

**【Instruction manual】**  
**Vacuum pump**  
**Model: CRV-16V, 25V**



- Thank you for purchasing the CRV rotary-type vacuum pump.
- Please read this instruction manual carefully before use.
- Keep this manual in a place where it can be referred to at any time and look after it carefully.




(V1.00)

**Myotoku Ltd.**

### For using it safely.

The following safety precautions are provided to prevent damage and danger to personnel and to provide instructions on the correct usage of this product.

These precautions are classified into 3 categories; **DANGER**, **WARNING**, and **CAUTION**, according to the degree of possible injury or damage and the degree of impedence of such injury or damage.

 <b>DANGER</b>	Indicates an impending hazardous situation which may arise due to improper handling or operation and could result in serious bodily injury or death.
 <b>WARNING</b>	Indicates a potentially hazardous situation which may arise due to improper handling or operation and could result in serious bodily injury or death.
 <b>CAUTION</b>	Indicates a potentially hazardous situation which may arise due to improper handling or operation and could result in bodily injury or property-damage only accidents.

## **DANGER**

- ① Do not use in flammable and/or explosive atmosphere. It may cause fire.
- ② Do not put flammable solvent or inflammables around a pump. It may cause fire.
- ③ Do not put any obstacle that may disturb the ventilation around a pump. It may cause overheating and can be the source of burnings and/or fire.

## **CAUTION**

- ① Make sure to disconnect the electrical supply before installation or maintenance of the pump.  
Do not touch the electrical wiring to avoid electric shock if the pump starts operating suddenly.
- ② Make sure the earth ground connection is properly made in order to avoid electric shock or pump failure. We recommend to install an earth leakage circuit breaker.
- ③ Supply the correct rated voltage to the pump motor. Apply over rated voltage may cause motor damage or failure and/or fire of the motor.
- ④ Do not put your finger or anything else into the motor orifice. It may cause electric shock, injury or fire.

## **WARNING**

### **About setting and operating**

- ① Make sure the ambient temperature range is within 7 ~ 40°C when the pump is operating. .
- ② Make sure that no corrosive gas, water or oil gets sucked into the pump vacuum port.  
(Avoid the suction of air with high temperature or high humidity)
- ③ Avoid places with lot of dust.
- ④ Install indoor and make sure to ensure sufficient ventilation around the pump.
- ⑤ Install in a place with no explosive gas.
- ⑥ Do not expose to direct sunlight.
- ⑦ Install it in a place without danger of ignition
- ⑧ Make sure to use your both hand when carrying the pump.
- ⑨ Blade abrasion particles are blown through the exhaust port due to the blade friction when the pump is operating. Set the piping with outdoor exhaust if necessary.
- ⑩ When the pump is operating, never touch the fan, the motor or other part of the pump. It causes injury.
- ⑪ Use the pump within the operating vacuum pressure range.  
(See below table for reference)

Model	Operating vacuum pressure range
CRV-16V	-60 kPa ~ 0 (Atmospheric pressure)
CRV-25V	

- ⑫ The pump temperature increases when operating and is still high after stop of operation. As it causes burns, never touch the pump when it is operating or just after operating.
- ⑬ For safety reasons, install an overcurrent protective device and an earth leakage circuit breaker.

## **CAUTION**

### **About maintenance / repair**

- ① When the pump stops unusually, wait until the pump cools down before. Make sure the temperature is low enough to perform any checking.
- ② Assembly and disassembly of the pump requires technical knowledge.
- ③ Make sure to disconnect the electrical supply before installation or maintenance of the pump. Do not touch the electrical wiring to avoid electric shock if the pump starts operating suddenly.

## TABLE OF CONTENTS

<b>1. PRECAUTIONS BEFORE USING THE PUMP .....</b>	<b>5</b>
1) Pump appearance inspection.....	5
2) Preparation.....	5
A) Site installation.....	5
B) Pump installation .....	5
C) Pump placement .....	5
D) Piping.....	5
3) Pump motor operation and protection .....	6
4) Pump start-up, operation and stopping procedures .....	6
5) Pump storage.....	6
<b>2. PUMP CONSTRUCTION .....</b>	<b>7</b>
<b>3. TROUBLE SHOOTING OF PUMP .....</b>	<b>8</b>
1) The vacuum pressure cannot be adjusted to a high vacuum.....	8
2) Abnormal noise .....	8
3) Stop of a pump.....	9
<b>3. DISASSEMBLY AND ASSEMBLY PROCEDURES</b>	
<b>(EXCHANGE OF A BLADES, AND REMOVAL OF DEBRIS/FOREIGN SUBSTANCE)</b>	<b>10</b>
1) Disassembly procedure .....	10
2) Re-assembly procedure.....	13
<b>5. PERIODICAL INSPECTION .....</b>	<b>17</b>
1) Filter cleaning .....	17
2) Piping check .....	17
3) Filter assembly procedure .....	17
4) Check of the pump .....	17
5) Rotating part inspection.....	18
6) Blade maintenance and replacement.....	18
<b>EXPLODED VIEW.....</b>	<b>19</b>
<b>PARTS LIST .....</b>	<b>20</b>



## 1. PRECAUTIONS BEFORE USING THE PUMP

### 1) Pump appearance inspection

Perform a visual inspection of the pump and check whether there is any damaged part or screw loose, etc.



### 2) Preparation

#### A) Site installation

- ① Install in a place without danger of ignition.
- ② Install in a place/environment that would not affect the proper operation of the pump (no gas, no chemicals, etc.)
- ③ Install in a place with no water drop, no oil drop or any other liquid drop. Do not expose to direct sunlight.
- ④ The allowable ambient air temperature range for this pump is 7~40°C. In the case there is heating source close to the pump, make sure the ambient air temperature does not exceed 40°C.
- ⑤ Use in a confined space may cause operation failure due to the heat generated by the pump. Make sure to ensure sufficient ventilation around the pump and be careful not to exceed the allowable ambient temperature.
- ⑥ Install in a place where it is not exposed to humidity or dust.
- ⑦ Please install in a place with sufficient space for check and maintenance.



