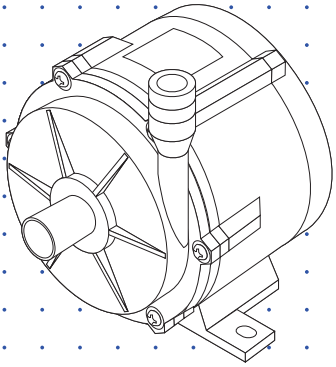
IWAKI PUMPS

Iwaki Direct Drive Pump

RD Series



Instruction manual

Thank you for choosing our product.

Please read through this instruction manual before use.

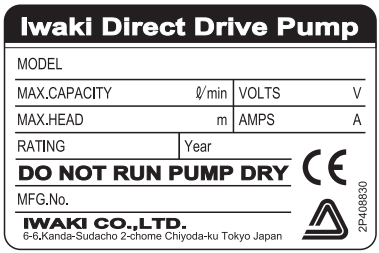
This instruction manual describes important precautions and instructions for the product. Always keep it on hand for quick reference.

Order confirmation

After unpacking, check the following points. Contact us or your nearest distributor 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.



b. Check if the delivery is damaged or deformed.

Check for transit damage and loose bolts.

Contents

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".

⚠ Export restrictions

Information contained within this instruction manual may be considered controlled technology as set by the Japanese Ministry of Economy, Trade and Industry (METI). An export license issued by METI may be required when exporting or providing the manual to a 3rd party.

⚠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 power by mistake while working on the pump, otherwise it may result in a serious accident. If your working area is noisy or dark, let other people know about the situation by displaying a notice such as "POWER OFF (Maintenance)" near a power switch.


Requirement

Stop operation

On sensing any abnormality or danger, 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 a power cable

Do not pull or knot a power cable or place a heavy stuff on it. Damage to a power cable could lead to a fire or an 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 working area.


Requirement

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

- Ambient temperature is out of the specified range. See page 33.
- Under a flammable atmosphere or in a dusty/humid place.
- Under direct sunlight or wind & rain.
- Under vibration.
- Under a corrosive atmosphere such as chlorine gas.


Prohibition

Countermeasure against efflux

Take protective measures 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 bands

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 working area

Keep workers away from around the pump when turning on power. The pump doesn't have an ON-OFF switch. The pump starts as a power cable is plugged in. Make the external variable signal input ready for operation if provided.


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, static electricity may generate in the pump and may cause static discharge. Take countermeasures to remove 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 (except pressure resistant types).

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

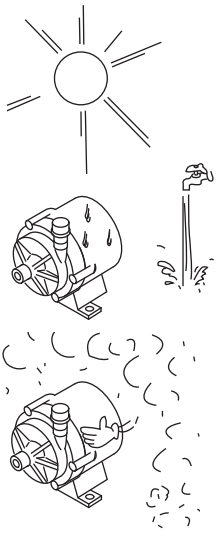

Prohibition

Precautions for use

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


Caution

- 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 out of the specified range. See page 33.
  - –Ambient humidity is out of the specified range. See page 33.

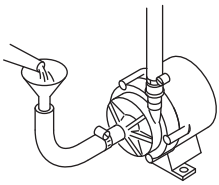


- Keep a wide maintenance space around the pump.


Requirement

- 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.



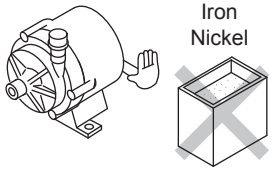
• Never wet the pump head, control unit and drive unit. Otherwise, failure or an accident may result. Immediately wipe off liquid if the pump has got wet.

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

• Release the pressure from a 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 benzine and thinner. This may discolour the pump or erase printing. Use a dry cloth or a wet cloth with water or neutral detergent.

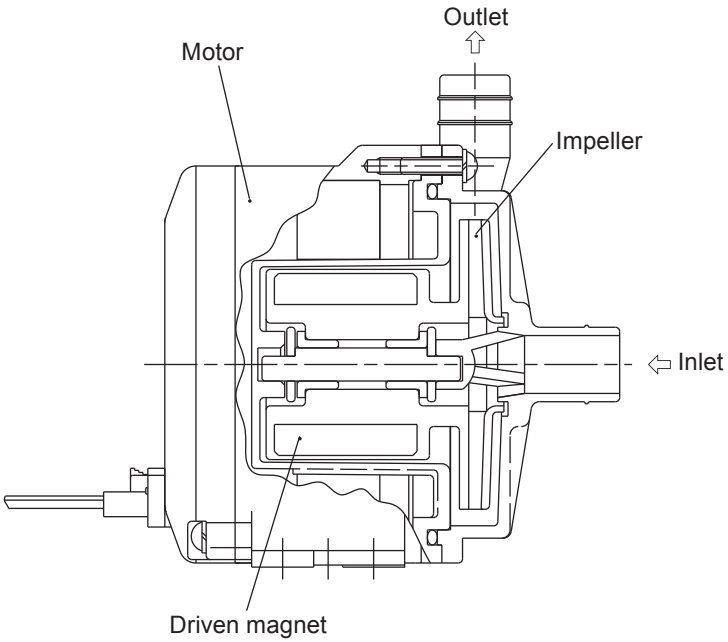


The information such as characteristics, features and part names are described in this section.

