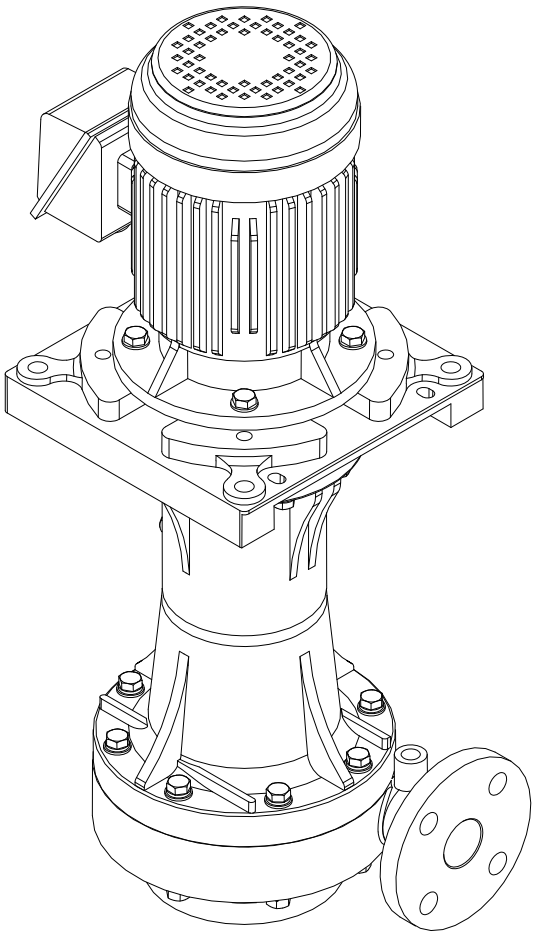
# Vertical Sealless Pump

## YD – VK, YD – VP series

# DRYFREE

Instruction manual

Version: 110711



World Chemical Co.,Ltd.

# PREFACE

Thank you very much for purchasing World Chemical's vertical sealless pump "DRYFREE".

DRYFREE is constructed of corrosion resistant materials like CFR PP (Carbon fiber reinforced polypropylene), and is both time saving and user friendly. An adequate understanding of this manual is required to maximize the pump's performance and to assure safety and long-term efficiency. Store this manual where it can be easily accessed.

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# INSPECTION WHEN UNPACKING

Please examine the product before use.

(1) Check the name plate that the product specification matches your order.

(2) Check that the product has not been accidentally damaged during transport.

(3) If the usage is changed from the time you ordered, should be contact us.

# SAFETY PRECAUTIONS (To be observed at all times)

The following procedures are intended to protect you from personal injury and/or property damage.

- The following symbols classify the degree of danger and explain the damages that could occur when its contents are ignored of the pump is used improperly.

| | |
|---|---|
|  | **Warning:** Non-compliance can lead to fatal or serious injury. |
|  | **Caution:** Non-compliance can lead to some injury and/or property damage. |

- Safety rules to be observed are classified and explained under the following symbols. (The following are examples of picture displays.)

| | |
|---|---|
|  | This symbol **cautions people to be careful**. |
|  | This symbol signifies that this **action must not be taken**. |
|  | This symbol indicates that the **action must be taken**. |

## WARNING

(1) Dangerous liquids, and dangerous surroundings.

When using the pump to move dangerous liquids or using in surroundings (only explosion prevention specifications) Liable to cause explosions, you must adhere to facility standards determined by law and always conduct daily check-ups to look for and prevent leakage. If the pump is operated under abnormal conditions, such as usage during a liquid leak, it could lead to serious accidents such as explosion or fire and personal injury. Please follow the manufacturer's instructions for handling liquid agents.

(2) Do not use damaged or modified pumps.

Do not use the pump if it has been damaged or modified. World chemical is not be responsible for any accident or damage of any kind caused by the user remodeling the pump.

(3) Caution when transporting or lifting the pump.

Always use the hoist bolt for pumps that come with them. For pumps without hoist bolts, hoist them carefully while watching the weight balance by using a belt sling. This operation must be performed by

qualified personnel and the slings to be used should have sufficient strength. Do no carry pumps by hand as even the lightest pump weights more than 26kg (57lbs) and could cause accidents.

(4) Do not inspect or dismantle the pump or the motor with the power on.

Do not inspect or dismantle the pump or motor with the power turned on. This could lead to personal injuries from electric shock or from getting caught in the rotor. Work should be performed only after verifying that multiple safety precautions have been taken, such as the switch for main power supply is off, the operation switch is off, and the hand switch for the pump is off.

(5) Connecting grounding line.

Using the pump without attaching the ground line from the motor could cause electric shock. The grounding operation must be performed by a qualified person in accordance with electric facilities technical standards and interior wiring regulations.

(6) Protecting the power supply cord.

Stretching, pinching or otherwise damaging the power supply cords or motor lead wires could cause fire or electric shock. Always replace the cover of the terminal box before use.

(7) Installing Ground Fault Interrupter (GFI)

Electric shock might result if the pump is used without attaching ground fault interrupter device. Protect the pump from accidents and damages caused by current overload by always attaching circuit breakers, over-current protection devices and/or other protective devices.

(8) Caution when removing pump

Before removing the pump from piping, close the intake and discharge pipe valves and verifying there are no liquid leaks. Drain all liquid from the pump. Always wear protective gear when performing these operations as direct contact with the fluids could cause injuries.

## CAUTION

(1) Unspecified use.

Do not use the pump for purposes other than those specified on the nameplate. Verify the power specification of motor (phase, voltage and frequency) prior to wiring the motor. Unspecified use could cause personal injuries or damage to the pump and peripheral equipment.

(2) Restrictions on persons handling the pump.

Transportation, installation, wiring, operation, servicing, and inspection should be performed only by an expert who has full knowledge of the handling the pump.

(3) Opening package.

Before opening the package verify that the top side of the package is up. When opening a wooden crate, be careful to avoid injury from nails and silvers when removing the product.

(4) Ventilation.

Do not obstruct ventilation of the motor. This could cause the motor to overheat. If handling toxic or odorous liquids, have the pump situated in a well-ventilated place to prevent poisoning.

(5) Repairs and returning the pump.