#### B) Pump installation

- ① Please install the pump horizontally and in a stable place.
- ② As the pump makes vibrations during operation, install rubber cushion.
- ③ Do not drop the pump when carrying it.



#### C) Pump placement

Make sure to always keep enough space around the fan cover. Provide at least 10 cm free space between the wall and the fan cover for heat dissipation.



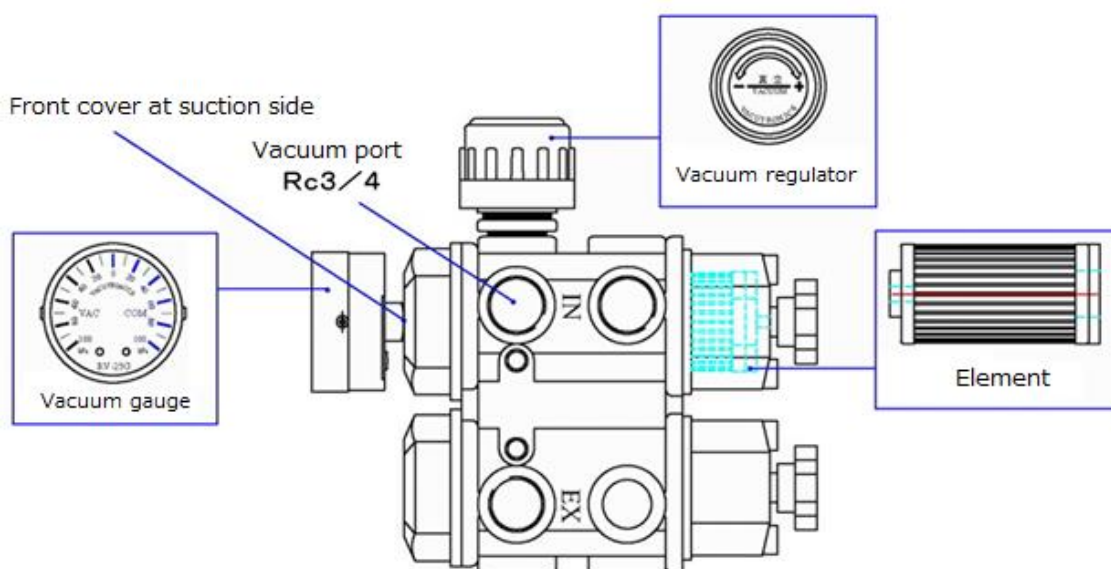
#### D) Piping

- ① Remove foreign debris from the piping by using air blow if any.
- ④ Shorten the piping as much as possible without stress on piping connections.
- ⑤ Make sure that no oil or other kind of liquid will be sucked into the piping. In the case there is oil or moisture in the operating environment, install an oil mist separator to prevent malfunction of the pump.
- ⑥ Depending on operating environment, install a precision filter (30

micrometers or less)

- ⑦ When the pump stops, if a reverse phenomenon occur, install a check valve at vacuum or exhaust port.

### Piping illustration



WARNING

#### 3) Pump motor operation and protection

- A) The rotation direction is shown on the pump cover.
- B) Protection device preparation: there is no overheat control device (thermal protector) installed on the pump; install an overcurrent protective device and an earth leakage circuit breaker.



CAUTION

#### 4) Pump start-up, operation and stopping procedures

- A) Set the vacuum at the minimum value (atmospheric pressure) before switching the power on.
- B) When operating, the temperature of the pump increases; this is a normal phenomenon.
- C) Set the vacuum at the minimum value (atmospheric pressure) before stopping the pump.

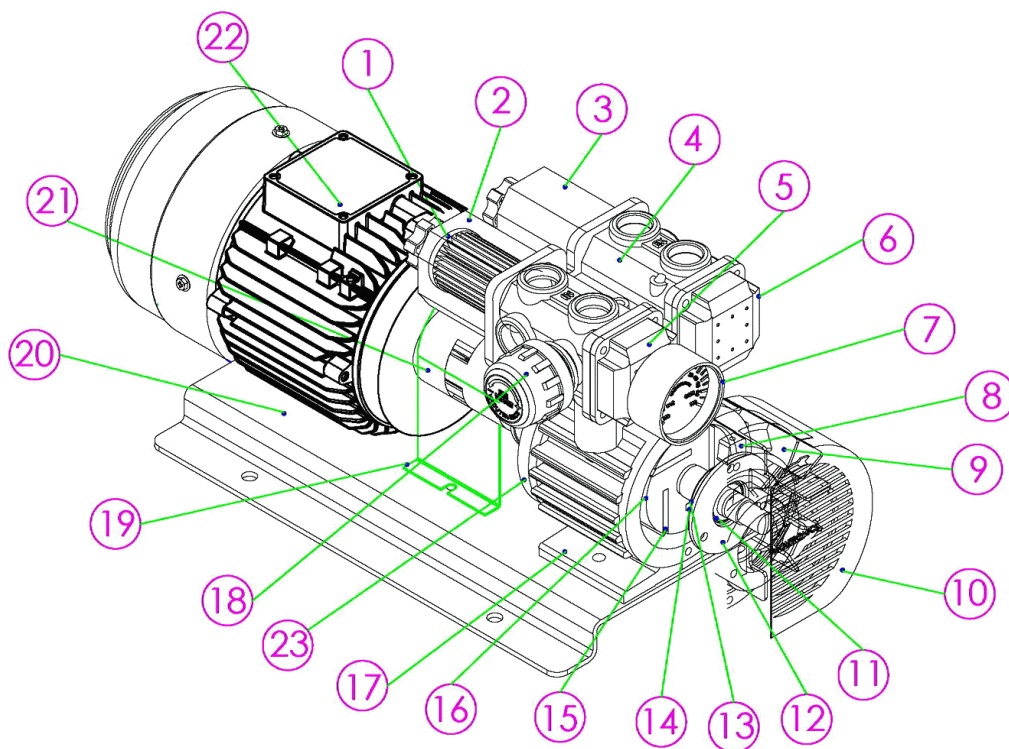
#### 5) Pump storage

After purchasing and using the pump, when you do not use it temporarily, be careful of the following matters.