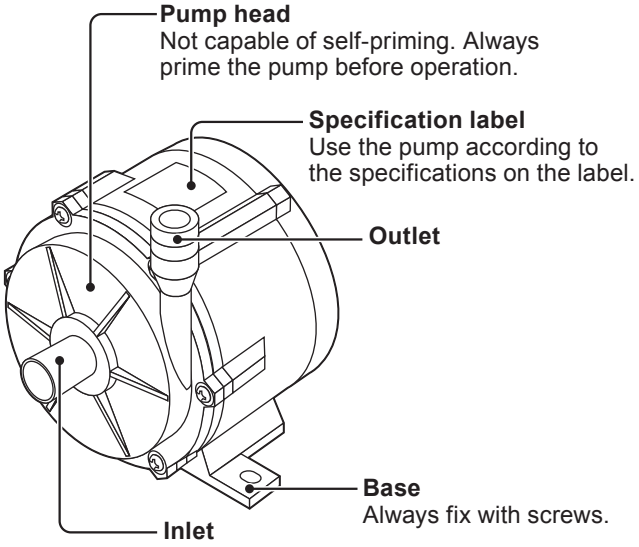
Introduction

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 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

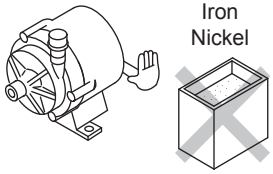
This pump is not capable of self-priming. Always prime the pump before operation. Running the pump without priming water, internal parts are excessively worn by friction heat and fatal pump damage results.

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. See page 33 for detail.

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-05/-05H/-20/-30 (except RD-30_V24-HV)>

RD - 05 T E 24
a b c d e

a. Series name
RD

b. Pump size
05/ 05H/ 20/ 30

c. Bearing material
No code: Filled PPS (RD-05/-05H) Filled PTFE (RD-20/-30)
T: PTFE (RD-05/-05H/-20/-30)

d. Oring material
V: FKM E: EPDM

e. Power voltage
24: 24VDC

<RD-12/-12Z/-30_V24-HV>

RD - 12 T E 24 - _ N1 V 12
a b c d e f g H i

a. Series name
RD

b. Pump size
12/ 12Z/ 30

c. Bearing material
No code: Filled PTFE (RD-30)
T: PTFE

d. Oring material
V: FKM (RD-30_V24-HV only) E: EPDM (RD-12/-12Z)

e. Power voltage
24: 24VDC

f. Liquid temperature
No code: Normal temperature H: High liquid temperature (RD-30_V24-HV only)

g. Connection
No code: Tube N1*: NPT thread N2*: NPT thread (Pressure resistant)
Q1*: Quick fastener Q2*: Quick fastener (Pressure resistant)

H. External input
V: 1-5VDC

i. Motor size
12: 12W (RD-12) 14: 14W (RD-12Z)

* RD-30_V24-HV is excluded.

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 abnormality or danger, stop 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

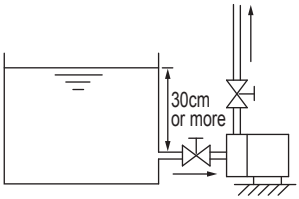
1 **Select a suitable place.**

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.

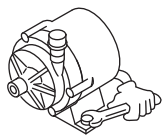


3 **Anchor the pump.**

Be sure to anchor the pump. See page 35 & 36 for suitable anchor bolts.

NOTE

Do not mount the pump in a vertical direction.

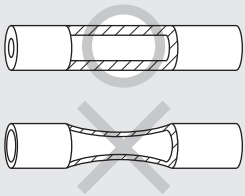


Pipework

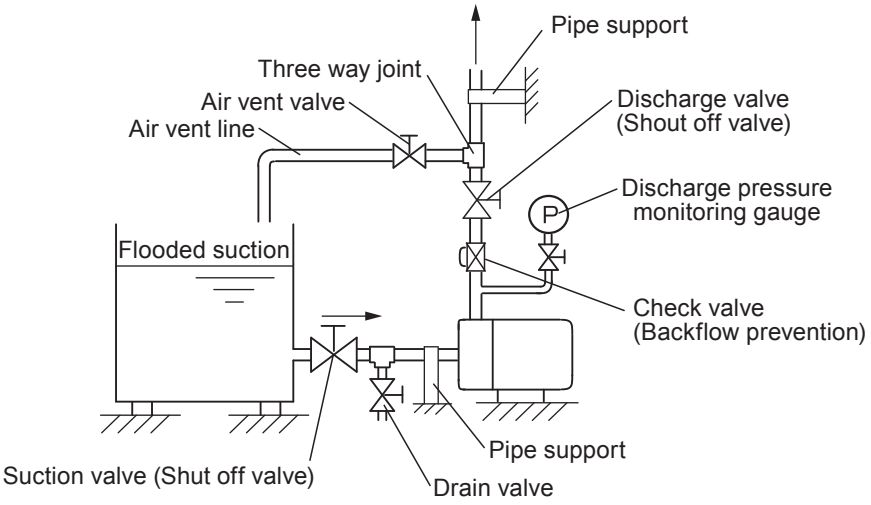
Connect tubes to the pump and install a check valve.

Precautions

- Using a high flow pump and a 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 a 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 a teflon tube, otherwise a suction tube can be crushed by negative pressure (especially for hot liquid).

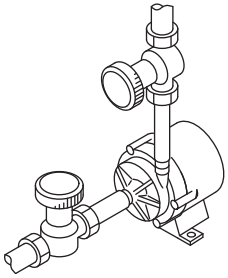


Plumbing layout



■ **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**

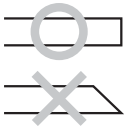
Install a drain valve in between the pump inlet and a suction valve for blowing down liquid.

Plumbing

Tube

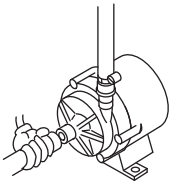
1 **Cut the tube end flat.**

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.



