see a doctor right away. If oil has gotten into the mouth, thoroughly rinse the mouth out with water.

Important Safety Guidelines

Operating Warnings (CAUTIONS)

⚠ CAUTION

Failure to follow instructions contained in a CAUTION may result in injury to the operator or damage to property.

Do not operate over the specified pressure.

Operating the product over the specified pressure will reduce the lifespan of the product and can lead to breakdown, overheating, or accidents.

Do not operate with blocked piping (KCP150D-V, KCP250D-V).

Do not operate the pump with the vacuum piping blocked. Doing so can cause an abnormal rise in pump temperature, breakdown, or burns.

Do not place other objects on top of the product.

Do not place heavy objects or containers of water on the product. Items falling down could lead to injury, spilled water could lead to rust or cause damage to electrical insulation, and there could be a danger of electric shorts or shock.

Do not operate the motor outside its specified power rating.

Operating the motor outside its specified power rating can lead to breakdown or accidents.

Periodically inspect the cooling fan.

If any dust or dirt is on the fan, clean it off with a brush. Operating the pump with a dirty fan can result in pump breakdown due to overheating.

Burn Hazard

Pump piping surfaces and gases exhaust are hot and should not be touched. Contact with these surfaces or exhaust gases can cause burns.

Periodically inspect the earth leakage breaker.

Checked the earth leakage breaker periodically to ensure that it is functioning properly. Operating the product with a faulty earth leakage breaker can lead to electric shocks should it fail to activate if there is a short or electrical leakage.

Do not remove the oil cap or magnetic drain plug while the product is operating.

Do not remove the oil cap or magnetic drain plug while the product is operating. Hot oil spraying out could cause burns.

Inspect and clean the paper element.

Periodically inspect and clean the paper element. Failure to clean the paper element can result in clogging which could cause an overload condition and possible product breakdown.

Remove the power source if the product is not be used for extended periods.

If the product is not to be used for an extended period, it should be removed from its power source for safety's sake. Failure to cut off the power can result in deterioration which could result in electric shock, shorts, or fire.

Important Safety Guidelines

Operating Warnings (CAUTIONS)

⚠ CAUTION

Failure to follow instructions contained in a CAUTION may result in injury to the operator or damage to property.

It is recommended that the product run continuously.

Operating the product with many short start and stop cycles (less than 5 minutes of operating time before stopping) can significantly reduce the life of the product and could also lead to product breakdown.

Wear protective clothing during cleaning and inspection.

Wear gloves and other protective clothing when undertaking cleaning and inspection. Failure to wear protective clothing can result in burns or other injury from hot oil spray. Wear non-slip gloves and safety shoes when the product is operating. Failure to do so can lead to injury.

Product Use Limitations

(1) If the product is to be used as part of critical installations, safety devices and backup systems which can be switched to should be put into place to insure that serious accidents or losses do not occur in the event that the product should break down or malfunction.

(2) This product was designed and produced as a general purpose device for use in ordinary manufacturing. Accordingly, this warranty does not apply to nor cover the following applications. However, in cases where the customer/user takes full responsibility and confirms the performance of the product in advance, and takes necessary safety precautions, please consult with ORION and we will consider if use of the product in the desired application is appropriate.

①Atomic energy, aviation, aerospace, railway works, shipping, vehicles (cars and trucks), medical applications, transportation applications, and/or any applications where it might have a great effect on human life or property.

②Electricity, gas, or water supply systems, etc. where high levels of reliability and safety are demanded.

When unplugging the product, grasp and pull the power cord by the plug.

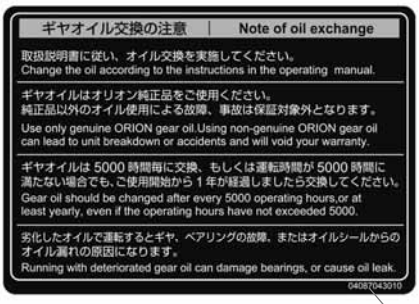
For products that have power cords with electrical plugs, when removing the plug, be sure to grasp and pull the plug from the socket. Attempting to remove the plug by pulling on the cord can damage some of the wires in the cord which could lead to overheating or deterioration of the cord.

Important Safety Guidelines

⚠ Unit Warning Label Locations

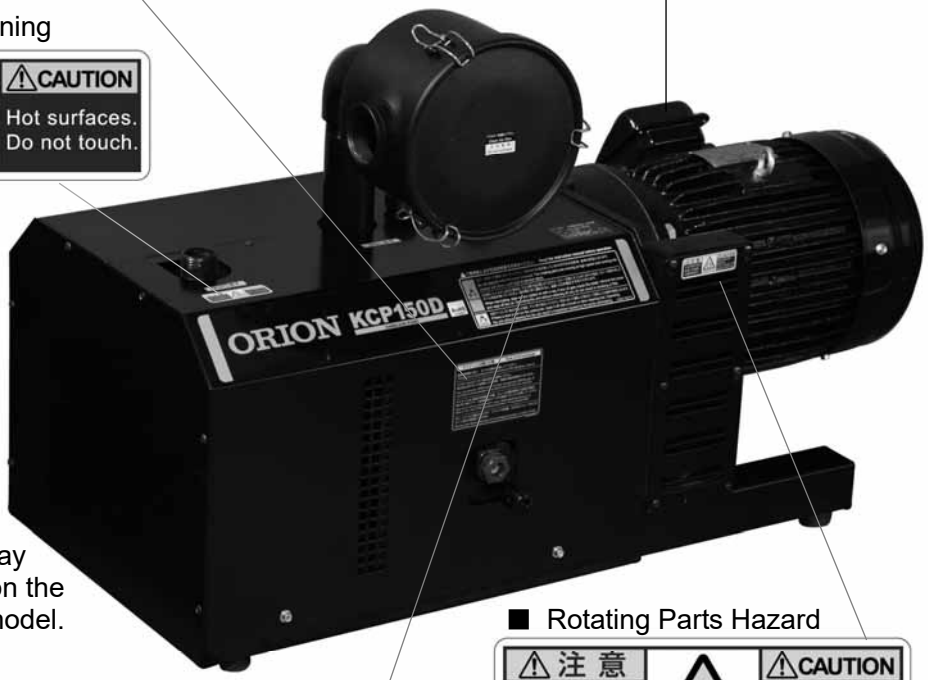
The following warning labels contain particularly important warnings and cautions regarding this unit. Be sure to read them before operating this unit. If any of the labels become so dirty or damaged that they are not clearly readable, please contact your dealer about obtaining new ones.

■ Note of oil exchange



■ Electric Shock Warning

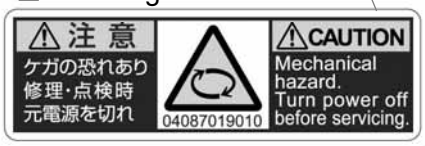
■ Burn Warning



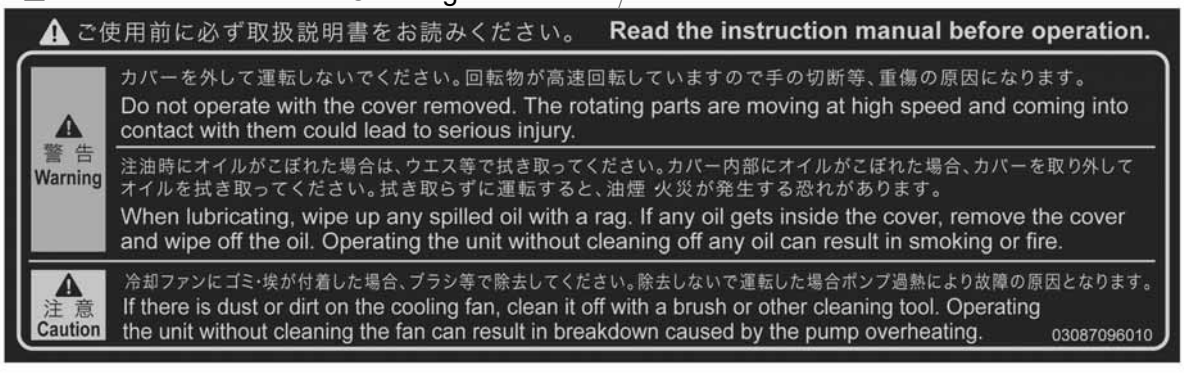
Photos are of the KCP150D

Label locations may differ depending on the specific product model.

■ Rotating Parts Hazard



■ Prohibited Actions and Cleaning



Ensuring The Unit Performs To Specifications

- Gas at intake, as a standard, should be clean air, relatively free from dust, be of normal temperature and humidity, and must be free of corrosive, combustible, or explosive components, and should not consist of high-temperature vapor (steam) or condensation.
  Normal temperature: 0〜40℃
  Normal humidity: 65%±20% (JISZ8703)
- Install the included filter in order to keep dust, powder, oil, etc. from entering the pump.
- Do not operate the pump in the reverse direction. Operating the pump in reverse can lead to breakdown.
- Operate the pump where ambient temperature is 0~40℃. And do not allow condensation to form inside the pump.
- If the product is to be installed in a small enclosed space without ventilation (such as in a box or small shed,etc.),please consult with ORION or your dealer ahead of time. Abnormal rises in temperature could lead to premature pump failure.

- Do not allow oil, water, dust, rain, etc. to come into contact with or enter the pump.
- Do not remove the cover. Rises in temperature can significantly lower the lifespan of the unit.
- Operate the pump at normal operating pressuers(KCP150D-V,KCP250D-V:80kPa or less).
- When performing exhaust piping, select suitable piping (inside diameter and length). (Piping diameter should be the same or larger than the exhaust port. Please check with ORION or your dealer regarding suitable piping lengths.) Also see the “Piping” section for information on making piping connections.
- Replace consumable parts regularly. (For further information, see page 21,22 "Parts to be replaced based on inspection", and "Fixed Term Replacement Parts".)
- The pump should be installed on a flat, horizontal surface. If the pump is installed on an incline, the gear oil will not be distributed uniformly and gear lubrication will be affected.
- Gear oil should be changed after every 5,000 operating hours, or at least yearly, even if the operating hours have not exceeded 5,000. Operating with deteriorated oil can result in breakdown of gears and bearings, and oil leakage from oil seals.
- As a general guideline, please request unit overhaul from your dealer after a total operating time of 20,000 hours or 4 years from the date that the unit was first put into operation. The prescribed overhaul time is recommended in order to avoid unit breakdown due to component wear and it does not indicate a warranty period in which unit performance or function is guaranteed. Actual times may be shorter than those listed above in cases of accelerated component wear due to particular operating methods or operating conditions. Please consult with your service representative for information regarding conditions of daily inspections.

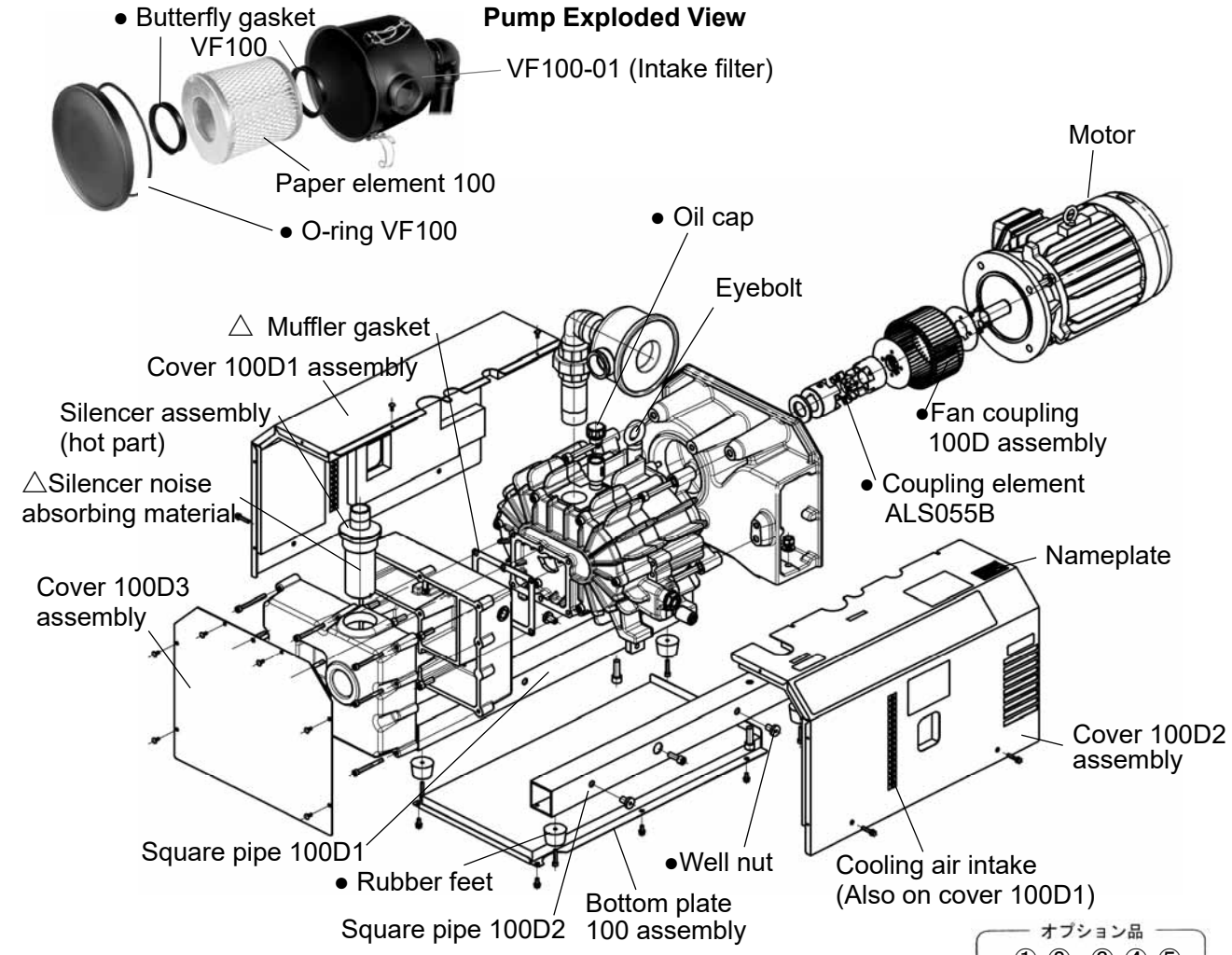
Main Parts

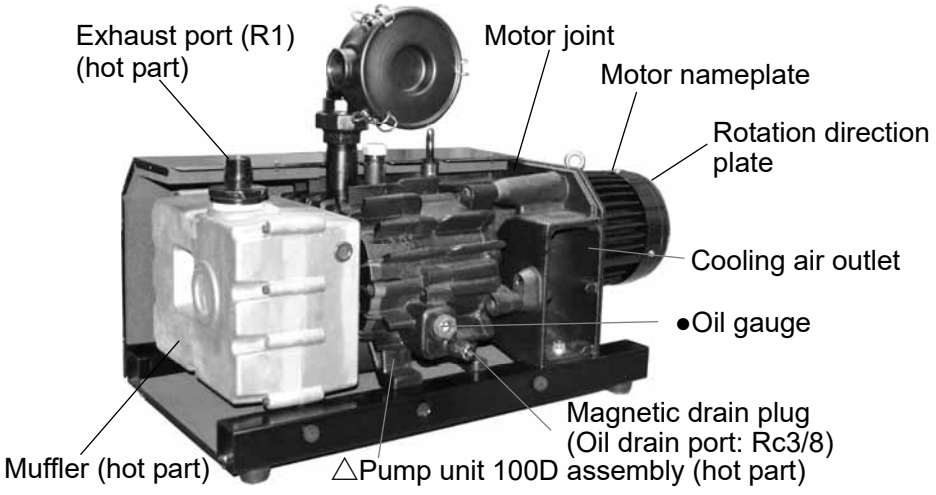
1.KCP100D-V-01A

※ Parts shown with a ● mark are replacement parts (parts to be replaced based on their condition at times of inspection.) (See page 21 for further information.)