- A) Cover and save indoors.

- B) Avoid places containing oil and water.
- C) Do not store in place with high humidity. Store in place where the temperature is under 40°C.

## 2. PUMP CONSTRUCTION



No.	Part name	No.	Part name
1.	Element	13.	Gap Washer
2.	Inlet Port Side Rear Lid	14.	Translucent Gap Washer
3.	Outlet Port Side Rear Lid	15.	Blade
4.	Filter	16.	Rotor
5.	Inlet Port Side Front Lid	17.	Frame
6.	Outlet Port Side Front Lid	18.	Regulator
7.	Vacuum Gauge	19.	Coupling Lid
8.	Pump Lid	20.	Base Plate
9.	Fan	21.	Coupling
10.	Fan Cover	22.	Motor
11.	Bearing	23.	Pump Rear Lid
12.	Bearing Washer		

### 3. TROUBLE SHOOTING OF PUMP

#### 1) The vacuum pressure cannot be adjusted to a high vacuum.

Cause: suction flow decrease due to clogging of filter.

- Countermeasure: remove the filter and perform an air blow to remove oil. If oil cannot be removed this way, replace with a new filter.

Cause: the blade does not rotate because of chip, dirt, liquid etc.

- Countermeasure: follow the disassembly procedure steps, remove the debris or substance.

Cause: the blade does not rotate due to rusting from water intrusion.

- Countermeasure: Disassemble the pump, remove the rust.

Cause: the vacuum gauge is broken.

- Countermeasure: change the vacuum gauge.

Cause: leakage from the piping or filter.

- Countermeasure: change the piping or filter.

Cause: screw loosening.

- Countermeasure: re-tighten the screw.

Cause: Slow speed rotation because of motor failure.

- Countermeasure: repair or change the motor.

Cause: blade is broken.

- Countermeasure: replace the blade with a new one.

Cause: blade size difference.

- Countermeasure: replace with correct sized blade.

Cause: blade wearing.

- Countermeasure: replace the blade with a new one.

#### 2) Abnormal noise

Cause: the vacuum pressure in use is too high.

- Countermeasure: adjust the vacuum pressure within the operating range using the regulator.

Cause: the coupling is inclined.

- Countermeasure: Unscrew and re-screw the coupling correctly in parallel position.

Cause: screw loosening.

- Countermeasure: re-tighten the screw.

Cause: Air cannot be sucked due to filter clogging.

- Countermeasure: remove the filter, perform an air blow to clean the filter from

oil. If oil cannot be removed by this way, replace the filter with a new one.

Cause: blade damaged by foreign debris.

- Countermeasure: Disassemble the pump, clean it and replace the blades.

### 3) Stop of a pump

Cause: blade damaged by foreign matter.

- Countermeasure: disassemble the pump, clean it and replace the blades.

Cause: Friction of rotor and/or other parts when pump is operating under over pressure.

- Countermeasure: disassemble the pump, replace the parts.

Cause: failure of the electrical system

- Countermeasure: check the state of wire and connecting terminals, and repair in case of poor contact and/or disconnection.



### 3. DISASSEMBLY AND ASSEMBLY PROCEDURES

(Exchange of a blades, and removal of debris/foreign substance)

- Disassembly and assembly process requires technical knowledge.

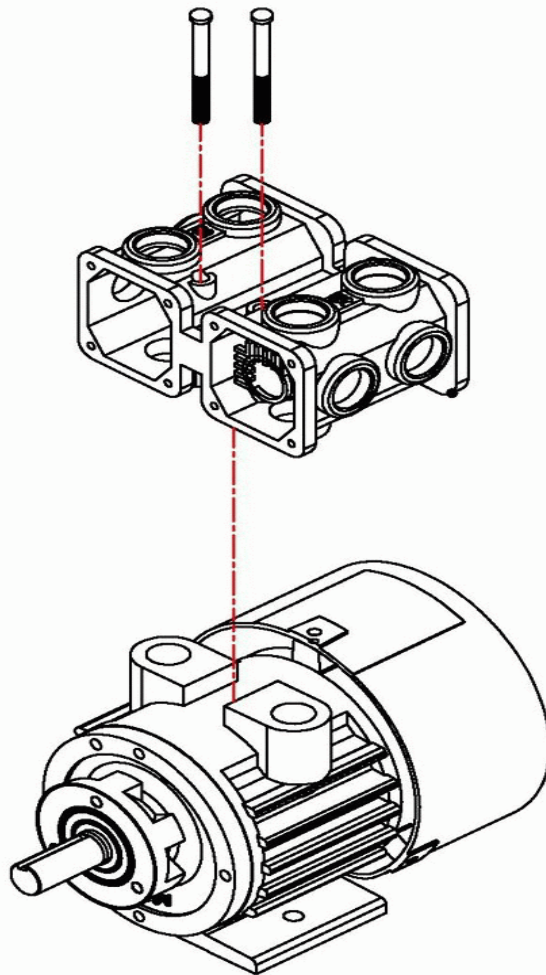
Installation and maintenance must be performed by knowledgeable personnel who understand how pneumatic and vacuum products are to be applied. Do not disassembly the pump is you do not have sufficient knowledge about vacuum pumps.