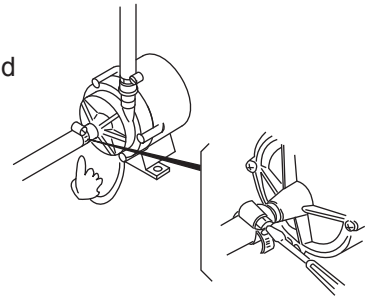
2 **Connect tube into the pump inlet.**

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



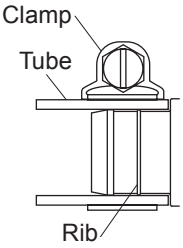
3 **Clamp down connection.**

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 tube 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

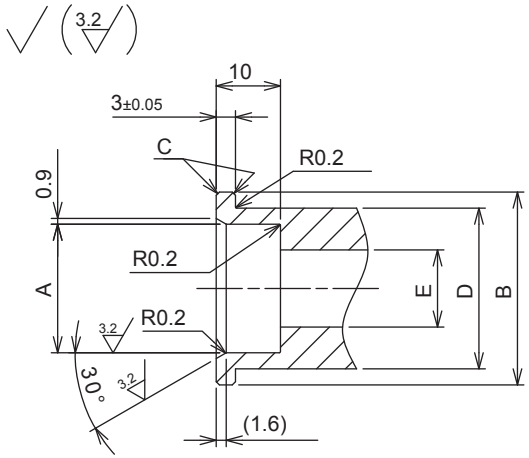
Do not use a liquid sealant. A liquid sealant can deteriorate the plastic connection.

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 up to 4N•m. Their thread should conform to pump inlet and outlet.

■ **Quick fastener**

See the dimension below for connection by quick fastener.



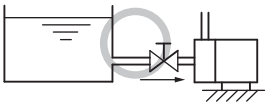
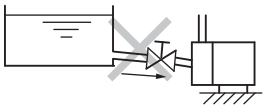
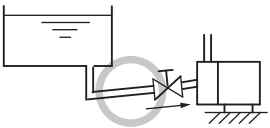
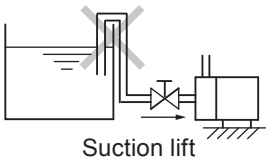
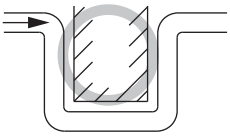
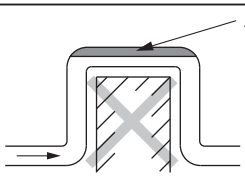
	P-16	P-14	P-10
A	ø20 $^{+0.06}_{0}$	ø18 $^{+0.06}_{0}$	ø13 $^{+0.05}_{0}$
B	ø30	ø26	ø20
C	C0.5	C0.5	C0.5
D	ø25	ø22	ø17
E	ø12 or more	ø10 or more	ø6 or more
Quick fastener	16A	12.7	10

Plumbing precautions

■ **Suction line**

- In order to minimize plumbing resistance, have plumbing shortest with the minimum bends. Note cavitation* tends to occur when plumbing length is too long.
- A liquid level should be at least 30cm higher than the tank outlet for the prevention of air ingress.
- Keep liquid in a supply tank free from foreign matters. Clean the tank at intervals.
- Avoid any loops in a 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.
- Be sure to secure connections on a suction line for the prevention of entrained air. The presence of air in a suction line may prevent liquid delivery.
- Never use a suction tube or pipe with a diameter smaller than that of the pump inlet.

Suction line examples

Acceptable	Unacceptable
 Flooded suction	 Descending gradient
 Ascending gradient	 Suction lift
 U-shaped piping	 Arched piping

Glossary

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 a discharge line will freeze.

Wiring

Wiring for 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 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 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 relevant electric work requirements. Use the recommended wiring accessories.
- Apply the specified power voltage. See the spec label.
- The pump doesn't have an ON-OFF switch. The pump starts as a power cable is plugged in. Do not turn ON and OFF power in a short time.
- 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 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.

• Noise accompanies the high-speed switching of the drive circuit. Check it does not affect peripheral devices.

• If a power source is shared with the inductive load such as solenoid and relay, take protective measures 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-05	0.4A	1.5A
RD-05H	1.6A	4A
RD-12	1.0A	4A
RD-12Z	1.2A	5A
RD-20	2.5A	8A
RD-30/-30_V24-HV	3.2A	10A

Wiring examples

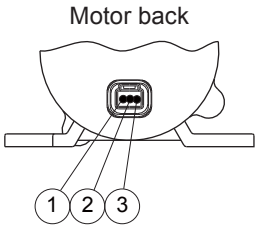
A 500mm option cable is available (except RD-05H).

■ **Specification (Connector)**

Models	Pin alignment			Maker	Receptacle	Applicable connector		Applicable lead wire
	1	2	3					
RD-05	-	Power (-)	Power (+)	SUMIKO TEC	M housing WP22A03M	F housing WP20B03F	Terminal 705432-2M	AWG#22 UL3265
RD-12/-12Z	External variable signal (+)*	Power (-)						
RD-20/-30	-				M housing CL07E03M	F housing CL07D03A	Terminal 215004-2M	AWG#20 UL3266
RD-30_V24-HV	External variable signal (+)*							

*****The power (-) is common to the external variable signal (-).

*External variable signal should not exceed 25.1VDC.



