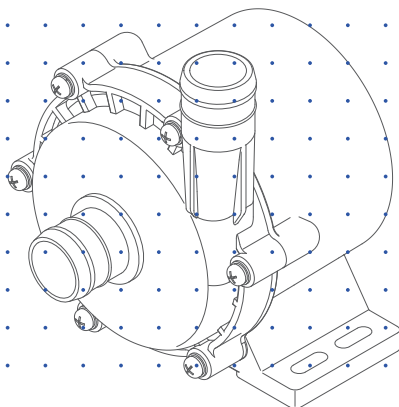


# Iwaki Direct Drive Pump

## RD-40



## Instruction manual

**Thank you for choosing our product.**



Please read through this instruction manual before use.

This instruction manual describes important precautions and instructions for the product. Always keep it on hand for quick reference.

# Order confirmation

After unpacking, check the following points. Contact us or your nearest dealer if the delivery is imperfect.

## a. Check if the delivery is as per order.

Check the nameplate to see if the discharge capacity, discharge pressure and voltage are as per order.

Iwaki Direct Drive Pump

MODEL			
MAX.CAPACITY	ℓ/min	VOLTS	V
MAX.HEAD	m	AMPS	A
RATING	Year		
DO NOT RUN PUMP DRY			
MFG.No.			
IWAKI CO.,LTD.			
6-6,Kanda-Sudacho 2-chome Chiyoda-ku Tokyo Japan			

CE

2P40830

## b. Check if the delivery is damaged or deformed.

Check for transit damage and loose bolts.

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# Safety instructions

**Read through this section before use. This section describes important information for you to prevent personal injury or property damage.**

## ■ Pictorial indication

In this instruction manual, the estimated risk of degree caused by incorrect use is ranked with the following pictorial indications. First, fully understand information on the pictorial indications.



### **WARNING**

Indicates mishandling could lead to a fatal or serious injury accident.



### **CAUTION**

Indicates mishandling could lead to personal or property damage.

Pictorial indication accompanies each precaution, suggesting "Caution", "Prohibition" and "Requirement".

#### **Caution marks**



Caution



Electrical shock

#### **Prohibition mark**



Prohibition



Do not remodel



Keep fire away

#### **Requirement mark**



Requirement



Wear protectors



### **For exportation**

Technology related to the use of goods in this instruction manual falls in the category of technology contained in the Foreign Exchange Order Attachment, which includes complementary export control of technology. Please be reminded that export license, which is issued by the Ministry of Economy, Trade, and Industry could be required, when this is exported or provided to someone even in Japan.

## WARNING

---

### Turn off power before work

Be sure to turn off power to stop the pump and related devices before work. Make sure no one turns on the power by mistake while working on the pump, otherwise it may result in a serious accident. If your work field is noisy or dark, let other people know about the situation by displaying a notice such as "POWER OFF (Maintenance)" near the power switch.



Requirement

---

### Stop operation

On sensing any abnormality or dangerous sign, suspend operation immediately and inspect/solve problems.



Requirement

---

### Do not use the pump in anything other than a specified purpose

The use of the pump in any purpose other than those clearly specified may result in failure or injury. Use this product in a specified condition.



Prohibition

---

### Do not modify the pump

Remodelling the pump carries a high degree of risk. We are not responsible for any failure or injury results from remodelling.



Do not remodel

---

### Wear protective clothing

Always wear protective clothing such as an eye protection, chemical resistant gloves, a mask and a work cap during work.



Wear protectors

---

### Use of hazardous chemicals

Risk of personal injury or fire. Check plumbing system for a leak before operation or monitor it during operation when handling a flammable, corrosive or harmful liquid.



Caution

---

### Do not damage the power cable

Do not pull or knot the power cable or place a heavy stuff on it. Damage to the power cable could lead to a fire or electrical shock.



Prohibition

---

### Do not use the pump in a flammable atmosphere

Do not place dangerous or flammable goods near the pump for your safety.



Keep fire away

## CAUTION

### **A qualified operator only**

The pump must be handled or operated by a qualified person with a full understanding of the pump. Any person who is not familiar with this product should not take part in operation or management.



Requirement

### **Use a specified power only**

Do not apply any power other than the one specified on the name-plate. Otherwise, failure or fire may result.



Requirement

### **Do not run pump dry**

Running the pump without liquid, friction heat builds up and damages the internal parts of pump.



Prohibition

### **Ventilation**

Poisoning may result when handling a toxic or odorous liquid. Keep good ventilation in your work area.



Requirement

### **Do not install or store the pump in the following places where...**

- Ambient temperature is beyond 0-40°C.
- Under a flammable or explosive atmosphere or in a dusty place.
- Under direct sunlight or wind & rain.
- Under vibration.
- Under a corrosive atmosphere such as chlorine gas.



Prohibition

### **Countermeasure against efflux**

Take a protective measure against an accidental chemical overflow results from pump or piping breakage.



Requirement

### **Do not stand on the pump**

Personal injury may result as the pump turns over.



Prohibition

### **Do not touch the pump or pipe with bare hands**

Risk of burning. The surface temperature of the pump or pipe rises high along with liquid temperature in or right after operation.



Caution

---

**Do not wet electric parts or wiring**

Risk of fire or electrical shock. Install the pump free from liquid spill.



Prohibition

---

**Confirm safety in your work area**

Keep workers away from around the pump when turning on power. The pump doesn't have the ON-OFF switch. The pump starts as the power cable is plugged in.



Requirement

---

**Remove foreign matters**

Turn off power as soon as foreign matters enter the pump and remove them. Otherwise, the pump may be damaged.



Requirement

---

**Static electricity**

When low electric conductivity liquids such as ultra-pure water and fluor inactive liquid (e.g. Fluorinert™) are handled, the static electricity may generate in the pump and may cause static discharge. Take countermeasures to remove the static electricity.



Requirement

---

**Fasten the front casing tight**

Liquid may leak if front casing fixing screws are loose. Tighten the screws diagonally and evenly by 1.6N•m before initial operation or at intervals.