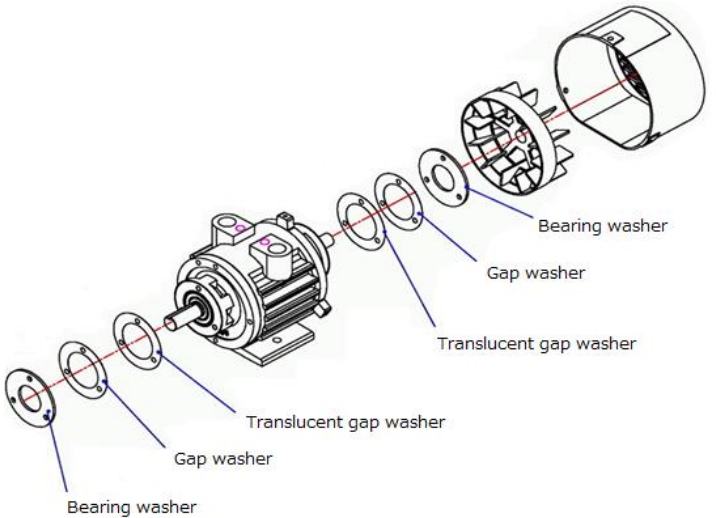
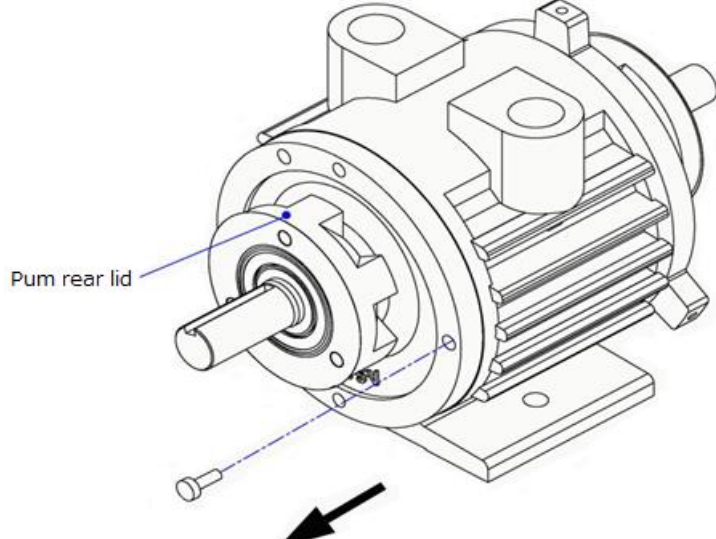
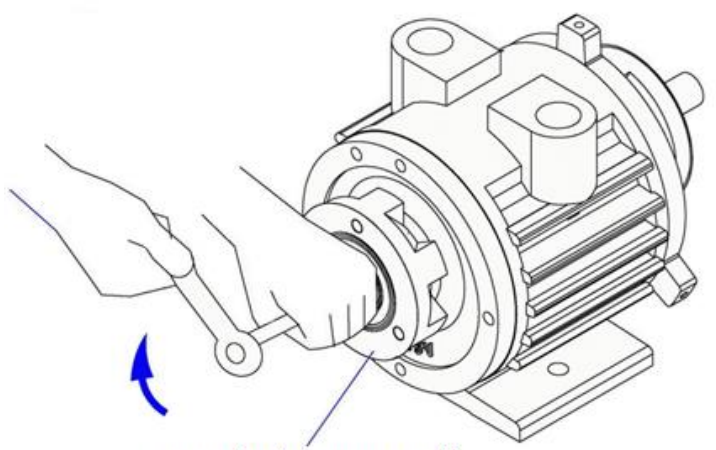
- If required, proceed with disassembly of the pump by following below instructions.

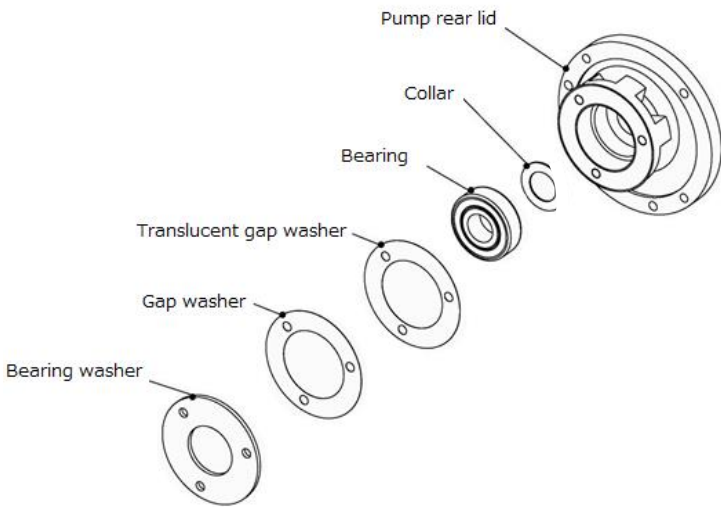
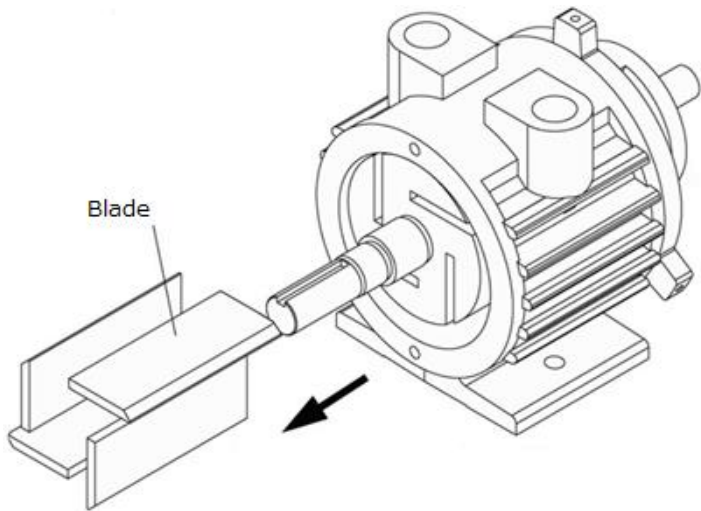
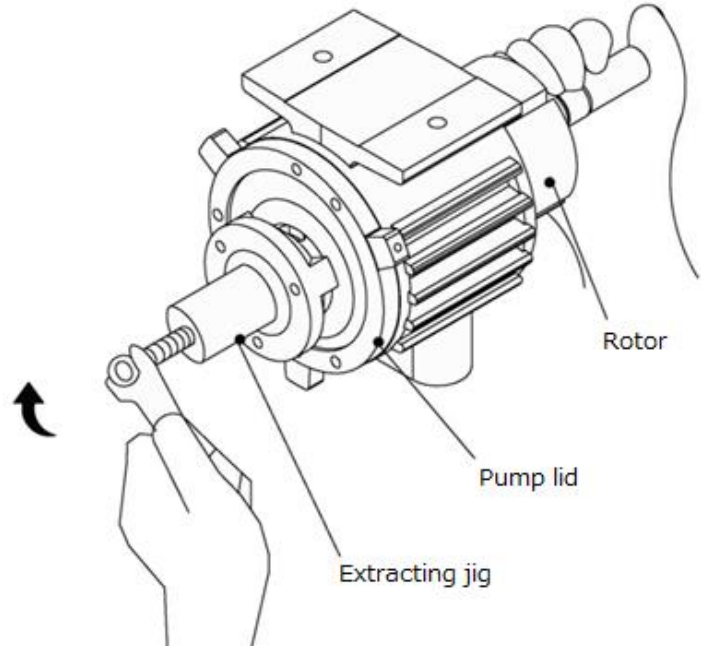
#### 1) Disassembly procedure