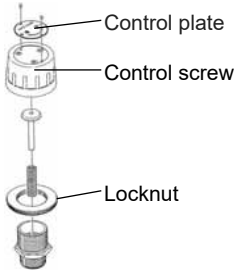
※ Parts shown with a △ mark are fixed term replacement parts (parts that are to be replaced within a designated period.) (See page 22 for further information.)

Pump Exploded View





① D-type vacuum gauge
② A-type vacuum gauge
③ Vacuum controller VC100B
(Degree of vacuum: 30〜60 kPa)
④ Vacuum controller VC100H
(Degree of vacuum: 60〜80 kPa)
⑤ Vacuum controller VC100H-01
(Degree of vacuum: 75〜95 kPa)



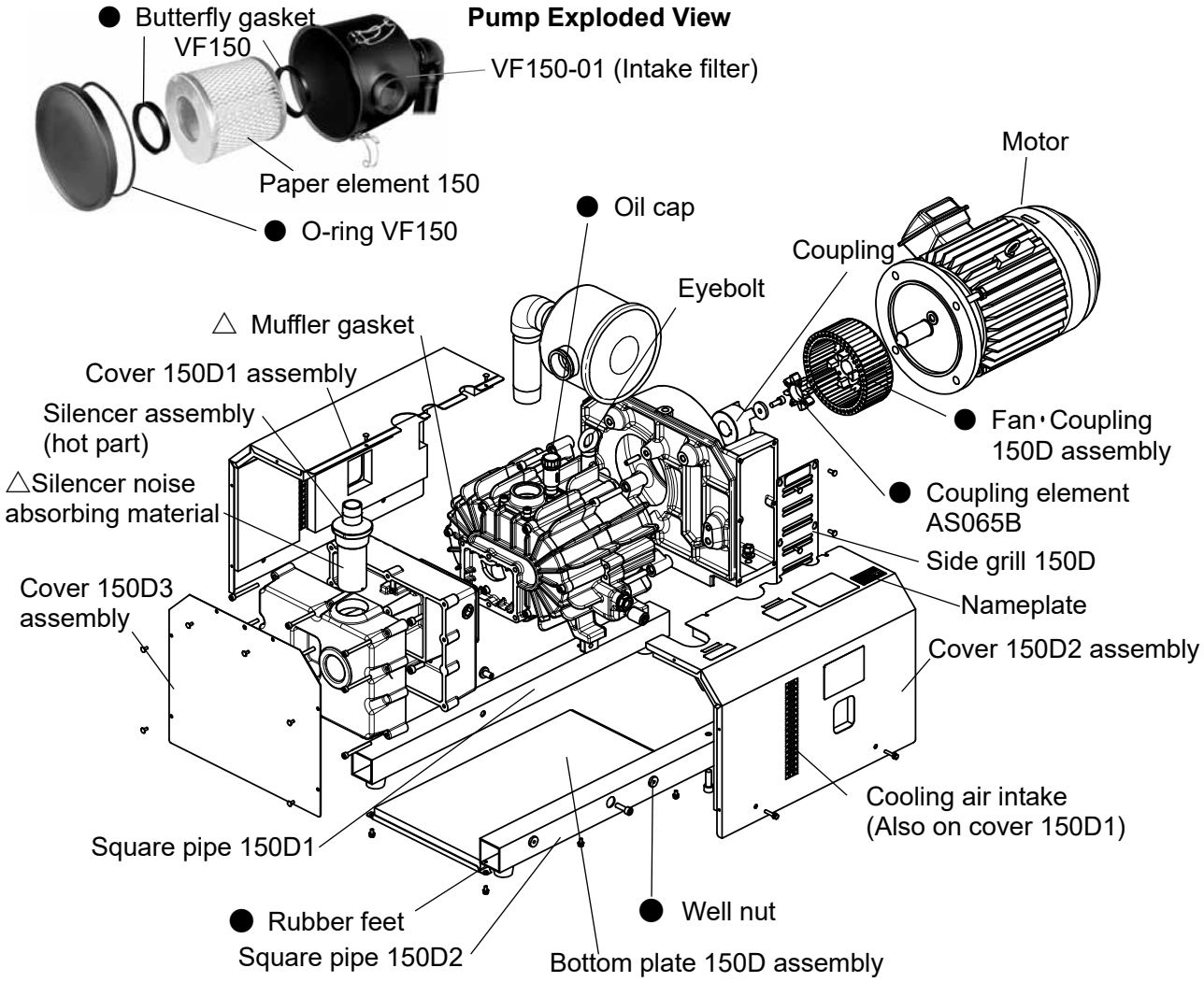
Main Parts

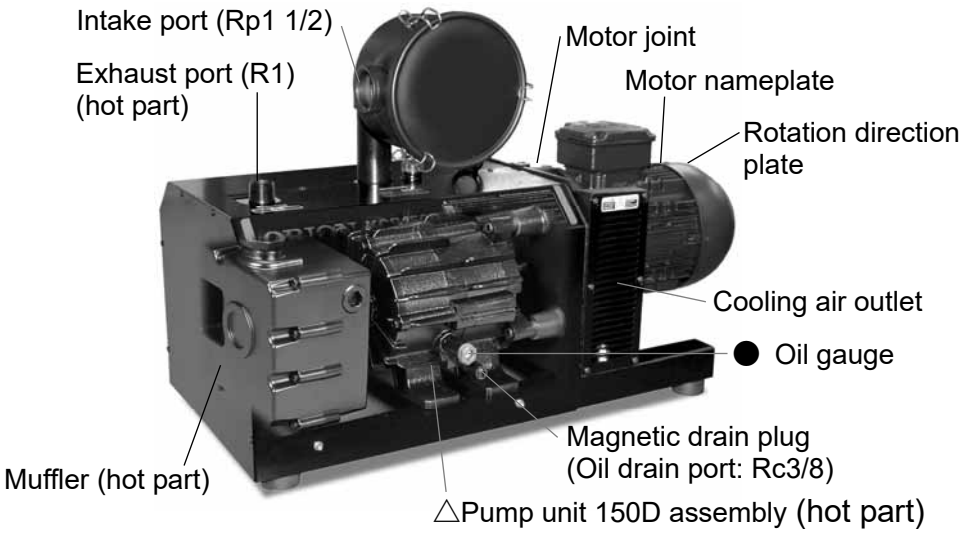
2.KCP150D-V-01A, KCP150D-VH-01A

※ Parts shown with a ● mark are replacement parts (parts to be replaced based on their condition at times of inspection.) (See page 21 for further information.)

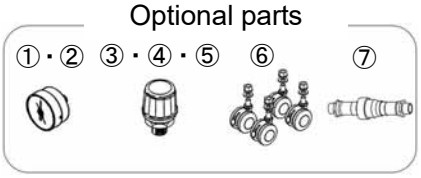
※ Parts shown with a △ mark are fixed term replacement parts (parts that are to be replaced within a designated period.) (See page 22 for further information.)

Pump Exploded View





Optional parts



① D-type vacuum gauge
② A-type vacuum gauge
③ Vacuum controller VC100B
(Degree of vacuum: 30〜60 kPa)
④ Vacuum controller VC100H
(Degree of vacuum: 60〜80 kPa)
⑤Vacuum Controller VC100H-01
(Degree of vacuum:75〜90kPa)
⑥Caster set 150 assembly
⑦Ball check valve set 150 assembly

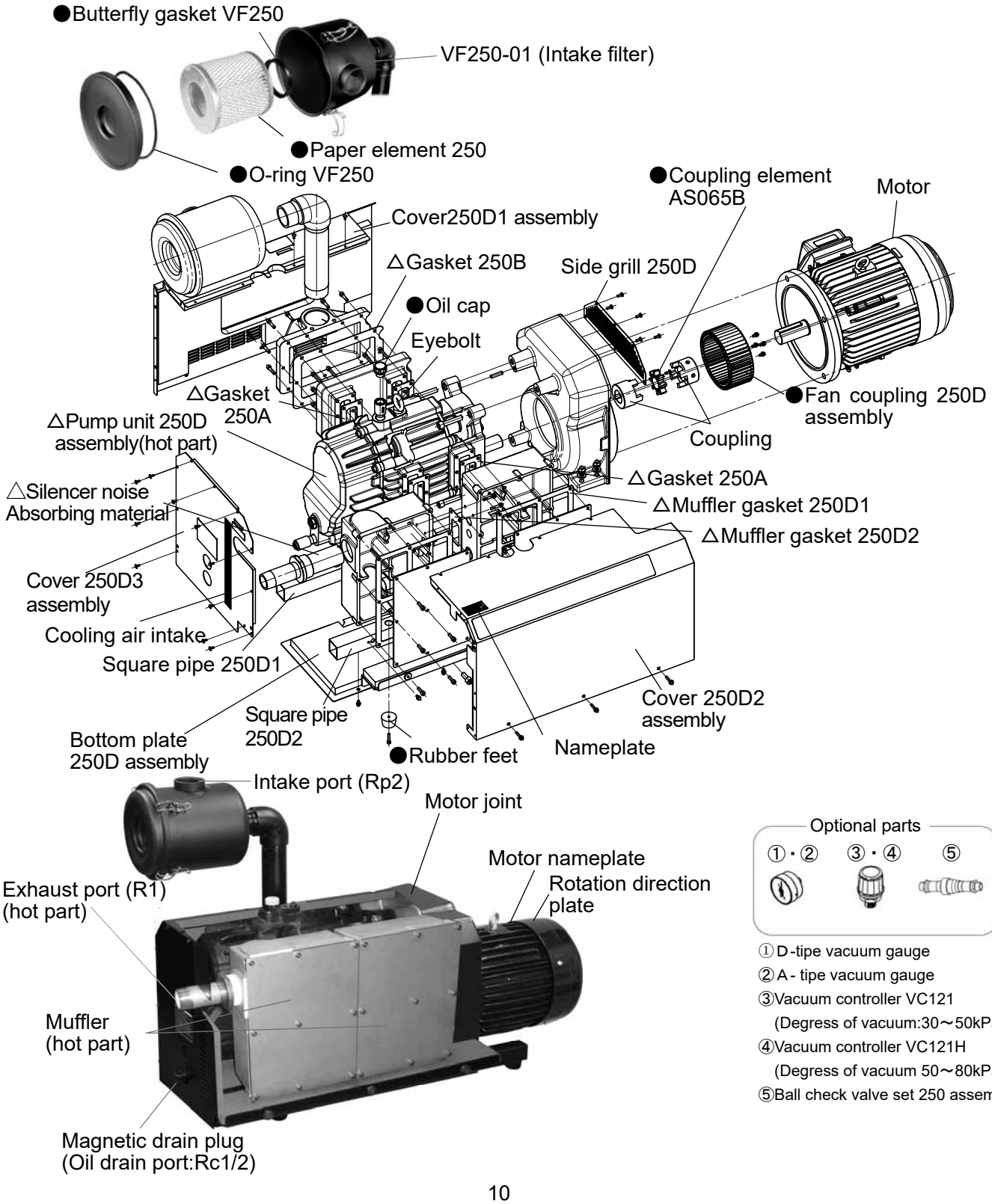
Main Parts

3.KCP250D-V-01A

※ Parts shown with a ● mark are replacement parts (parts to be replaced based on their condition at times of inspection.) (See page 21 for further information.)

※ Parts shown with a △ mark are fixed term replacement parts (parts that are to be replaced within a designated period.) (See page 22 for further information.)

Pump Exploded View



Optional parts

①D-tipe vacuum gauge
②A- tipe vacuum gauge
③Vacuum controller VC121
(Degress of vacuum:30～50kPa)
④Vacuum controller VC121H
(Degress of vacuum 50～80kPa)
⑤Ball check valve set 250 assembly

Unit Operation

Pre-operation Checks / Operation

Pre-operation Checks

■ Install an earth leakage breaker.

Rated voltage and frequency	Interrupting capacity（A）
200V-50/60Hz 220V-60z	Approx. 1.5 times the amperage listed on the motor nameplate (as a guideline)

※ Use a high-speed breaker with a current sensitivity of 30mA.

■ Install an overload protection device (thermal relay) to prevent motor burnout due to overloading or from a missing phase if operating with three-phase power.

MODEL	200V		220V
	50Hz	60Hz	60Hz
KCP100D-V-01A	8.9A	9.6A	8.9A
KCP150D-V-01A	13.4A	14.4A	13.1A
KCP150D-VH-01A	13.4A	14.2A	12.9A
KCP250D-V-01A	20.6A	24.3A	21.2A

Approximate set values are listed to the right.

■ When the pump has not been used for a long time, confirm proper rotation of the motor/fan before use. Always first remove the power source and then confirm pump rotation by hand.

■ Be careful when handling the vacuum gauge as it is very susceptible to damage from being knocked or dropped (in models that include a gauge).

■ If the pump is to be used in a place 10℃ or warmer than the place where it was stored, allow it to sit for at least 2 hours in the new location. Wait until the pump has become the same temperature as the new location before using. Operating the pump when it is cooler than the surrounding air will cause condensation inside the pump which can lead to rust and breakdown.

Operation

IMPORTANT

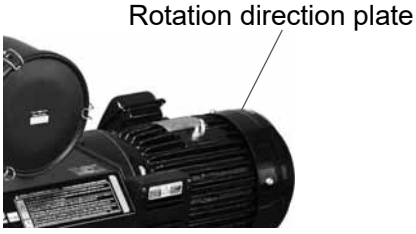
● Before connecting a check valve, carry out the electrical wiring to the unit and then, by momentarily applying power to the unit, confirm that the direction of rotation matches the direction of the arrow printed on the "Direction of Rotation Plate". If a check valve is installed on the piping and then unit is run in reverse, the unit will be running with a blocked air-flow and the filter case O-ring could be blown off.

● If for some reason the unit is run in reverse after a check valve has been installed, check the filter-case O-ring to confirm that it is in place or has been blown off.

● Always confirm the pump is operating in the proper direction of rotation.

● If the pump is started where the ambient temperature is around 0℃, a high pitch noise may be heard. The noise will naturally go away in a short time and does not indicate abnormal operation. If the high pitch noise continues for more than 30 minutes, consult with your dealer or a qualified repair person.

1. Confirm the pump rotation matches the direction on the rotation direction plate by momentarily applying power and observing the direction of rotation. (This unit uses three-phase power; always ensure that there are no reversed power phases.)
2. Turn on the power switch
3. The pump cannot sustain ultimate vacuum while operating. Install a vacuum controller (sold separately) on the piping if there is a chance that vacuum piping may be blocked, and operate at a normal vacuum level (80 kPa or less).



