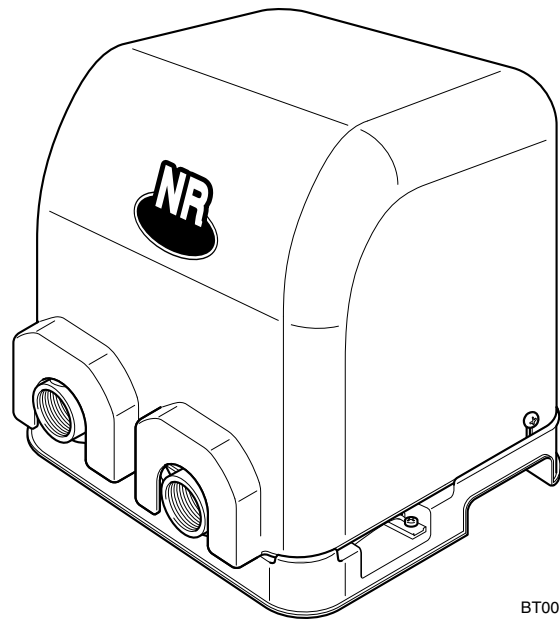


Home pump

KAWA-ACE® NR type

Instruction Manual

Thank you for purchasing our home pump.
 Please make sure to read this manual and have a full understanding of the contents before starting use.
 This manual provides precautions for preventing personal injuries or physical damage.
 After reading, keep this instruction manual in a safe place for quick reference.



BT001

Contents

How to handle (for customers)	Important safety instructions	2
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	Troubleshooting.	27
Installation and preparation (for construction shops)	Specialty constructions are necessary for installation of this product. Read "Installation and preparation" thoroughly and understand the content before starting operation. Do not install and prepare the product by the customer.	
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How to handle




Important safety instructions

This manual provides precautions for using this product safely and for preventing personal injuries or physical damage.

The precautions are classified as "DANGER," "WARNING," and "CAUTION" to indicate the degree of possible injury or damage and urgency in case of improper handling.



All precautions are important matters related to safety and must be observed.

Contents of hazard degree indicated by "Danger," "Warning," or "Caution"



 DANGER	Contents which if ignored could lead to imminent death or serious injury
 WARNING	Contents which if ignored could lead to death or serious injury
 CAUTION	Contents which if ignored could lead to personal injury or physical damage

Symbols






This symbol () indicates items requiring caution. For example, the symbol  means "electrical shock hazard".



This symbol () indicates items you must not do. For example, the symbol  means "no disassembling".



This symbol () indicates something that you must do. For example, the symbol  means "forcing execution" and  means "grounding must be done".

How to handle (for customers)

DANGER

Specifications



Prohibition

Never operate the pump at a pressure higher than the maximum operating pressure. Failure to do so could result in serious accidents.

WARNING

Bring-in and installation



Prohibition

Do not connect the pump directly to the water pipe. It is possible that the tap water becomes contaminated by counter flow of water.



Request the installation to the dealer (construction shops). Inappropriate construction may cause electric shock, fire, injury by falling on over-turning.



While unpacking, be careful with nails and staples. Failure to do so could result in injury.



Store the pump at a location, where a lock is provided, such as a pump room. Or take an appropriate measure such as installing the fence or enclosure, so any irrelevant person cannot easily touch the pump. Otherwise, anyone may touch the rotating parts or hot parts, causing injury; settings on the electric parts box or valve open/close state may be improperly changed, causing abnormal operation of the pump and water flow to stop.



Prohibition

Do not burn the resin and rubber parts at the site. Burning resin and rubber could result in emission of hazardous gases.

WARNING

Bring-in and installation



For longer use of the product, install the product at a well-ventilated place without dust, corrosive gas, explosive gas, salt, humidity, vapor, condensation, and exposure to wind, rain, and direct sunlight. When the product is installed in an improper environment, short circuit, electric shock, or fire may be caused due to faulty insulation of the motor or electric parts box.



Prohibition

Do not use the pump in an explosive environment. Otherwise, fire may be caused.

Electrical work



Avoid connecting multiple electric devices to one outlet (octopus outlet) and construct wiring by using the special wiring. Otherwise, short circuit, electric shock, or fire may be caused.



Remove dust from the power plug, wire connecting part, junctions, and terminals. Accumulated dust may be heated up and causes fire.



Prohibition

Insert the power plug completely and do not use damaged plugs. If the plug is inserted incompletely, electric shock or fire may be caused.

Operation and trial operation



When connecting or disconnecting the wiring, always shut down the power before you start operating. Failure to do so could result in electric shock.



Prohibition

After the power is turned on or while the power is on, do not touch the charging part of the electric parts box, motor terminals, and cable ends. Otherwise, short circuit, electric shock, or fire may be caused.



Prohibition

Do not use the pump with the pump cover removed. Failure to do so could result in short circuit, electric shock, or fire from the accumulated dust or faulty insulation.



Prohibition

Do not splash water on the motor and the control panel (electric parts box). Otherwise, electric shock, short circuit, or fire may be caused.



In case of the power outage, turn off the power switch. Otherwise, the product and the facility may get damaged, or the pump may suddenly start moving and cause injury at the time of power recovery.



Prohibition

Do not put hands or feet near the suction port during operation. Suction into the port may cause injury.



Prohibition

Do not use or operate the product in a hoisted condition. The product may fall down, and injury may be caused.

Inspection/Maintenance



If the product stops working or if any abnormality is sensed (i.e., broken cable or burning smell), stop operation immediately and shut down the power. Then contact the place of purchase for inspection or repairs. If the product is continuously operated in an abnormal condition or the repair is inappropriate, short circuit, electric shock, fire, and/or water leakage may be caused.



Do not disassemble or modify

This product must be disassembled, repaired or modified only by a qualified repair technician. Improper repairs could result in malfunction, damage, electric shock, and fire.



When inspecting or replacing the product, always shut down the power before you start working. Failure to do so could result in short circuit, electric shock, or injury.



When moving and reinstalling the product, consult the place of purchase. If the product is improperly installed, short circuit, electric shock, fire, or water leakage may be caused.



When inspecting or replacing the electric part such as the control panel (electric parts box), be sure to check with a tester that there is no voltage remained before you start working. Failure to do so could result in electric shock, or injury.




If the motor insulation resistance is decreased to 1MΩ or lower, immediately contact the place of purchase. Otherwise, the motor may get burnt out, or electric shock or fire may be caused.





When repairing the product, use our genuine parts. If any part other than the genuine parts is used, breakage or accidents may be caused. In addition, the product could not be used with its optimal condition.

CAUTION


Product specifications

 **Perform repair coating at an interval that suits to your use condition of the product.** At screws, and processed parts and other parts with antirust coating, rust may be caused in an environment with high humidity, condensation, and water splash. The rust may cause unexpected damages and injuries.


 **Select a product that is the most suitable for your application.** Use for improper application may lead to an accident.


 **Always use this product within the specified specifications.** Failure to do so could result in electric shock, fire, water leakage, etc.



 **The Danger, Warning, and Caution labels have contents that could endanger people's lives or damage properties. Be sure to follow the instructions on the labels.** Otherwise, the product may get broken, or electric shock, fire, injury, etc. may be caused.


 **Do not use the product for fluids that are out of the range of specified fluid quality.** Otherwise, the pump may get broken, and short circuit, electric shock, and fire may be caused.


 **For applications for living things (such as fish farm, fish preserve, and aquarium) or for important facility, prepare the spare pump.** Otherwise, malfunction of the pump will cause oxygen deficiency and water quality deterioration, causing risks to lives that are under influence of the pump.


 **For applications for transfer of food, check the use materials carefully.** Failure to do so could result mixing of foreign objects.


 **Do not use this product for living things that are not compatible with copper alloy.** Otherwise, risks to lives may be caused.


Bring-in and installation


 **Do not give a shock or tumble the product.** Otherwise, the product may get broken.


 **When the product is used for drinking water, perform water quality inspections at the installation and periodically according to the instructions from the specialized agencies.** If the water quality is deteriorated, drinking such water may cause health damage.


 **Do not put objects on the product or do not mount on the product.** Otherwise, the product may get broken or a mounted person may get injured by tumbling.


 **Prepare a buzzer or other facility for alarms, so the malfunction of the product can be confirmed.** Failure to do so could result in serious accidents due to continuous use of the malfunctioning product.


 **Do not make any modifications such as drilling holes to the control panel (electric parts box).** Drill fragments, iron filings, etc. created by such modifications may attach to parts and cause fires or malfunction.

 **If there is any possibility of congelation during winter period, prevent congelation by using lagging material or heater.** Failure to do so could cause damages due to congelation.


 **Tidy up the surrounding environment before starting the installation, inspection, or other operation.** Failure to do so could result in injury by slipping and tumbling.