1-0

Remove the 2 screws from the filter and frame. Remove the filter body.

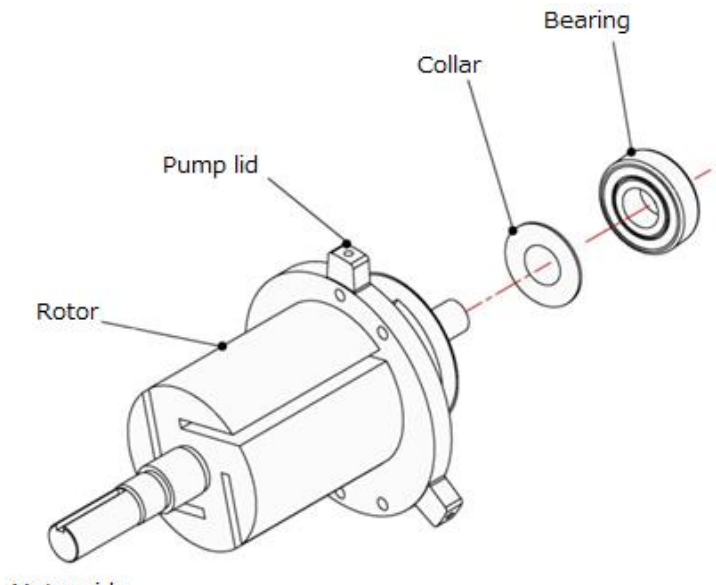


<p>1-1</p> <p>Remove the screws from the bearing, remove the bearing washer, the cap washer and translucent cap washer. Don't lose these parts after removing.</p>	 <p>Bearing washer</p> <p>Gap washer</p> <p>Translucent gap washer</p> <p>Bearing washer</p> <p>Gap washer</p> <p>Translucent gap washer</p>
<p>1-2</p> <p>Remove the screws from the pump lid.</p>	 <p>Pum rear lid</p>
<p>1-3</p> <p>Remove the 3 nuts fixed to the lid. Remove the pump lid. Do not scratch the frame side of the pump or the pump lid.</p>	 <p>Removing the pump rear lid</p>

<p>1-4</p> <p>Insert the collar, the bearing, the translucent washer, the gap washer and the bearing washer on the pump. Tighten temporary with the screws. (keep at least 1mm space between the pump lid and collar)</p>	 <p>Pump rear lid</p> <p>Collar</p> <p>Bearing</p> <p>Translucent gap washer</p> <p>Gap washer</p> <p>Bearing washer</p>
<p>1-5</p> <p>Remove the blades and make sure to remember the correct direction of the blades edge when replacing it.</p>	 <p>Blade</p>
<p>1-6</p> <p>Use the extracting jig at the opposite side of the motor and push out. Be careful not to scratch the frame or the motor.</p>	 <p>Rotor</p> <p>Pump lid</p> <p>Extracting jig</p>

<p>1-7</p> <p>Remove the pump lid from the frame.</p> <p>Do not clean the bearing with washing solution.</p>	

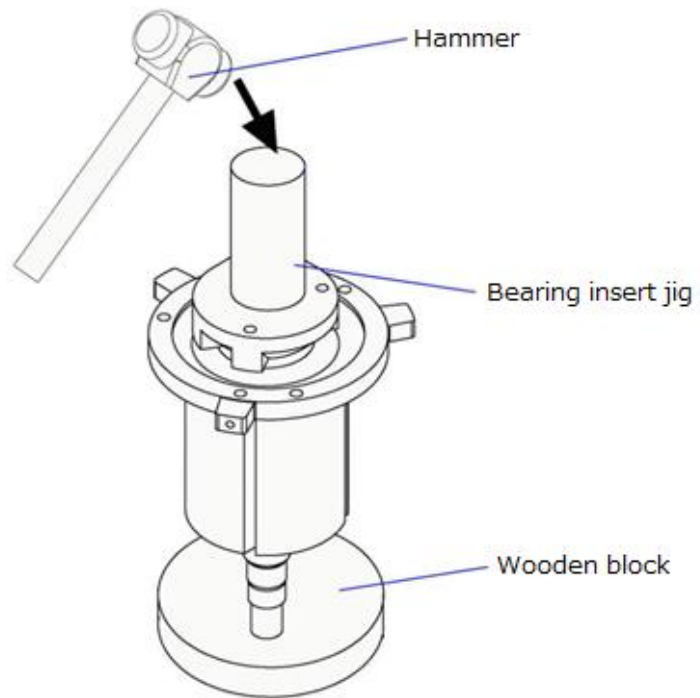
## 2) Re-assembly procedure

<p>2-1</p> <p>Facing the rotor at motor side, insert the pump lid, the collar and the bearing.</p>	 <p>The diagram illustrates the re-assembly process. A motor is shown with a rotor. The rotor has a pump lid, a collar, and a bearing. The pump lid is shown being inserted into the rotor. The collar and bearing are shown being inserted into the rotor. Red dashed lines indicate the alignment of the components. Labels include: Pump lid, Rotor, Collar, Bearing, and Motor side.</p>
--	---

2-2

Use a hammer to insert the bearing into the rotor.