Unit Operation

Controlling the Degree of Vacuum / How to Correct Vacuum Level / Stopping the Pump

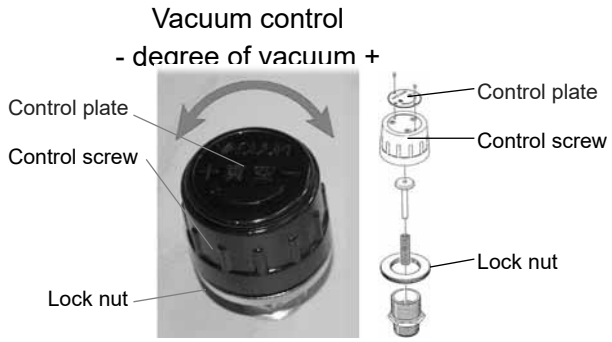
Controlling the Degree of Vacuum (using a vacuum controller - sold separately)

IMPORTANT

● Note that the actual range of operable degree of vacuum may differ as shown in the chart below.

■ Controlling the degree of vacuum (using a vacuum controller)

1. Rotate the lock nut clockwise to unlock the control screw.
2. While keeping an eye on the vacuum gauge, adjust the control screw until the desired degree of.
3. Rotate the lock nut counter-clockwise to lock the control screw in place.



Model	Operable degree of vacuum	Operable degree of vacuum	Color of control plate
KCP100D-V、KCP150D-V	30～60kPa	VC100B	Green
KCP100D-V、KCP150D-V(VH)	60～80kPa	VC100H	Black
KCP100D-V、KCP150D-VH	75～90kPa	VC100H-01	
KCP250D-V	30～50kPa	VC121	
	50～80kPa	VC121H	

How to Correct Vacuum Level (Gauge Pressure)

Correction formula: B=D＋(101.3−C)

B: Vacuum level at 1 atmosphere　kpa

C: Atmospheric pressure at vacuum level measuring position　kpa

D: Reading on compound gauge（Vacuum based on atmospheric pressure）kpa

Ex) When the reading on the compound gauge is 76kPa and the atmospheric pressure is 973hPa (97.3kPa), the vacuum level at 1 atmosphere is calculated as follow:76 + (101.3 – 97.3) = 80kPa
To read the accurate vacuum level, use a mercury manometer or an equivalent meter based on absolute pressure.

Atmospheric pressure conversion formula (hPa → kPa)

C（kPa）=C（hPa）÷10

Stopping the Pump

Turn off the power switch.

Inspection and Maintenance

WARNING

- Cut off the power source when cleaning or during inspection.
  Always remove the power source before cleaning, servicing, or inspecting this unit. Place a sign on the main power switch that indicates, "POWER OFF FOR CLEANING, SERVICE, INSPECTION". Failure to post such a warning can lead to electric shock or injury.
- Do not attempt to clean paper elements using organic solvents.
  Do not clean paper elements and such parts using thinner, alcohol, benzene, gasoline, or kerosene. Failure to follow this warning could result in an explosion or fire.
- Completely wipe up any spilled oil.
  When lubricating the unit, wipe up any spilled oil with a rag. If any oil gets inside the unit cover, remove the cover and wipe up the oil. Operating the unit without cleaning off any oil can result in smoking or fire.
- Do the following if, during an oil change, oil gets on skin or in eyes, or is ingested:
  Oil on the skin: Wash off the oil with soap and water.
  Oil splashed on eyes: Rinse eyes with clean water for 15 minutes and then have the eyes checked by a doctor.
  Oil ingested: Do not induce vomiting and see a doctor right away. If oil has gotten into the mouth, thoroughly rinse the mouth out with water.

CAUTION

- Do not remove the oil cap or magnetic drain plug while the unit is operating.
  Do not remove the oil cap or magnetic drain plug while the unit is operating. Hot oil spraying out could cause burns.
- Wear protective clothing during cleaning and inspection.
  Wear gloves and other protective clothing when undertaking cleaning and inspection. Failure to wear protective clothing can result in burns or other injury from hot oil spray. Wear non-slip gloves and safety shoes when carrying the unit. Failure to do so can lead to injury.

Inspection and Maintenance

Inspection and Replacement Chart

Inspection and Replacement Chart

Item \ Inspection and/or Part Replacement Time		During installation (During initial test runs)	Regular inspection	Weekly	Every 5,000h ※1	Every 10,000h ※2	Every 20,000h ※3	Comments ※4
Piping inspection		●			●			→ P18
Check for oil leaks		●		●				
Check oil level		●		●				→ P15
Check degree of vacuum		●	●					
Check for noise and vibration		●	●					
Release pipe drainage			●					→ P19
Inspect and clean the paper element				●				→ P17
O-ring inspection				●				→ P17
Butterfly gasket inspection				●				→ P17
Gear-oil change					●			→ P15
Oil cap inspection					●			
Oil gauge inspection					●			→ P17
Rubber feet inspection					●			
Well nut inspection					●			
Centrifugal fan inspection and cleaning					●			→ P18
Loose screws					●			
Cleaning the Controller (sold-separately)					●			→ P18
Coupling element inspection						●		Ask your dealer
Motor maintenance							●	
Overhaul (replacement)	Pump unit 100D assembly						●	
	Pump unit 150D assembly						●	
	Pump unit 250D assembly						●	
	Silencer noise absorbing material						●	
	Gasket250A						●	
	Gasket250B						●	
	Muffler gasket150						●	
	Muffler gasket250D1						●	
	Muffler gasket250D2						●	

※1 Inspections and replacements should be made after 1 year of use even if the running time is less than 5,000 hours.

※2 Inspections and replacements should be made after 2 years of use even if the running time is less than 10,000 hours.

※3 Inspections and replacements should be made after 4 years of use even if the running time is less than 20,000 hours.

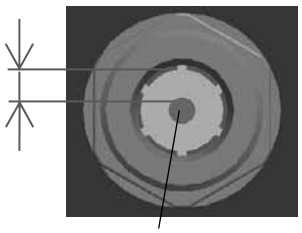
※4 Always confirm replacement part numbers, quantity/volume, etc. on pages 21-22.

Inspection and Maintenance

Inspection the Gear Oil / Changing the Gear Oil

Inspection the Gear Oil

1. Check to make sure there is the proper quantity of clean oil.
2. Check the pump oil level when the pump is stopped by comparing the oil gauge on the pump to the one in the figure.
3. The oil level will appear lower when the pump is running. When the pump is running, check to make sure the oil level is near the center of the oil gauge.
   (Use the red circle on the gauge as a reference.)
4. If the oil level is low, add enough oil to bring it to the proper level.
5. If the oil appears considerably discolored, then the oil should be changed.



IMPORTANT

If the oil is cold, the oil level will temporarily be below the center point just after the unit starts running. Check the oil level after the unit has had a chance to warm up.

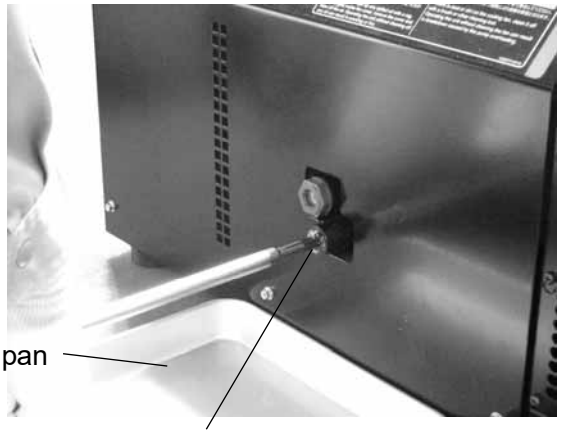
Changing the Gear Oil

1. Gear oil should be changed after every 5,000 operating hours, or at least yearly, even if the operating hours have not exceeded 5,000. Use only genuine ORION gear oil. Using non-genuine ORION gear oil can lead to unit breakdown or accidents and will void your warranty.

Type	Genuine ORION Oil Free Pump oil A-02
ISO viscosity grade	VG68
Flammability	Flash point: 210℃ or more
Part Name	Oil Change Set Assembly C
Part number	03087122010
Replacement volume	750mL
Oil replacement period	Every 5,000 hours

2. Procedure of oil change

(1) Place the drain pan below the magnetic plug, and then remove the plug.



(2) Remove the upper oil cap and drain all of the oil. As the amount of oil remaining in the unit decreases, the oil will come out in fine strands. Near the end, it will come out in drops. Drain the oil until it comes out in drops.

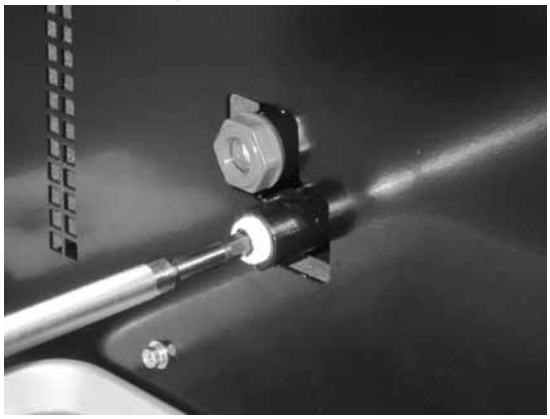
Inspection and Maintenance

Changing the Gear Oil

(3) As the oil is draining, wipe off the flakes of iron that are stuck to the magnetic plug. When doing so, use a lint-free cloth and/or gloves so that foreign matter or fibers do not enter the pump. (If there are drain ports on both sides, be sure to clean both ports.)

Lint-free gloves Lint-free cloth

(4) After all of the oil has been drained out, wrap the magnetic plug with sealing tape and screw it back on the unit. (Do not use liquid sealing compounds.) If the drain port has old sealing tape or metal flakes on it, clean off the port with a clean toothbrush or other cleaning tool.

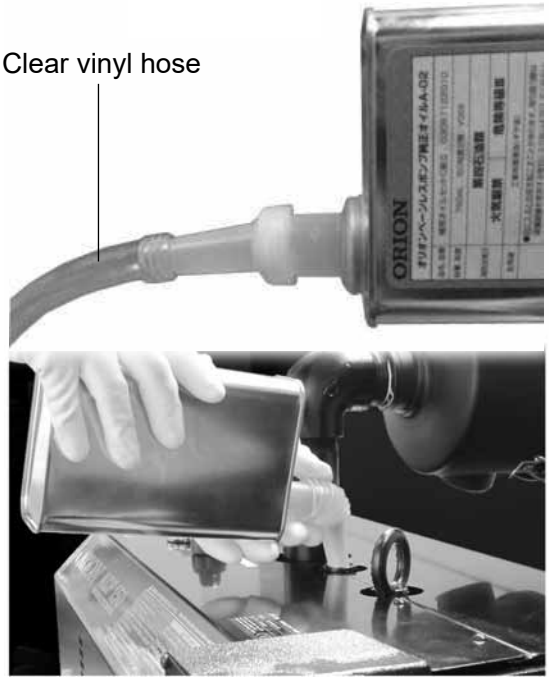


(5) Clean out the inside of the oil can spout with compressed air to remove any foreign matter. Remove the oil can lid with a flat blade screwdriver.

spout

(6) Attach the spout to the oil can, insert the tip of the spout into the oil port on the unit, and pour in all of the new oil. If it is difficult to add oil due to the particular configuration of the pump and surrounding components, place the included clear vinyl hose on the end of the spout for easier access. After all of the oil has been added, replace the oil cap.

Clear vinyl hose



Inspection and Maintenance

Changing the Gear Oil / Inspecting and Cleaning the Paper Element

3. Notes of oil change

(1) After the oil has been added, be sure to check the oil level. (Refer to section on gear oil inspection on the previous page.)

(2) When changing the oil, make sure that no foreign matter enters the pump. If foreign matter gets into the pump, it could cause damage or abnormal wear to the gears or bearings.

(3) When adding the oil, always use the oil can spout included with the oil replacement set. Using a measuring cup or other items can allow foreign substances to enter the unit.

(4) Do not reuse the spout. Reusing an old spout can result in foreign substances entering the unit.

(5) If any oil spills during the oil changing procedure, be sure to wipe it up completely with a cloth or rag. If any oil gets on the inside of the cover or directly on the pump unit, remove the cover and wipe off the oil. Failure to clean off any oil can cause the oil to smoke or may cause a fire.

(6) In winter months, the gear oil temperature will be low and the viscosity will rise, so adding and draining oil can take more time. Warming the oil before doing the oil change can shorten the time of the job. (For old oil: run the pump about 10 minutes to warm the oil. For the new oil: Warm the oil by leaving it in a warm room (approx. 20℃) for about a half day, or by warming the container in a bath of warm water, etc.)

(7) When performing an oil change, check that the oil cap and gauge are not damaged, and that there are no oil leaks. Replace the oil gauge if it is so dirty that it is difficult to read the oil level.

Inspecting and Cleaning the Paper Element

1.If the paper filter element is clogged, first remove the intake filter cover. Remove the paper filter element and clean it off with a compressed air blow. Replace the paper filter element with a new one if it is damaged or if it cannot be cleaned sufficiently to become unclogged by using an air blow. Note that while some types clogging such as dust may be easy to see, there may be other types of clogging such as that from resin constituents which can be difficult to spot through visual inspection.

2.When inspecting the paper element, also inspect the butterfly gasket VF150 and the O-ring VF150.

3.Make sure the O-ring is properly see when replacing the lid.

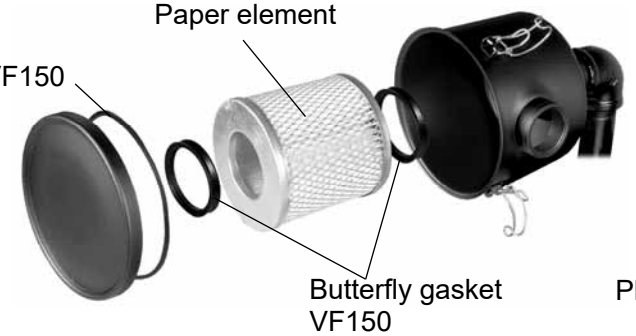


Photo: VF150

Inspection and Maintenance

Inspecting and Cleaning the Centrifugal Fan / Cleaning the Controller / Piping Inspection

Inspecting and Cleaning the Centrifugal Fan

If the centrifugal fan has dirt on it, remove the cooling air outlet side grill and clean out the dirt with an air blow or a brush. If the parts cannot be cleaned because the dirt is mixed with oil, consult your dealer or a qualified repair person.

IMPORTANT

●Cut off the power source when cleaning or during inspection.
Always remove the power source before cleaning, servicing, or inspecting this unit. Place a sign on the main power switch that indicates, "DO NOT TURN ON POWER - EQUIPMENT BEING INSPECTED". Failure to post such a warning can lead to electric shock or injury.