 **Prevent air from accumulating in the pipes.** Failure to do so may cause abnormal operation of the pump.


 **Do not directly connect the commercial power supply to the motor.** Otherwise, fire, malfunction, or breakage may be caused.


 **Do not cover your head with the plastic bag used for packing of the product.** Otherwise, suffocation may be caused.


Electrical work

 **Do not scratch, damage, process, forcibly bend, pull, twist, bundle, or pinch the power cable. Do not put a heavy object on the power cable.** Otherwise, the cable breaks, and fire or electric shock may be caused.

Operation and trial operation

 **If the water was not used for a long period, run the water for a while and check that the water becomes clean before you start using the water.** If the water quality is deteriorated, drinking such water may cause health damage.

 **Do not use this product in a range outside the rated voltage.** Failure to observe this could result in fire or electric shock.

 **Check that the rotating direction is right.** If rotated in the wrong direction, impeller nuts or bolts may get loose and cause an accident.

⚠ CAUTION

Operation and trial operation



Prohibition

Do not touch rotating parts or insert fingers or objects in the opening during operation. Failure to observe this could result in electric shock, damage, or personal injury.



Caution for rotating parts



Do not insert fingers in rotating parts



Do not touch

Do not touch the pump, motor, and heater during or immediately after operation. These parts can be very hot and cause burns.



Very hot: do not touch



Shut off the power when not using the product for a long time. Failure to do so could result in short circuit, electric shock, or fire from faulty insulation.



Prohibition

Do not idle or perform shut off operation of a certain period of time. In addition, do not allow mixing of air into the handling fluid. Otherwise, casing, bearing, shaft seal may get damaged, or pumping becomes unavailable. In addition, the pump may get overheated, causing a burn.



Check that the pump and pipes are filled with water. Lack of water may result in fire or disconnection of the heater.



Prohibition

Do not operate a 50Hz-specified pump in 60Hz. Otherwise, a breakage due to an excessive pressure or motor burnout due to overload may be caused.

Do not operate a 60Hz-specified pump in 50Hz. The pump performance may be degraded.



Use valves in the designated condition. Otherwise, the product cannot be operated properly, causing damages in the units.



Prohibition

Do not place flammable objects around the pump, cable, or in the pump cover. Or do not cover these parts with a flammable object. Flammable objects may get overheated, causing a start of fire.



At startup of the operation after long-time storage or a recess, perform a trial operation by following the "installation" and "operation" procedures in a specified order. There are possibilities of pump constraint by seizure, motor burnout, or idling by water drainage.



Operate the pump within the specification range. Failure to do so may cause pump damage or accident.



At the time of trial operation, remove air in the product and pipes thoroughly. Failure to do so may cause air lock of the pump, temperature increase, causing breakdown or accident.



Prohibition

At the time of priming and exhaust, avoid splashing of water over the product.

Otherwise, short circuit, electric shock, fire, or malfunction may be caused.

Inspection/Maintenance



When the product is not used during winter time, turn off the power and drain water from the pump and pipes. When the product is left with water inside of the pump and pipes, the pump may get damaged due to congelation of the pump.



Prohibition

When the pump is hot, do not remove the plug (priming cup/exhaust outlet). Failure to observe this could result in spouting of boiling water and causing a burn.



When the pump is not used for a long time, drain water from the pump and pipes. Otherwise, accumulated water may get rotten, and bacteria may be increased.



To use the product safely for a long time, conduction of both periodical and daily inspections are recommended. Failure to do so may cause breakage of pump and accident. For the periodical inspection, consult the place of purchase.



Periodically check the performance of protective relay. The product does not operate properly at the time of accident, causing electric shock or malfunction.



Replace the consumables periodically. When the consumables are continuously used in deteriorated and worn-out condition, accidents such as water leak, seizure, and breakage may be caused. For the periodical inspection and replacement of parts, consult the place of purchase.



When the pressure gauge or the compound gauge is used, keep the cock closed while the gauge is not used for measurement. If the cock is kept opened all the time, the pressure gauge or the compound gauge may get broken.



Be sure to perform the inspection by following the inspection items. Otherwise, generation of malfunction cannot be prevented in advance, causing accidents.

How to handle (for customers)

Notes

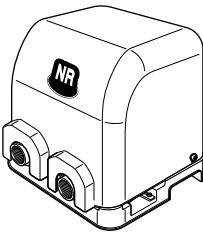

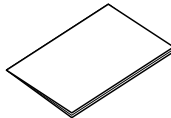
- The following cases may be out of the scope of warranty range: use outside of the application range, disobedience to caution and other messages, inappropriate repair and modification, problem occurred due to nature of God, problem occurred due to installation environment (abnormal power supply, foreign object, sand, etc.), conditions not complying laws, regulations, and equivalent rules, malfunction due to carelessness or by intention, problem due to replacement of consumables or due to resale.
- When contacting us, please provide "model" and "manufacturing number" of your product.
- For the disposal method of unnecessary parts and packing materials, check with laws, ordinances, or standards etc. based on the laws.

* The illustrations in this manual show a typical model of the NR type. Some models differ slightly from the illustrations.

Unpacking

After unpacking, please check the following items. In case of problems, contact the place of purchase.

- Check the nameplate to ensure that the correct product has been delivered.
- Check that no parts have been damaged during transportation, and that no bolts, nuts, etc. are loose. Tighten any parts that are loose.
- Make sure that all of the ordered accessories have been included.

Main unit	Strainer	Instruction manual
 BT002	 25mm: 200, 250W BT003	 AL005

Note:

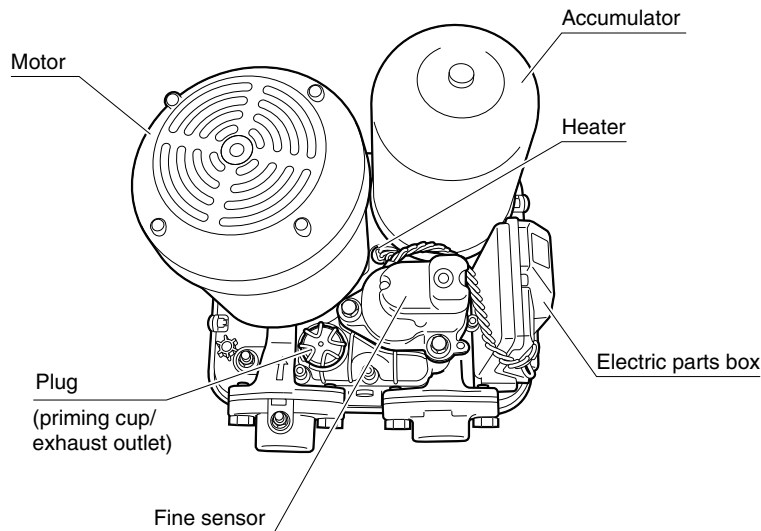
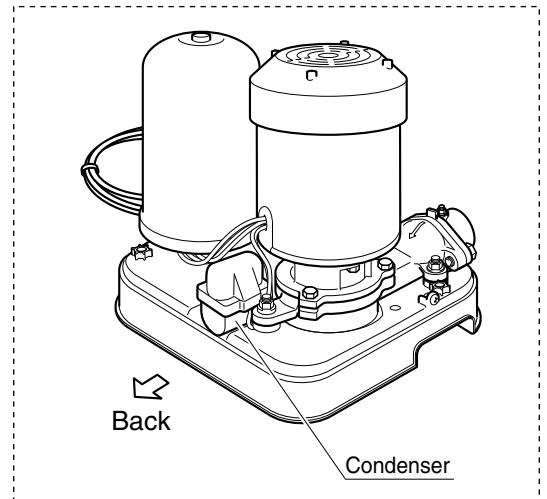
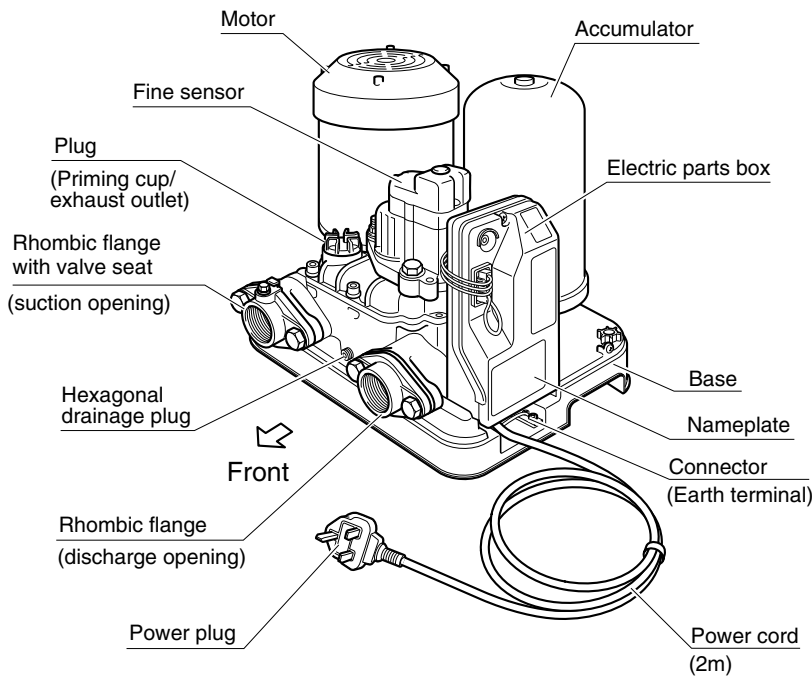
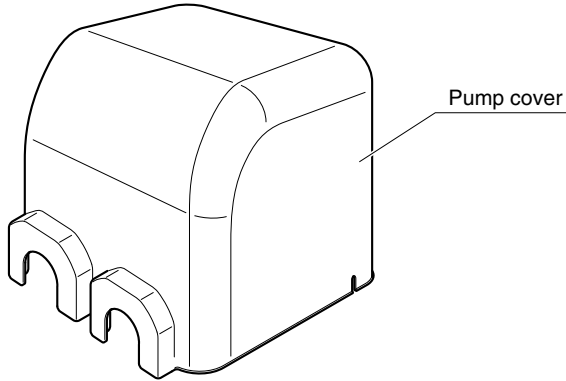
The ground bar or ground plate is not included. Prepare either of them by yourself.