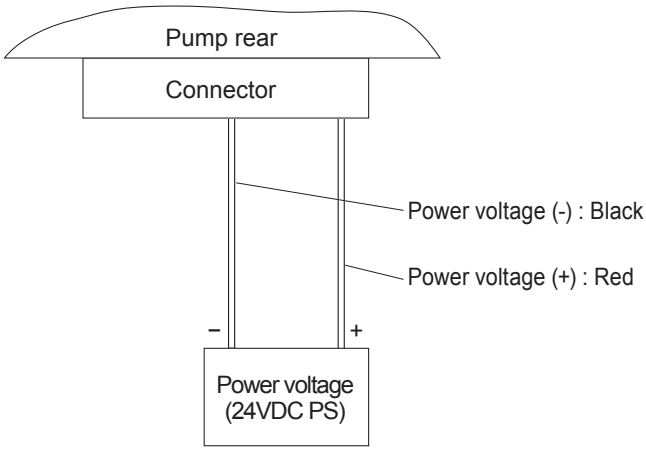
NOTE

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

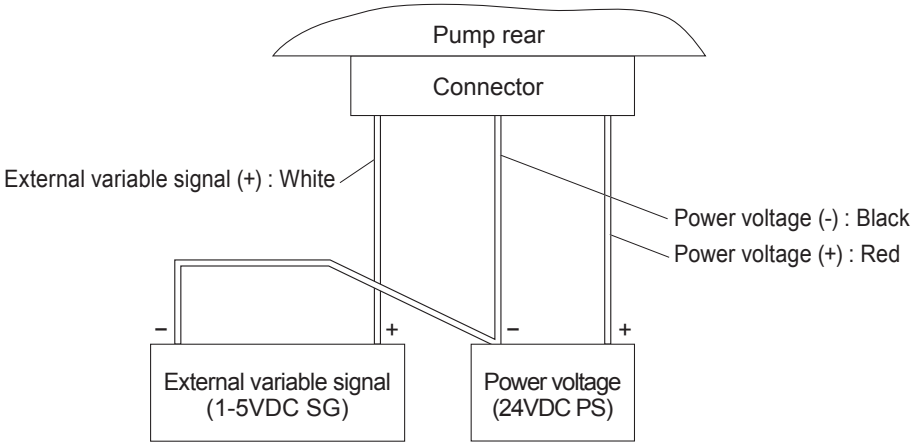
■ Wiring diagram (option cable)

RD-05/-05H/-20/-30 (except 30_V24-HV)

*The RD-05H has already been equipped with cables at our factory.



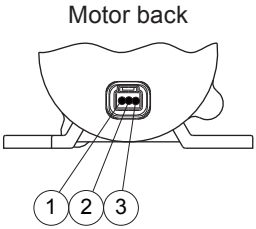
RD-12/-12Z/-30_V24-HV

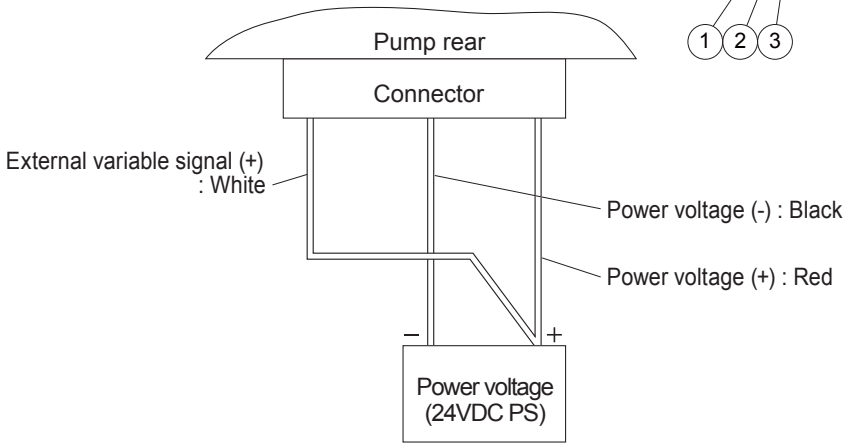


■ **Wiring diagram (with no 1-5VDC signal generator)**

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-12/-12Z/-30_V24-HV	Power (+)	Power (-)	Power (+)





Operation

The pump becomes ready after pipework and wiring is completed.

Observe the following points

- Never operate the pump with a suction valve (gate valve) closed. Otherwise, the internal parts of the pump will be damaged.
- Be sure to close a 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 a 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.	• See "Pipework" and "Wiring" sections. • Check the spec label for specified supply voltage.
2	Clean the inside of tubing/piping and tank. Then prime the pump.	• Do not allow foreign mattes to enter the pump.
3	Open a valve.	• Fully open a suction valve. • Fully close a discharge valve. • Close an air vent valve as necessary.
4	Supply power. Send the external variable signal as necessary.	• 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. • The minimum starting voltage changes with plumbing, liquid property and other operating conditions.
5	Open a discharge valve to adjust a flow to a specified level.	• Open a discharge valve slowly to meet a duty point. Do not rotate the valve sharply. • Observe the minimum flow rate of 0.5L/min. (a tenth of the max flow rate for the RD-12/-12Z/-30_V24-HV). Failure may result when operation below that flow rate continues more than 1 minute. • Turn off power if operation is upset, see page 28.

No.	Procedure	Points to be checked
6	Expel air from the pump.	• Air may not be expelled well if plumbing resistance is too high. Install air vent line as necessary. • Completely expel air from the pump. Or the bearing will be badly worn. • Keep the discharge line resistance to 1m or below and repeat 15-second operation about 5 times
7	Points to be checked during operation	• Do not allow foreign matters to enter the pump. Foreign matters may cause an impeller to be locked, hindering liquid circulation. In this case turn off power immediately and contact us. • Turn off power when the fuse has blown. Investigate a root cause on Troubleshooting section of page 28.

NOTE

• Turn off power immediately at system upset. See page 28 for Troubleshooting.

Shutdown

Observe the following points

- Liquid in the pump may freeze and consequently damage the pump in winter. 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.	• Do not cause sudden closure by using a solenoid valve, or pump may be damaged.
2	Reduce the external variable signal level below 1VDC. And then turn off main power.	• 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. • 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. • Follow the Start-up procedure every time the pump is run. If the pump does not run, inspect the pump.