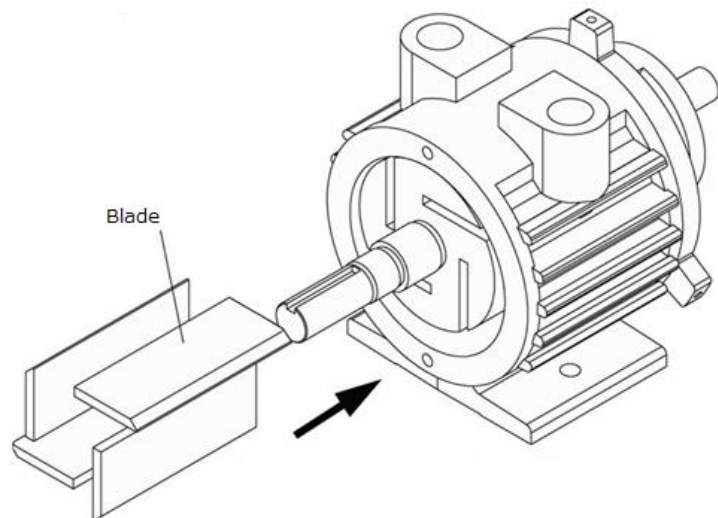
To prevent any damage of the rotor, put a wooden block between the table and the rotor.

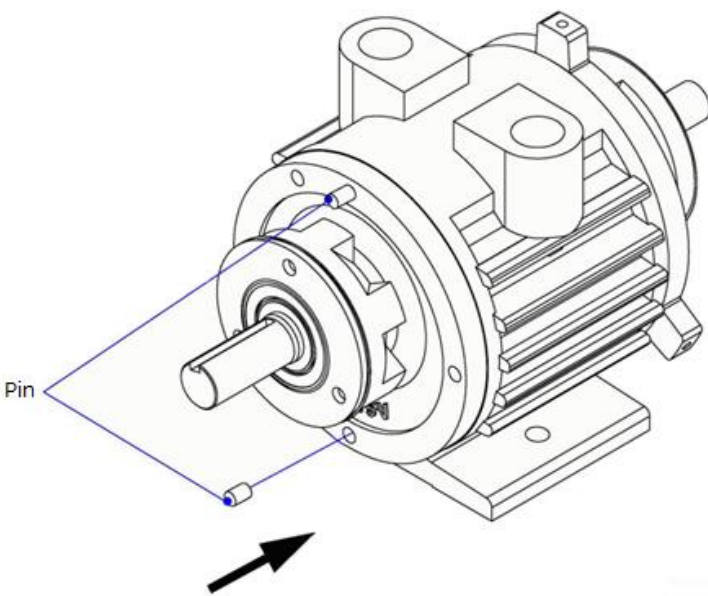
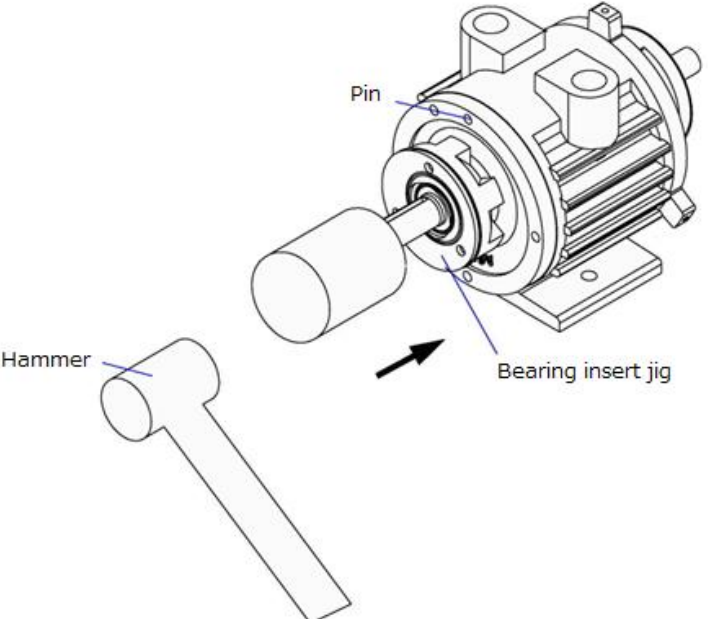


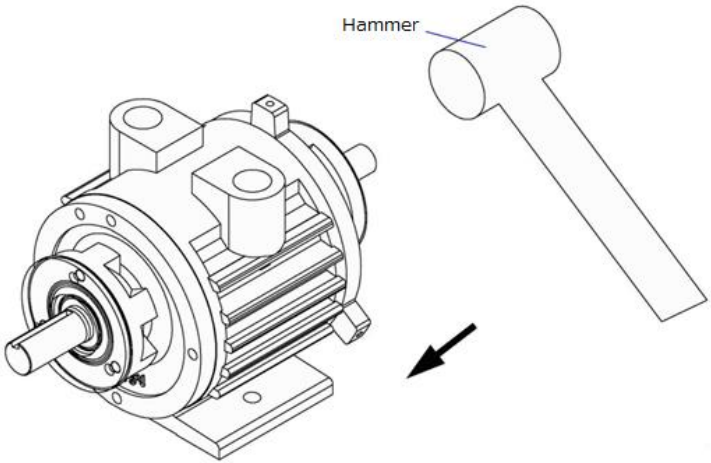
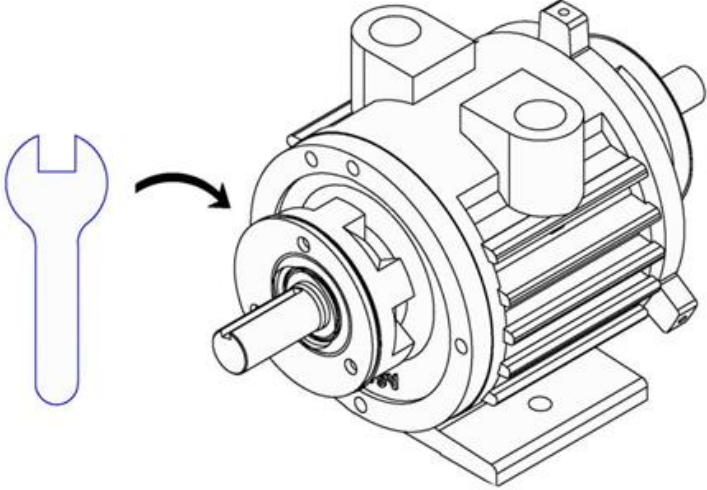
2-3