In the event of a pump failure, contact World Chemical or your nearest sales agent for repairs. If the pump is to be returned for repairs, decontaminate and clean interior and exterior of the pump before returning.

(6) Regarding thermoplastic (resin) parts.

The pump is made of thermoplastic resin material. Therefore, it could cause injuries if it becomes damaged through impact with other objects. Refrain from having people hit a pump against any objects. Attach piping support to avoid any pipe load stress on the pump.

(7) Verifying rotation direction of the motor and starting the pump.

Verify the direction of rotation when initially starting up the pump. Open the intake and discharge valves first, and check that there is no liquid leakage from the pipe connection. Verify the pipe is emptied of air and the pump is filled with liquid, and then, turn on the switch for a split second to check the direction of rotation. If the rotation reversed, switch two of the three phases in the three phase power supply to change the direction of rotation. Turn off the power supply and confirm that it is safe before switching the two phases.

(8) Disposing of scrapped pump.

When disposing a scrapped pump, thoroughly flush any hazardous materials from the pump and discard as industrial waste in accordance with the law.

(9) Leak protection.

Always take appropriate preventative measure to safeguard against liquid leaks in the event of a breakdown of the pump or piping.

# MODEL DESCRIPTION

Example

**YD – 41 VK – B K 1 5 - M**

| 41 | VK | B | K | 1 | 5 | M |
|---|---|---|---|---|---|---|
| Discharge Bore | Model | Resin Base | Cut Seal | Hose Power<br>1HP–0.75kW | Frequency<br>5 – 50Hz<br>6 – 60Hz | Special Motor |

- VK type: Specific gravity 1.1

  VK type can be used in/out of a tank, and is best suited for use as a circulating pump for scrubber.
- VP type: Specific gravity 1.4

  VP type is for high pressure applications, and is used mainly for printed-circuit boards and etching machine.
- Material: CFR PP (Carbon fiber reinforced polypropylene)
- Features:
  ①. Since a high corrosion resistant resin (CFR PP) is used for the main body, this pump is excellent in resisting heat and corrosion, and can be widely used for various kinds of chemicals.
  ②. To reduce air entrapment to a minimum, a newly designed special blade has been adopted for the impeller.
  ③. Because of its sealless construction, it is free from problems caused by heat and wear, and not affected by slight amounts of slurry.
  ④. Because of its composed of molded parts, each part has high dimensional accuracy, and can be efficiently used in a wide range of low to high pressures.
  ⑤. The pump includes cut seal as standard equipment against temporal leak caused by backflow right after pump operation stops.
- Applications:
  ①. Spray pump for etching machines
  ②. Circulating pump for scrubbers
  ③. Circulating transfer pump for reaction and mixing tanks
  ④. Circulating / stirring pump for electroless nickel plating solution, general plating solution, filters, heat exchangers, etc.
  ⑤. Transfer pump for emptying and replacing chemicals
- Range of the used liquid temperature: 0 – 70℃ (32F – 158F)

# SPECIFICATION

**VK standard specification** **50Hz: S.G.1.1**

| Model | Bore (mm) | Output | | Total head | Capacity | Weight |
|---|---|---|---|---|---|---|
| | Suction x Discharge | HP | kW | m (Ft) | L / min (GPM) | kg (lbs) |
| YD-41VK-B15 | 50 x 40 | 1 | 0.75 | 9 (29.5) | 150 (39.5) | 26 (57) |
| YD-42VK-BK25 | 50 x 40 | 2 | 1.5 | 10 (33) | 300 (79) | 35 (77) |
| YD-50VK-BK35 | 65 x 50 | 3 | 2.2 | 12 (39.5) | 350 (92.5) | 38.5 (85) |
| YD-65VK-BK55 | 80 x 65 | 5 | 3.7 | 15 (49) | 550 (145) | 52.5 (116) |
| YD-65VK-BK7.55 | 80 x 65 | 7.5 | 5.5 | 18 (59) | 700 (185) | 63 (139) |

**60Hz: S.G.1.1**

| Model | Bore (mm) | Output | | Total head | Capacity | Weight |
|---|---|---|---|---|---|---|
| | Suction x Discharge | HP | kW | m (Ft) | L / min (GPM) | kg (lbs) |
| YD-41VK-B16 | 50 x 40 | 1 | 0.75 | 8 (26) | 120 (32) | 26 (57) |
| YD-41VK-B26 | 50 x 40 | 2 | 1.5 | 8 (26) | 300 (79) | 35 (77) |
| YD-42VK-BK36 | 50 x 40 | 3 | 2.2 | 12 (39.5) | 350 (92.5) | 38 (84) |
| YD-50VK-BK56 | 65 x 50 | 5 | 3.7 | 15 (49) | 550 (145) | 52.5 (116) |
| YD-65VK-BK7.56 | 80 x 65 | 7.5 | 5.5 | 18 (59) | 800 (211.5) | 63 (139) |
| YD-65VK-BK106 | 80 x 65 | 10 | 7.5 | 25 (82) | 850 (224.5) | 70 (154) |

* 1HP – 5HP: The dimension of Motor shaft is the same and interchangeable.