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 personal injury or property damage due to nonobservance of this warning. Contact us or your nearest distributor 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 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 a suction line	Check the 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

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 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 electrical parts including a 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 removing a tube or a pipe.

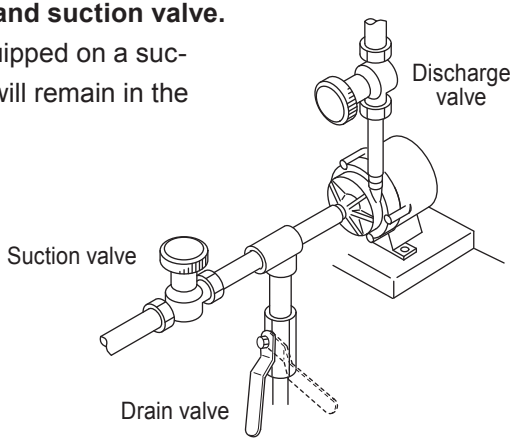
Blowdown

1 **Turn off power.**

Make sure no one turns on 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.



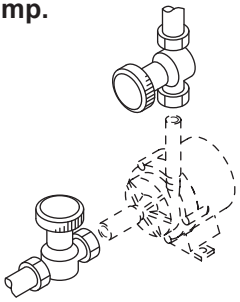
3 **Remove tubes or pipes from the inlet and outlet.**

Collect residual liquid from plumbing in a container.

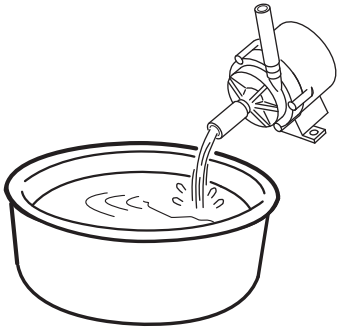
NOTE

Do not get wet with dripping residual liquid in disconnection.

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



5 **Direct the inlet 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 abnormality, 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 distributor.

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 a 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-05	ø14mm	ø8mm	4.7L/min	3.6m	1.0	24VDC	4.4W	0.4kg
RD-05H			7.9L/min	11.0m			18W	0.5kg
RD-12	ø18mm	ø18mm	12.7L/min	6.8m	1.0		12W	
	NPT3/8"	NPT3/8"						
	P-16	P-14						
RD-12Z	ø18mm	ø10mm	3.8L/min	10.5m			14W	
	NPT3/8"	NPT1/4"						
	P-16	P-10						
RD-20	ø18mm	ø18mm	19.5L/min	9.3m			28W	1.3kg
RD-30			23.5L/min	11.5m			45W	

*The max flow & head fields show average values obtained at our shipping inspection. There may be deviation up to ±10% of the values on each individual.
*Performance and dimension may be changed without prior notice.
*This data is based on pumping clean water at ambient temperature.
*The maximum flow rate could be collected if a delivery head was 0m. The maximum head could be collected if a flow rate was 0 L/min.
*The maximum viscosity is 1mPa•s when specific gravity is 1.0.
*Observe the allowable maximum pressure of 0.60MPa for pressure resistant types, or a leak or a break may result. Do not install other types than pressure resistant in a pressurized line.
*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).

Model	Ambient temperature	Liquid temperature	Ambient humidity
RD-05/-05H	0-40ºC	0-40ºC	30-85%RH
RD-12	0-50ºC	0-75ºC	30-90%RH
RD-12Z		0-60ºC	
RD-20/-30	0-40ºC	0-40ºC	30-85%RH
RD-30_V24-HV	0-50ºC	0-80ºC	30-90%RH

*Motor type: The pumps 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 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.

Outer dimensions

RD-05

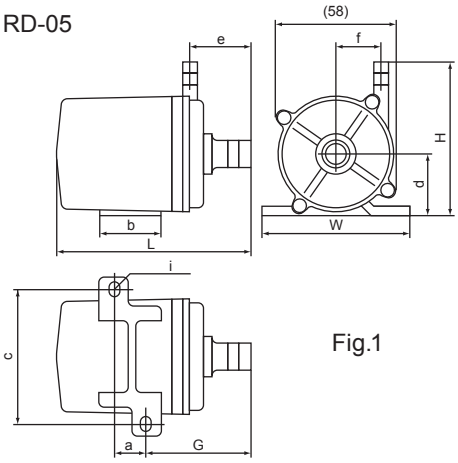


Fig.1

RD-05H

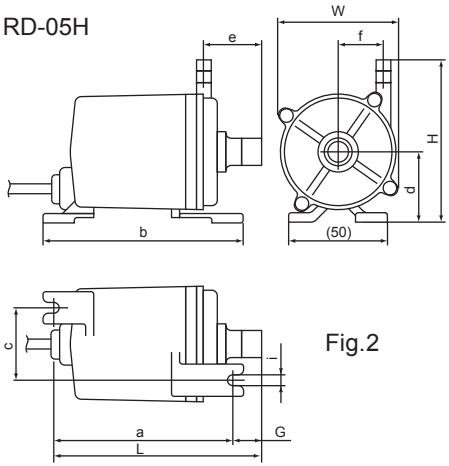


Fig.2

RD-20/-30

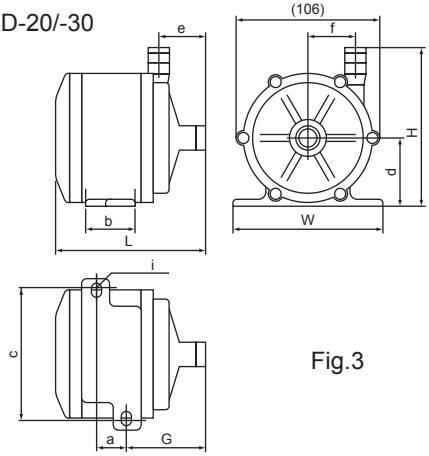


Fig.3

Unit (mm)