Caution

---

**Do not use the pump in a water place**

The pump is not totally waterproof. The use of the pump in water or high humidity could lead to electrical shock or short circuit.



Prohibition

---

**Do no use a damaged pump**

Using a damaged pump could lead to an electric leak or shock.



Prohibition

---

**Disposal of the used pump**

Dispose of any used or damaged pump in accordance with relevant regulations. Consult a licensed industrial waste products disposing company.



Requirement

---

**Do not pressurize the pump.**

If the pump is pressurized over the normal operating pressure, O ring seal may be impaired and leakage may result.



Prohibition

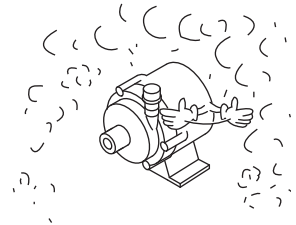
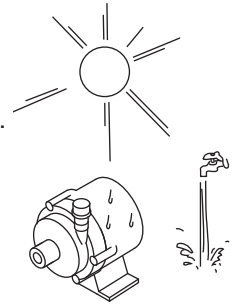


## Precautions for use

- Electrical work should be performed by a qualified operator. Otherwise, personal or property damage accident may result.



- Do not install the pump in the following places where...
  - Under a flammable atmosphere or in a dusty/humid place.
  - Under corrosive or explosive atmosphere.
  - Under water drop
  - Under flame, vibration or shock
  - Ambient temperature is beyond 0-40 degrees Celsius.
  - Ambient humidity is beyond 35-90%RH.



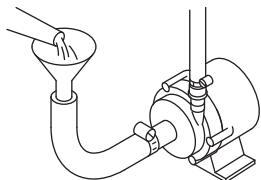
- Keep a wide maintenance space around the pump.



- Be careful not to drop the pump onto the floor. A strong impact may reduce pump performance. Do not use a pump which has once damaged. Otherwise an electrical leak or shock may result.



- This pump is not capable of self-priming. Always prime the pump before operation.



- Never wet the pump head, control unit and drive unit. Otherwise, Failure or an accident may result. Immediately wipe off liquid if the pump has got wet.



- The pump should never be operated for a lengthy period (1 minute or more) with the discharge valve closed. Otherwise, liquid may leak or tubing may break.



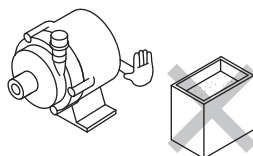
- Release the pressure from the discharge line before dismantling the pump or removing tubing. Otherwise, chemical liquid gushes out.



- Be careful not to come in contact with residual liquid.



- Do not clean the pump or nameplate with a solvent such as benzene and thinner. This may discolour the pump or erase printing. Use a dry cloth or a wet cloth with water or neutral detergent.



# Outline

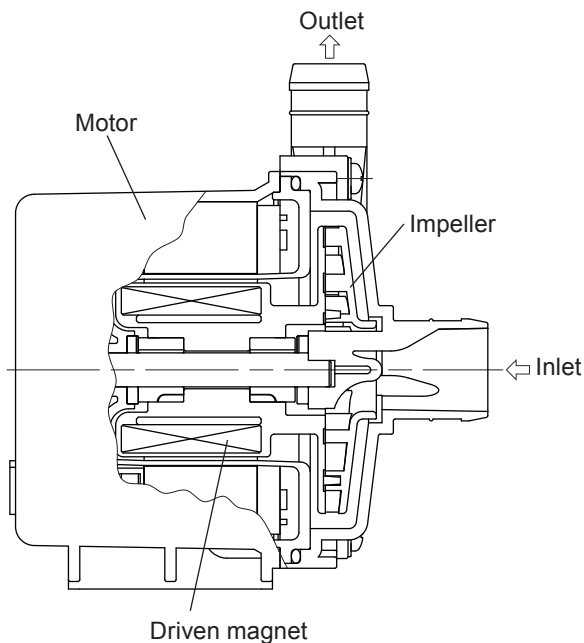
***The information such as characteristics, features and part names are described in this section.***

## Introduction

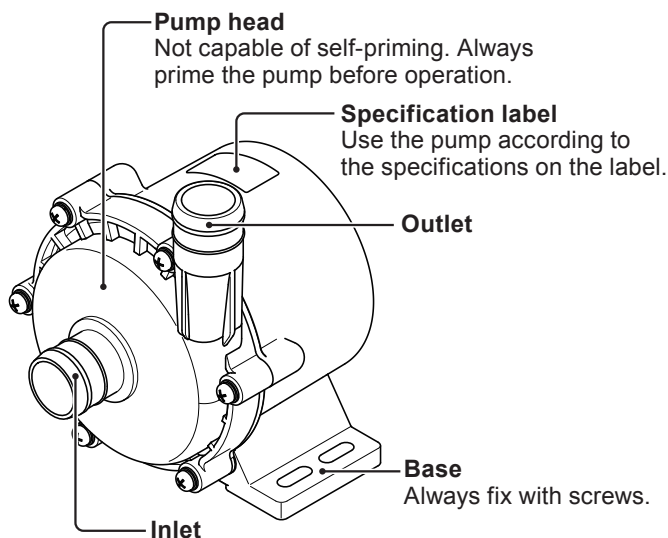
### ***Pump structure & Operating principle***

*The RD pump is a canned motor pump with a brushless DC motor.*

*The magnetic force of the motor rotates the driven magnet in order for the impeller to revolve in the pump chamber, where a liquid is transferred from the inlet to outlet.*



## Part names



## Introduction

### ***Before operation***

*Water hammer phenomenon may occur when starting or stopping operation, especially when a discharge line is too long.*

#### **When starting operation...**

First prime the pump and close a discharge valve. Run the pump and then start to open the discharge valve to meet a duty point slowly.

#### **When stopping operation...**

Slowly close a discharge valve until it bottoms out. Then turn off power to stop the pump.

\*Do not close a discharge line sharply, or water hammer phenomenon may occur and damage the pump with impact pressure.