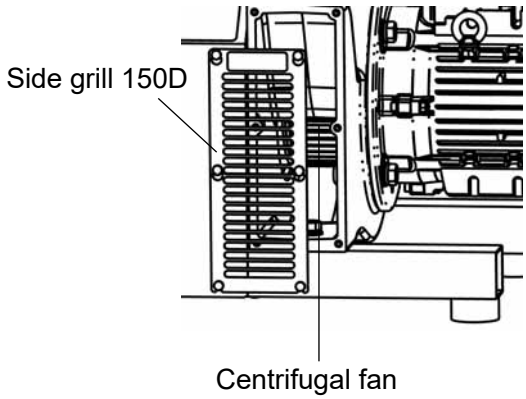


Figure: KCP150D

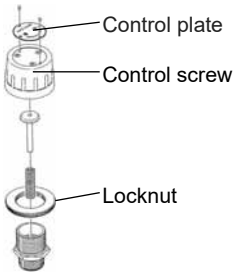
Inspecting the Coupling Element

Periodically check the coupling element for cracks or other damage. Please ask your dealer or other qualified repair person.

Cleaning the Controller

Vacuum controller
If the seat of the controller is very dirty, the function of the controller will be reduced.
Periodically take apart the unit and clean the respective parts.

Vacuum controller
VC100H



Piping Inspection

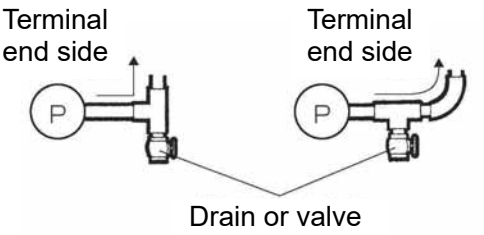
Inspect the piping system to make sure there are no air leaks, clogging, or loose parts. Make sure the filter cover is securely in place.

Inspection and Maintenance

Release Pipe Drainage / Overhaul

Release Pipe Drainage

Periodically drain the collected condensation water.



Overhaul

Overhaul should be requested from your dealer after every 20,000 operating hours, or at least every 4 years, even if operating hours have not exceeded 20,000.

Diagnosing and Troubleshooting Abnormalities or Unit Failure

WARNING

- Cut off the power source when cleaning or during inspection.
  Always remove the power source before cleaning, servicing, or inspecting this unit. Place a sign on the main power switch that indicates, "POWER OFF FOR CLEANING, SERVICE, INSPECTION". Failure to do so can lead to injury or electric shock.

CAUTION

- Wear protective clothing during cleaning and inspection.
  Wear gloves and other protective clothing when undertaking cleaning and inspection. Failure to wear protective clothing can result in burns or other injury from hot oil spray. Wear non-slip gloves and safety shoes when carrying the unit. Failure to do so can lead to injury.

IMPORTANT

If you suspect the pump has failed or is not working properly, please check the "Troubleshooting Chart" on the next page.

Diagnosing and Troubleshooting Abnormalities or Unit Failure

Troubleshooting Chart

Troubleshooting Chart

Condition	Cause	Measures to take
Vacuum doesn't increase	The paper element is clogged and air cannot enter the intake.	Remove the paper element and clean off with compressed air or other means. If it cannot be cleaned well, replace with a new one.
	The pump motor is running in reverse.	Change the wiring to the motor.
	Faulty gauge	Replace the affected gauge
	There are air leaks due to loose fittings of the filter case, piping, air tank, etc.	Consult with your dealer or a qualified repair person.
	Pump speed is low due to a faulty motor.	
	A voltage drop is causing poor motor speed.	Check the voltage of the main power source.
There is an abnormal running noise.	Pressure is not within operating ranges.	Bring pressure back within operating ranges.
	A high pitched sound is present when starting in cold weather.	If the noise continues for more than 30 minutes, consult with your dealer or a qualified repair person.
	There is contact with the rotor.	Consult with your dealer or a qualified repair person.
	Foreign matter has entered the pump.	
	The motor bearings are bad.	
	The pump bearings are bad.	
	The coupling is off center.	
	The coupling element is bad.	
	The motor has burnt out.	
	There are loose bolts.	
	The gear oil has deteriorated or the oil level is low.	Change or add oil as required.
	Improper oil is being used.	Use only the designated oil.
Oil leaks	Deteriorating or damaged oil seal or O-ring	Consult with your dealer or a qualified repair person.
	Damaged oil gauge	Replace the oil gauge.
	Damaged oil cap	Replace the oil cap.
	Loose oil gauge	Retorque the gauge so that it adequately presses against the gasket. (Generally, 4~5 N·m)
	Loose oil cap	
	Loose magnetic drain plug	Retorque the magnetic drain plug. (Use sealing tape to improve the seal if needed.)
	Improper oil is being used.	Use only the designated oil.
There is smoking oil.	Oil has spilled inside the cover and is touching the main pump unit or the muffler.	Remove the cover and clean off the oil.
	There is dirt or dust on the cooling fan so it's not able to cool.	Clean off the fan with compressed air or a brush. If the parts cannot be sufficiently cleaned, consult your dealer or a qualified repair person.
The pump has stopped turning.	Foreign matter has entered the pump or the rotor has locked up.	Consult with your dealer or a qualified repair person.
	The rotor is coming into contact from operating at pressures outside the specified range.	
	There is trouble with the electrical system.	

Consumable Parts

Parts Replaced Based on Inspection

Parts Replaced Based on Inspection

(Parts to be inspected replaced as required depending on part wear)

1.When to replace

Part Name		When to Inspect	When to replace
Intake Filter	Paper Element	Weekly	When it is damaged or when it cannot be unclogged by compressed air
	O-ring	Weekly	When it is damaged or when it has been pressed flat
	Butterfly Gasket	Weekly	When it is damaged or when it has been pressed flat
Oil Cap		When change Gear Oil	When it is damaged or when it can no longer be cleaned
Oil Gauge		When change Gear Oil	When it is damaged or when it can no longer be cleaned
Cushion Foot		Every 5,000 hours (1 year)	When it is damaged or when it has been pressed flat.
Well Nut		Every 5,000 hours (1 year)	When it is damaged or when it has been pressed flat.
Fan・Coupling Assembly		Every 5,000 hours (1 year)	When it is damaged or when it can no longer be cleaned by compressed air
Coupling Element		Every 10,000 hours (2 year)	When there are cracks or other damage

2.Prat Number List

(1)KCP100D-V

Part Name	Part Number	Qty./Product
Paper Element 100	03087616010	1
O-ring VF100	04087229010	1
Butterfly Gasket VF100	04087230010	2
Oil Cap	35851500030	1
Oil Gauge	35856100050	2
Cushion Foot	35100502230	4
Well Nut	32005900070	4
Fan・Coupling 100D Assembly	03087641010	1
Coupling Element ALS055B	04087193010	1

(2)KCP150D-V、KCP150D-VH

Part Name	Part Number	Qty./Product
Paper Element 150	03087039010	1
O-ring VF150	04087016010	1
Butterfly Gasket VF150	04087017010	2
Oil Cap	35851500030	1
Oil Gauge	35856100050	2
Cushion Foot	35100502230	4
Well Nut	32005900070	4
Fan・Coupling 150D 組立	03087594010	1
Coupling Element ALS065B	04087002010	1

(3)KCP250D-V

Part Name	Part Number	Qty./Product
Paper Element 250	03087041010	1
O-ring VF250	04087028010	1
Butterfly Gasket VF250	04087029010	1
Oil Cap	35851500030	1
Oil Gauge	35856100050	1
Cushion Foot	35100502230	4
Well Nut	32005900070	6
Fan・Coupling 250D Assembly	03087595010	1
Coupling Element ALS065B	04087002010	1

Consumable Parts

Fixed Term Replacement Parts / Included Parts

Fixed Term Replacement Parts(Parts that need to be replaced within a designated period)

1.When to Inspect

Part Name	When to Inspect
Oil Change C Kit	Every 5,000 hours (1 year)
Pump Unit Assembly	Every 20,000 hours (Overhaul) Consult your dealer
Silencer Noise Absorbing Material	
Muffler Gasket, Gasket	

2.Part Number List

(1)KCP100D-V

Parts Name	Part Number	Qty./Product
Oil Change C Kit	03087122010	1
Pump Unit 100D Assembly	KCP100D-V-PU1	1
Silencer Noise Absorbing Material	04087007010	1
Muffler Gasket 150	03087013010	1

（2）KCP150D-V

Parts Name	Part Number	Qty./Product
Oil Change C Kit	03087122010	1
Pump Unit 150D Assembly	KCP150D-V-PU	1
Silencer Noise Absorbing Material	04087007010	1
Muffler Gasket 150	03087013010	1

（3）KCP150D-VH

Parts Name	Part Number	Qty./Product
Oil Change C Kit	03087122010	1
Pump Unit 150D Assembly	KCP150D-VH-PU1	1
Silencer Noise Absorbing Material	04087007010	1
Muffler Gasket 150	03087013010	1

（4）KCP250D-V

Parts Name	Part Number	Qty./Product
Oil Change C Kit	03087122010	1
Pump Unit 250D Assembly	KCP250D-V-PU1	1
Silencer Noise Absorbing Material	04087007010	1
Gasket 250A	03087094010	4
Gasket 250B	03087077010	1
Muffler Gasket 250D1	03087430010	2
Muffler Gasket 250D1	04087147010	1

Included Parts

Parts Name	Qty./Product	Model
Hour meter（200V）	1	All models
VF100-01（Intake Filter）	1	KCP100D-V
VF150-01（Intake Filter）	1	KCP150D-V KCP150D-VH
VF250-01（Intake Filter）	1	KCP250D-V
Short pipe（Black and having male pipe thread at each end、2”×250L）	1	KCP250D-V
Elbow（2”）	1	
Barrel nipple（2”）	1	

Consumable Parts

Main Component Maintenance Cycle / List of Exchange Sets / Optional Parts

Main Component Maintenance Cycle

1.Maintenance Cycle

Part Name	Maintenance Cycle
Motor	Every 20,000 hours

※Indicates the time when the chance of failure due to wear increase. The motor does not necessarily require replacement after this time – the actual replacement time will depend on the operating conditions and environment of the particular installation. Please have the motor replaced when operation becomes abnormal.

2.Part Number List

Part Name	Part Name	Specification	Part Number	Qty./Product
KCP100D-V	Motor	2.2kW 2P※ (3-phase 200V)	0A003565000	1
KCP150D-V KCP150D-VH		3.7kW 2P※ (3-phase 200V)	0A003406010	1
KCP250D-V		5.5kW 2P※ (3-phase 200V)	0A003507000	1

※Top Runner regulation High-efficiency Motor

List of Exchange Sets

Model	5000-Hour Set		20,000-Hour Set	
	Part Name	Part Number	Part Name	Part Number
KCP100D-V	5,000-Hour Set 100D Assembly	04106305010	20,000-Hour Set 100D Assembly	Ask your dealer ※1
KCP150D-V	5,000-Hour Set 150 Assembly	04105673010	20,000-Hour Set 150D Assembly	
KCP150D-VH			20,000-Hour Set 150D-VH Assembly	
KCP250D-V	5,000-Hour Set 250D Assembly	04106263010	20,000-Hour Set 250D Assembly	
Content ※2	Oil, Intake Filter Paper Element		Pump Unit、Intake Filter Element、 Intake Filter O-ring・Butterfly Gasket, Muffler Gasket(Gasket), Silencer Noise Absorbing Material, Well Nut Coupling Element	

※1 Always request an overhaul from your dealer after 20,000 hour of operation.

※2 See “Part Replaced Based on Inspections” and “Fixed Term Replacement Parts” for part number. Contact your dealer for details.

Optional Parts

Part	Part Name	Part Number	Qty./ Product	Specification	Model
Gauge	A type Vacuum Gauge	04102121010	1	With a red pointer	All models
	D type Vacuum Gauge	04100705010	1	With a red pointer	
Vacuum Controller	VC100B	03044148010	1	Vacuum degree 30 to 60kPa	KCP100D-V, KCP150D-V
	VC100H	03037915010	1	Vacuum degree 60 to 80kPa	KCP100D-V, KCP150D-V, KCP150D-VH
	VC100H-01	03087423010	1	Vacuum degree 75 to 90kPa	KCP100D-V, KCP150D-VH
	VC121	03087114010	1	Vacuum degree 30 to 50kPa	KCP250D-V
	VC121H	03087121010	1	Vacuum degree 50 to 80kPa	
Check Valve	Ball Check Valve Set 150 Assembly	03087592010	1	Recommended for low flow rates.	KCP100D-V(Piping connection size:R1 1/2) KCP150D-V、KCP150D-VH
	Ball Check Valve Set 250 Assembly	03087593010	1	Recommended for low flow rates.	KCP250D-V
Caster	Caster Set 150 Assembly	04087045010	1	–	KCP100D-V KCP150D-V、KCP150D-VH

※Used only genuine specified parts.

※Ball check Valve Assemblies do not comply with The RoHS directive.

Storage (Long Periods of Disuse)

How to Store / Where to Store

How to Store

After purchase or after having used the pump, the maximum recommended time of disuse or for storage is 6 months. Oil will collect in the lower section of the gear box and rust will form in the gearbox, breakdown due to the deterioration of the initial lubrication of bushings and oil seals breakdown, or breakdown from deterioration of oil can occur.

Where to Store

1. Store indoors, and cover to protect from water and dust.
2. Store in a place free from water, oil, dust and dirt.
3. Store in a clean and dry place.
4. Store in a place that has good ventilation (ambient temperature below 40℃.)
5. Store in a place free from chlorine, sulfurous acid gas or other compounds that could lead to corrosion on the pump.
6. Always store in a cool place in order to help prevent rust.

Disposing of the Unit

1. When disposing of this unit, always follow local disposal regulations and employ a professional industrial waste company for proper disposal.
2. Methods of disposal of gear oil is covered by certain regulations. Process oil according to relevant regulations.

After-Sales Service

- This equipment is for industrial use only. Please take all necessary precautions during installation and handling.
- Read this Operating Manual thoroughly and use the equipment accordingly.
- Be sure to retain the Operating Manual for future reference.

■ Warranty

- The product warranty is printed at the end of this manual. Be sure to keep it in a safe place.
- Note that the user may have to pay for consumable parts even during the warranty period. Please read the warranty carefully.
- The customer will be responsible for charges incurred for repairs conducted after the warranty period has expired. Purchase of a new product may be recommended depending on the area where the repair is to take place, as well as the particulars of the repair and the amount of time the product has been in service, in which case, we ask that you please consult with your dealer.

■ Before Requesting Inspection or Service...

- See " Diagnosing and Troubleshooting Abnormalities or Unit Failure " (Page 19,20).
- If the problem cannot be remedied by taking the noted suggestions, do not attempt to fix the problem yourself; please consult with the dealer where the product was purchased.

■ Spare Parts

- Spare parts are items necessary to maintain the proper function of the product.
- Spare parts for this product will be made available for a period of 7 years from the last day of production of the product.

■ Requesting After-Sales Service

- When requesting inspection or repairs, please provide the following information to the dealer where the product was purchased.
  (1) Product name
  (2) Model designation (shown on nameplate)
  (3) Condition (be as specific as possible)
  (4) Address and phone number
- When ordering replacement parts, please give the following information.
  (1) Product name
  (2) Model designation
  (3) Part name, part number and quantity required

Installation Guide

Employ a qualified transport agent or other specialist to transport and install this product.
Improper installation can lead to the product tipping over, personal injury from the product falling, electric shock, or fire. Also, vibration can lead to inconsistent oil levels which could cause product breakdown.
Operator Technical Level: A contractor, specialized technician, or person qualified in unloading and placement, installation, piping, electrical wiring, etc.