Model	W	H	L	a	b	c	d	e	f	G	I	Fig
RD-05	76	75	94.5	16	30	64	30	29.5	22.4	50.5	2-5×7	1
RD-05H	58	78	105	90	100	35	33			15	2-6	2
RD-20/-30	112	119	110	22	37	97	49	35	36	59.5	2-6×8	3

RD-12/-12Z Tube

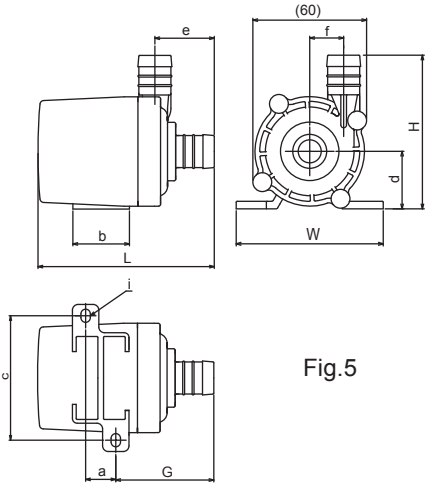


Fig.5

RD-12/-12Z NPT pipe thread

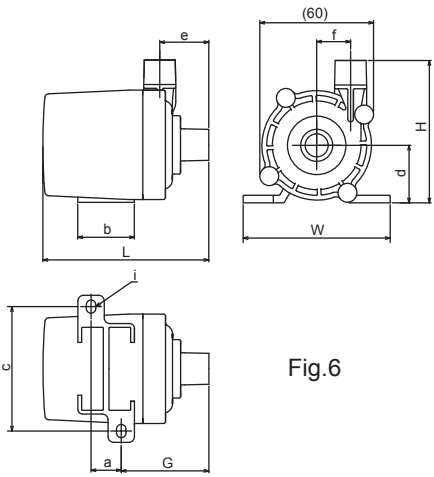


Fig.6

RD-12/-12Z Quick fastener

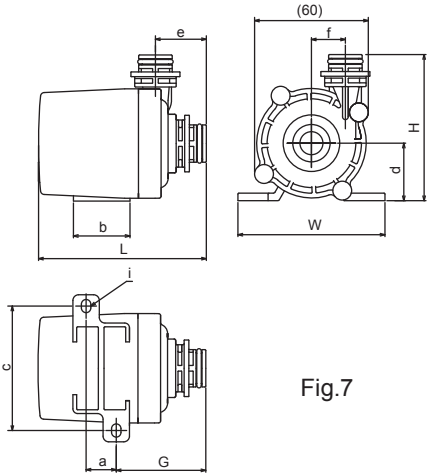


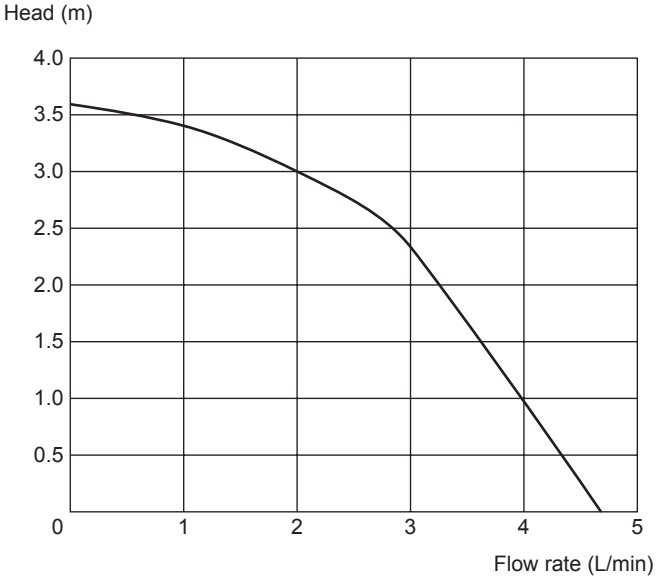
Fig.7

Unit (mm)

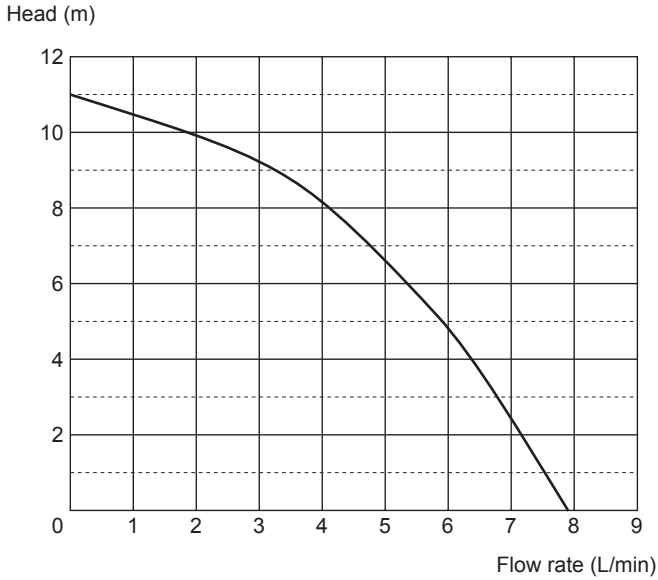
Model	Connection	W	H	L	a	b	c	d	e	f	G	i	Fig
RD-12	Tube	78	81.5	93.5	16	30	66	30.5	31.5	18	52	2-5×7	5
	NPT pipe thread		75.5	88					26		46.5		6
	Quick fastener		77.5	89					27		47.5		7
RD-12Z	Tube		79.5	93.5					31.5	19.8	52		5
	NPT pipe thread		75.5	88					26		46.5		6
	Quick fastener		77.5	89					27		47.5		7