## Priming

---

*This pump is not capable of self-priming. Always prime the pump before operation. Running the pump without priming water, internal parts are excessively worn by friction heat and fatal pump damage results.*

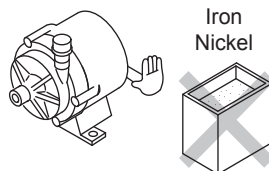
## Liquid to be handled

---

**Do not use the following liquids.**

- Paraffinic hydrocarbons such as gasoline and kerosene
- Halogenated hydrocarbons such as trichloroethylene and carbon tetrachloride
- Ether and low-grade ester
- Slurry (Never use slurry, which wears out the pump bearings.)
- Magnetic fluid
- Explosive or flammable liquid

**A strong magnet is inside the pump. Do not use the pump with any liquid which contains metals such as iron and nickel.**



**Observe the viscosity limit of 1mPa·s (at SG=1.0)**

Pure water may bring poor lubrication to the bearing. Contact us in advance.

### Effect of temperature change

Viscosity, vapour pressure or corrosiveness changes with liquid temperature.

Observe optimum operating conditions.

- Liquid temperature: 0-80°C (clean water)
- Ambient temperature: 0-40°C
- Ambient humidity: 35-90%RH

## ON-OFF operation

---

*Do not turn on or off the pump 2 times or more per minute. Observe the allowable shortest ON or OFF time of 15sec.*

## Identification codes

*The model code represents the following information.*

**RD - 40 - E 24 - H - V**  
**a      b   c d   e      f g H**

**a. Series name**

RD

**b. Pump size**

40

40X

**c. Bearing material**

No code: Filled PTFE

**d. Oring material**

E: EPDM

**e. Power voltage**

2: 24VDC

**f. Liquid temperature**

H: High liquid temperature (0-80°C)

**g. Connection**

No code: Tube

R1: R pipe thread

N1: NPT pipe thread

**H. External input**

V: 1-5VDC

# Installation

***This section describes the installation of the pump, tubing and wiring. Read through this section before work.***

## **!** Observe the following points

- Be sure to turn off power to stop the pump and related devices before work.
- Upon sensing abnormal condition or a dangerous sign, stop the work immediately. Remove problems before resuming work.
- Do not place dangerous or flammable goods near the pump for your safety.
- Risk of electrical leak or shock. Do not use a damaged pump.
- A strong magnet is inside the pump. Do not bring a watch or floppy disk which may be adversely affected by a magnetic force.

## Pump mounting

### **1** Select a suitable place.

Select a convenient place for maintenance and inspection.

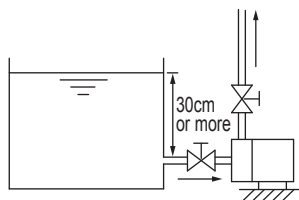
- Install the pump in a clear and flat place.
- The pump should always be free from liquid spillage.
- Keep good ventilation, taking account of the self-heating of pump.

### **2** Mounting position

This pump is not capable of self-priming.

The pump should be installed lower than the supply tank liquid level. Always keep a liquid level 30cm higher than the outlet of the tank.

If this distance is too short, air may enter a suction line and an abnormal bearing wear may result.

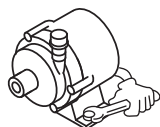


### **3** Anchor the pump.

Be sure to anchor the pump. See page 33 for suitable anchor bolts.

#### NOTE

Do not mount the pump in a vertical direction.

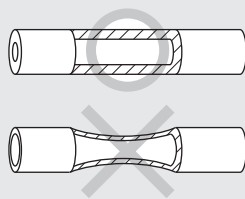


## Pipework

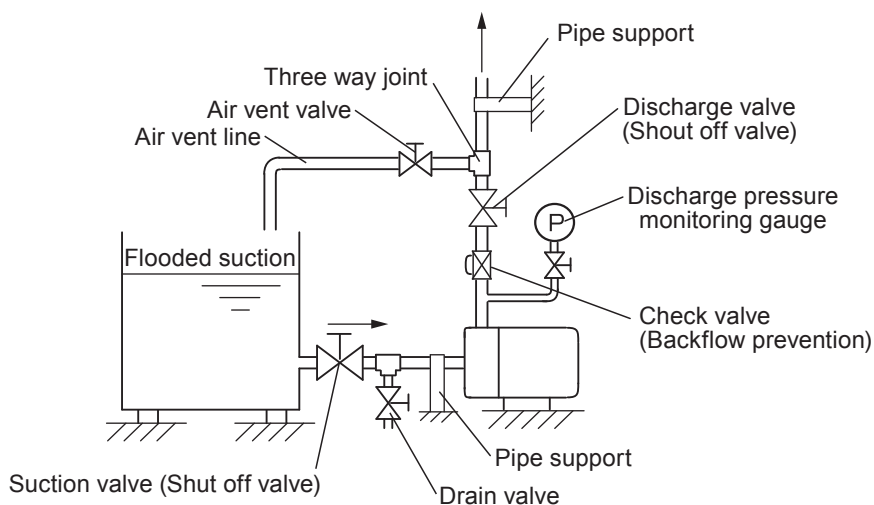
*Connect tubes to the pump and install a check valve.*

### Precautions

- Using a high flow pump and small supply tank, a liquid level in the tank changes greatly.
- Do not allow a drop of adhesive agent or sealant into pipework. They may cause fatal damage to the pump.
- If pipework directory weighs on the pump, deformation or damage may result. Be sure to install pipe supports.
- Air may be entrained into a suction line when the supply tank is refilled during operation. Take any action to prevent air ingress such as installing a baffle.
- Make sure every joint in plumbing is securely sealed.
- Use a corrosion-/pressure-resistant vinyl tube such as a braided and teflon tube, otherwise the suction hose can be crushed by negative pressure (especially for hot liquid).



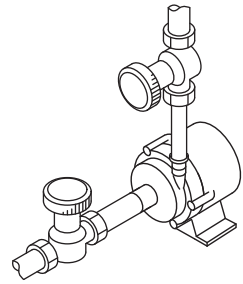
## Plumbing layout





### ■ Discharge & Suction valves

Install a ball valve on a discharge line for flow rate adjustment and on a suction line for the convenience of maintenance, as close to the pump as possible.