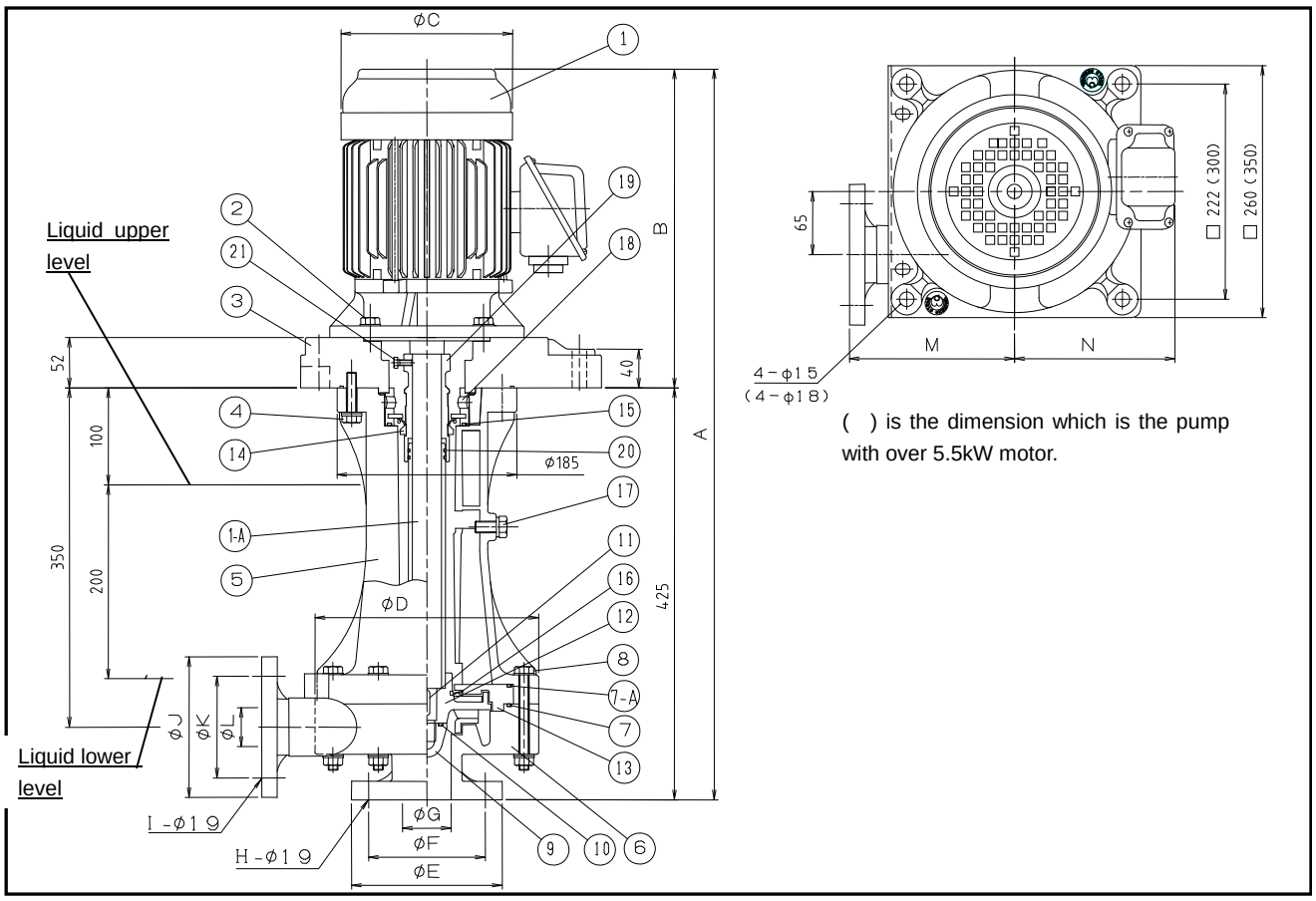
**VP standard specification** **50Hz: S.G.1.4**

| Model | Bore (mm) | Output | | Total head | Capacity | Weight |
|---|---|---|---|---|---|---|
| | Suction x Discharge | HP | kW | m (Ft) | L / min (GPM) | kg (lbs) |
| YD-50VP-BK35 | 65 x 50 | 3 | 2.2 | 12 (39.5) | 300 (79) | 38.5 (85) |
| YD-50VP-BK55 | 65 x 50 | 5 | 3.7 | 15 (49) | 430 (113.5) | 52.5 (116) |
| YD-65VP-BK7.55 | 80 x 65 | 7.5 | 5.5 | 17 (56) | 600 (158.5) | 63 (139) |
| YD-65VP-BK105 | 80 x 65 | 10 | 7.5 | 18 (59) | 750 (198) | 70 (154) |

**60Hz: S.G.1.4**

| Model | Bore (mm) | Output | | Total head | Capacity | Weight |
|---|---|---|---|---|---|---|
| | Suction x Discharge | HP | kW | m (Ft) | L / min (GPM) | kg (lbs) |
| YD-50VP-BK36 | 65 x 50 | 3 | 2.2 | 12 (39.5) | 300 (79) | 38.5 (85) |
| YD-50VP-BK56 | 65 x 50 | 5 | 3.7 | 15 (49) | 430 (113.5) | 52.5 (116) |
| YD-65VP-BK7.56 | 80 x 65 | 7.5 | 5.5 | 23 (75.5) | 400 (106) | 63 (139) |
| YD-65VP-BK106 | 80 x 65 | 10 | 7.5 | 20 (65.5) | 800 (211.5) | 70 (154) |

# OUTLINE DIMENSION




| No. | Parts name | Q'ty | Material | No. | Parts name | Q'ty | Material |
|---|---|---|---|---|---|---|---|
| 1 | Motor | 1 | | 11 | Key | 1 | SUS316 |
| 1-A | Shaft | 1 | SUS304 | 12 | Impeller | 1 | CFR PP |
| 2 | Hex. bolt | 4 | SUS304 | 13 | Back plate | 1 | CFR PP |
| 3 | Base | 1 | GFR PP | 14 | Dry seal | 1 | FPM |
| 4 | Hex. bolt | 8 | SUS304 | 15 | O-ring | 1 | FPM/EPDM |
| 5 | Connecting pipe | 1 | CFR PP | 16 | Cut seal | 1 | FPM |
| 6 | Casing | 14 | CFR PP | 17 | Hex.bolt | 1 | SUS304 |
| 7-A | O-ring | 1 | EPDM | 18 | Seal case | 1 | CFR PP/ Ceramic |
| 7 | O-ring | 1 | FPM/EPDM | | | | |
| 8 | Hex. bolt & nut | 8 | SUS304 | 19 | Dry seal holder | 1 | CFR PP |
| 9 | Impeller nut | 1 | CFR PP | 20 | O-ring | 2 | FPM/EPDM |
| 10 | O-ring | 1 | FPM/EPDM | 21 | Hex.bolt | 1 | SUS304 |

*1: No.19, 20 and 21 are not come with the pump with over 5.5kW motor.

*2: No.16 “Cut seal” is not come with the high temperature type.