Performance curves

■ **RD-05**

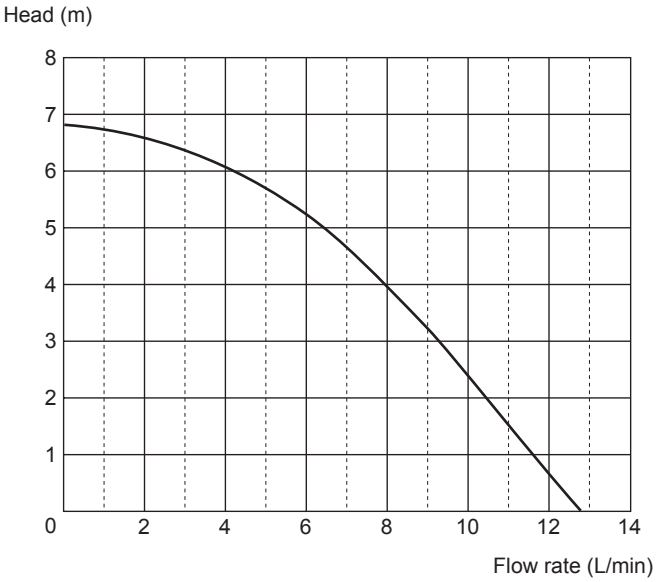


■ **RD-05H**

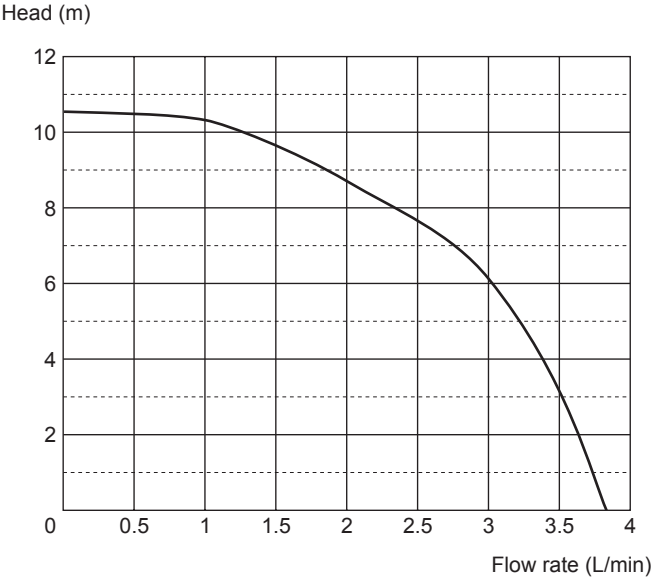


*For the RD-05H, water cutting sound is generated when the discharge head is at or below 2m.

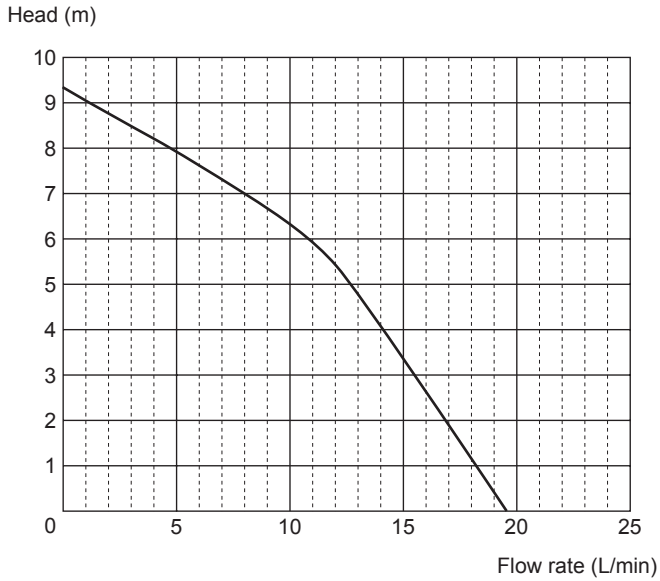
■ RD-12


Head (m)
8
7
6
5
4
3
2
1
0
2
4
6
8
10
12
14
Flow rate (L/min)

■ RD-12Z

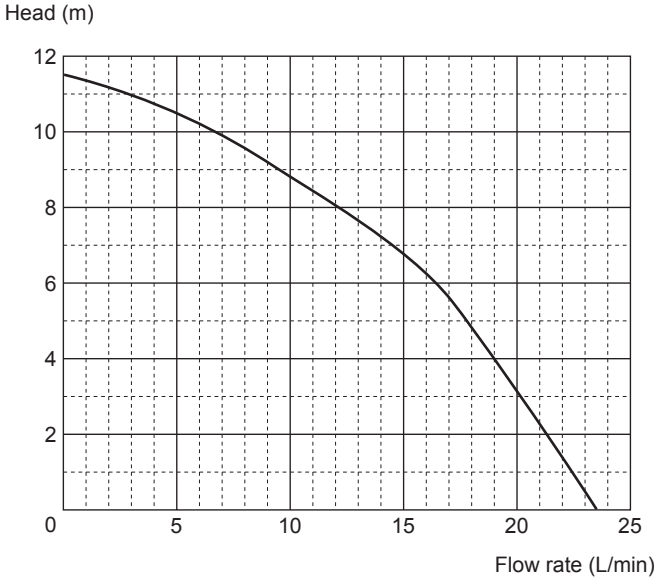

Head (m)
12
10
8
6
4
2
0
0.5
1
1.5
2
2.5
3
3.5
4
Flow rate (L/min)