### ■ Pressure gauge

Install a pressure gauge for monitoring discharge line pressure.

### ■ Drain valve

Install a drain valve in between the pump inlet and the suction valve for blowing down liquid.

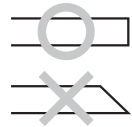
## ***Plumbing***

---

### **Tube**

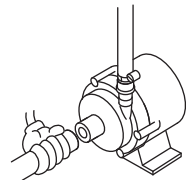
#### **1 Cut the tube end flat.**

Select a tube in accordance with the inlet and outlet of the pump. Connection will not be secured if a different size tube is used.



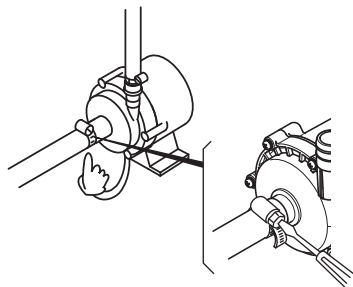
#### **2 Connect tube into the pump inlet.**

First slide an applicable screw/band hose clamp onto a tube. Then push a tube end into an inlet or outlet until it bottoms out.



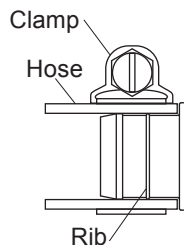
### 3 Clamp down connection.

Be sure to secure the tube connection and eliminate the possibility of leakage.



#### NOTE

- The pump inlet and outlet are plastics. Do not use excessive force.
- Always use a screw/band hose clamp. Do not use wire clamp.



## Pipe

### 1 Connect to plastic thread pipe.

The inlet and outlet of the pump are made of plastics. They must be connected to plastic thread pipes. Do not connect them to metal ones, or plastics parts will break.

### 2 Apply thread sealing tape.

Wrap a sealing tape two to three turns to the inlet and outlet of the pump. Do not wrap too many time unnecessarily, otherwise the connection may break.

#### NOTE

Do not use a liquid sealant. A liquid sealant can deteriorate the plastic connection.

### 3 Plumb the pump.

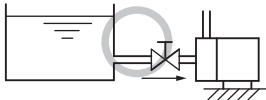
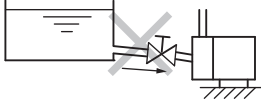
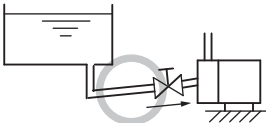
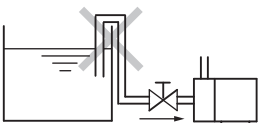
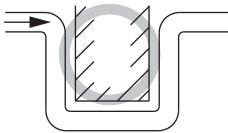
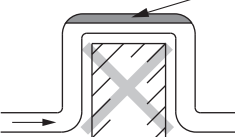
Always hold the pump head while screwing in pipes. Avoid holding the motor unit, or excessive force may be applied to connection. Tighten pipes by 4N•m. Their thread should conform to pump inlet and outlet.

# Plumbing precautions

## ■ Suction line

- In order to minimize the plumbing resistance, have plumbing shortest with the minimum bends. Note cavitation\* tends to occur when plumbing length is too long.
- Liquid level should be at least 30cm higher than the tank outlet for the prevention of air ingress.
- Keep liquid in the supply tank free from foreign matters. Clean the supply tank at intervals.
- Avoid any loops in the plumbing run that could form a vapour trap. A suction line should be laid on a rising gradient of 1/100 toward the pump so as to expel air easily.
- Attach the coupling on the suction tube or pipe carefully, so that no air enters the line. The presence of air in the suction line may prevent liquid delivery.
- Never use a suction tube or pipe with a diameter smaller than that of the pump inlet.

## Tightening torque

Acceptable	Unacceptable
 <p>Flooded suction</p>	 <p>Descending gradient</p>
 <p>Ascending gradient</p>	 <p>Suction lift</p>
 <p>U-shaped piping</p>	 <p>Arched piping</p>

**Cavitation**

Air bubbles caused by a negative pressure in the pump unit, accompanied with vibration and noise. Performance deterioration or part corrosion results.

■ **Discharge line**

- Use proper pipe supports so that the weight of the plumbing does not load the pump nozzle.
- If the plumbing is very long, its diameter should be determined by calculating the piping resistance. Otherwise, the specified performance may not be obtained due to increased piping resistance.
- A drain valve should be installed for the drainage of liquid if there is a chance that the liquid in the discharge line will freeze.

*Wiring for the power source, earthing and external signal.*

### **! Observe the following points**

- Electrical work should be performed by a qualified operator. Always observe applicable codes or regulations.
- Do not perform wiring work while the power is on. Otherwise, an electrical shock and short circuit may result, and consequently the pump may fail. Be sure to turn off power before wiring work.
- Be careful for the power not to be turned on during work.

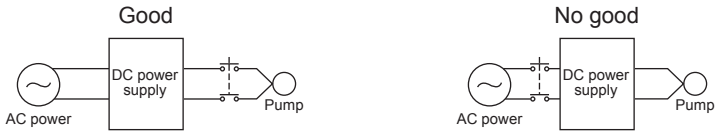
## ***Power & External signal cables***

---

### **■ Before work**

- Check that the main power is turned off.
- Wiring work should be done in accordance with electric work requirements. Use the recommended wiring accessories and follow electrical installation requirements.
- Apply the specified power voltage. See the spec label.
- The pump doesn't have the ON-OFF switch. The pump starts as the power cable is plugged in. Do not make the ON-OFF operation frequently.
- When an external fuse is used and it has blown, always solve the root cause of blowout. Be sure to unplug the cable before investigation. If the fuse blows frequently, the starting current may be a root cause.
- Check the power voltage has reduced to 0V before turning on power if it is right after operation. Otherwise, the pump may not start to run.
- Use a DC power supply that assures voltage increment to 24VDC within 50ms. If it takes more than 50ms, the pump may not start to run.