*3: No.16 “Cut seal” is not come with YD-41VK-15 / 16 / 26.

mm (inch)

## VK Dimension

**50Hz: S.G.1.1**

| Model | A | B | ϕC | ϕD | ϕE | ϕF | ϕG | H | I | ϕJ | ϕK | ϕL | M | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YD-41VK-B15 | 754 (29.5) | 329 (13) | 176.5 (7) | 230 (9) | 155 (6) | 120 (5) | 50 (2) | 4 (0.2) | 4 (0.2) | 145 (5.5) | 105 (4) | 40 (1.5) | 170 (6.5) | 179 (7) |
| YD-42VK-BK25 | 798.5 (31.5) | 373.5 (15) | 196.5 (8) | 230 (9) | 155 (6) | 120 (5) | 50 (2) | 4 (0.2) | 4 (0.2) | 145 (5.5) | 105 (4) | 40 (1.5) | 170 (6.5) | 192 (7.5) |
| YD-50VK-BK35 | 798.5 (31.5) | 373.5 (15) | 196.5 (8) | 260 (10) | 175 (7) | 140 (5.5) | 65 (5.5) | 4 (0.2) | 4 (0.2) | 155 (6) | 120 (5) | 50 (2) | 200 (8) | 192 (7.5) |
| YD-65VK-BK55 | 848 (33) | 423 (16.5) | 238 (9.5) | 260 (10) | 190 (7.5) | 150 (6) | 80 (6) | 8 (0.3) | 4 (0.2) | 175 (7) | 140 (5.5) | 65 (2.5) | 200 (8) | 202 (8) |
| YD-65VK-BK7.55 | 868 (34) | 443 (17.5) | 238 (9.5) | 260 (10) | 190 (7.5) | 150 (6) | 80 (6) | 8 (0.3) | 4 (0.2) | 175 (7) | 140 (5.5) | 65 (2.5) | 200 (8) | 202 (8) |

**60Hz: S.G.1.1**

| Model | A | B | ϕC | ϕD | ΦE | ϕF | ϕG | H | I | ϕJ | ϕK | ϕL | M | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YD-41VK-B16 | 754 (29.5) | 329 (13) | 176.5 (7) | 230 (9) | 155 (6) | 120 (5) | 50 (2) | 4 (0.2) | 4 (0.2) | 145 (5.5) | 105 (4) | 40 (1.5) | 170 (6.5) | 179 (7) |
| YD-42VK-BK26 | 798.5 (31.5) | 373.5 (15) | 196.5 (8) | 230 (9) | 155 (6) | 120 (5) | 50 (2) | 4 (0.2) | 4 (0.2) | 145 (5.5) | 105 (4) | 40 (1.5) | 170 (6.5) | 192 (7.5) |
| YD-50VK-BK36 | 798.5 (31.5) | 373.5 (15) | 196.5 (8) | 230 (9) | 155 (6) | 120 (5) | 50 (2) | 4 (0.2) | 4 (0.2) | 145 (5.5) | 105 (4) | 40 (1.5) | 170 (6.5) | 192 (7.5) |
| YD-65VK-BK56 | 848 (33) | 423 (16.5) | 238 (9.5) | 260 (10) | 175 (7) | 140 (5.5) | 65 (5.5) | 4 (0.2) | 4 (0.2) | 155 (6) | 120 (5) | 50 (2) | 200 (8) | 202 (8) |
| YD-65VK-BK7.56 | 868 (34) | 443 (17.5) | 238 (9.5) | 260 (10) | 190 (7.5) | 150 (6) | 80 (6) | 8 (0.3) | 4 (0.2) | 175 (7) | 140 (5.5) | 65 (2.5) | 200 (8) | 202 (8) |
| YD-65VK-BK106 | 898 (35) | 473 (18.5) | 238 (9.5) | 260 (10) | 190 (7.5) | 150 (6) | 80 (6) | 8 (0.3) | 4 (0.2) | 175 (7) | 140 (5.5) | 65 (2.5) | 200 (8) | 202 (8) |

## VP Dimension

**50Hz: S.G.1.4**

| Model | A | B | ϕC | ϕD | ϕE | ϕF | ϕG | H | I | ϕJ | ϕK | ϕL | M | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YD-50VP-BK35 | 798.5 (31.5) | 373.5 (15) | 196.5 (8) | 260 (10) | 175 (7) | 140 (5.5) | 65 (5.5) | 4 (0.2) | 4 (0.2) | 155 (6) | 120 (5) | 50 (2) | 200 (8) | 192 (7.5) |
| YD-50VP-BK55 | 848 (33) | 423 (16.5) | 238 (9.5) | 260 (10) | 175 (7) | 140 (5.5) | 65 (5.5) | 4 (0.2) | 4 (0.2) | 155 (6) | 120 (5) | 50 (2) | 200 (8) | 202 (8) |
| YD-65VP-BK7.55 | 868 (34) | 443 (17.5) | 238 (9.5) | 260 (10) | 190 (7.5) | 150 (6) | 80 (6) | 8 (0.3) | 4 (0.2) | 175 (7) | 140 (5.5) | 65 (2.5) | 200 (8) | 202 (8) |
| YD-65VP-BK105 | 898 (35) | 473 (18.5) | 238 (9.5) | 260 (10) | 190 (7.5) | 150 (6) | 80 (6) | 8 (0.3) | 4 (0.2) | 175 (7) | 140 (5.5) | 65 (2.5) | 200 (8) | 202 (8) |

**60Hz: S.G.1.4**

| Model | A | B | ϕC | ϕD | ϕE | ϕF | ϕG | H | I | ϕJ | ϕK | ϕL | M | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YD-50VP-BK36 | 798.5 (31.5) | 373.5 (15) | 196.5 (8) | 260 (10) | 175 (7) | 140 (5.5) | 65 (5.5) | 4 (0.2) | 4 (0.2) | 155 (6) | 120 (5) | 50 (2) | 200 (8) | 192 (7.5) |
| YD-50VP-BK56 | 848 (33) | 423 (16.5) | 238 (9.5) | 260 (10) | 175 (7) | 140 (5.5) | 65 (5.5) | 4 (0.2) | 4 (0.2) | 155 (6) | 120 (5) | 50 (2) | 200 (8) | 202 (8) |
| YD-65VP-BK7.56 | 868 (34) | 443 (17.5) | 238 (9.5) | 260 (10) | 190 (7.5) | 150 (6) | 80 (6) | 8 (0.3) | 4 (0.2) | 175 (7) | 140 (5.5) | 65 (2.5) | 200 (8) | 202 (8) |
| YD-65VP-BK106 | 898 (35) | 473 (18.5) | 238 (9.5) | 260 (10) | 190 (7.5) | 150 (6) | 80 (6) | 8 (0.3) | 4 (0.2) | 175 (7) | 140 (5.5) | 65 (2.5) | 200 (8) | 202 (8) |