Names of parts

The illustrations below shows a typical model of the NR type. Some models differ slightly from the illustrations.

Caution

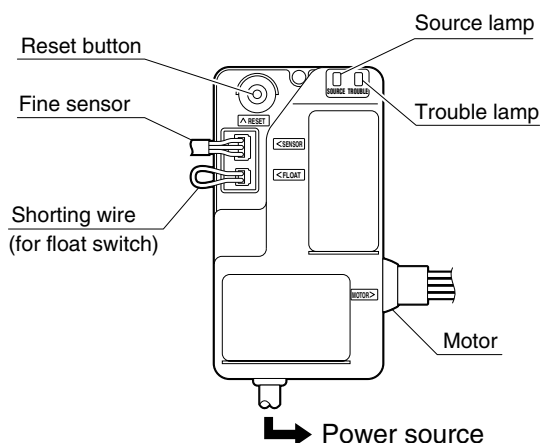
Make sure to remove the protector (cardboard) inside the pump cover before using the product.



How to handle (for customers)

BT024

Electric parts box



BT025

Lamp indications

If there is no water even when the faucet is turned on, remove the pump cover, and then check the condition of the lamps.

Source lamp

Lights up in red when the power is on.

Trouble lamp

Lights up or flashes in orange if there is a defect in the electric parts box, motor, or pump. At the same time, the pump stops automatically. Refer to "Troubleshooting" (page. 27) for detailed procedure for the failures.

* When the trouble lamp lights, remove the cause of failure and reset the pump by pressing the **reset button** after 10 minutes.

Caution

When carrying out inspection or maintenance of the pump, do not touch the motor and connectors with the power on.

Mechanism of this product

When turning on the faucet, the water pressure inside this product (pump) decreases. When the built-in fine sensor^(*) detects a pressure failure, the pump operates automatically to set the water pressure back to the prescribed level. When the water supply reduces to less than approximately 4 liters/min by turning off the tap, the fine sensor detects it and the pump stops automatically. (The pump may not stop soon because of the timer function. This is not a failure.)

(*) The sensor that has the pressure transmitter and flow switch necessary for the automatic operation of the pump in one unit

Removing and attaching the pump cover

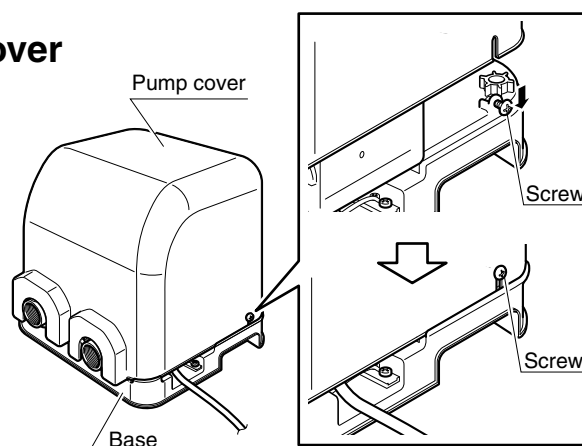
How to remove

- 1 Loosen both screws on the pump cover.
- 2 Remove the pump cover.

How to attach

- 1 Align the notches on both sides of the pump cover with the screws on both sides of the base, and then attach the pump cover to the base.
- 2 Fasten both left and right screws to the pump cover.

* The pump cover will be secured. Confirm that the pump cover does not move or cannot be easily removed.



BT026

How to use

The construction shop will perform operations from the installation throughout the trial operation. Preparation by the customer is not required. When the power is on, the pump operates automatically simply by turning on/off the faucet.

Caution

- A squeak is made when the pump starts or stops. This is not a failure.
- This product starts/stops automatically. This is not a failure.
- When any failure occurs in this product, refer to “Troubleshooting” on page 27.

Water quality testing

Please note the following when requesting testing for water quality by the specialized agencies, etc.

- (1) Use water obtained from a faucet for a water examination.
- (2) When doing a microbiological examination
 - Use a water container for testing bacteria sterilized at the specialized agencies.
 - Do not touch the inside of the container or lid to prevent bacterial contamination.
 - To prevent contamination, immediately request testing at the specialized agencies after obtaining water samples.
- (3) Contact the specialized agencies for other details about water quality testing.

Product specification

CAUTION



Install the product at an altitude of 1000m or lower. If the product must be installed at a location of an altitude above 1000m, consult the place of purchase.

Pumping fluid	Fluid quality, fluid temperature	Clean water (pH. 5.8 to 8.6), 0 to 40°C (no freezing), leaching performance standards conforming product
	Chloride ion concentration	200mg/L or less
Solid object concentration, diameter		50mg/L or less, 0.3mm or less
Installation location (ambient temperature/humidity)		Indoor, outdoor (0 to +40°C/90% RH or less)
Suction condition		Total suction head: within -8m (20°C) / pour head: within 5m
Supply voltage		Single phase 200V (within +/-10%, interphase unbalance rate: 3% or lower)
Frequency		50Hz or 60Hz exclusive
Main circuit switch		Solid state relay (SSR)
Motor protection method		Auto-cut off by thermal protector (built-in motor)
Indicator		Source lamp, trouble lamp

Installation and preparation (for construction shops)

Specialty constructions are necessary for installation of this product. Read "Installation and preparation" thoroughly and understand the content before starting operation. Do not install and prepare the product by the customer.




Important safety instructions

This manual provides precautions for using this product safely and for preventing personal injuries or physical damage.








The precautions are classified as "DANGER," "WARNING," and "CAUTION" to indicate the degree of possible injury or damage and urgency in case of improper handling.

All precautions are important matters related to safety and must be observed.

Contents of hazard degree indicated by "Danger," "Warning," or "Caution"

 DANGER	Contents which if ignored could lead to imminent death or serious injury
 WARNING	Contents which if ignored could lead to death or serious injury.
 CAUTION	Contents which if ignored could lead to personal injury or physical damage.


Symbols

	This symbol (△) indicates items requiring caution. For example, the symbol  means "electrical shock hazard".		This symbol (⊘) indicates items you must not do. For example, the symbol  means "no disassembling".		This symbol (●) indicates something that you must do. For example, the symbol  means "forcing execution" and  means "grounding must be done".
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 DANGER


Specifications


 **Never operate the pump at a pressure higher than the maximum operating pressure.** Failure to do so could result in serious accidents.
禁止


 WARNING

Bring-in and installation

 **Do not connect the pump directly to the water pipe.** It is possible that the tap water becomes contaminated by counter flow of water.
禁止

 **Follow the applicable laws and regulations for the construction.**
 Inappropriate construction not only fails to comply with regulations but also may cause electric shock, fire, injury by falling or over-tumbling.

 **Install the product surely by following the instruction manual.** Install the pump horizontally on the footing, and fix with the foundation bolts. Inappropriate installation may cause short circuit, electric shock, fire, injury by falling or over-tumbling. In addition, pump vibration may also be caused.