If the blade is damaged or worn, replace it with a new one.

Make sure the blade is insert and oriented in the correct direction.



<p>2-4</p> <p>Put the rotor in the frame and insert the pins. Make sure that the pin and the frame are set in the correct direction. Tighten the screws firmly. Make sure the direction of rotation and frame direction are correct.</p>	 <p>Pin</p>
<p>2-5</p> <p>Put the rotor in the pump rear lid and insert the bearing in the shaft of the rotor.</p> <p>Inset the pins and tighten the screws firmly to fix it.</p>	 <p>Pin</p> <p>Hammer</p> <p>Bearing insert jig</p>

<p>2-6</p> <p>Use a hammer and hit the bearing so that the collar, the rotor and the bearing are completely in contact.</p>	 <p>The diagram shows a motor assembly with a hammer positioned to strike the bearing. A label 'Hammer' points to the tool. An arrow indicates the direction of the impact.</p>
<p>2-7</p> <p>Firmly tighten the screw of the bearing.</p>	 <p>The diagram shows a motor assembly with a wrench positioned to tighten a screw on the bearing. An arrow indicates the direction of rotation.</p>
<p>2-8</p> <p>Make the rotor rotating clockwise and counterclockwise. Check that the rotation is performed smoothly without any resistance.</p>	



## 5. PERIODICAL INSPECTION

### 1) Filter cleaning

Perform a daily check of the filter element condition.

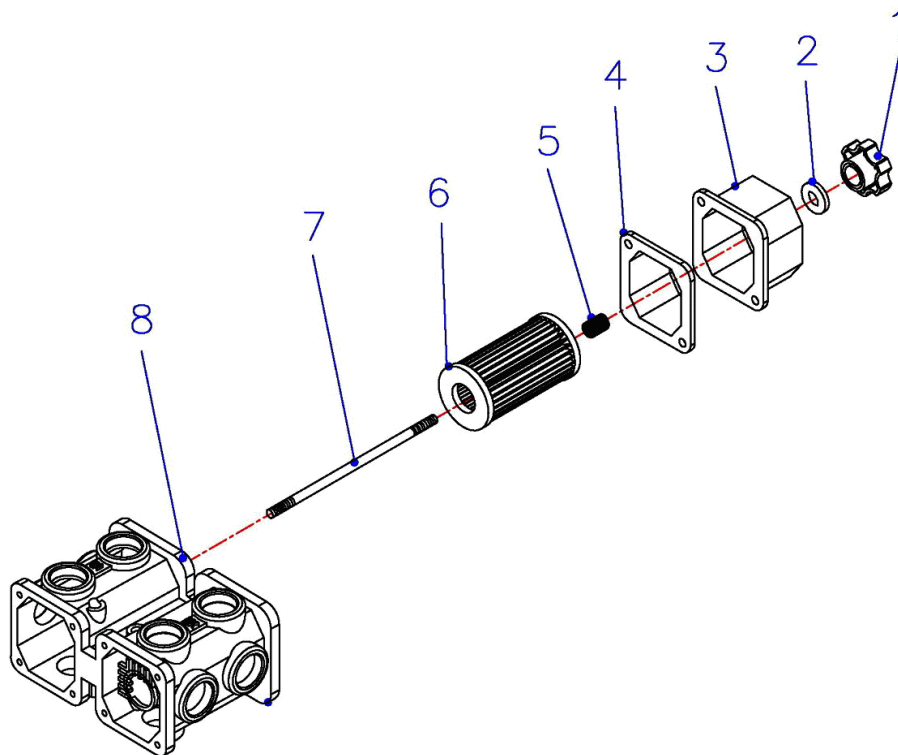
When it becomes dirty, remove the dirt by using an air blower.

In the case the oil cannot be removed by this way, replace with a new filter element.

### 2) Piping check

Check periodically and make sure there is no loose, damaged or broken piping.

### 3) Filter assembly procedure



No.	Part name	No.	Part name
1	Knob	5	Spring
2	Gasket	6	Element
3	Inlet Port Side Rear Lid	7	Screw
4	Gasket	8	Filter Main Body

### 4) Check of the pump

Check that the pump is operating correctly. Check that the performance of the pump is not decreasing.

Replacement of parts will be required in the case of abnormal sound generation.  
Contact your representative for maintenance parts purchasing and repair the pump.

5) Rotating part inspection

The pump is rotating by using the rotating part and the coupling.

① Inspection

Inspect both side of the coupling. Check the space between the coupling.

② Coupling position correction

If there is a problem with the coupling, use a scale and adjust its position.

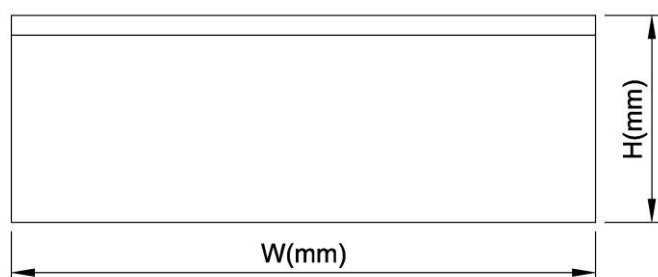
(Location may be the motor or the pump edges)

If the plastic is deteriorated, replace it with a new one.