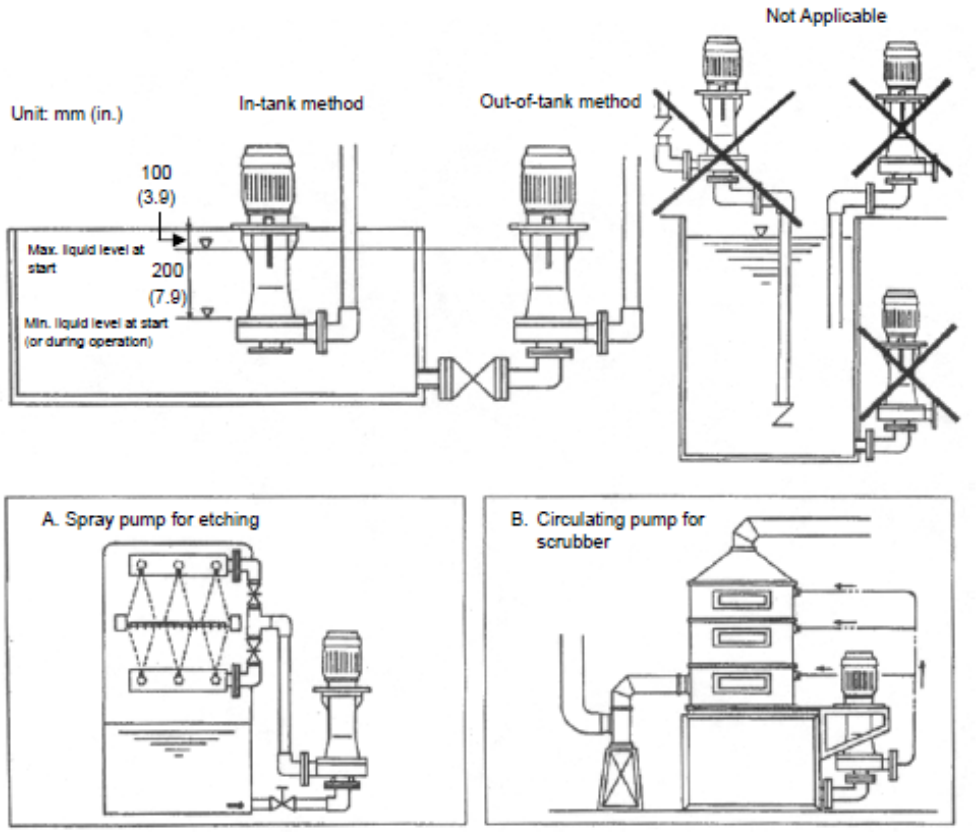
# CAUTION WHEN INSTALLING, LAYING PIPES

1. Installation height and liquid level in an intake tank

   The pump does not need a mechanical seal or gland packing to prevent liquid leakage. Refer to the illustration below as reference to determine the pump's proper installation position. If necessary, use a pump stand.

   The pump should be installed so that the liquid level in the tank is between the maximum liquid level and the minimum liquid level for the pump. If the liquid level is set at the maximum liquid level, note that there is the possibility of liquid leak from the upper part of the pump during suspension or during operation, such as a filter of the discharge piping, in which liquid easily stagnates, install a check valve between the pump and piping to prevent backflow.

   **Examples of Standard Installation**




2. Caution about the operation which is unconfirmed joint parts and seal parts

   When operating the pump for the first time after installation or reaassembly, make sure the pump is primed, air is released, and that pump parts and suction/discharge couplings are securely sealed.

3. Installation position and placement

(1) Install the pump as close as possible to intake tank, and maintain the liquid level within the standard setting range (End suction method). The pump can be installed indoors or outdoors (pump with indoor use motor can be used indoor only). Protection of the motor and wiring equipment should be made to avoid failure due to exposure to the elements.

(2) Anchor the pump vertically on level surface where there is no influence of other machine's vibration. There should be sufficient space around the pump for easy access for maintenance and for the motor cooling fan. If an installation stand is used, ensure it is secured.

4. Piping

(1) Use M16 bolts for suction/discharge flanges and tighten them evenly with an appropriate torque wrench.
M16 bolts Recommended torque: 19.6N・m (200kgf・cm)

(2) The suction pipe should employ the end suction method. The shortest pipe possible, with the minimum number of bends, should be designed. Arrange a proper support on the suction pipe so that the load and the thermal stress of the pipe are not applied to the pump.

(3) Do not allow areas such as projections where air may be trapped in the suction piping to avoid air lock.

(4) When transferring high-temperature liquid, use pipes with one size larger diameter, or use the shortest pipes possible with as a few pipe bends as possible to prevent a decrease in suction performance caused by high vapor pressure and to prevent cavitation.

(5) Use proper pip supports on the discharge piping to avoid applying load of piping on the pump.

(6) If a screen such as a strainer is installed at the inlet, periodically clean the screen. The pump's performance and function are greatly affected by a clogged screen.

(7) If the piping is long, its diameter should be determined by calculating the piping resistance. Otherwise, the specified performance may not be obtained due to increased resistance.

(8) Install valves that induce less pressure loss on the suction/discharge pipes with consideration for maintenance and accessibility.

5. Wiring 

Qualified personnel must handle electrical wiring and power source setup. We are not responsible for personal injury and equipment damage caused by improper wiring/power source setup done by unqualified personnel. If necessary, contact us or the nearest distributor. Always abide by the local and national electrical codes.

(1) Use an electromagnetic switch that conforms to the specifications of the pump motor (voltage, watt, et.).

(2) If the pump is installed outdoors, use waterproof wiring to protect the switches from rainwater and moisture.

(3) The electromagnetic switch and push button should be installed a reasonable distance from the pump.

# CAUTION WHEN OPERATING 

1. General cautions

(1) Never operate the pump with the suction valve closed. The pump may be damaged by a rapid vacuum state of the pump.

(2) In the event of cavitation, stop the pump immediately. Do not operate the pump with air trapped.