- In order to make the ON-OFF operation, install the switch between the DC power supply and the pump. Installing it between the DC power supply and the AC power supply, the pump may not run.



Wiring example

- After wiring work, check that the system is free from the inductive noise at start-up.
- The drive circuit generates noise because of its high-speed switching. Check if peripheral devices are not affected by the noise.
- If a power source is shared with the inductive load such as solenoid and relay, take a protective measure against surge.
- The external variable signal is used for just a simple flow control. Note that the flow is not in proportion to the signal input. Install a flow sensor for the feedback control when more controllability is required.

#### ■ Rated current & Starting current

Model	Rated current	Starting current
RD-40	5.5A	10A
RD-40X	5.3A	10A

# Wiring examples

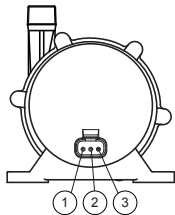
A 500mm option cable is available.

## ■ Specification (option cable)

Model	Pin alignment			Receptacle	SUMIKO TEC applicable connector		Applicable lead wire
	1	2	3				
RD-40/-40X	External variable signal (+)*	Power (+)	Power (-)	M housing CL07E03M	F housing CL07D03A	Terminal 215004-2M	AWG#20 UL3266

\*The 3rd pin is common to the power (-) and the external variable signal (-).

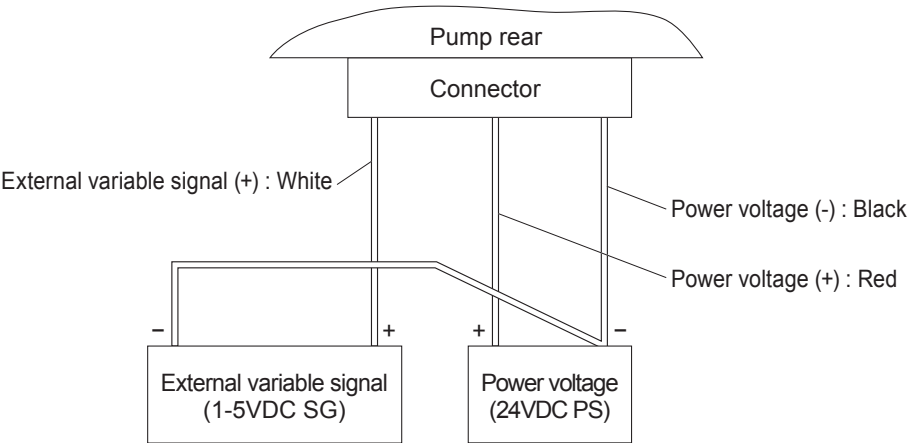
\*External variable signal should not exceed 25.2VDC.



## NOTE

- Observe polarity, otherwise failure or malfunction may result. Note that rotational direction of the motor does not change by reversing polarity.

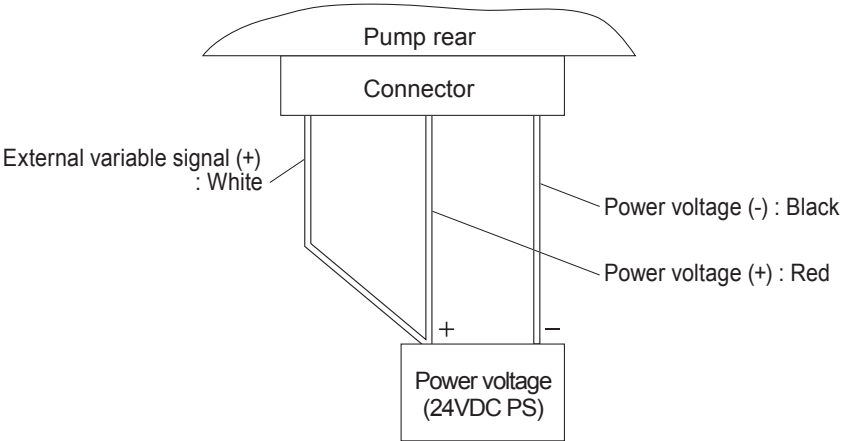
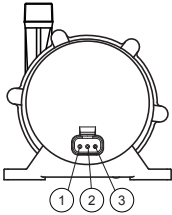
## ■ Wiring diagram (option cable)



■ **Wiring diagram (with no 1-5VDC signal generator)**

The pump is able to run with no 1-5VDC signal generator when electrically wired as follows. In this case the pump runs as if receiving the external signal of 5VDC.

Model	Pin alignment		
	1	2	3
RD-40/-40X	Power (+)	Power (+)	Power (-)





# Operation

***The pump becomes ready after pipework and wiring is completed.***

## **! Observe the following points**

- Never operate the pump with the suction valve (gate valve) closed. Otherwise, the internal parts of the pump will be damaged.
- Be sure to close the discharge valve completely before starting operation in order to prevent water hammer upon start-up.
- The pump should never be operated for a lengthy period (1 minute or more) with the discharge valve closed. The resulting rise in temperature of liquid in the pump may cause damage to the pump.
- Risk of burning. Pump and pipe surface temperatures rise high along with liquid temperature. Do not touch the pump or pipe surface directly during operation or right after operation.