 **While unpacking, be careful with nails and staples.** Failure to do so could result in injury.

Installation and preparation (for construction shops)

! WARNING

Bring-in and installation

! Store the pump at a location, where a lock is provided, such as a pump room. Or take an appropriate measure such as installing the fence or enclosure, so any irrelevant person cannot easily touch the pump. Otherwise, anyone may touch the rotating parts or hot parts, causing injury; settings on the electric parts box or valve open/close state may be improperly changed, causing abnormal operation of the pump and water flow to stop.

! If there is any possibility that internal pressure of the discharging pipe increases due to high temperature during summer time, install an appropriate depressurizing equipment (such as a safety valve). Due to pressure increase, the pipes and valves may get damaged, causing injury.

Prohibition Do not burn the resin and rubber parts at the site. Burning resin and rubber could result in emission of hazardous gases.

! For longer use of the product, install the product at a well-ventilated place without dust, corrosive gas, explosive gas, salt, humidity, vapor, condensation, and exposure to wind, rain, and direct sunlight. When the product is installed in an improper environment, short circuit, electric shock, or fire may be caused due to faulty insulation of the motor or control panel (electric parts box).

Prohibition Do not use the pump in an explosive environment. Otherwise, fire may be caused.

Prohibition Do not connect an inverter. Connecting an inverter may result in fire or damage to the condenser.

Electrical work

! Electrical work must be performed by a professional engineer. Improper wiring and connection could result in malfunction, short circuit, electric shock, and fire.

Be sure to connect to ground Be sure to connect the earth ground wire to the product. Malfunctions or short circuits may result in electrical shock if not connected. (Refer to page 19 for details.)

Be sure to connect to ground Be sure to make the ground connection before starting any electrical operations. Operations without secure grounding could result in malfunction, short circuit, electric shock, and fire.

! Avoid connecting multiple electric devices to one outlet (octopus outlet) and construct wiring by using the special wiring. Otherwise, short circuit, electric shock, or fire may be caused.

! Remove dust from the power plug, wire connecting part, junctions, and terminals. Accumulated dust may be heated up and causes fire.

! Before turning on the power, check that the wire connecting section and junctions are not loose or unconnected. Even one section loosened or disconnected may cause fire or electric shock.

Prohibition Insert the power plug completely and do not use damaged plugs. If the plug is inserted incompletely, electric shock or fire may be caused.

Operation and trial operation

! When connecting or disconnecting the wiring, always shut down the power before you start operating. Failure to do so could result in electric shock.

Do not touch After the power is turned on or while the power is on, do not touch the charging part of the electric parts box, motor terminals, and cable ends. Otherwise, short circuit, electric shock, or fire may be caused.

Prohibition Do not use the pump with the pump cover removed. Failure to do so could result in short circuit, electric shock, or fire from the accumulated dust or faulty insulation.

Prohibition Do not splash water on the motor and the control panel (electric parts box). Otherwise, electric shock, short circuit, or fire may be caused.


! In case of the power outage, turn off the power switch. Otherwise, the product and the facility may get damaged, or the pump may suddenly start moving and cause injury at the time of power recovery.

Prohibition Do not put hands or feet near the suction port during operation. Suction into the port may cause injury.

Prohibition Do not use or operate the product in a hoisted condition. The product may fall down, and injury may be caused.

⚠ WARNING




Inspection/Maintenance

- ⚠ **If the product stops working or if any abnormality is sensed (i.e., broken cable or burning smell), stop operation immediately and shut down the power. Then contact the place of purchase for inspection or repairs.** If the product is continuously operated in an abnormal condition or the repair is inappropriate, short circuit, electric shock, fire, and/or water leakage may be caused.
-  **This product must be disassembled, repaired or modified only by a qualified repair technician.** Improper repairs could result in malfunction, damage, electric shock, and fire.
Do not disassemble or modify
- ⚠ **When inspecting or replacing the product, always shut down the power before you start working.** Failure to do so could result in short circuit, electric shock, or injury.

- ⚠ **When moving and reinstalling the product, consult the place of purchase.** If the product is improperly installed, short circuit, electric shock, fire, or water leakage may be caused.
- ⚠ **When inspecting or replacing the electric part such as the control panel (electric parts box), be sure to check with a tester that there is no voltage remained before you start working.** Failure to do so could result in electric shock, or injury.
- ⚠ **If the motor insulation resistance is decreased to 1MΩ or lower, immediately contact the place of purchase.** Otherwise, the motor may get burnt out, or electric shock or fire may be caused.
- ⚠ **When repairing the product, use our genuine parts.** If any part other than the genuine parts is used, breakage or accidents may be caused. In addition, the product could not be used with its optimal condition.



⚠ CAUTION

Product specifications

- ⚠ **Perform repair coating at an interval that suits to your use condition of the product.** At screws, and processed parts and other parts with antirust coating, rust may be caused in an environment with high humidity, condensation, and water splash. The rust may cause unexpected damages and injuries.
- ⚠ **Select a product that is the most suitable for your application.** Use for improper application may lead to an accident.
-  **Always use this product within the specified specifications.** Failure to do so could result in electric shock, fire, water leakage, etc.
Prohibition
-  **The Danger, Warning, and Caution labels have contents that could endanger people's lives or damage properties. Be sure to follow the instructions on the labels.** Otherwise, the product may get broken, or electric shock, fire, injury, etc. may be caused.
Warning to electric shock
-  **Do not use the product for fluids that are out of the range of specified fluid quality.** Otherwise, the pump may get broken, and short circuit, electric shock, and fire may be caused.
Prohibition

- ⚠ **For applications for living things (such as fish farm, fish preserve, and aquarium) or for important facility, prepare the spare pump.** Otherwise, malfunction of the pump will cause oxygen deficiency and water quality deterioration, causing risks to lives that are under influence of the pump.
- ⚠ **For applications for transfer of food, check the use materials carefully.** Failure to do so could result mixing of foreign objects.
- ⚠ **Do not use this product for living things that are not compatible with copper alloy.** Otherwise, risks to lives may be caused.

Bring-in, installation, and water quality

-  **Do not scratch, damage, process, forcibly bend, pull, twist, bundle, or pinch the power cable. Do not put a heavy object on the power cable.** Otherwise, the cable breaks, and fire or electric shock may be caused.
Prohibition
 -  **Do not install the pump at a location without a water drainage treatment and a water-proof treatment.** Otherwise, when the water leaks, serious damage may be caused.
Prohibition
- * Damages occurred due to a facility without water drain and water preventive treatments are not within the responsibility of Kawamoto Pump.

⚠ CAUTION

Bring-in, installation, and water quality



Do not use pump in humid location

Do not install the pump at a location with a lot of moisture such as a bathroom. If a short circuit occurs, it could result in electric shock.



Prohibition

Do not install in locations such as machinery and chemical factories where harmful gases containing acid, alkali, organic solvents, paint and gases containing corrosive components are generated or in where dust is abundant. Doing so may result in short circuits or fire.



Prohibition

Do not give a shock or tumble the product. Otherwise, the product may get broken.



When the product is used for drinking water, perform water quality inspections at the installation and periodically according to the instructions from the public health department. If the water quality is deteriorated, drinking such water may cause health damage.



Prepare the spare pump for unexpected breakdown of the pump. Water supply may be stopped, and the facility may get stopped.



Depending on the facility, attach a filter appropriate to the discharge side and flush sufficiently and confirm there are no foreign objects before using the pump. There may be a risk of contaminating the treatment solution with cutting oil, rubber mold releasing agents and other foreign matter at the time of product manufacturing, or cutting oil and other foreign matter included in the piping system.



Remove the companion flange from the pump and insert into the pipe. Otherwise, damage or water leak may be caused.



Prohibition

Do not put objects on the product or do not mount on the product. Otherwise, the product may get broken or a mounted person may get injured by tumbling.



Prepare a buzzer or other facility for alarms, so the malfunction of the product can be confirmed. Failure to do so could result in serious accidents due to continuous use of the malfunctioning product.



Prohibition

Do not make any modifications such as drilling holes to the control panel (electric parts box). Drill fragments, iron filings, etc. created by such modifications may attach to parts and cause fires or malfunction.



Install the product at an altitude of 1000m or lower. If the product must be installed at a location of an altitude above 1000m, consult the place of purchase.



Apply sealing agent to the screws on the pipe to prevent water leakage. Failure to do so may cause water to leak.



If a device with rapid change of flow rate such as a flash valve is used, consult the place of purchase in advance. When the flash valve is used while the pump is stopped, the pressure inside of the pipe rapidly decreases, causing pressure change or air mixture.



If there is a risk of freezing during winter, prevent freezing by using insulation or a heater. Failure to do so may result in damage from freezing.



Tidy up the surrounding environment before starting the installation, inspection, or other operation. Failure to do so could result in injury by slipping and tumbling.



Prepare the suction pipes for each pump. Avoid right angled loops and set the pipes as short as possible and with as few bent as possible with a rising slope (1/100 or more). Otherwise, the pump may not work properly.