Table of Contents

Important Safety Guidelines

Operating Warnings (DANGERS / WARNINGS)

⚠ DANGER

Failure to follow instructions contained in a DANGER warning may result in death or serious injury to the operator.

Intake of combustible or explosive gases is prohibited.

Do not allow combustible or explosive gases to enter the product. And never operate the product where combustible or explosive gases may be present. Failure to follow this warning could result in an explosion or fire.

⚠ WARNING

Failure to follow instructions contained in a WARNING might possibly result in death or serious injury to the operator.

Never operate without the terminal box cover.

When using a motor that has a terminal box cover, do not operate without the cover. Failure to follow this warning can lead to electric shock.

Do not modify the product.

Do not modify this product. Modifications can result in improper operation which can lead to injury, electric shock, or fire.

Always properly ground this product.

Always properly fix a ground wire to the ground terminal (labeled E) in the terminal box. Improper grounding can lead to electric shock.

Employ a qualified transport agent or other specialist to transport and install this product.

Use caution when suspending or moving the pump. Improper suspension or handling can result in the product dropping which could result in injury. Never stand under the pump when it is being suspended. Improper installation can lead to the product tipping over, personal injury from the product falling, electric shock, or fire. Also, vibration can lead to inconsistent oil levels which could cause product breakdown. Follow all relevant laws and regulations when working with and installing this product (for example the Industrial Safety and Health Law in Japan.)

Always install required safety devices.

Have a qualified person install an earth leakage breaker. Improper installation can result in electric shock or fire. Also install an overload protection device (thermal relay). Failure to do so can result in serious accidents such as electric shock or fire as a result of breakdown due to overload.

Do not use the product outside.

This product is for indoor use only. Operating the product outside could expose it to rain, which could lead to damage to the motor insulation and cause electrical shorts or fire.

Important Safety Guidelines

Operating Warnings (CAUTIONS)

⚠ CAUTION

Failure to follow instructions contained in a CAUTION may result in injury to the operator or damage to property.

Do not operate with blocked piping (KCP150D-V, KCP250D-V).

Do not operate the pump with the vacuum piping blocked. Doing so can cause an abnormal rise in pump temperature, breakdown, or burns.

Do not place other objects on top of the product.

Do not place heavy objects or containers of water on the product. Items falling down could lead to injury, spilled water could lead to rust or cause damage to electrical insulation, and there could be a danger of electric shorts or shock.

Do not operate the motor outside its specified power rating.

Operating the motor outside its specified power rating can lead to breakdown or accidents.

Prevent cable contact damage.

Route cables so they do not come into contact with the motor frame. Depending on the type of contact, cable coverings could possibly melt or result in fire.

Install a vacuum controller (sold separately).

Install a vacuum controller if there is a chance that vacuum piping may be blocked. Failure to do so can result in product breakdown.

Install a check valve.

A check valve should be installed within 50cm of the pump intake because back pressure when the pump is stopped may cause it to turn in reverse. Failure to do so can result in product breakdown.

Installation

Before Installation

DANGER

- Never operate the unit where combustible or explosive gases may be present.

WARNING

- Do not install where the unit will come into contact with oil, water, or dust.
- For indoor use only.
- Do not install in a location that has corrosive gases (chlorine, sulfurous acid gas, etc.)
- Do not install where the unit will be in direct sunlight.
- The ambient temperature should be 0~40℃.
- Employ a qualified transport agent or other specialist to transport and install this product. Follow all relevant laws and regulations when working with and installing this product (for example the Industrial Safety and Health Law in Japan.)

Before Installation

IMPORTANT

- The unit is heavy; use caution when moving or transporting.
- It is possible that the unit could be damaged during shipping or transport.
  When the unit arrives, open the packing soon to check for any deformities, scratches, or other damage. If by some chance there is a problem, please consult with your dealer.
- Ensure the model number of the unit ordered matches the model number printed on the unit nameplate.

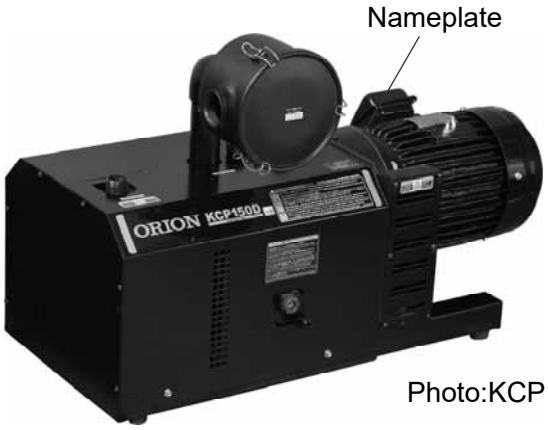


Photo:KCP150D

- Check to make sure all parts are included. (See page 22 for details.)

Installation

Installation / Unit Placement

Installation

IMPORTANT

- Do not suspend using wire cables. Because the unit is suspended at one point, the unit may spin when suspended, which will decrease the strength of the wire cable, possibly causing it to break and the unit to fall.
- When moving the unit, support it by suspending it with a sling. Use a sling that has adequate length and load-bearing strength.
  Product mass

Model	Mass (kg)
KCP100D-V-01A	135
KCP150D-V-01A,KCP150D-VH-01A	155
KCP250D-V-01A	225

- Support the pump with the eye bolt as shown in the figure.
- Use caution when suspending or moving the pump. Improper suspension or handling can result in the unit dropping which could result in injury. Never stand under the pump when it is being suspended.
- When moving the unit, if there is a danger of it bumping nearby objects, use another rope or assistant to guide the unit into place.
- When suspending the unit, pay careful attention to the center of gravity.
- When suspending by two points, ensure the sling forms an acute (sharp) angle.(Recommended angle: 60°)

B

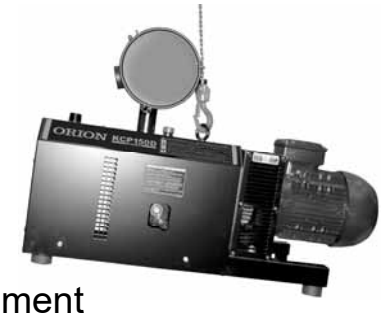


Figure (photo)

When suspending the pump,
Do not attach the sling to these points.

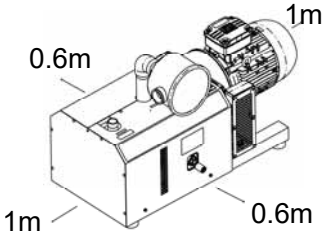
Photo:KCP150D

Unit Placement

WARNING

- Employ a qualified specialist to install the unit. Improper installation can lead to the unit tipping over, personal injury from the unit falling, electric shock, or fire. Also, vibration can lead to inconsistent oil levels which could cause unit breakdown.
- Allowable operating ambient temperature: 0～40℃. When operating at below 0℃, such as in winter months, the oil viscosity will increase, and can cause the pump to operate loudly or to become overloaded. Be aware that if there is a heat source in the area surrounding the pump, it could cause the pump to overheat and break down.
- Operating in a sealed space can cause the pump to overheat. Ensure there is adequate ventilation in the area surrounding the pump and that the surrounding allowable ambient temperature is not exceeded.

CAUTION



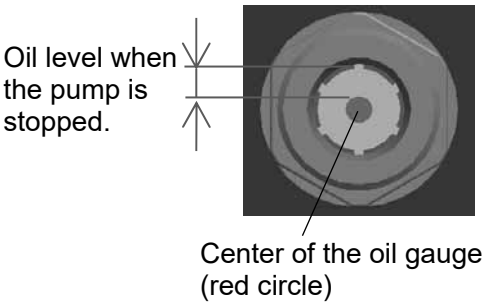
- Make sure there is sufficient space around the unit to allow for maintenance, inspection, and overhaul. See figure to the right for space requirements. Allow enough vertical space to ensure the pump can be lifted and moved by suspending it from a sling.
- The pump should be installed on a flat, horizontal surface. If the pump is installed on an incline, the gear oil will not be distributed uniformly and gear lubrication will be affected.
- Install such that the oil can easily be checked and changed when necessary, and also that the oil gauge is clearly visible.

Installation

Gear Oil / Gauge and Controller / Piping

Gear Oil

1. Check to make sure there is the proper quantity of clean oil.
2. Check the pump oil level when the pump is stopped by comparing the oil gauge on the pump to the one in the figure.
3. The oil level will appear lower when the pump is running. When the pump is running, check to make sure the oil level is near the center of the oil gauge. (Use the red circle on the gauge as a reference.)
4. If the oil level is low, add enough oil to bring it to the proper level.



IMPORTANT

- If the oil is cold, the oil level will temporarily be below the center point just after the unit starts running. Check the oil level after the unit has had a chance to warm up.

Gauge and Controller (Sold separately)

※ Install the gauge and controller using a tee coupling. (See page 33 for details.)
※ When installing the controller, do not use sealing tape on the tap. Hand tighten and then, using a wrench, further tighten 1/4 to 1/2 turn. Using sealing tape will make the threads more slippery and lead to over-tightening which can cause the controller threads and internal components to become deformed, causing it to cease to function properly. (This is a low pressure/low vacuum pump, and therefore a perfect seal using sealing tape or other adhesive on the threads of the controller is not necessary.)
※ Do not use sealing tape when installing the gauge. (Be careful not to over-tighten.)
※ Be careful when handling the gauge as it is very susceptible to damage from being knocked or dropped.
※ For collection piping, install a gauge and controller on one pump.

Piping

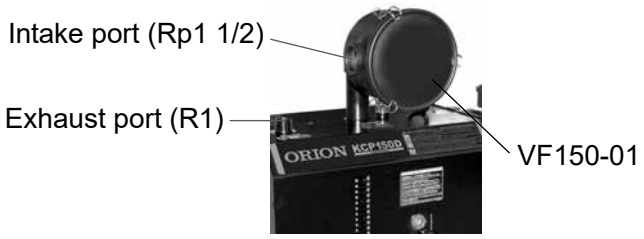
IMPORTANT

- Before connecting a check valve, carry out the electrical wiring to the unit and then, by momentarily applying power to the unit, confirm that the direction of rotation matches the direction of the arrow printed on the "Direction of Rotation Plate". If a check valve is installed on the piping and then unit is run in reverse, the unit will be running with a blocked air-flow and the filter case O-ring could be blown off.
- If for some reason the unit is run in reverse after a check valve has been installed, check the filter-case O-ring to confirm that it is in place or has been blown off.

Installation

Piping

1. Always install the included intake filter. Running the pump without the filter installed will allow dust, dirt, and other foreign matter to enter the pump causing breakdown.
2. Always install the included intake filter (VF150-01). Running the pump without the filter installed will allow dust, dirt, and other foreign matter to enter the pump causing breakdown.



3. The intake filter pipe connection is a parallel pipe thread fitting (Rp). Use a taper threaded fitting (R) on the connecting pipe and be sure to wrap the joint with sealing tape. Failure to properly seal the joint with sealing tape can result reduced performance due to leakage.
4. If the air at the intake will be very dusty or contain very fine particulate (10 μm or smaller) then a different intake filter that can adequately filter such air should be used.
5. Do not connect this unit directly to steel piping.
   - Intake and exhaust piping connections should be made with either hose or flexible joints. Directly connecting the unit to steel piping from the main piping system can lead to excessive noise and vibration. If using hose, it should be heat and pressure resistant.

	Intake piping	Exhaust piping
Heat resistance	At least 40℃	At least 150℃ ※1
Pressure resistance	Degree of vacuum: At least 100 kPa	At least 200 kPa

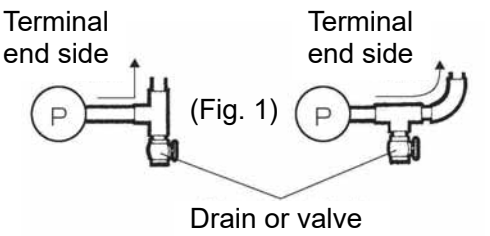
※ Depending on the operating pressure, operating temperatures in excess of 120℃ may result, and therefore the use of flexible joints is recommended.

- Choose appropriate piping (inside diameter and length) to ensure there is not excessive resistance. (Piping diameter should be the same or larger than the exhaust port. Please check with ORION or your dealer regarding suitable piping lengths.)
- Install support fittings on piping to ensure that the weight of piping does not rest directly on filter and muffler connections.
- Use union couplings to so that piping may easily be separated from the unit during maintenance and other work.
- Take into account the use of eye bolts on the pump and motor (for use during maintenance) and install piping so that it won't interfere with such fittings.

6. Be sure that the inside of all piping is completely free of dirt, etc. before performing installation.
7. In order to prevent condensation formed within the exhaust piping from permeating the pump and reaching the end of the piping, a drain fixture should be included somewhere along the exhaust piping. Take the following measures in order to avoid the pump from locking up due to rust from condensation reaching the inside of the pump.

①Install a drain or valve to drain off condensation that can form within the piping.
(Fig. 1)

- Install a valve or drain on the pump side in order to prevent condensation from entering the pump.
- If piping is long, install a valve or drain in the middle of the piping.
- To prevent condensation from spewing out the end of the piping, install a valve or drain there.



(Fig. 1)

②For a pump with a low operating frequency, after the main operation is complete, run the pump with the pipes open for 10 to 15 minutes in order to dry out the insides.

Installation

Piping

8. Install a vacuum controller (sold separately) if there is a chance that vacuum piping may be blocked. Failure to do so can result in unit breakdown. (Fig. 2) (V type)
9. Do not install the vacuum controller between the intake filter and the pump. Installing the vacuum controller between the intake filter and pump can result in trouble due to foreign matter entering the pump. (Fig. 2)
10. When the pump is stopped, pressure remaining in the exhaust piping can damage the pump by causing it to turn in reverse. In order to prevent this, a check valve should be installed within approximately 50cm of the intake port on the filter. Install the check valve so that it is level with the floor surface. Failure to install the valve level will result in pulsation or abnormal noises. (Fig. 2) (The cover of the swing check valve should be facing up.)

Recommended Check Valves

Piping	Maker	Recommended Check Valves
Metal piping	KITZ	Bronze JIS swing check valve ※1
	Asahi Yukizai ※4	Ball check valve with flange
		Ball check valve with union connection ※2
Resin piping	Asahi Yukizai ※4	Ball check valve with union connection
		Ball check valve with threaded connection ※3

※1 Please use a ball check valve with low flow rates as pulsation or metallic sounds may occur at times of low flow rates (when the flow rate has fallen to a rate at which vacuum is 80 kPa (at 60 Hz)). Also, this check valve is not compliant with the revised RoHS directive.