(3) Do not operate the pump with the discharge valve fully closed for extended periods of time. A resulting rise in temperature of liquid within the pump may cause damage to the pump.

(4) Turn off the power switch immediately when power outage occurs in operation.

(5) When transferring high-temperature liquid, install a protection device around the pump to prevent burn injury as the surface of the pump becomes very hot.

2. Before starting operation

   When operating the pump for the first time after installation or after long-term suspension, prepare for operation as described below.

   (1) Pour liquid into the tank and piping after thoroughly cleaning tank and piping.

   (2) Re-tighten the flange connecting bolts and pump base bolts.

   (3) Add priming liquid into the pump to release air trapped in the pump and piping.

   (4) Run the motor momentarily to check the direction of motor's rotation after adding priming liquid into the pump (or after checking that the pump is filled with priming liquid). The rotational direction of the motor must be clockwise as viewed form the motor fan. It is also indicated by the arrow on the motor casing. If the motor rotates in the wrong direction, stop the pump immediately and reverse two wires of the three-phase power wires after the power source is shut off.

3. Operation

   Check the valves first, and then check that the flow rate and pressure are appropriate specified points after a continuous run.

4. When stopping operation

   Turn off the power supply, and observe if the pump stops smoothly. If not, check the inside of the pump. In case of long-term suspension of operation, remove all liquid from the pump, rinse it and close the suction/discharge valves.

# MAINTENANCE AND INSPECTION

1. Troubleshooting

   If a cause of pump failure is unknown, stop the pump and contact us or the nearest distributor immediately.

| PROBLEM | SYMPTON ON PUMP | | CAUSE | INSPECTION & CORRECTION |
|---|---|---|---|---|
| | DISCHARGE VALVE CLOSE | DISCHARGE VALVE OPEN | | |
| No discharge | | Pressure gauge & vacuum gauge indicate zero | ● Insufficient priming water | ○ Stop pump and fill with enough liquid, then restart |
| | Priming water does not go into the pump | | ● Stainer is clogged<br>● Improper suction piping<br>● Deline in liquid level in suction tank | ○ Clean strainer<br>○ Inspect closed valve<br>○ Adjust the liquid level |
| | After the pump starts, the pressure drop after discharge valve is opened | Pressure and vacuum gauge show sudden fluctuation and drop to zero | ● Air entering through suction pipeor gasket | ○ Check that suction flange is sealed airtight<br>○ Check for any abnormally low liquid level<br>○ Make sure voltage is normal |
| | No discharge after restartig the pump following a shutdown | No discharge after restarting the pump following a shutdown | ● Air lock or air accumulation in the suction pipe | ○ Release air in the pip<br>○ Inspect piping and modify air pocket section<br>○ Make sure air mixed in the backflow liquid can be smoothly drawn back into the suction tank; improve the piping incline; clean strainer |
| | Pressure gauge readings remain low at all time | | ● Pump rpm not enough<br>● Pump rotating in the wrong direction | ○ Inspect wiring and motor, and take appropriate measures<br>○ Reverse wiring |
| Dischrge quantity not enough | | High vacuum gauge reading | ● clogged strainer is obstructing in the suction pipe | ○ Clean clogged striner and remove foreign object |
| | Pressure gauge and vacuum gauge showing normal readings | Vibration | ● The entrance to impeller is clogged | ○ Remove foreign object |
| | | Pressure and vacuum gauge show fluctuation | ● Air entering throu suction pipe or gasket | ○ Inspect suction pipe joints and re-tighten if necessary |
| | | | ● Foreign object obstructing the discharge side | ○ Remove foreign object from pump<br>○ Remove obstruction or scale in pipe |
| | | High pressure gauge reading but normal vacuum reading | ● Discharge piping section causing high resistance or actual head & loss of head are too high | ○ Check for actual pump head or pressure loss in discharge pipe and takeappropriate action |
| | Low pressure gauge reading and low vacuum gauge reading | Low pressure gauge reading and low vacuum gauge reading | ● Reverse rotation | ○ Reverse wiring |

| PROBLEM | SYMPTON ON PUMP | | CAUSE | INSPECTION & CORRECTION |
|---|---|---|---|---|
| | DISCHARGE VALVE CLOSE | DISCHARGE VALVE OPEN | | |
| Motor heats up | | | ● Insufficient voltage<br>● Overload<br>● High ambient temperature | ○ Make sure voltage and Hz are appropriate<br>○ Make sure flow rate, liquid specific gravity and viscosity are appropriate<br>○ Improve foreign object |
| Sudden loss of discharge quantity | | High vacuum gauge reading | ● Strainer clogged by foreign object | ○ Remove foreign object |
| | | | ● Base defect<br>● Loose bolts<br>● Closed suction pipe, cavitation in the pump<br>● impeller comes into contact with casing<br>● Worn motor bearing | ○ Make sure installation is done appropriately<br>○ Tighten bolts<br>○ Clean or remove cause for cavitation<br>○ Remove cause or replace<br>○ Replace bearing or motor |

2. Inspection

(1) Daily inspection

- Check for liquid leaks before operation. If any, do not operate the pump and take proper action(s) (see *Troubleshooting*).
- Check that pump operates smoothly, without generating abnormal sounds or vibration.
- Check the liquid level in the tank and the suction pressure.
- Compare the flow rate, discharge pressure and current value during operation to those values indicated on the nameplate in order to verify normal pump load.

  **Note**: The indicated value of the pressure gauge varies in proportion to the specific gravity of the liquid.
- If a spare pump is available, keep it ready for use by operating it from time to time.
- Check for fluctuations of discharge pressure, discharge flow rate and motor current/voltage. If they fluctuate greatly, see *Troubleshooting* and take proper actions.