Prohibition

Do not use the pump outside of the range of total suction head specification. Otherwise, the pump may not work properly.



Confirm that no debris or foreign objects are clogging the strainer of the suction intake before operating the pump. Negative pressure will be created on the suction side and cause malfunction or result in damage.



Prevent air from accumulating in the pipes. Failure to do so may cause abnormal operation of the pump.



Prohibition

Do not directly connect the commercial power supply to the motor. Otherwise, fire, malfunction, or breakage may be caused.



Before installing the pump, be sure to clean the well. Remove foreign objects such as sand from inside and outside of the pipes. When foreign object such as sand is sucked, pumping may become not possible due to sand bite.



Water level of the well changes. Be careful with the operating water level. When the water level lowers, the pump may suck air in, causing idling.



Prohibition

Do not cover your head with the plastic bag used for packing of the product. Otherwise, suffocation may be caused.

⚠ CAUTION

Electrical work



Prohibition

Do not feed the power cable and control cable in one pipe or duct. Erroneous operation of the product or other equipment may be caused.



If the outlet has to be prepared outside under unavoidable situation, use water-proof outlet. Failure to do so could result in short circuit, electric shock, or fire.



Prohibition

Do not scratch, damage, process, forcibly bend, pull, twist, bundle, or pinch the power cable. Do not put a heavy object on the power cable. Otherwise, the cable breaks, and fire or electric shock may be caused.

Operation and trial operation



Prohibition

Do not use this product in a range outside the rated voltage. Failure to observe this could result in fire or electric shock.



Check that the rotating direction is right. If rotated in the wrong direction, impeller nuts or bolts may get loose and cause an accident.



Prohibition

Do not touch rotating parts or insert fingers or objects in the opening during operation. Failure to observe this could result in electric shock, damage, or personal injury.



Caution for rotating parts



Do not insert fingers in rotating parts



Do not touch

Do not touch the pump, motor, and heater during or immediately after operation. These parts can be very hot and cause burns.



Very hot: do not touch



Prohibition

Do not idle or perform shut off operation of a certain period of time. In addition, do not allow mixing of air into the handling fluid. Otherwise, casing, bearing, shaft seal may get damaged, or pumping becomes unavailable. In addition, the pump may get overheated, causing a burn.



Check that the pump and pipes are filled with water. Lack of water may result in fire or disconnection of the heater.



Prohibition

Do not operate a 50Hz-specified pump in 60Hz. Otherwise, a breakage due to an excessive pressure or motor burnout due to overload may be caused.

Do not operate a 60Hz-specified pump in 50Hz. The pump performance may be degraded.



Use valves in the designated condition. Otherwise, the product cannot be operated properly, causing damages in the units.



Prohibition

Do not place flammable objects around the pump, cable, or in the pump cover. Or do not cover these parts with a flammable object. Flammable objects may get overheated, causing a start of fire.



At startup of the operation after long-time storage or a recess, perform a trial operation by following the "installation" and "operation" procedures in a specified order. There are possibilities of pump constraint by seizure, motor burnout, or idling by water drainage.



Operate the pump within the specification range. Failure to do so may cause pump damage or accident.



At the time of trial operation, remove air in the product and pipes thoroughly. Failure to do so may cause air lock of the pump, temperature increase, causing breakdown or accident.



At the time of priming and exhaust, avoid splashing of water over the product. Otherwise, short circuit, electric shock, fire, or malfunction may be caused.



Prohibition

Do not allow the pump to suck in sand or foreign objects. Failure to observe this could result in the failure of the pump to start or operate normally.

Inspection/Maintenance



When the product is not used during winter time, turn off the power and drain water from the pump and pipes. When the product is left with water inside of the pump and pipes, the pump may get damaged due to congelation of the pump.



Before starting disassembly or inspection, check that the internal pressure is zero. Failure to do so could result in spouting of water causing accident and injury.



When measuring the insulation resistance, use an insulation resistance meter (250V or lower) that matches to the power voltage. Otherwise, the electric parts box, etc. may get broken.



Prohibition

When the pump is hot, do not remove the plug (priming cup/exhaust outlet). Failure to observe this could result in spouting of boiling water and causing a burn.



When the pump is not used for a long time, drain water from the pump and pipes. Otherwise, accumulated water may get rotten, and bacteria may be increased.

CAUTION

Inspection/Maintenance



To use the product safely for a long time, conduction of both periodical and daily inspections are recommended. Failure to do so may cause breakage of pump and accident. For the periodical inspection, consult the place of purchase.



Periodically check the performance of protective relay. The product does not operate properly at the time of accident, causing electric shock or malfunction.



Replace the consumables periodically. When the consumables are continuously used in deteriorated and worn-out condition, accidents such as water leak, seizure, and breakage may be caused. For the periodical inspection and replacement of parts, consult the place of purchase.



When the pressure gauge or the compound gauge is used, keep the cock closed while the gauge is not used for measurement. If the cock is kept opened all the time, the pressure gauge or the compound gauge may get broken.



Be sure to perform the inspection by following the inspection items. Otherwise, generation of malfunction cannot be prevented in advance, causing accidents.

Operating principle

When turning on the faucet, the water pressure inside this product (pump) decreases. When the built-in fine sensor^(*) detects a pressure failure, the pump operates automatically to set the water pressure back to the prescribed level. When the water supply reduces to less than approximately 4 liters/min by turning off the tap, the fine sensor detects it and the pump stops automatically. (The pump may not stop soon because of the timer function. This is not a failure.)

(*) The sensor that has the pressure transmitter and flow switch necessary for the automatic operation of the pump in one unit

Installation and piping

Selecting the installation site

CAUTION



Prohibition

Do not install the pump at a location without a water drainage treatment and a water-proof treatment. Otherwise, when the water leaks, serious damage may be caused.

* Damages occurred due to a facility without water drain and water preventive treatments are not within the responsibility of Kawamoto Pump.



Install the product at an altitude of 1000m or lower. If the product must be installed at a location of an altitude above 1000m, consult the place of purchase.

Select sites like those described below for installing the product.

- A location that is not directly influenced by wind and rain from typhoons, etc.
- A location that is well-ventilated, cool and not exposed to rain and direct light.
- A location where the temperature around the pump is lower than 40°C.
- A location that is as close to the water supply source and as low as possible.
- A location where at least 30 cm space can be secured around and above the product for inspection and repair.
- A level surface

Precaution for installation

- Install the pump horizontally, and secure it with foundation bolts.
Purchase foundation bolts separately.
Select a bolt size that is sufficiently longer than M8 x base thickness (58mm). (2 bolts)
- Do not overtighten the foundation bolts. Overtightening may result in deforming or damaging the resin base.

Measures against cold

CAUTION



Prohibition



Warning to fire

Do not place flammable objects around the pump, cable, or in the pump cover. Or do not cover these parts with a flammable object. Flammable objects may get overheated, causing a start of fire.

- This pump incorporates a heater that keep it warm automatically at low temperature. However, this antifreezing mechanism is insufficient in an area where ambient temperature is extremely low (0°C or less). Prepare a shed etc. for the pump, and install the pump inside.
- To prevent congelation, wrap the pipes with lagging material or install pipes belowground.
- When the power is turned off, the antifreezing mechanism does not operate. In a cold region, do not turn off the power until water is removed even if this product is not used for a long time.

Caution

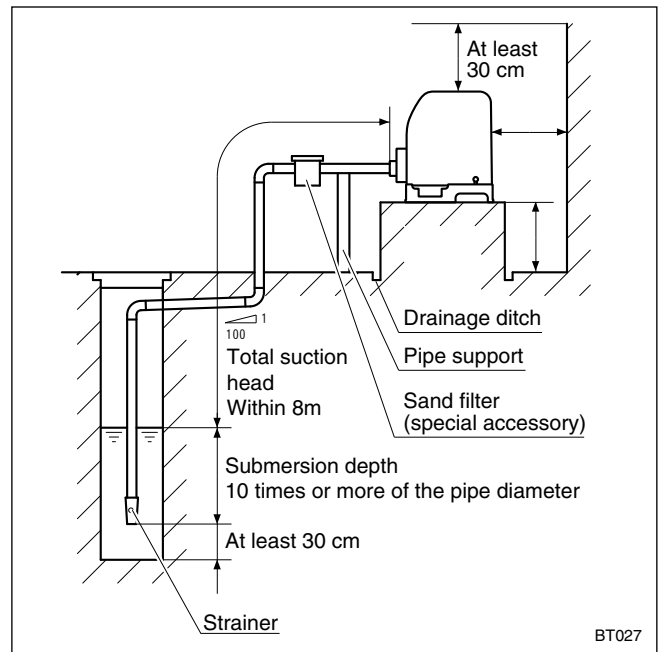
Carry out thorough measures against congelation. Kawamoto Pump assumes no responsibility for breakage caused by congelation.