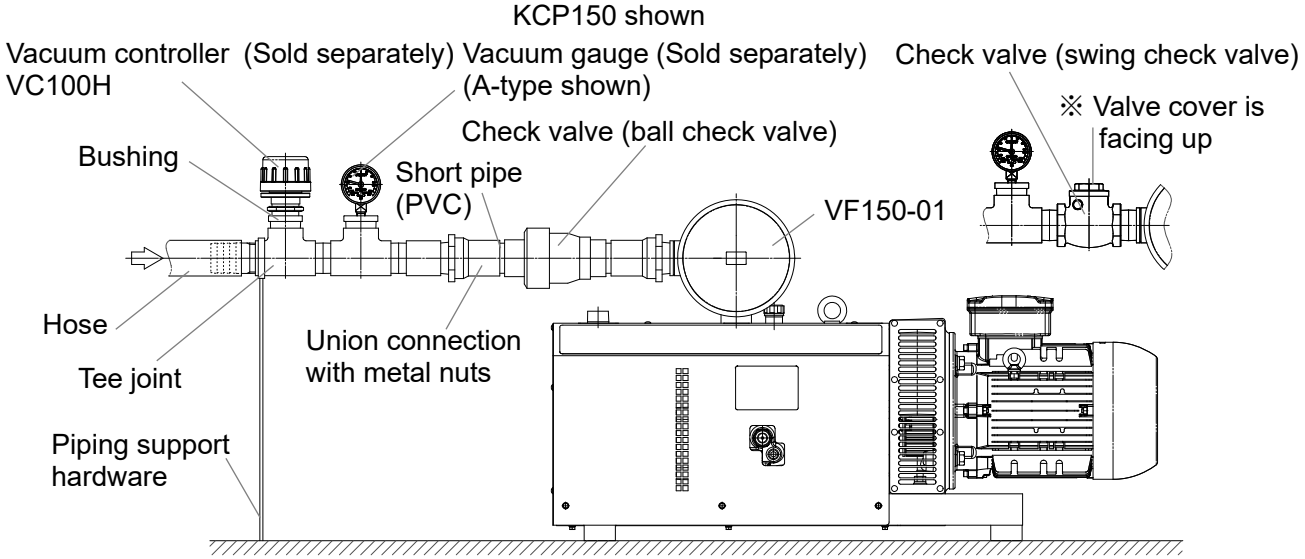
※2 If a ball check valve with a union connection is to be used with metal piping, be sure to use a valve that has metal union connections (nuts). (Fig. 2)

※3 Use of metal piping with a threaded type ball check valve may result in a damaged connection.

※4 Some parts of the Asahi Yuikzai ball check valve used in Orion's ball check valve assembly are not compliant with the revised RoHS directive.

11. Be careful not to over-tighten the piping fixtures. Over-tightening can damage the filter casing.

（Fig. 2 Sample configuration with gauge, controller, and check valve）



Wiring

WARNING

● Have a qualified person install an earth leakage breaker. Improper installation can result in electric shock or fire. Also install an overload protection device (thermal relay). Failure to do so can result in breakdown or fire due to overload.

Overload-protection earth leakage breaker

1. Install an earth leakage breaker.

Rated voltage and frequency	Interrupting capacity (A)
200V-50/60Hz 220V-60Hz	Approx. 1.5 times the amperage listed on the motor nameplate (as a guideline)

※ Use a high-speed breaker with a current sensitivity of 30mA.

2. Always properly ground the unit.
   - Ground (earth) screw location: The ground screw is In the motor terminal box. ("E" or " ⏚ " will be printed nearby.)
   - Choose a copper ground wire that has a nominal cross sectional area of at least the figure shown below.

Model	Motor rated output（kW	Nominal cross sectional area（mm^2）
KCP100D-V-01A	2.2	3.5
KCP150D-V-01A KCP150D-VH-01A	3.7	5.5
KCP250D-V-01A	5.5	5.5

   - Tighten and fix the grounding wire to the grounding screw such that it will not come loose from vibrations of the wire during operation.

3. Install an overload protection device (thermal relay) to prevent motor burnout due to overloading or from a missing phase if operating with three-phase power. Approximate set values are listed to the right.

Model	200V		220V
	50Hz	60Hz	60Hz
KCP100D-V-01A	8.9A	9.6A	8.9A
KCP150D-V-01A	13.4A	14.4A	13.1A
KCP150D-VH-01A	13.4A	14.2A	12.9A
KCP250D-V-01A	20.6A	24.3A	21.2A

Installation

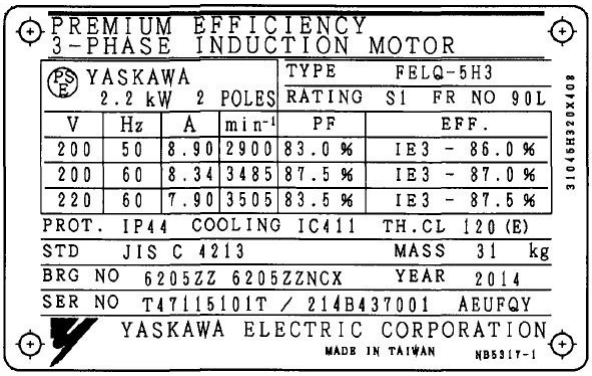
Wiring

4. Operate the motor at the power rating shown on the motor nameplate. The power supply voltage must not have intermittent fluctuations greater than 10%, or 5% if fluctuations are sustained. Apply the phase balance of power supply voltage within 1%.
   ※The phase balance〔%〕=(MAX. voltage – MIN. voltage) / Average of three-phase voltage×0.67
5. Refer to the current rating on the motor nameplate when choosing a power cord.
6. There will be times when the operating current will exceed the value on the motor nameplate. However, the standard ORION motor used is a Class-F motor with a B-temp-rise profile, therefore operation will be normal as long as it operates below set thermal value. Note that during initial operation in cases where the gear oil is cool, the operating current may exceed the thermal relay set value, but this is not a problem as the current will gradually fall over time.
7. When connecting the power cord, use cord fasteners to ensure that there will be no stress on the cord contacts directly. (Please don't make International Protection code fall.)
   Recommended cord fastener

Motor	Maker	Recommended cord fastener
YASKAWA	SEIWA ELECTRIC MFG	SC lock SCL-14 (KCP100D)
		SC lock SCL-18 (KCP150D)
		SC lock SCL-22 (KCP250D)

8. Install the included hour meter in the distribution box (on the secondary side of the thermal relay) in order to help keep track of when various inspections should be carried out, and when parts need to be replaced. Install and wire the hour meter according to the instructions included with the meter. Note that the standard included hour meter is for 200V (50/60Hz selectable). If operating at 220V, please consult with your dealer.
9. Motor nameplate
   YASKAWA

■KCP100D

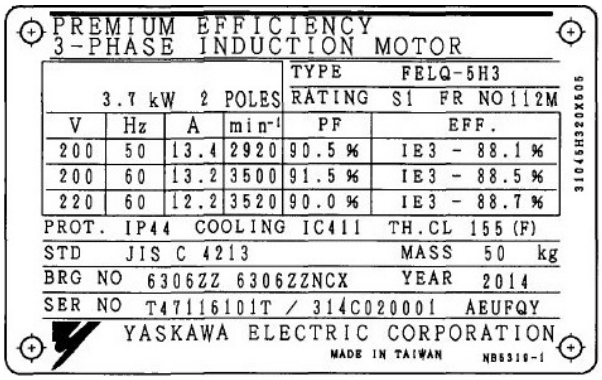

PREMIUM EFFICIENCY
3-PHASE INDUCTION MOTOR

YASKAWA
2.2 kW 2 POLES
TYPE FELQ-5H3
RATING S1 FR NO 90L

V	Hz	A	min⁻¹	PF	EFF.
200	50	8.90	2900	83.0 %	IE3 - 86.0 %
200	60	8.34	3485	87.5 %	IE3 - 87.0 %
220	60	7.90	3505	83.5 %	IE3 - 87.5 %

PROT. IP44 COOLING IC411 TH.CL 120 (E)
STD JIS C 4213 MASS 31 kg
BRG NO 6205ZZ 6205ZZNCX YEAR 2014
SER NO T47115101T / 214B437001 AEUFQY
YASKAWA ELECTRIC CORPORATION
MADE IN TAIWAN NB5317-1
3104SH320X408

■KCP150D

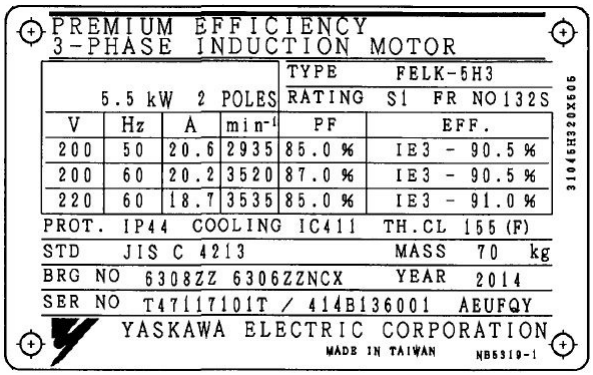

PREMIUM EFFICIENCY
3-PHASE INDUCTION MOTOR

3.7 kW 2 POLES
TYPE FELQ-5H3
RATING S1 FR NO112M

V	Hz	A	min⁻¹	PF	EFF.
200	50	13.4	2920	90.5 %	IE3 - 88.1 %
200	60	13.2	3500	91.5 %	IE3 - 88.5 %
220	60	12.2	3520	90.0 %	IE3 - 88.7 %

PROT. IP44 COOLING IC411 TH.CL 155 (F)
STD JIS C 4213 MASS 50 kg
BRG NO 6306ZZ 6306ZZNCX YEAR 2014
SER NO T47116101T / 314C020001 AEUFQY
YASKAWA ELECTRIC CORPORATION
MADE IN TAIWAN NB5316-1
3104SH320X505

■KCP250D


PREMIUM EFFICIENCY
3-PHASE INDUCTION MOTOR

5.5 kW 2 POLES
TYPE FELK-5H3
RATING S1 FR NO132S

V	Hz	A	min⁻¹	PF	EFF.
200	50	20.6	2935	85.0 %	IE3 - 90.5 %
200	60	20.2	3520	87.0 %	IE3 - 90.5 %
220	60	18.7	3535	85.0 %	IE3 - 91.0 %

PROT. IP44 COOLING IC411 TH.CL 155 (F)
STD JIS C 4213 MASS 70 kg
BRG NO 6308ZZ 6306ZZNCX YEAR 2014
SER NO T47117101T / 414B136001 AEUFQY
YASKAWA ELECTRIC CORPORATION
MADE IN TAIWAN NB5319-1
3104SH320X505

Specifications

Specifications

Specifications

Model			KCP100D-V-01A	
Power frequency			50Hz	60Hz
Designed pumping capacity ※1			96m³/h	117m³/h
Continuous operating vacuum ※2			0kPa～Ultimate vacuum(Under 1 atmosphere)	
Ultimate vacuum ※2			90kPa or more	94kPa or more
Intake piping connection size (VF100-01:Intake filter)			Rp1 1/4	
Outlet piping connection size			R1	
Oil inlet port size			G1/2	
Oil drain port size			Rc3/8	
Motor	Power Phase / output / No. of poles		Three phase / 2.2kW / 2P	
	Frame number and insulation class ※3		90L・E	
	Rated voltage and frequency ※3、※4、※5		200V-50/60Hz 220V-60Hz	
	Current rating ※3		8.9A/8.4A 7.9A	
	Specifications		Top Runner regulation High-efficiency Motor	
Thermal relay setting ※3、※6			8.9A/9.6A 8.9A	
Mass ※3			135kg	
Custom coating			Black	
Working Environment		Place of installation	Indoors	
		Permissible ambient temperature※7	0～40℃	
		Intake gas	Normal temperature: 0～40℃ Normal humidity: 65±20%RH（JIS Z 8703） Atmosphere free of corrosive, combustible, and explosive gases. Air should be free of hot vapor, condensation, clean, and relatively free of dust.	
		Operable elevation ※8	1,000m max	
		Pollution degree ※9	Pollution degree 3 (General factory environment)	
		Overvoltage category ※9	CAT III (Equipment in fixed installations)	
Operating noise ※3、※10			74dB	76dB

※1 Designed pumping capacity: Theoretical value calculated from volume. Refer to performance data for actual flow rate.

※2 If operating the unit at a high elevation location, there will be a difference in the degree of vacuum at 1 atmosphere in such a region and so the ultimate vacuum may be lower than the value noted in the specifications.

Simplified ultimate vacuum correction formula:

Noted specified value [kPa] – Elevation [m] X 0.0115 [kPa/m]

※3 Value when using the standard built-in motor.

※4 The power supply voltage must not have intermittent fluctuations greater than 10%, or 5% if fluctuations are sustained.

※5 When using other than the ORION standard motor, follow the electrical guidelines printed on the nameplate of the motor used.

※6 The thermal relay setting is only a guideline as there is some variation among different machines.

※7 If the pump is started where the ambient temperature is around 5℃, a high frequency noise may be heard. The noise will naturally go away in a short time and does not indicate abnormal operation. If the high pitch noise continues for more than 30 minutes, consult with your dealer or a qualified repair person.

※8 Please consult with ORION if the unit is to be operated at an elevation above 1,000m.

※9 Refer to IEC 664-1.

※10 Operating noise measured at an operating vacuum of 80 kPa, and is not a guaranteed value.

Specifications

Specifications

Model			KCP150D-V-01A	
Power frequency			50Hz	60Hz
Designed pumping capacity ※1			158m³/h	192m³/h
Continuous operating vacuum ※2			0～80kPa (Under 1 atmosphere)	
Ultimate vacuum ※2 ※3			90kPa or more	94kPa or more
Intake piping connection size (VF150-01:Intake filter)			Rp1 1/2	
Outlet piping connection size			R1	
Oil inlet port size			G1/2	
Oil drain port size			Rc3/8	
Motor	Power Phase / output / No. of poles		Three phase / 3.7kW / 2P	
	Frame number and insulation class ※4		112M・F	
	Rated voltage and frequency ※4、※5、※6		200V-50/60Hz 220V-60Hz	
	Current rating ※4		13.4A/13.2A 12.2A	
	Specifications		Top Runner regulation High-efficiency Motor	
Thermal relay setting ※4、※7			13.4A/14.4A 13.1A	
Mass ※4			155kg	
Custom coating			Black	
Working environment	Place of installation		Indoors	
	Permissible ambient temperature※8		0～40℃	
	Intake gas		Normal temperature: 0～40℃ Normal humidity: 65±20%RH（JIS Z 8703） Atmosphere free of corrosive, combustible, and explosive gases. Air should be free of hot vapor, condensation, clean, and relatively free of dust.	
	Operable elevation ※9		1,000m max	
	Pollution degree ※10		Pollution degree 3 (General factory environment)	
	Overvoltage category ※10		CAT III (Equipment in fixed installations)	
Operating noise ※4、※11			76dB	78dB

※1 Designed pumping capacity: Theoretical value calculated from volume. Refer to performance data for actual flow rate.

※2 Pressures indicated are when operating the pump under 1 standard atmospheric pressure.

※3 Ultimate vacuum: Continuous operation is not possible at maximum ultimate vacuum of the pump. This value is for model selection calculations.

※4 Value when using the standard built-in motor.

※5 The power supply voltage must not have intermittent fluctuations greater than 10%, or 5% if fluctuations are sustained.

※6 When using other than the ORION standard motor, follow the electrical guidelines printed on the nameplate of the motor used.

※7 The thermal relay setting is only a guideline as there is some variation among different machines.

※8 If the pump is started where the ambient temperature is around 0℃, a high frequency noise may be heard. The noise will naturally go away in a short time and does not indicate abnormal operation. If the high pitch noise continues for more than 30 minutes, consult with your dealer or a qualified repair person.