(2) Periodic inspection

- To ensure smooth operation of the pump, carry out the following periodic inspection procedures. When performing an overhaul inspection, handle seal parts carefully.
- The recommended interval for periodic inspection is once a year. Maintain records of inspections.

| PARTS NAME | WHAT TO BE CHECKED | CORRECTION (IN CASE OF ABNORMALITY) |
|---|---|---|
| Motor | ● Sound of bearing during operation<br>● Vibration<br>● Tightness of pump base bolts | ○ Replace bearing<br>○ Contact us<br>○ Re-tighten bolts |
| Connecting pipe | ● Scratch, flaw, crack<br>● Corrosion<br>● Deformation<br>● Liquid leak from seal part | ○ Replace connecting pipe<br>○ Replace connecting pipe<br>○ Remove load on piping if any<br>○ Replace O-ring if liquid leaks |
| Casing | ● Scrtch, flaw, crack<br>● Scale buildup on interior wetted part<br>● Swlling and corrosion of O-ring | ○ Replace casing<br>○ Remove acale<br>○ Replace O-ring<br>(Always replace it with new one in each disassembly inspection) |
| Impeller | ● Sliding mark on whole area of impeller<br>● Corrosion<br>● tightness of impeller nut | ○ Replace impeller<br>○ Replace impeller<br>○ Check for corrosion on shaft after removing nut and impeller, and re-fasten impeller nut. If shaft is corroded, contact us |
| Seal case | ● Abrasion & corrosion of oil seal | ○ Replace oil seal if it is corroded or worn away greatly |

# DISMANTLING AND ASSEMBLING

1. Dismantling
   (1) Rinse the inside of the pump that is removed form the installation stand with water before dismantling it. Upend the pump on level place for an easy disassembly of the pump.
   (2) Remove the hexagon head bolts and nuts (8) to remove the casing (6) and O-ring (7).
   (3) Lock the pumping blades of the impeller with a screwdriver, turn the impeller nut (9) counterclockwise with a wrench to remove it, and pull the impeller from the pump shaft. Remove also O-rings (7, 10, 20), cut seal (16) and key (11).
   (4) Pull out the back plate (13) after removing the impeller (12) and O-ring (7-A). Remove the hexagon head bolts (4) to separate the connecting pipe (5).
   (5) Remove the dry seal holder (19): Insert a box screwdriver (for M6) into the opening on the side of the resin base (3) to remove hexagon head bolt (21), and pull the dry seal holder (19) from the pump shaft.
   (6) Remove the seal case (18) from the resin base (3) as well as the O-ring (15) and dry seal (14). Remove hexagon head bolts (2) to separate the resin base (3) from the motor (1).

2. Assembling
   (1) Put the motor on the even place with the shaft-side up. Wipe dirt and foreign materials off the motor shaft with a clean cloth.
   (2) Insert the pump shaft (1-A) into the dry seal holder (19). Align the hole of the dry seal holder with the spot facing hole on the pump shaft. Then, insert the set bolt into the hole and tighten with a box screwdriver (for M6) (see exploded view No.5).
   (3) Attach the base (3) to the motor, and tighten the bolts (2).
   (4) Attach the seal case (18) to the base (3), then put the O-ring (15) and dry seal (14) in this order. Set the dry seal (14) at the setting position on the dry seal holder (19). (see *exploded view* No.4,5)

   <u>For a pump with 5.5kW motor or larger</u>

   As a dry seal holder (19) does not come with these models, insert the dry seal into the groove in the end of the shaft sleeve instead (see *Dry seal setting position for pump with 5.5kW motor or larger*)
   (5) Attach the connecting pipe (5) to the base (3), and tighten the bolts (4). Put the O-ring (7-A) on the back plate (13), and attach them to the connecting pipe (5) (see *exploded view* No.3).
   (6) Insert the key (11) into the key groove located at the end of the pump shaft.
   (7) Set the cut seal (16) at the proper position on the impeller (12) as shown in *exploded view* No.6. Then, put O-ring (20) on as shown in *exploded view* No. 3.
   (8) After putting the O-ring (10) on the impeller nut (9), thread it onto the shaft end. Then, lock the impeller pumping blades with a screwdriver, and re-tighten the impeller nut (9) by turning

it clockwise with a wrench.

The tightening torque for the impeller nut (9) should be 250kgf･cm (18.08 ft-lb).

(9) After putting the O-ring (7) on the casing (6), attach the casing to the pump body. The discharge flange of casing should be located at the opposite side of the motor terminal box. Check if the O-ring is placed properly by looking through the gap between the casing (6) and connecting pipe (5).

(10) Tighten the bolts (8) to secure the casing (6) to the connecting pipe. The tightening torque should be 250kgf･cm (18.08 ft-lb), and all the bolts should be tighten uniformly. Then, turn the impeller with your finger inserted from the casing suction inlet to check if it rotates smoothly.

**Note:**

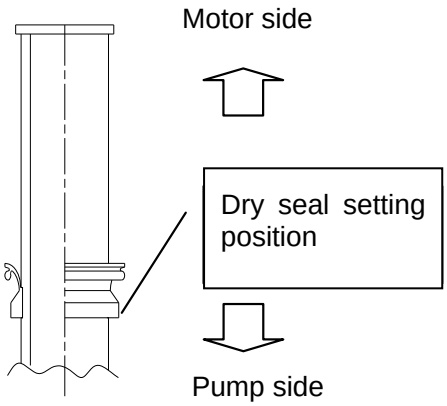
1. Dry seal holder (19) and O-ring (20) are not included with a pump with 5.5kw motor or larger. However, a dry seal comes with these models.