Installation

Install the product while observing the following items.

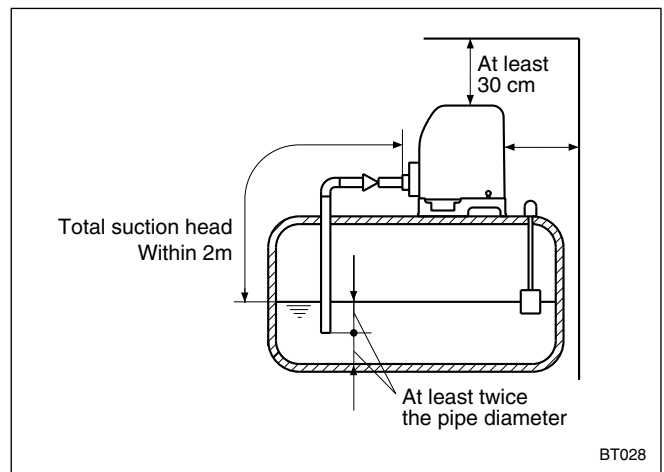
When using the product to suck in water from a well

- Set up the product so that the total suction head is within 8m.
The total suction head must be a sum of the suction height and the piping-loss height of horizontal pulling etc. depending on the type of pipe used.
- The water level drops in low-water season. The total suction head should be based on the time of low water.
- The depth of submersion under water must be at least 10 times the pipe diameter while being careful not to suck air in.
- The depth to the bottom of the well must be 30cm or more.
- Attach a strainer to the end of suction pipe.
- When the pump could suck in foreign objects, sand, etc., install a sand filter (special accessory) to the suction pipe.
- Do not install a sand filter to the discharge pipe.



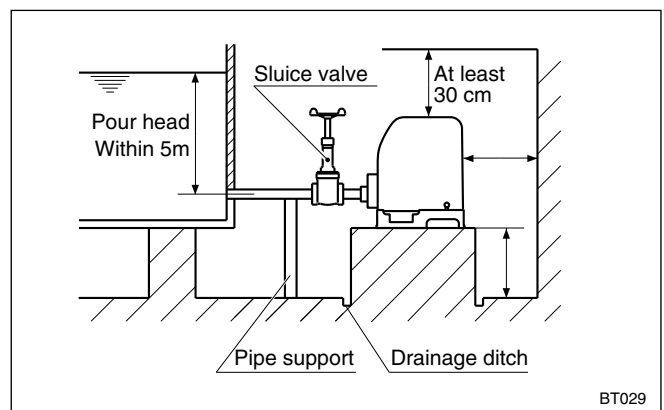
When sucking in water from a water tank

- Set up the product so that the total suction head is within 2m.
- The depth of submersion under water must be at least twice the pipe diameter.
- The depth to the bottom of the water tank must be at least twice the pipe diameter.
- The settings of the pump sensor before shipment are all set to "starting suction head for well water." Please adjust the sensor. (See page 22.)
- Purchase the water tank accessory set (special accessory) separately.



When pouring water from a water tank

- Set up the product so that the pour head is within 5m.
- Install a sluice valve near the suction opening for maintenance.
- The settings of the pump sensor before shipment are all set to "starting suction head for well water." Please adjust the sensor. (See page 22.)



Piping

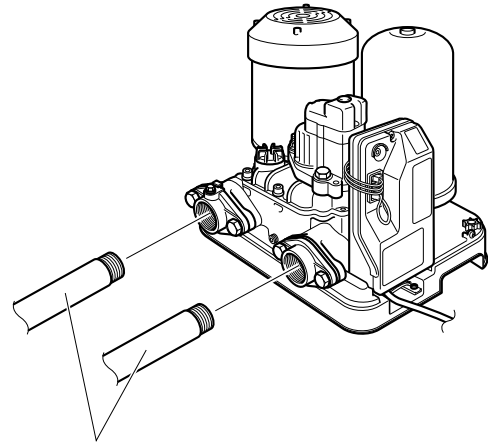
⚠ CAUTION



Apply sealing agent to the screws on the pipe, so the water leak can be prevented surely. Failure to do so may cause water leak.

Notes on piping

- Remove the flanges before piping work.
- Make the pipes as short as possible, and minimize bending parts.
- Use pipes appropriate for respective types. If the pipe diameter is shorter than the regulation size, it may cause low water volume or disable pumping.
- Install a sluice valve near the discharge opening for maintenance.
- Install pipe supports so that the pipe weight is not directly applied to the pump.
- Fasten the pipe joints completely to prevent air suction, water leakage, etc.
- Incline the suction pipes to prevent air from accumulating in the pipes. Avoid right angled loops and set the pipes with a rising slope (1/100 or more).



Pipe specifications

Type	Pipe diameter
NR255-F2	25mm
NR256-F2	25mm

BT030

Electrical work

⚠ WARNING



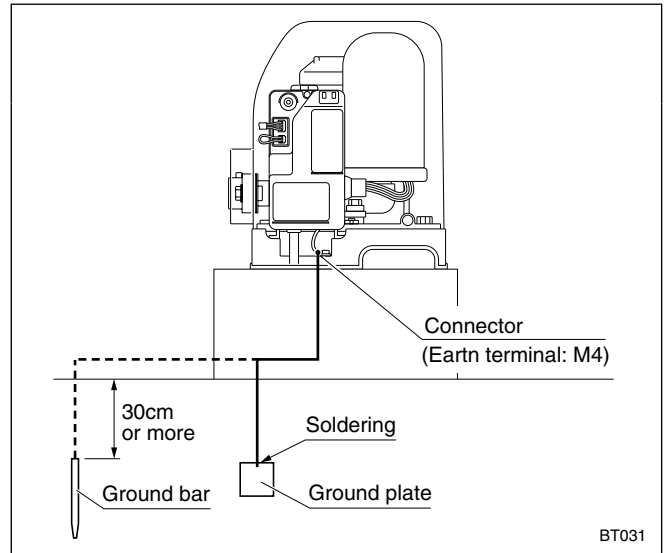
Electrical work must be performed by a professional engineer. Improper wiring and connection could result in malfunction, short circuit, electric shock, and fire.

Grounding

- 1 Connect a ground wire to the connector (earth terminal: M4) on the base.
- 2 Connect a ground plate of 30cm square or more or a ground bar of 1cm or more in diameter and 40cm or more in length to a ground wire by soldering, and bury it in the wet ground to the depth of 30cm or more.

Caution

Be careful not to damage a pipe etc. when burying the ground bar.



About a sterilization device

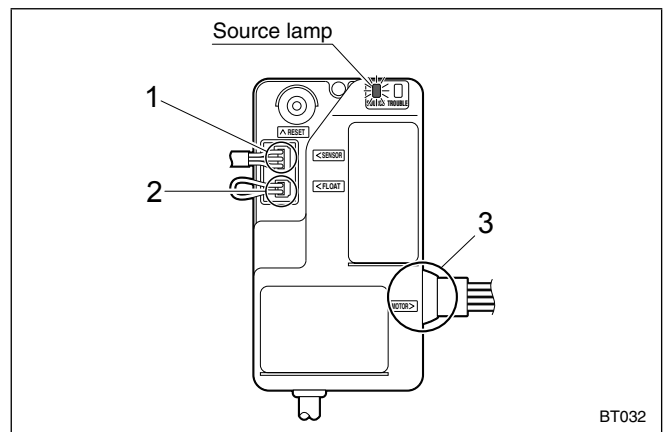
- If you need a sterilization device, contact the place of purchase.
- When using a sterilization device of a third party, purchase the control unit, DMS4 (special accessory). (Some models are not available.)

Turning on the pump

Turn on the power and confirm that the source lamp lights up red.

Caution

Before turning on the power, check that the cords are correctly connected, and that the connectors (1 to 3 in the illustration) are not loose.



Trial operation

WARNING



Prohibition



Warning to electric shock

When connecting or disconnecting the wiring, always shut down the power before you start operating. Failure to do so could result in electric shock.



Do not touch

After the power is turned on or while the power is on, do not touch the charging part of the control panel (electric parts box), motor terminals, and cable ends. Otherwise, short circuit, electric shock, or fire may be caused.

CAUTION



Prohibition

Do not allow the pump to suck in sand or foreign objects. Failure to observe this could result in the failure of the pump to start or operate normally.



Check that the rotating direction is right. If rotated in the wrong direction, impeller nuts or bolts may get loose and cause an accident.



Prohibition



Caution for rotating parts



Do not insert fingers in rotating parts

Do not touch rotating parts or insert fingers or objects in the opening during operation. Failure to observe this could result in electric shock, damage, or personal injury.