※9 Please consult with ORION if the unit is to be operated at an elevation above 1,000m.

※10 Refer to IEC 664-1.

※11 Operating noise measured at an operating vacuum of 80 kPa, and is not a guaranteed value.

Specifications

Specifications

Model			KCP150D-VH-01A	
Power frequency			50Hz	60Hz
Designed pumping capacity ※1			158m³/h	192m³/h
Continuous operating vacuum ※2			0kPa～Ultimate vacuum	60kPa～Ultimate vacuum
Ultimate vacuum ※2			90kPa or more	94kPa or more
Intake piping connection size (VF150-01:Intake filter)			Rp1 1/2	
Outlet piping connection size			R1	
Oil inlet port size			G1/2	
Oil drain port size			Rc3/8	
Motor	Power Phase / output / No. of poles		Three phase / 3.7kW / 2P	
	Frame number and insulation class ※3		112M・F	
	Rated voltage and frequency ※3、※4、※5		200V-50/60Hz　220V-60Hz	
	Current rating ※3		13.4A/13.2A　12.2A	
	Specifications		Top Runner regulation High-efficiency Motor	
Thermal relay setting ※3、※6			13.4A/14.2A　12.9A	
Mass ※3			155kg	
Custom coating			Black	
Working environment	Place of installation		Indoors	
	Permissible ambient temperature※7		0～40℃	
	Intake gas		Normal temperature: 0～40℃ Normal humidity: 65±20%RH（JIS Z 8703） Atmosphere free of corrosive, combustible, and explosive gases. Air should be free of hot vapor, condensation, clean, and relatively free of dust.	
	Operable elevation ※8		1,000m max	
	Pollution degree ※9		Pollution degree 3 (General factory environment)	
	Overvoltage category ※9		CAT III (Equipment in fixed installations)	
Operating noise ※3、※10			78dB	82dB

※1 Designed pumping capacity: Theoretical value calculated from volume. Refer to performance data for actual flow rate.

※2 If operating the unit at a high elevation location, there will be a difference in the degree of vacuum at 1 atmosphere in such a region and so the ultimate vacuum may be lower than the value noted in the specifications.

Simplified ultimate vacuum correction formula:

Noted specified value [kPa] – Elevation [m] X 0.0115 [kPa/m]

※3 Value when using the standard built-in motor.

※4 The power supply voltage must not have intermittent fluctuations greater than 10%, or 5% if fluctuations are sustained.

※5 When using other than the ORION standard motor, follow the electrical guidelines printed on the nameplate of the motor used.

※6 The thermal relay setting is only a guideline as there is some variation among different machines.

※7 If the pump is started where the ambient temperature is around 0℃, a high frequency noise may be heard. The noise will naturally go away in a short time and does not indicate abnormal operation. If the high pitch noise continues for more than 30 minutes, consult with your dealer or a qualified repair person.

※8 Please consult with ORION if the unit is to be operated at an elevation above 1,000m.

※9 Refer to IEC 664-1.

※10 Operating noise measured at an operating vacuum of 80 kPa, and is not a guaranteed value.

Specifications

Specifications

Model			KCP250D-V-01A	
Power frequency			50Hz	60Hz
Designed pumping capacity ※1			256m³/h	308m³/h
Continuous operating vacuum ※2			0～80kPa (Under 1 atmosphere)	
Ultimate vacuum ※2 ※3			90kPa or more	94kPa or more
Intake piping connection size (VF250-01:Intake filter)			Rp2	
Outlet piping connection size			R1 1/4	
Oil inlet port size			G 1/2	
Oil drain port size			Rc 1/2	
Motor	Power Phase / output / No. of poles		Three phase / 5.5kW / 2P	
	Frame number and insulation class ※4		132S・F	
	Rated voltage and frequency ※4、※5、※6		200V-50/60Hz　220V-60Hz	
	Current rating ※4		20.6A/20.2A　18.7A	
	Specifications		Top Runner regulation High-efficiency Motor	
Thermal relay setting ※4、※7			20.6A/24.3A　21.2A	
Mass ※4			225kg	
Custom coating			Black	
Working Environment		Place of installation	Indoors	
		Permissible ambient temperature ※8	0～40℃	
		Intake gas	Normal temperature: 0～40℃ Normal humidity: 65±20%RH（JIS Z 8703） Atmosphere free of corrosive, combustible, and explosive gases. Air should be free of hot vapor, condensation, clean, and relatively free of dust.	
		Operable elevation ※9	1,000m max	
		Pollution degree ※10	Pollution degree 3 (General factory environment)	
		Overvoltage category ※10	CAT III (Equipment in fixed installations))	
Operating noise ※4、※11			80dB	81dB

※1 Designed pumping capacity: Theoretical value calculated from volume. Refer to performance data for actual flow rate.

※2 Pressures indicated are when operating the pump under 1 standard atmospheric pressure.

※3 Ultimate vacuum: Continuous operation is not possible at maximum ultimate vacuum of the pump. This value is for model selection calculations.

※4 Value when using the standard built-in motor.

※5 The power supply voltage must not have intermittent fluctuations greater than 10%, or 5% if fluctuations are sustained.

※6 When using other than the ORION standard motor, follow the electrical guidelines printed on the name plate of the motor used.

※7 The thermal relay setting is only a guideline as there is some variation among different machines.

※8 If the pump is started where the ambient temperature is around 0℃, a high frequency noise may be heard. The noise will naturally go away in a short time and does not indicate abnormal operation. If the high pitch noise continues for more than 30 minutes, consult with your dealer or a qualified repair person.

※9 Please consult with ORION if the unit is to be operated at an elevation above 1,000m.

※10 Refer to IEC 664-1.

※11 Operating noise measured at an operating vacuum of 80 kPa, and is not a guaranteed value.

European Conformity Declaration

■ This European Conformity Declaration applies only to models that are equipped with ORION specified 3 phase motors. Model specifications that do not include motors or models with nameplates that do not have CE markings do not apply.

CE

ORION

ORION MACHINERY CO., LTD.
246 Oaza Kotaka, Suzaka-shi, Nagano-ken, 382-8502 JAPAN
TEL +81-26-245-1230 FAX +81-26-246-0564

DECLARATION OF CONFORMITY

We hereby declare that the following our product conforms with the essential health and safety requirements of EC Directive. This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product	: OIL FREE PUMP
Model	: KCP100D-V-01A ,KCP150D-V-01A KCP150D-VH-01A,KCP250D-V-01A
Serial No.	: K19100001~K29Z99999
Manufacturer	: ORION MACHINERY CO., LTD. 246 Oaza Kotaka, Suzaka-shi, Nagano-ken 382-8502 Japan
Authorized person to compile the technical file	: Lorenz Beck Ehrler & Beck GmbH Industriestrasse 16 D-71272 Renningen, Germany
Directives	: Machinery Directive 2006/42/EC RoHS2 Directive 2011/65/EU

The above product has been evaluated for conformity with above directive using the following European standards. The technical construction file (TCF) for this product is retained at the above manufacturer's location.

Machinery Directive:
EN ISO12100:2010, EN1012-2:1996+A1:2009, EN60204-1:2006+AI:2009

RoHS2 Directive :
EN 50581:2012

Place and date of issue	: Nagano, Japan, 28 December, 2018
Name/Title	: Fumihiko Yamada / General Manager Vacuum Pump System Engineering Department Environmental System Division
Signature	:

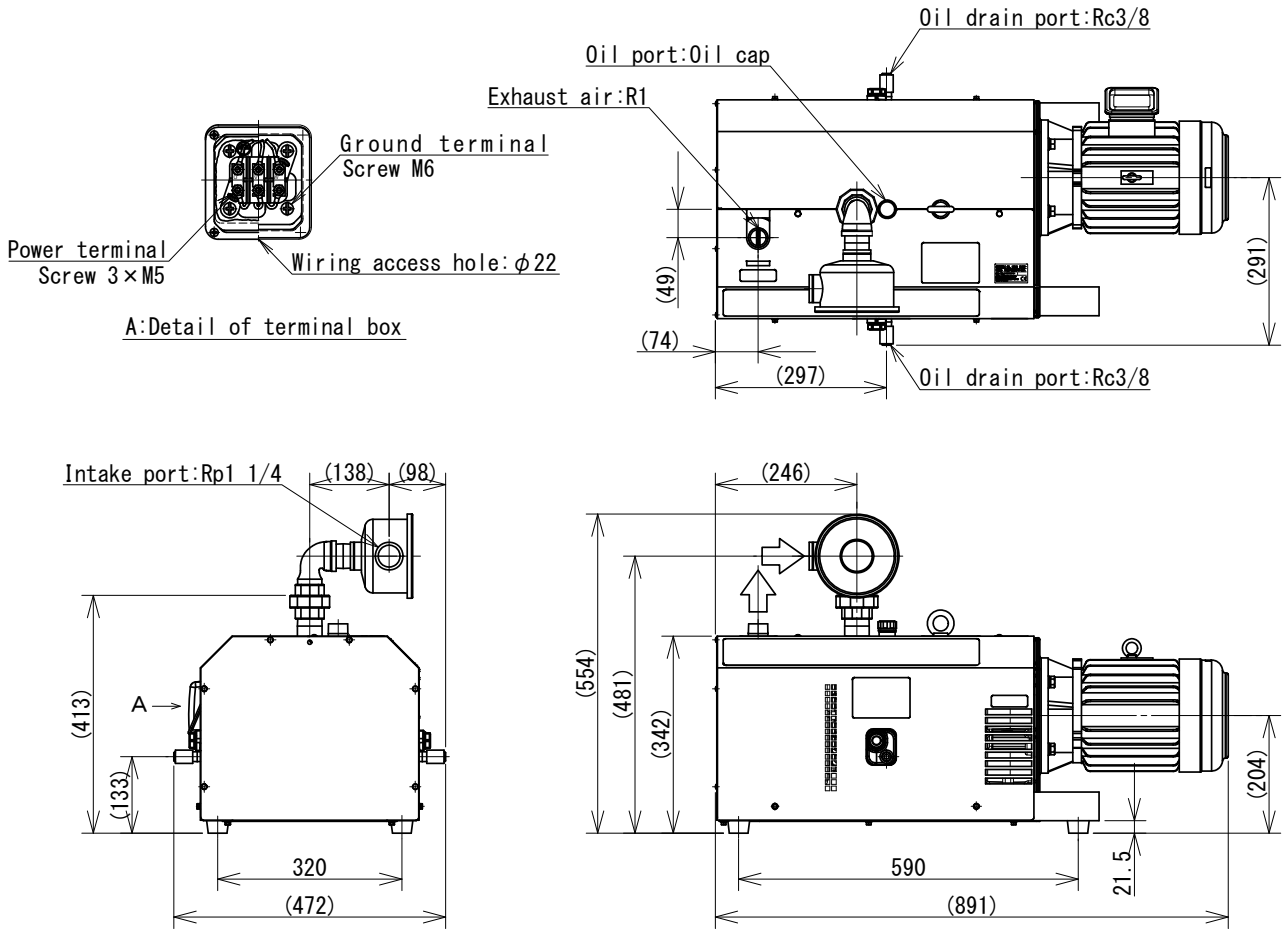
Being the responsible person appointed and employed by the manufacturer.

(Original)

Outside Dimensions

KCP100D-V-01A

(Units: mm)

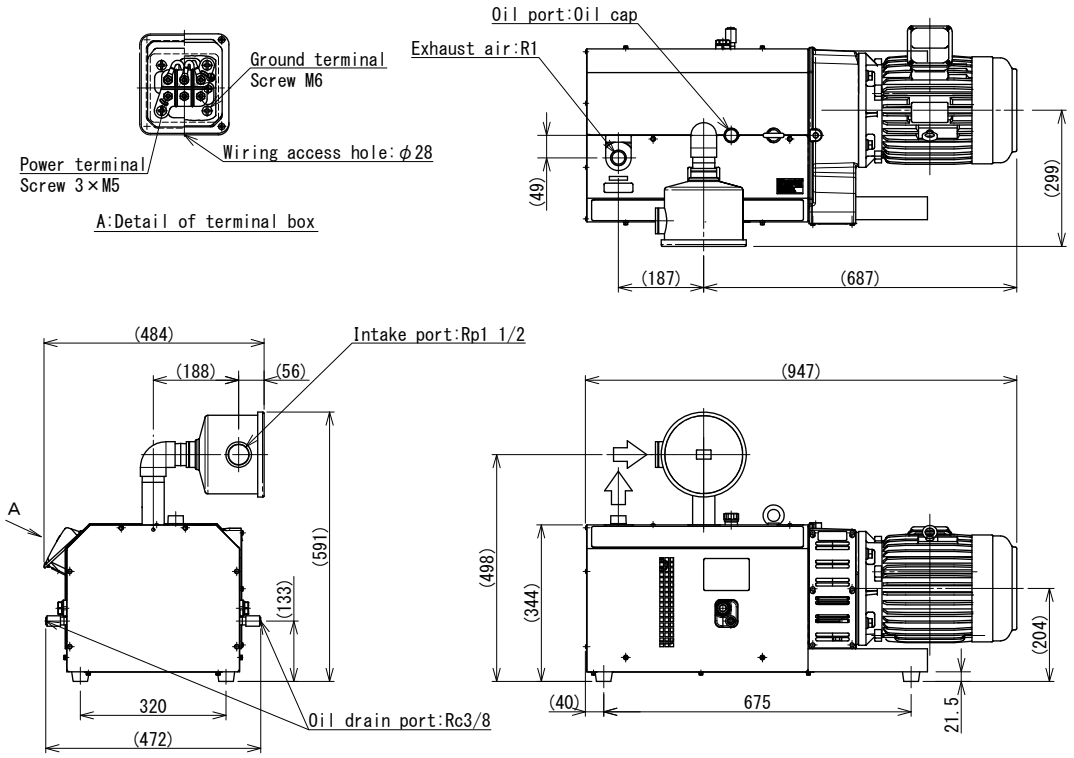


Outside Dimensions

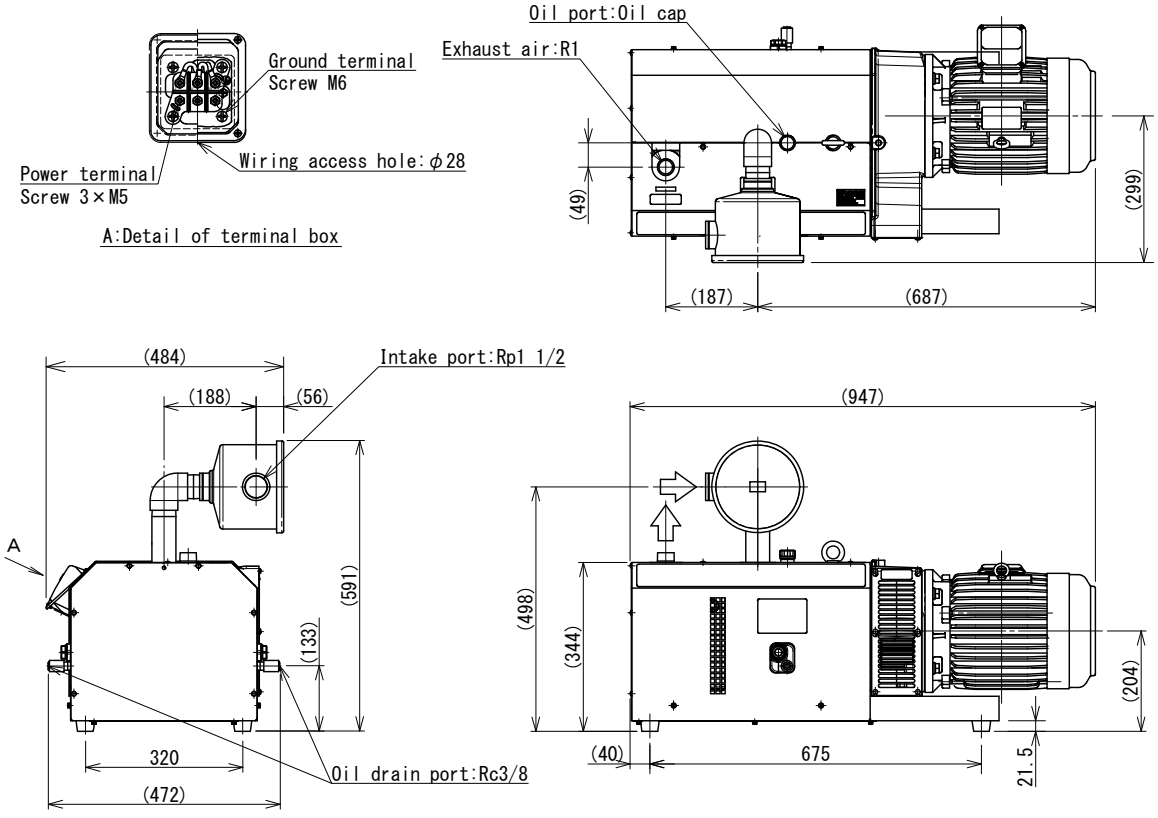
KCP150D-V-01A / KCP150D-VH-01A

KCP150D-V-01A

(Units: mm)