## Pump operation

### ***Start-up***

No.	Procedure	Points to be checked
1	Check plumbing, wiring and power voltage.	<ul style="list-style-type: none"><li>• See "Pipework" and "Wiring" sections.</li><li>• Check the spec label for specified supply voltage.</li></ul>
2	Clean the inside of tubing/piping and tank. Then prime the pump.	<ul style="list-style-type: none"><li>• Do not allow foreign matters to enter the pump.</li></ul>
3	Open a valve.	<ul style="list-style-type: none"><li>• Fully open a suction valve.</li><li>• Fully close a discharge valve.</li><li>• Close an air vent valve as necessary.</li></ul>
4	Supply power and the external variable signal.	<ul style="list-style-type: none"><li>• The pump may not start to run if the signal is less than 3VDC, because starting torque is too low and subsequently protective circuit lock the motor. In this case, turn off power supplies once. Increase the signal to more than 3VDC transiently at the start of operation.</li><li>• The minimum starting voltage changes with plumbing, liquid property and other operating conditions.</li></ul>
5	Open discharge valve to adjust a flow to a specified level.	<ul style="list-style-type: none"><li>• Open the discharge valve slowly to meet a duty point. Do not rotate the valve sharply.</li><li>• Observe the minimum flow rate (a tenth of the max flow rate). Failure may result when operation below that flow rate continues more than 1 minute.</li><li>• Turn off power if operation is upset, see page 27.</li></ul>

No.	Procedure	Points to be checked
6	Expel air from the pump.	<ul style="list-style-type: none"> <li>• Air may not be expelled well if plumbing resistance is too high. Install air vent line as necessary.</li> <li>• Completely expel air from the pump. Or the bearing will be badly worn.</li> <li>• Keep the discharge line resistance to 1m or below and repeat 15-second operation about 5 times</li> </ul>
7	Points to be checked during operation	<ul style="list-style-type: none"> <li>• Do not allow foreign matters to enter the pump. Foreign matters may cause impeller to be locked, hindering liquid circulation. In this case turn off power immediately and contact us.</li> <li>• Turn off power when the fuse has blown. Investigate the root cause on Troubleshooting section of page 27.</li> </ul>

## NOTE

- Turn off power immediately at system upset. See page 27 for Troubleshooting.

## Shutdown

### **!** Observe the following points

- Liquid in the pump may freeze and consequently damage the pump in winter season. Drain or flush out liquid before leaving a pump and plumbing in freezing temperature.
- Use a heater to prevent liquid from freezing when the pump is temporarily stopped in extremely cold region.
- In case a blackout interrupts the pump operation, switch off the pump and close a discharge valve.

No.	Procedure	Points to be checked
1	Close a discharge valve slowly.	<ul style="list-style-type: none"> <li>• Do not cause sudden closure by using solenoid valve, or pump may be damaged.</li> </ul>
2	Reduce the external variable signal level below 1VDC. And then turn off main power.	<ul style="list-style-type: none"> <li>• The pump does not always stop at the same voltage level of the external variable signal as it is reduced. It varies with plumbing, power spec and other operating conditions.</li> <li>• When phasing down the voltage level, the pump may stop before a signal level falls below 1VDC. In this case, the motor may still be charged. Be sure to reduce the signal level below 1VDC before turning off main power.</li> <li>• Follow the Start-up procedure every time the pump is run. If the pump does not run, inspect the pump.</li> </ul>

# Maintenance

***This section describes troubleshooting, inspection, wear part replacement, exploded views and specifications.***

## Troubleshooting

*Handling of the pump, maintenance and inspection should be carried out within this instruction manual. Do not handle the pump beyond the descriptions in this manual.*

*We are not responsible for any injury or damage accident due to nonobservance of this warning. Contact us or your nearest dealer as necessary.*

States	Possible causes	Solutions
Abnormal heat	A motor has locked up or a circuit has failed.	Contact us.
	Specific gravity or viscosity is too high.	Replace with a suitable pump.
	Liquid and ambient temperature are out of spec.	Contact us.
Pump does not run.	Wrong wiring	Inspect wiring. Rewire as necessary.
	A motor has locked up or a circuit has failed.	Contact us.
	Specific gravity or viscosity is too high.	Replace with suitable pump.
	Power capacity shortage	Check the power capacity.
	Frequent ON-OFF	Do not make a frequent ON-OFF. See page 13.
Delivery head is too low.	Air trap in the pump	Expel air.
	Entrained air from the suction line	Check suction line.
	Dry running	Check for possibility of dry running before operation.
	Specific gravity or viscosity is too high.	Replace with a suitable pump.
	Pump head mounting screws are loose.	Tighten the mounting screws by 1.6 N•m.

Over current	Wrong wiring	Inspect wiring. Rewire as necessary.
	A motor has locked up or a circuit has failed.	Contact us.
	Dry running	Check for possibility of dry running before operation.
	Specific gravity or viscosity is too high.	Replace with suitable pump.
Significant noise and vibration	A motor has locked up or a circuit has failed.	Contact us.
	Air trap in the pump	Expel air.
	Dry running	Check for possibility of dry running before operation.
Leakage	Pump head mounting screws are loose.	Tighten the mounting screws by 1.6 N•m.

### ***Retightening of pump head fixing screws***

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*After a long period of operation or storage, the pump head mounting screws may come loose. Tighten the mounting screws by 1.6N•m as necessary, but then do not deform the plastic pump head.*

## Drainage

*No drain port is provided to this pump. See drainage procedure below.*

### **! Observe the following points**

- Turn off the power before drainage.
- Always wear protective clothing such as safety footwear and protective gloves during operation.
- Be sure to wear rubber gloves, protective goggles or so when handling a harmful chemical liquid.
- A liquid flows out when detaching a tube or pipe from the pump. Be careful not to wet the electrical parts including the motor.
- Do not drain a harmful chemical liquid directly on the ground or the floor. Use a draining pan or container.
- Dilute and flush out harmful liquid before drainage.

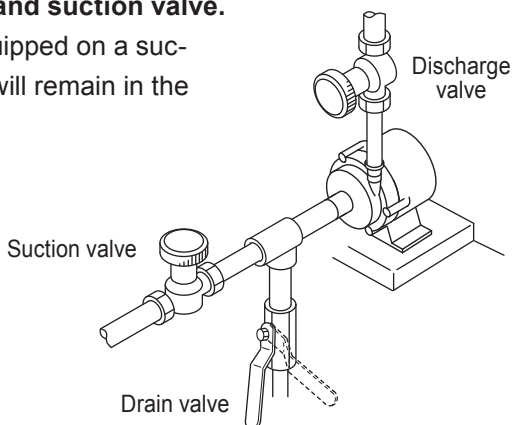
## Blowdown

### **1 Turn off power.**

Make sure no one turns on the power by mistake in operation.