Do not touch



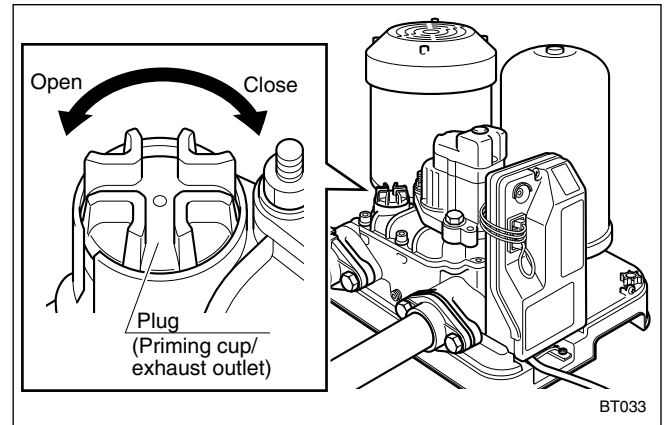
Very hot: do not touch

Do not touch the pump, motor, and heater during or immediately after operation. These parts can be very hot and cause burns.

1 Preparing for trial operation

In case of suction operation (self-priming operation)

- 1 Remove the pump cover (see page 8).
- 2 Remove the plug and fill water until the prime is filled fully.
- 3 Tighten the plug.
- 4 Turn on the faucet at the discharge side.



- 5 Turn on the power.

Caution

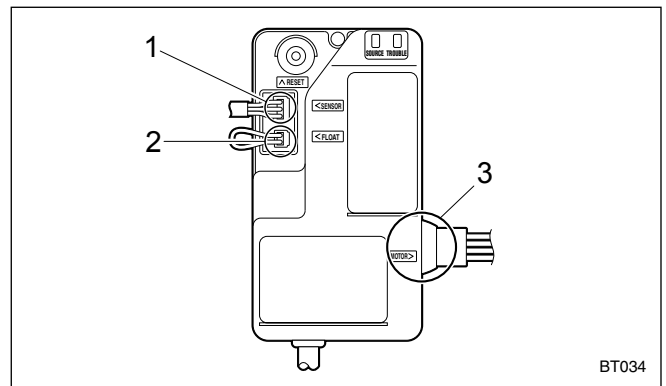
The pump starts operating by turning on the power. Before turning on the power, check that the cords are correctly connected, and that the connectors (1 to 3 in the illustration) are not loose.

- 6 Set the plug about one-half turn open. (Be sure not to open the plug too much, otherwise it could result in spouting of a large amount of water.)
- 7 When water spouts out from the plug, the self-priming operation is finished.

Note

It takes 3 to 5 minutes until the self-priming operation finishes.

- 8 Tighten the faucet and the plug .

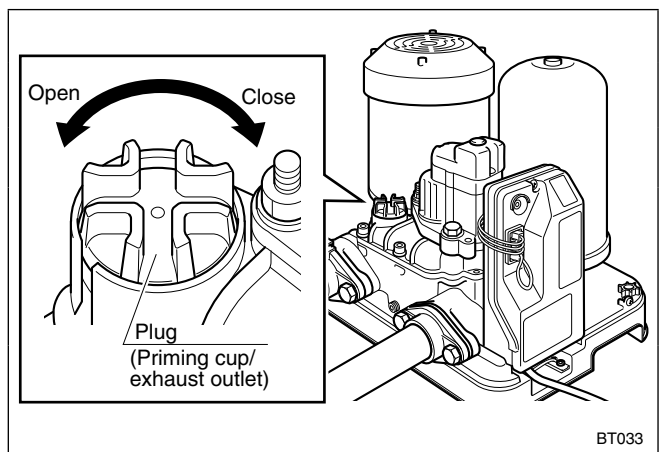


If the self-priming operation does not finish:

If the self-priming operation does not finish although 5 minutes have elapsed since the power was turned on, turn off the power. Then prime the pump, and then carry out the self-priming operation again.

In case of pouring water operation

- 1 Remove the pump cover (see page 8).
- 2 Loosen the plug for about a half turn.
- 3 Open the sluice valve at the suction side of the pump.
* When water spouts out from the plug, the self-priming operation is finished.
- 4 Tighten the plug.



Precaution for trial operation

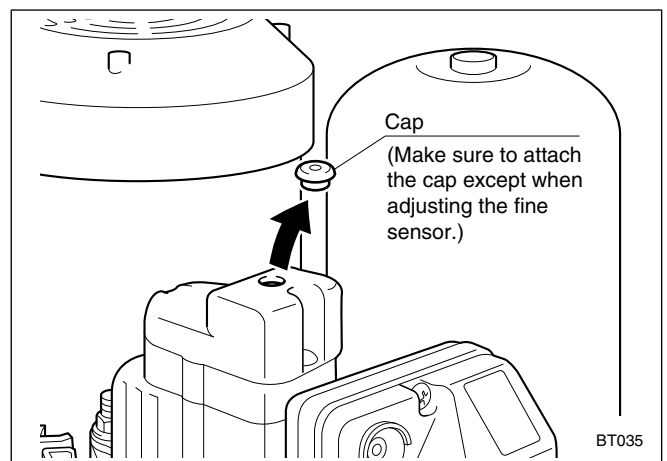
- Confirm that no pressure is applied in the pump before opening or closing the plug (Failure to do so could result in spouting of water or protruding of the O ring.) If the O ring protrudes, a water leakage may be caused. Replace the O ring with a new one.
- After the trial operation, wipe off water droplet on the pump, motor, accumulator, etc. with a dry cloth.

2 Adjusting the fine sensor (when sucking or pouring water from a water tank)

If the starting suction head is low or high, adjust the fine sensor to change the starting suction head.

* The starting suction head of the fine sensor is preset for sucking in water. Adjustment is not necessary if you will be using the pump for well water.

- 1 Remove the cap on the top of the fine sensor.

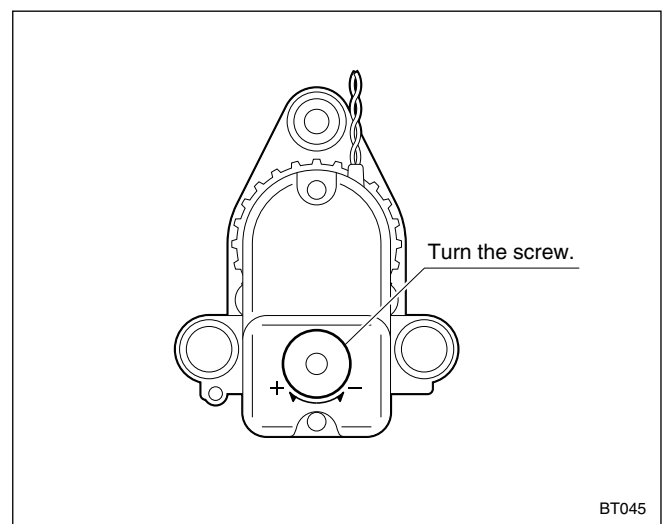


- 2 Use a Phillips-head screwdriver to turn the screw on the top of the fine sensor clockwise until it stops.

Caution

Be careful not to apply force too much, otherwise the thread or the sensor part may be damaged.

Type	Starting suction head (m)	
	Sucking from a well (Default)	Sucking from a water tank/ Pouring water
NR255-F2	14	20
NR256-F2		



- 3 Put the cap back to its original position.

Caution

Should the cap is lost, seal the hole with vinyl tape etc.

3 Trial operation

- 1 When pumping of water has started, leave the water running for a while.
* Confirm that there is no sand mixed in, no water leakage from the pipes and no abnormal operation noise.
- 2 Turn the faucet on and off.
* Confirm that this product starts and stops when the faucet is turned on and off.

4 Preparing for the normal operation

WARNING



Prohibition

Do not use the pump with the pump cover removed. Failure to do so could result in short circuit, electric shock, or fire from the accumulated dust or faulty insulation.



In case of the power outage, turn off the power switch. Otherwise, the product and the facility may get damaged, or the pump may suddenly start moving and cause injury at the time of power recovery.

CAUTION



If the water was not used for a long period, run the water for a while and check that the water becomes clean before you start using the water. If the water quality is deteriorated, drinking such water may cause health damage.



Shut off the power when not using the product for a long time. Failure to do so could result in short circuit, electric shock, or fire from faulty insulation.



Prohibition

Do not operate a 50Hz-specified pump in 60Hz. Otherwise, a breakage due to an excessive pressure or motor burnout due to overload may be caused.
Do not operate a 60Hz-specified pump in 50Hz. The pump performance may be degraded.



Prohibition

Do not place flammable objects around the pump, cable, control panel (electric parts box), or in the pump cover. Or do not cover these parts with a flammable object. Flammable objects may get overheated, causing a start of fire.