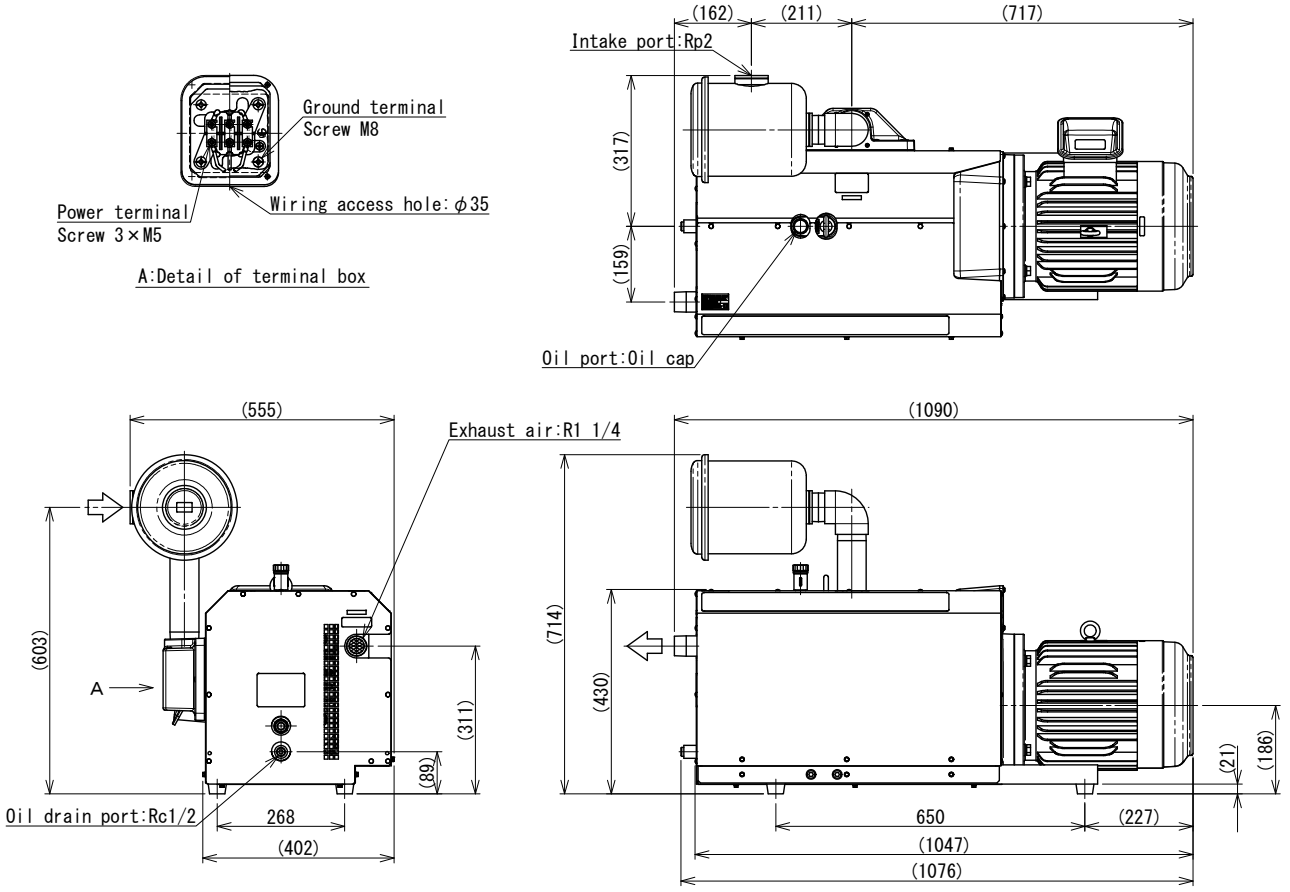
KCP150D-VH-01A



Outside Dimensions

KCP250D-V-01A

(Units: mm)



NOTE

NOTE

NOTE

保　証　書

本製品の保証内容は、下記のとおりです。保証修理をお受けになる場合は、機種名と製造番号をご確認のうえ、お買い上げの販売店へご連絡ください。

1. 保証期間
　お買い上げ後１年間　　ただし、稼動時間 3,000 時間まで

2. 保証範囲
　(1) 上記保証期間中に当社側の責任による故障が発生した場合は、製品の故障部分の交換または修理を無償で実施いたします。ただし、ご使用される国・地域によっては修理対応ができない場合や時間を要す場合がありますので、日本国外で修理をお受けになる場合は、お買い上げの販売店に別途ご相談ください。
　(2) 取扱説明書の故障診断に沿った確認は、原則としてお客様にて実施をお願いいたします。ただし、ご要望により当社サービス網がこの業務を代行することができます。この場合、故障原因が当社側にある場合は無償といたします。
　(3) 保証期間内であっても、以下の場合は有償修理（保証対象外）とさせていただきます。
　　①仕様書・取扱説明書等に記載されている以外の不適切な使用条件・環境・取扱い・使用方法・用途、およびお客様の不注意や過失等に起因する故障
　　②当社製品以外（お客様の装置やソフトウェアの設計等）の原因による故障
　　③当社指定サービス業者以外による修理や改造に起因する故障
　　④当社製品がお客様の装置に組み込まれて使用された場合、お客様の機器が受けている法的規制による安全装置、または業界の通念上備えられているべきと判断される機能・構造等を備えていれば回避できたと認められる故障
　　⑤取扱説明書等に記載された定期点検や消耗部品の保守・交換が正常に実施されていれば回避できたと認められる故障
　　⑥消耗部品（点検および定期交換部品）の交換
　　⑦火災等の不可抗力による外部要因、および地震・雷・風水害等の天変地異による故障
　　⑧当社出荷時の科学技術の水準では予見できなかった事由による故障
　　⑨腐食性ガス・有機溶剤・化学薬品溶液等の雰囲気、およびこれらが付着する可能性のある環境下での使用による製品腐食に起因する故障
　(4) 個別契約等にて別途定めがある場合は、それを優先いたします。
3. 保証責務の除外
　保証期間を問わず、当社の責に帰すことができない事由から生じた障害・事故補償、当社製品の故障に起因するお客様での機会損失・逸失利益・二次損害・当社製品以外への損傷、およびお客様による交換作業・現地機械設備の再調整・試運転業務に対する補償については、保証責務外とさせていただきます。

4. 用途限定
　(1) 本製品を重要な設備に適用する際は、本製品が故障しても重大な事故や損失に至らないように、バックアップやフェールセーフ機能を設備側に設けてください。
　(2) 本製品は、一般工業向けの汎用品として設計・製造されています。したがいまして、下記のような用途は保証適用外とさせていただきます。ただし、お客様の責任において製品仕様をご確認のうえ、必要な安全対策を講じていただく場合には適用可否について検討いたしますので、当社までご相談ください。
　　①原子力・航空・宇宙・鉄道・船舶・車両・医療機器・交通機器等、人命や財産に多大な影響が予想される用途
　　②電気・ガス・水道の供給システム等、高い信頼性や安全性が要求される用途

オリオン機械株式会社

Product Warranty

This product shall be warranted as follows. For warranty repairs, please contact the dealer where the product was sold after confirming the product model and serial number.

1. Warranty Period
　(1) One year from the date of purchase, or 3,000 operating hours, whichever comes first.

2. What Is Covered by this Warranty
　(1) If breakdown occurs within the above warranty period and the cause of the breakdown lies with ORION, then the damaged part(s) will be replaced or repaired by ORION free of charge. Note that depending on the country/region where the product is being used, repairs may take more time or be impossible. Please consult with your dealer in advance regarding service and repair options for products to be operated outside of Japan.
　(2) In principal, the owner of the product will confirm diagnosis of the breakdown according to the operating manual. However, there might be cases where this work may be carried out instead by a member of ORION's service network. In such cases, there will be no charge where the cause of the breakdown lies with ORION.
　(3) Note that even during the warranty period, there will be costs incurred by the user (outside the warranty) in the following cases:
　　①Breakdown resulting from operating under unsuitable operating conditions, environment, handling, use, or method of operation outside those written in the specifications or operating manual of the product or as a result of carelessness or negligence on the part of the user.
　　②Breakdown resulting from non-ORION equipment (user's own equipment or software design, etc.).
　　③Breakdown resulting from repairs or modifications conducted by non-ORION designated contractors.
　　④Breakdown which could be recognized as being avoidable in cases where an ORION product is used in conjunction with the user's equipment where the user's equipment is legally regulated to have a safety device whereby inclusion of the safety device could have averted the breakdown, or in cases where the addition of function, structure, etc., could have, according to common knowledge of the industry, averted the breakdown.
　　⑤Any breakdown which is recognized as being avoidable had normal fixed term inspections, and/or normal maintenance and replacement of consumables, been performed as indicated in the operating manual, etc.
　　⑥Replacement of consumables (parts to be replaced at fixed terms or based on inspection).
　　⑦Breakdown due to external factors beyond human control such as fire etc., or breakdown resulting from natural disaster such as earthquake, lightning, storm and flood damage, etc.
　　⑧Breakdown due to reasons unforeseeable due to the technological standard at the time the product was shipped from ORION.
　　⑨Any breakdown resulting from corrosion caused by operating the product in an atmosphere that contains corrosive gases, organic solvents, chemical solutions, etc., or in an environment where such substances could come into contact with the product.
　(4) In cases where a separate contract, etc. has been established, that contract will take priority.

3. Warranty Obligation Exclusions
　Regardless of the warranty period, compensation for any of the following will not fall under the obligations of this warranty: any hindrance or accident compensation resulting from reasons not under ORION's obligations; any lost opportunities, lost profit, secondary losses, damages to non-ORION equipment incurred by users resulting from the breakdown of ORION products; and any replacement work, readjustment of on-site machinery and equipment, and operating work by users.

4.Product Use Limitations
　(1) When using ORION products in connection with important facilities, be sure to establish backup and/or failsafe measures so that even in the event of breakdown of such products, such breakdown will not lead to serious accidents or losses.
　(2) ORION products are designed and produced as general purpose equipment to be used in general industrial applications. Therefore, this warranty will not apply when used in the following applications: However, in cases where the customer/user takes full responsibility and confirms the performance of the product in advance, and takes necessary safety precautions, please consult with ORION and we will consider if use of the product in the desired application is appropriate.
　　①Atomic energy, aviation, aerospace, railway works, shipping, vehicles (cars and trucks), medical applications, transportation applications, and/or any applications where it might have a great effect on human life or property.
　　②　Electricity, gas, or water supply systems, etc.,where high levels of reliability and safety are demanded.

ORION MACHINERY CO., LTD.

オリオン機械株式会社

http : // www.orionkikai.co.jp

当社製品に関するお問合せ・資料請求は

お客様相談センター

sijo@orionkikai.co.jp

フリーコール 0120-958-076

受付時間　平日９時～17時

FAX 026-246-6753

北海道オリオン株式会社(札幌) 011-865-3666
東北オリオン株式会社(仙台) 022-284-0691
東北オリオン株式会社(盛岡) 019-641-4554
東北オリオン株式会社(郡山) 024-963-1051
東日本オリオン株式会社(東京) 03-3523-8881
東日本オリオン株式会社(横浜) 045-934-7011
東日本オリオン株式会社(八王子) 042-631-5561
東日本オリオン株式会社(千葉) 043-221-7788
東日本オリオン株式会社(太田) 0276-46-7678
東日本オリオン株式会社(さいたま) 048-783-3975
東日本オリオン株式会社(宇都宮) 028-680-6332
東日本オリオン株式会社(茨城) 0299-49-1008
東日本オリオン株式会社(新潟) 025-260-8005
東日本オリオン株式会社(長野) 026-248-2428
東日本オリオン株式会社(上田) 0268-22-6780
東日本オリオン株式会社(諏訪) 0266-58-7535

中部オリオン株式会社(名古屋) 0587-21-1717
中部オリオン株式会社(三河) 0566-62-4377
中部オリオン株式会社(三重) 059-253-7911
中部オリオン株式会社(浜松) 053-464-4737
中部オリオン株式会社(沼津) 055-929-0155
中部オリオン株式会社(金沢) 076-263-1881
関西オリオン株式会社(大阪) 06-6305-1414
関西オリオン株式会社(京都) 075-646-3939
関西オリオン株式会社(岡山) 086-246-3501
関西オリオン株式会社(山陰) 0859-30-4103
関西オリオン株式会社(広島) 082-264-4535
関西オリオン株式会社(高松) 087-835-1367
西日本オリオン株式会社(福岡) 092-477-8480
西日本オリオン株式会社(熊本) 0968-38-7311
西日本オリオン株式会社(鹿児島) 099-263-5275

本社工場　〒382-8502　長野県須坂市大字幸高246
更埴工場　〒387-0007　長野県千曲市大字屋代1291
千歳工場　〒066-0077　北海道千歳市上長都1051-16

便利メモ（おぼえのため、記入されると便利です。）

お買いあげ日		製造番号	
販売店名		店名 電話（　　）　　－	

ORION MACHINERY CO.,LTD.

Head Office and Factory : No.246 Kotaka Suzaka city, Nagano pref. 382-8502 Japan
TEL:+81-(26)-245-1230　FAX:+81-(26) -245-5424

K No.3719　2019.6.19　C　T.G.　J.F.