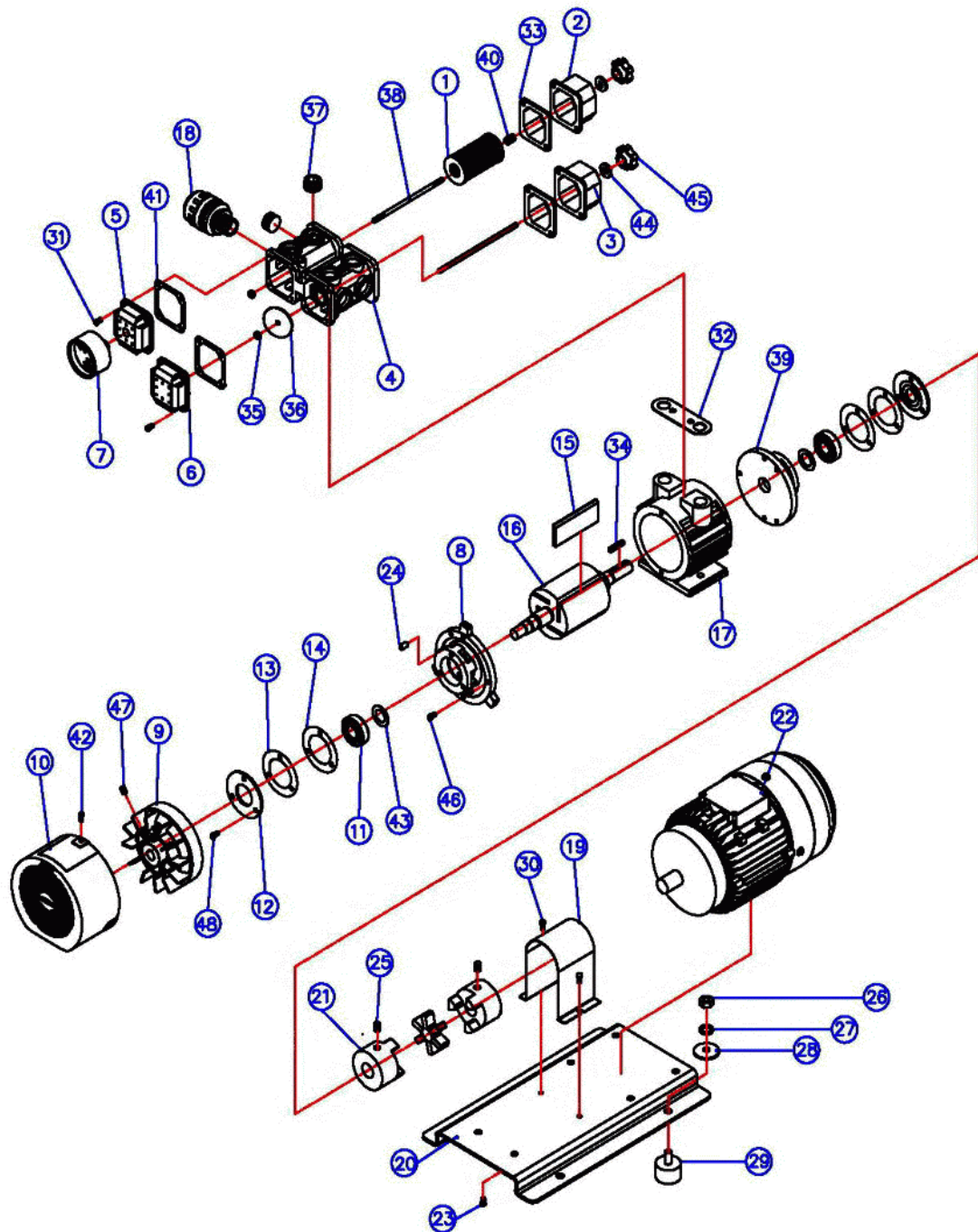
6) Blade maintenance and replacement

Replace the blade when the height reaches 14mm height.

Model	(W) Blade width	(H) Blade height (non-used)	(H) Minimum height
CRV-16V	66 mm	34 mm	26.5 mm
CRV-25V	95 mm	38 mm	29.5 mm



## EXPLODED VIEW



## PARTS LIST

No.	Part No.	Part name	Quantity
1	M0037-2	ELEMENT	1
2	M0052-2	INLET PORT SIDE REAR LID	1
3	M0052-1	OUTLET PORT SIDE REAR LID	1
4	MS024	FILTER MAIN BODY	1
5	MS024-1-2	INLET PORT SIDE FRONT LID	1
6	MS024-1-1	OUTLET PORT SIDE FRONT LID	1
7	M0041-3	VACUUM GAUGE	1
8	MS008-3	PUMP LID	1
9	M0025-4	FAN	1
10	M0024-3	FAN COVER	1
11	M0003-4	BEARING	2
12	M0011-01	BEARING WASHER	2
13	M0051	GAP WASHER	2
14	M0051-2	TRANSLUCENT GAP WASHER	2
15	M0001-3	BLADE	4
16	MS017-02	ROTOR	1
17	MS009-4	FRAME	1
18	MS017-02	REGULATOR	1
19	M0047	COUPLING COVER	1
20	Z0002-1	BASE PLATE	1
21	M0045-7	COUPLING	1
22	M0036-1	MOTOR	1
23	M0008-09-6	SCREW	2
24	M0049	PIN	4
25	M0008-07-3	RESISTING SCREW	4
26	M0009	NUT	4
27	M0010-1-05	SPRING WASHER	4
28	M0010-3-04	FLAT WASHER	4
29	M0022-2	CUSHION RUBBER FEET	4
30	M0008-08-4	SCREW	2
31	M0008-02-2-2	SCREW	8