At startup of the operation after long-time storage or a recess, perform a trial operation by following the "installation" and "operation" procedures in a specified order. There are possibilities of pump constraint by seizure, motor burnout, or idling by water drainage.



Operate the pump within the specification range. Failure to do so may cause pump damage or accident.










At the time of priming and exhaust, avoid splashing of water over the product. Otherwise, short circuit, electric shock, fire, or malfunction may be caused.








- After the trial operation, use a dry cloth to completely remove water drops on the pump, motor, accumulator, and other items.
- Attach the pump cover (see page 8).
- When draining off the water from the pump, remove the hexagonal drainage plug.
After draining off the water, make sure to put back the hexagonal drainage plug. (See page 7.)

Inspection and maintenance




WARNING

-  If the product stops working or if any abnormality is sensed (i.e., broken cable or burning smell), stop operation immediately and shut down the power. Then contact the place of purchase for inspection or repairs. If the product is continuously operated in an abnormal condition or the repair is inappropriate, short circuit, electric shock, fire, and/or water leakage may be caused.
-  This product must be disassembled, repaired or modified only by a qualified repair technician. Improper repairs could result in malfunction, damage, electric shock, and fire.
Do not disassemble or modify
-  When inspecting or replacing the product, always shut down the power before you start working. Failure to do so could result in short circuit, electric shock, or injury.
-  When moving and reinstalling the product, consult the place of purchase. If the product is improperly installed, short circuit, electric shock, fire, or water leakage may be caused.
-  When inspecting or replacing the electric part such as the control panel (electric parts box), be sure to check with a tester that there is no voltage remained before you start working. Failure to do so could result in electric shock, or injury.
-  If the motor insulation resistance is decreased to $1M\Omega$ or lower, immediately contact the place of purchase. Otherwise, the motor may get burnt out, or electric shock or fire may be caused.
-  When repairing the product, use our genuine parts. If any part other than the genuine parts is used, breakage or accidents may be caused. In addition, the product could not be used with its optimal condition.

CAUTION

-  When the product is not used during winter time, turn off the power and drain water from the pump and pipes. When the product is left with water inside of the pump and pipes, the pump may get damaged due to congelation of the pump.
-   When the pump is hot, do not remove the plug (priming cup/exhaust outlet). Failure to observe this could result in spouting of boiling water and causing a burn.
Prohibition Very hot: do not touch
-  At startup of the operation after long-time storage or a recess, perform a trial operation by following the "installation" and "operation" procedures in a specified order. There are possibilities of pump constraint by seizure, motor burnout, or idling by water drainage.
-  When the pump is not used for a long time, drain water from the pump and pipes. Otherwise, accumulated water may get rotten, and bacteria may be increased.
-  To use the product safely for a long time, conduction of both periodical and daily inspections are recommended. Failure to do so may cause breakage of pump and accident. For the periodical inspection, consult the place of purchase.
-  Periodically check the performance of protective relay. The product does not operate properly at the time of accident, causing electric shock or malfunction.

⚠ CAUTION

-  Replace the consumables periodically. When the consumables are continuously used in deteriorated and worn-out condition, accidents such as water leak, seizure, and breakage may be caused. For the periodical inspection and replacement of parts, consult the place of purchase.
-  When the pressure gauge or the compound gauge is used, keep the cock closed while the gauge is not used for measurement. If the cock is kept opened all the time, the pressure gauge or the compound gauge may get broken.
-  Be sure to perform the inspection by following the inspection items. Otherwise, generation of malfunction cannot be prevented in advance, causing accidents.

Daily inspection

Item	Check point	Acceptance criteria
Pump	Water leakage on the mechanical seal	No drop of water
Motor	Exterior temperature	Ambient temperature is +60°C or lower.
	Ball-bearing	Operation noise & vibration should be unchanged from initial condition.
	Insulation resistance ^(*)	1MΩ or more
Unit	Discharge pump head	No large change from the set value
	Current	Nameplate rated current value or less
	Voltage	Within ±10% of rated voltage
	Water leakage	No water leakage on each part

Daily inspections are essential for detecting problems quickly. It is therefore recommended to keep a daily operation log.

(*) When measuring insulation resistance of the motor, disconnect the cables. Use an insulation resistance tester of 250V or lower. If the electric parts box is measured by using an insulation resistance tester of higher than the specified voltage, the electric parts box may get broken.

Semi-annual inspection

Item	Check point	Acceptance criteria
Accumulator	Filler gas pressure	The frequency of starting the pump is not extremely high. ^(*)
Electric parts box	Internal condensation	No condensation
	Substrate appearance.	No defect such as discoloration
Fine sensor	Pump performance	Pump performance (start/stop) is not unstable.

(*) When this product is used for a long period, the sealed gas pressure of the accumulator will decrease. Once the gas pressure decreases, it cannot be pressurized and must be replaced with a new one. When the sealed gas pressure decreases, the frequency of starting will increase. Check the pressure by removing the accumulator and inserting a stick (with a blunt end) into the nipple at the bottom. The stick will contact the rubber bladder immediately when normal, however when the sealed gas pressure has decreased, the rubber will spread and the end of the stick will not contact the rubber.

Replacing consumables

The following parts are consumables. Replace the parts by referring to the replacement schedule guideline.

Part name	Replacement schedule	Condition as a guide for replacement
Ball-bearing	3 year	When the bearing becomes hot, or when abnormal noise or vibration is generated
Mechanical seal	1 year	When there is a visible leak
O-ring (packing)	At every disassembly or inspection	-
Packing with valve seat	-	When required (in case of serious wear or deterioration at time of replacement or inspection)
Fine sensor	3 year	When the pump performance (start/stop) is unstable
Accumulator	3 year	When the outage time of the pump becomes noticeably short.

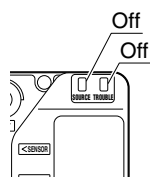
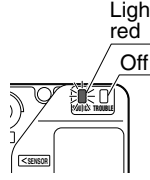
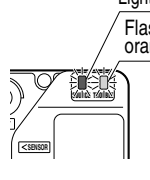
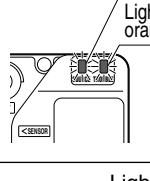
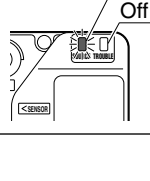
The replacement schedule above is not assured. It is recommended to replace parts as soon as possible if you detect any problem during daily maintenance and inspections.

Troubleshooting

⚠ WARNING

- ❗ If the product stops working or if any abnormality is sensed (i.e., broken cable or burning smell), stop operation immediately and shut down the power. Then contact the place of purchase for inspection or repairs. If the product is continuously operated in an abnormal condition or the repair is inappropriate, short circuit, electric shock, fire, and/or water leakage may be caused.
- ❗ When inspecting or replacing the product, always shut down the power before you start working. Failure to do so could result in short circuit, electric shock, or injury.

If the problem persists after taking the countermeasures in the table below, contact the place of purchase.

Problem	Lamp indication	Cause	Countermeasure
Motor does not rotate (pump does not operate)	 BT037	<ul style="list-style-type: none"> ● The power plug is not connected completely. ● Electric power outage ● The breaker has tripped, or it shorted out. ● Abnormality of electric parts box 	<p>Insert the power plug into the socket completely.</p> <p>Wait until the power is recovered.</p> <p>Eliminate the cause of failure and turn on the power again.</p>
	 BT038	<ul style="list-style-type: none"> ● The motor connector is disconnected or the wire is broken. ● The fine sensor connector is disconnected or the wire is broken. 	<p>Insert the connector into the socket completely.</p>
	 BT039	<ul style="list-style-type: none"> ● The drought-protection function is activated by sensing an increase in water temperature. 	<p>It recovers automatically when the water temperature is reduced.</p>
	 BT040	<ul style="list-style-type: none"> ● Locking due to sand, trash, congelation, etc. ● Locking due to abnormalities on the bearing. ● Electric parts box is faulty. 	<p>Insert the connector into the socket completely.</p> <p>Eliminate the cause of failure and press the reset button after about 10 minutes.</p>
Motor does not stop even when the faucet is turned off.	 BT038	<ul style="list-style-type: none"> ● Leaking in pump or piping, etc. ● Catching on float of fine sensor (by invasion of foreign matter etc.) 	<p>Eliminate the cause of failure.</p>
Motor frequently repeats start/stop.	-	<ul style="list-style-type: none"> ● Insufficient gas pressure in accumulator or breakage on diaphragm. ● Leaking in pump or piping, etc. ● Electric parts box is faulty. 	<p>Eliminate the cause of failure.</p>

* If specifying a cause for the damage is not possible, contact the place of purchase. Note the pump type, serial number and nature of trouble (fault) when making an inquiry.

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