### **2 Close both the discharge and suction valve.**

Use a drain valve If it is equipped on a suction line. Note some liquid will remain in the pump in this situation.



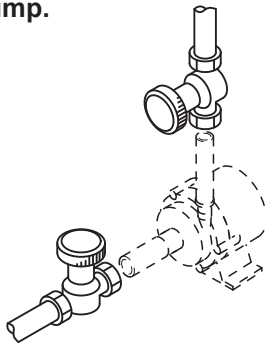
### **3 Remove tubes or pipes from the inlet and outlet.**

Collect residual liquid from plumbing in a container.

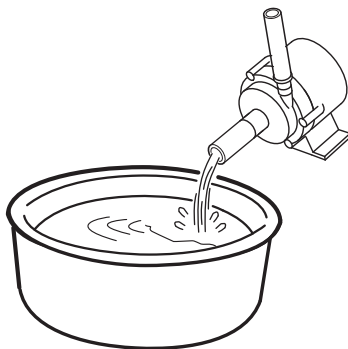
#### **NOTE**

Do not get wet with dripping residual liquid in disconnection.

### **4 Remove anchoring bolts and release the pump.**



### **5 Direct the outlet downwards to run off liquid in the container.**



## Inspection

*Perform daily and periodic inspections to keep pump performance and safety.*

### **Daily inspection**

*Check the following points. Upon sensing abnormal condition, stop operation immediately and remove problems according to "Troubleshooting".*

*If the following measures do not help removing problems, do not dismantle the pump. Contact us or your nearest dealer.*

No.	States	Points to be checked	How to check
1	Evidence of a leak	• Check for a leak. Do not start operation with a leak.	Visual
2	Pumping	• If liquid is pumped.	Flow meter or visual inspection
		• If the suction and discharge pressure are normal.	Check specification.
		• If a liquid level in the supply tank is proper.	Visual
		• If liquid is deteriorated, crystallized or settled.	Visual or audio inspection
3	Noise and vibration	• If abnormal noise or vibration occurs. They are signs of abnormal operation.	Visual or audio inspection
4	Air ingress from pump head joints and a suction line	• If discharge liquid includes air bubbles, check lines for a leak and retighten as necessary.	Visual or audio inspection
5	Load to the pump	• If discharge pressure and current are normal.	See the motor spec label.
6	Performance specification	• If discharge pressure, a flow rate or load current fluctuates. If so, see Troubleshooting.	See the performance specification.

## Specification

Model code	Connection bore		Max flow	Max head	Max SG	Motor		Weight			
	Inlet	Outlet				Power voltage	Rated output				
RD-40	ø26mm	ø19mm	25L/min	15m	1.0	24VDC	85W	1.5kg			
	R1"	R1/2"									
	NPT1"	NPT1/2"									
RD-40X	ø26mm	ø26mm	70L/min	8m			1.0		24VDC	72W	1.5kg
	R1"	R3/4"									
	NPT1"	NPT3/4"									

\*This data is based on pumping clean water at ambient temperature.

\*The maximum flow rate could be collected when a delivery head was 0m. The maximum head could be collected when the flow rate was 0 L/min.

\*The maximum viscosity is 1mPa·s when specific gravity is 1.0.

\*Allowable ambient temperature: 0-40°C

\*Allowable ambient humidity: 35-90%RH

\*Allowable liquid temperature: 0-80°C

\*The ambient temperature/humidity and liquid temperature range may change with operating conditions such as development of heat cycle (Do not use the prohibited liquid on page 13).

\*Motor type: The RD-40/-40X are equipped with a BLDC motor and its drive circuit provides the following protections.

### a. Pump lock protection

A speed detector monitors the impeller speed. The motor stops when it is upset by foreign matters.

### b. Heat protection

The pump stops when the motor temperature becomes extremely high due to sharp ambient or liquid temperature rise or overload operation.

After the pump lock protection or heat protection are activated, solve root causes before resuming operation. The pump restarts when the power is turned on.

### c. Overcurrent limiting control circuit

Drive elements are protected from the starting current and excessive current.

### d. Fuse

A fuse is equipped in driving circuit in order to protect other equipment or to prevent a fire which may occur when an internal circuit is damaged.

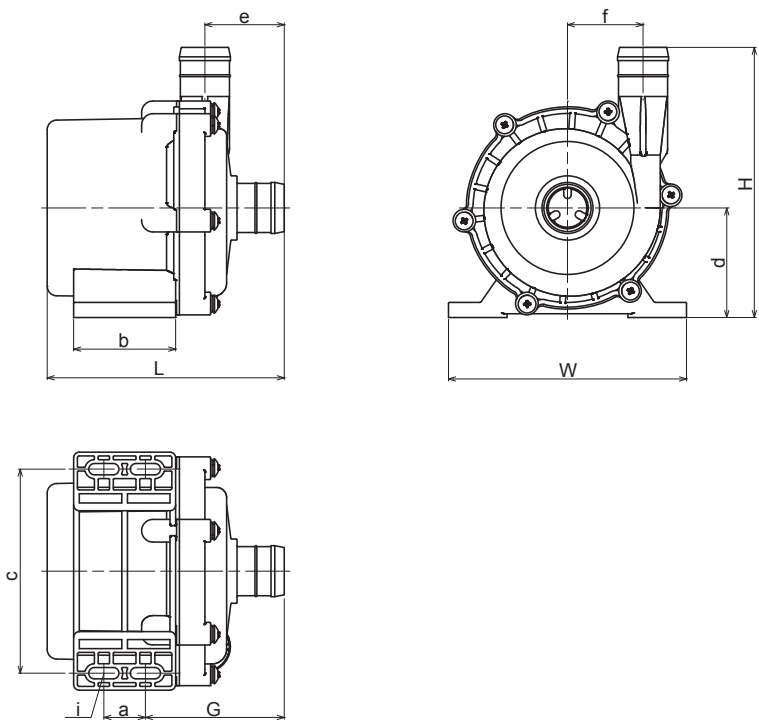
The built-in fuse can not be replaced. Installation of an external fuse is recommended.