2. Whenever assembling the pump, replace used O-rings, gasket and seals with new ones.

- **<u>Reference tightening torque</u>**

  Bolts and nuts for Casing (8): 250kgf･cm

  Impeller nut (9): 250kgf･cm

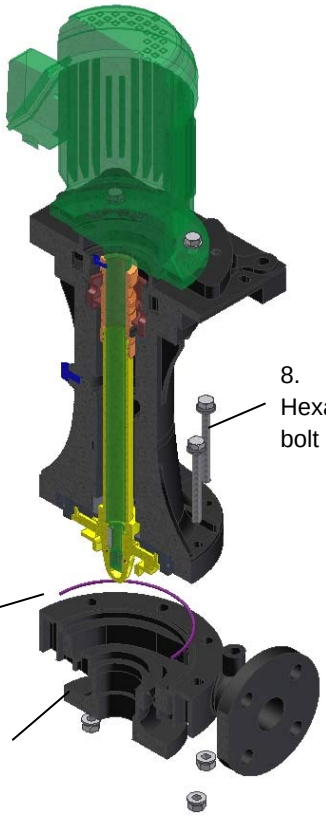



Dry seal setting position for pump with 5.5kW motor or larger

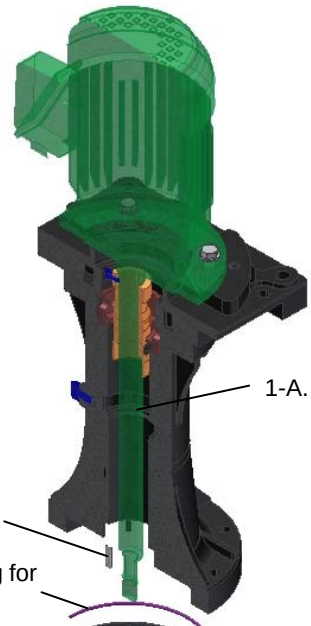
# EXPLODED VIEW

**1**

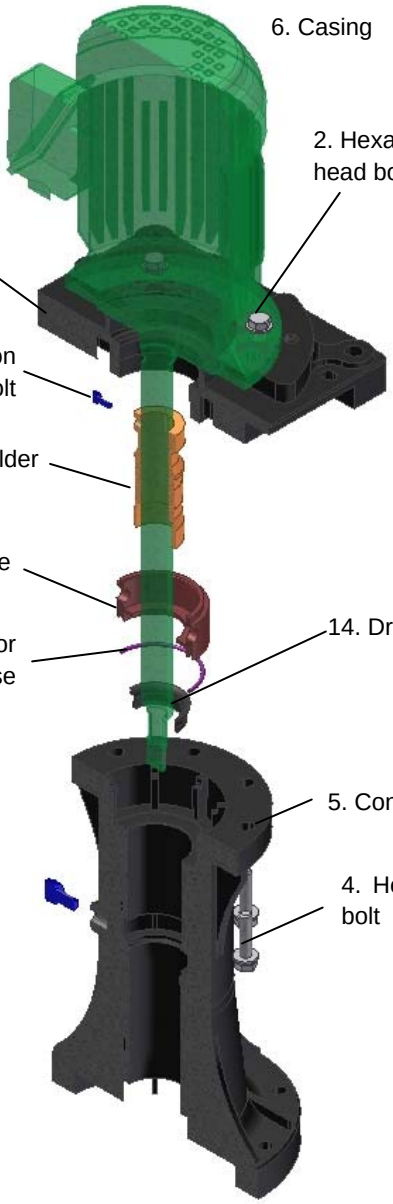
**2**



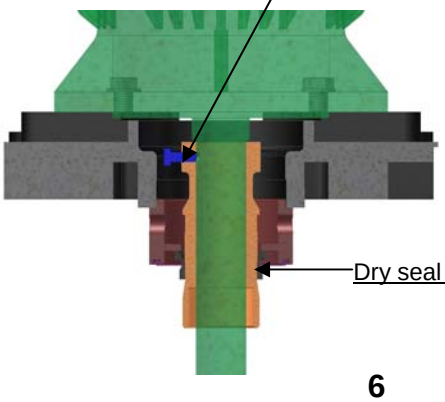

**3**



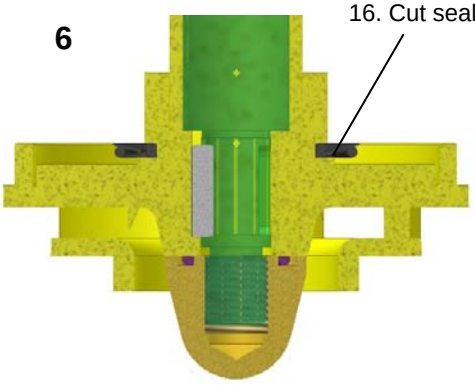

**4**




**5**




**6**




**Note:**
Cut seal (16) is not included with a pump for high-temperature specification.

# WARRANTY PERIOD AND COVERAGE

1. The warranty period is one year from the date of factory shipment.
2. During warranty period, if the unit breaks down or becomes damaged in normal operating condition due to manufacturing defect (s), the cause of breakdown or damaged parts(s) will be repaired free of charge.
3. There will be a service charge for repairing the following breakdown(s) or damage(s) and for replacement of worn out part(s):
   - Any breakdown or damage occurred after the warranty period.
   - Any breakdown or damage due to improper use or safekeeping.
   - Any breakdown or damage due to the use of part(s) manufactured by others or the use of unauthorized parts.
   - Any breakdown or damage stemming from repair or modification performed by an unauthorized agent.
   - Any breakdown or damage as a result of natural disaster or act of God.
4. We cannot be responsible for any breakdown or damage of a product manufactured using the specification or material designated by the customer.
5. Irregularities or breakdowns due to chemical or hydrodynamic corrosion or the property of liquid that was pumped will not be covered under the warranty. The material chosen at the time of contract is only a recommendation; we do not guarantee the chemical resistance of such material.
6. In case the determination of the cause for a breakdown or damage is questionable, it shall be resolved through discussion between the customer and the manufacturer.
7. We will bill the customer for any travel expenses incurred for non-warranted repair service to a remote location.
8. Any expense or other damage incurred as a result of a breakdown during operation is not covered under the warranty.

# REPAIR

**Notice:**
For repair, consult the distributor where the pump was purchased. When returning a pump, the pump chamber should be adequately cleaned.

If any irregularity is detected during operation, the pump should be stopped for inspection (refer to the section on “*Troubleshootin*g”).

1. To request a repair service, please call your distributor or the manufacturer.
2. Before requesting any repair service, please carefully read the instruction manual again and repeat the inspection.
3. When requesting a repair service, please be prepared to provide the following information:
   - Model type and manufacturing serial number
   - How long the unit has been used and its condition
   - The part in questions and its condition
   - Type of liquid pumped (name, specific gravity, liquid temperature, and slurry or not)

Since the residual liquid in a pump can leak out during shipment, creating a hazardous condition, make sure the inside of the unit is adequately cleaned when returning a pump.

Customers may order spare parts using names displayed in the parts table. Nevertheless, it is safer to also provide the part number.

| | |
|---|---|
| **MODEL** | YD - |
| **SERAIL NO.** | |
| **DISTRIBUTOR** | |
| **DATE OF PARCHASE** | |
| **DATE OF STARGIN OPERATION** | |

# CONTACT INFORMATION

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