■ **RD-20**



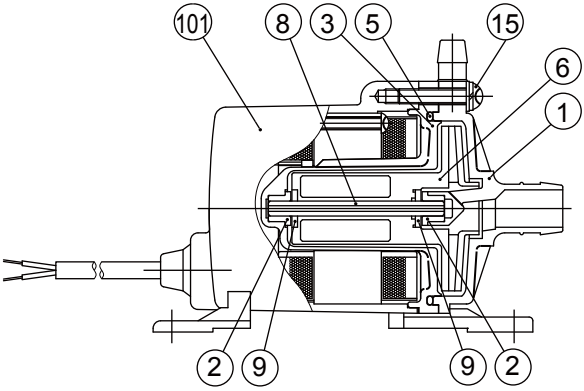
*For the RD-20, water cutting sound is generated when the discharge head is at or below 4m.

■ **RD-30**



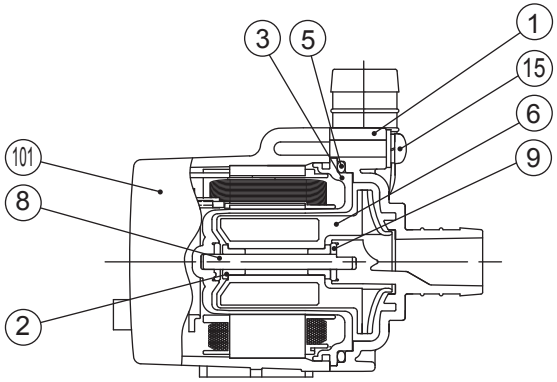
*For the RD-30, water cutting sound is generated when the discharge head is at or below 5m.

■ **RD-05/-05H**



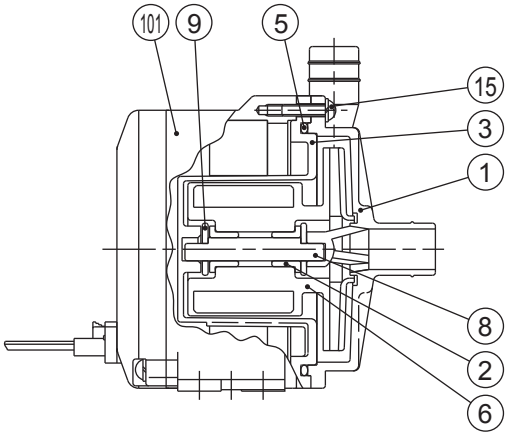
No.	Part names	Q'ty	Materials
1	Front casing	1	PPE
2	Bearing	2	PPS or PTFE
3	Rear casing	1	PPE
5	O ring	1	FKM or EPDM
6	Impeller	1	GFRPP
8	Spindle	1	Alumina ceramic
9	Thrust ring	2	Alumina ceramic
15	Machine screw w/ PW & SW	4	Stainless steel
101	Motor	1	—

■ **RD-12/-12Z**

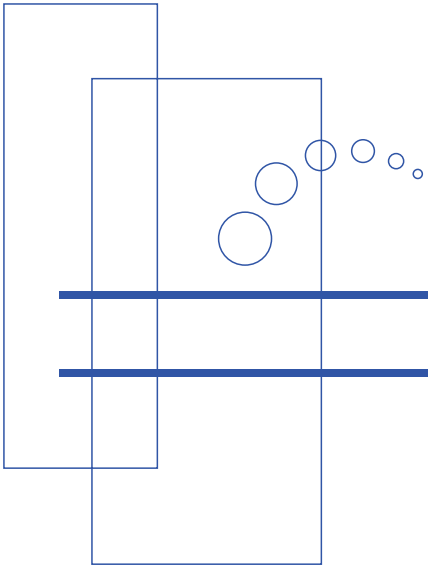


No.	Part names	Q'ty	Materials
1	Front casing	1	PPS
2	Bearing	2	PTFE
3	Rear casing	1	PPS
5	O ring	1	FKM or EPDM
6	Impeller	1	PPS
8	Spindle	1	Alumina ceramic
9	Thrust ring	2	Alumina ceramic
15	Machine screw w/ PW & SW	4	Stainless steel
101	Motor	1	—

■ **RD-20/-30**



No.	Part names	Q'ty	Materials
1	Front casing	1	PPE
2	Bearing	2	PTFE
3	Rear casing	1	PPE
5	O ring	1	FKM or EPDM
6	Impeller	1	GFRPP
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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Belgium	**IWAKI Belgium n.v.**	TEL:(32)1367 0200	FAX:1367 2030	**Malaysia**	**IWAKIm Sdn. Bhd.**	TEL:(60)3 7803 8807	FAX:3 7803 4800
China	**IWAKI Pumps (Shanghai) Co., Ltd.**	TEL:(86)21 6272 7502	FAX:21 6272 6929	**Norway**	**IWAKI Norge AS**	TEL:(47)23 38 49 00	FAX:23 38 49 01
China	**IWAKI Pumps (Guandong) Co., Ltd.**	TEL:(86)750 3866228	FAX:750 3866278	**Singapore**	**IWAKI Singapore Pte. Ltd.**	TEL:(65)6316 2028	FAX:6316 3221
China	**GFTZ IWAKI Engineering & Trading (Guangzhou)**	TEL:(86)20 8435 0603	FAX:20 8435 9181	**Spain**	**IWAKI Iberica Pumps, S.A.**	TEL:(34)943 630030	FAX:943 628799
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Denmark	**IWAKI Nordic A/S**	TEL:(45)48 24 2345	FAX:48 24 2346	**Switzerland**	**IWAKI (Schweiz) AG**	TEL:(41)26 674 9300	FAX:26 674 9302
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