\*Performance and dimension may be changed without prior notice.



Outer dimensions

■ RD-40/-40X

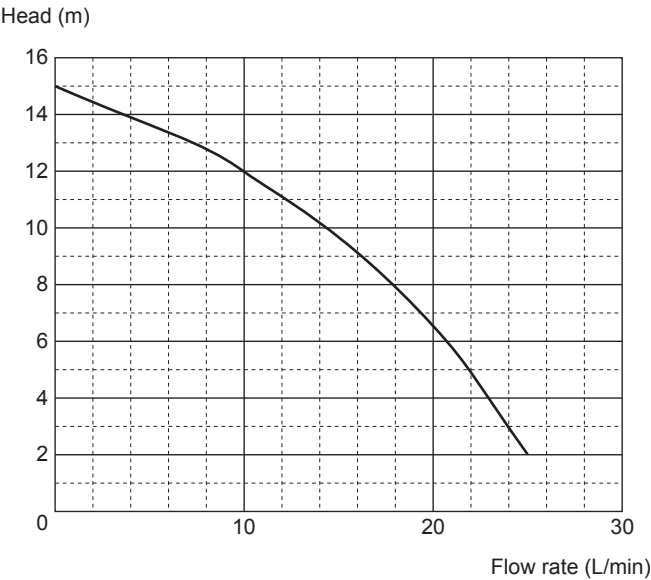


Unit (mm)

Model	Connection	W	H	L	a	b	c	d	e	f	G	I
RD-40	Tube	126	(139)	(127)	22	54	108	(58)	42	37	(75)	4-16×6
	R pipe thread	126	(133)	(127)	22	54	108	(58)	42	37	(75)	4-16×6
	NPT pipe thread	126	(133)	(127)	22	54	108	(58)	42	37	(75)	4-16×6
RD-40X	Tube	126	(143)	(127)	22	54	108	(58)	42	40	(75)	4-16×6
	R pipe thread	126	(134)	(127)	22	54	108	(58)	42	40	(75)	4-16×6
	NPT pipe thread	126	(134)	(127)	22	54	108	(58)	42	40	(75)	4-16×6

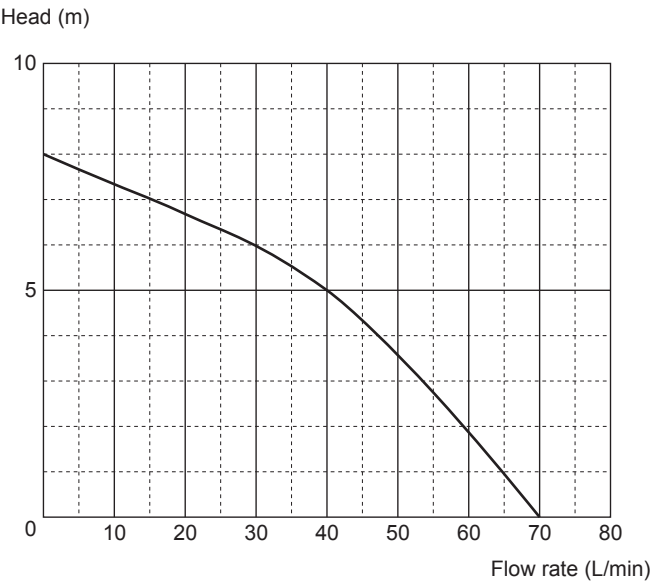
Performance curves

■ RD-40

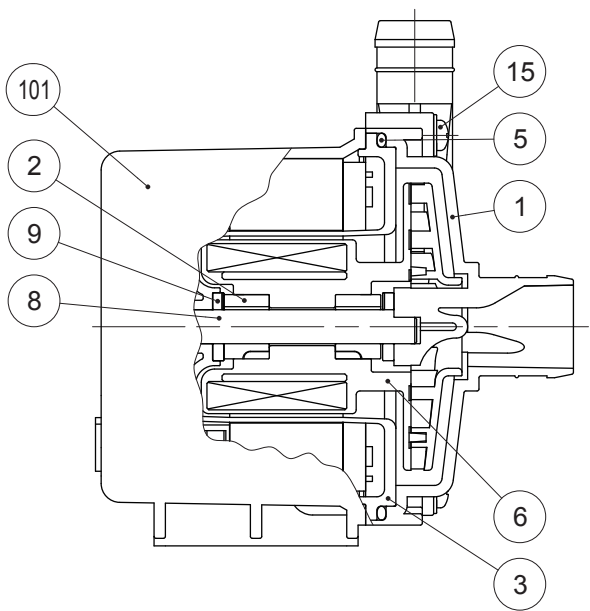


\*Observe the maximum flow rate of 25L/min. Cavitation may be developed beyond that rate.

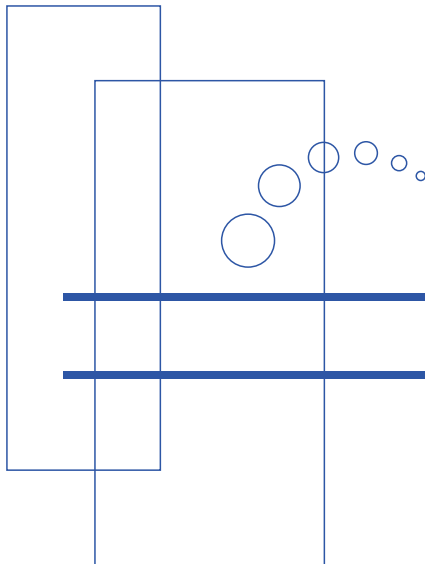
■ RD-40X



Part names & Structure



No.	Part names	Q'ty	Materials
1	Front casing	1	PPS
2	Bearing	2	Filled PTFE
3	Rear casing	1	PPS
5	O ring	1	EPDM
6	Impeller	1	PPS
8	Spindle	1	Alumina ceramic
9	Thrust ring	2	Alumina ceramic
15	Machine screw w/ PW & SW	6	Stainless steel
101	Motor	1	



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( ) Country codes

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