



ISO 9001
Certified Company

Drum Pumps

VDR SERIES

INSTRUCTION MANUAL

천세산업 | 주

Thank you very much for your purchasing our Cheonsei Drum Pump VDR Series.
Read this Manual carefully before you use the product. You will find it easy to read and familiarize yourself with how to handle, service, and repair the product properly.
Be familiar with the instructions so you can achieve the pump's high performance, safe use, and long-term service life.
Put this Instruction Manual in a place well visible to the operators.

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1 Safety precautions

1-1 Introduction

·The following safety symbols are used throughout this manual to emphasize various levels of safety information.

·Those indications must be observed for safe use of the product.

·The symbols have the following meanings.

  Warning

To warn of hazards or unsafe handling which could result in severe personal injury or death.

  Caution

To warn of hazards or unsafe handling which could result in minor personal injury or property damage.

1-2 Safety precautions while in use

  Warning

- The motor of this pump is not explosion-protected; do not use it in a potentially explosive environment or apply it to an inflammable liquid.

(Ex-proof electric motors and air motors can be used in such a place.)

  Cautions

- This pump is intended only for use in the transfer, split, and refilling of a liquid; make sure that it should not be used any purpose other than these.
- Be sure to observe the following, which otherwise may result in a malfunction.
 - Ambient temperature: 0~40°C
 - Temperature of applicable liquid: Max. 140°C
 - Viscosity of applicable liquid: below the limit indicated by its specification details.
- This pump is not to be used for a liquid that contains fiber.
- Check with the lubricator if it has been filled with oil or oil is supplied before compressed air is delivered to it. (It is recommended that the lubricator should be supplied at a rate of 2~3 drops of oil per minute and that it should be fully filled with oil.) (air motor)
- The air motor should be installed in a direction where there are no workers and equipment because it discharges compressed air and oil from the silencer and vents when the motor begins to run. (air motor)
- Be sure to drain out the water from the filter side of the air unit because the air motor produces water while in operation. (air motor)

1-3 Precautions to be taken during installation

경고 Warnings

- Install the product in a place away from the reach of outsiders and children, other than authorized persons.
- Do not touch with wet hands, which may result in electric shock.
- The ex-proof electric motor does not carry an ex-proof plug; be sure to substitute an ex-proof plug when the motor is used in a potentially explosive place.

주의 Cautions

- Check with the pump if its parts and connections are properly engaged.
- Install the pump vertically.
- Avoid submerging the pump deeper in a liquid tub than its discharge level.
- Be familiar with such values as the voltage, constants, and frequency of the motor, so that it must be supplied with the specified power. Supplying incorrect power can cause a failure or fire. (electric motor)
- Make sure that the motor must be switched OFF (“0”) before power is supplied to it. (electric motor)
- Check if the power cord is damaged every time the pump is used. (electric motor)
- Check if the suction is clogged every time the pump is used.

1-4 Safety precautions to be taken while operating the pump

주의 Cautions

- Do not run the pump in dry state. Bring it to an immediate stop when the container is empty.
- Wear protective gears (such as protective gloves, mask, goggles, and chemical-resistant work clothes) when you use a hazardous liquid.
- There might be a chance of the water used in the final performance test remaining inside the pump. Be sure to remove the water and dry up the pump when a liquid that can react with water is used.
- Do not operate the motor without connecting the hose on the discharge side of the pump.
- Do not leave the pump unattended while it is in operation.
- Check with the hand if the silencer is properly engaged before the air motor is put in operation. (air motor)
- Check with the air supply line for the mounting of the air unit (filter, regulator, and lubricator). (air motor)
- Make sure that the ball valve of the air motor should be set at OFF before an air supply hose is mounted to the air motor. (The “OFF” position is when the value is set crossed with the lever.) (air motor)

1-5 Safety precautions to be taken while storing the pump

주의 Cautions

- Drain out the liquid from the inside of the pump and clean it with water at all times before it is kept in storage.
- Use a wall mount to prevent the pump from being turned over and protect pipes.
- Keep the pump in a place away from heat, direct sunlight, and rain.

1-6 Safety precautions to be taken while maintaining or repairing the pump

경고 Warning

- Be sure to shut off the power whenever you start work, as there is a danger of an electric shock.

주의 Cautions

- Wear protective gears when you do the (disassembly or assembly) work.
- Drain out the liquid from inside of the pump before you start to do repair or maintenance work.

1-7 Safety precautions to be taken while repairing or servicing the pump under warranty

경고 Warning

- We are not responsible for any defects arising from and in connection with the arbitrary alteration or modification of the pump or the use of non-specified parts, in which case any costs and expenses incurred resulting from any accidents and/or mechanical failures shall not be covered under our warranty.

주의 Cautions

- Be sure to drain out and clean the pump when you send it to our factory for repair.
- Do not return the pump in case the pump is used with a liquid lethal to the human body.

1-8 Miscellaneous

주의 Cautions

- Do not use the pump when it gets damaged, which otherwise may lead to an accident or a failure.
- Dispose of the pump whose service life comes to an end according to relevant local laws and regulations.

2 Checking the product

2-1 Checkpoints when disassembling the package

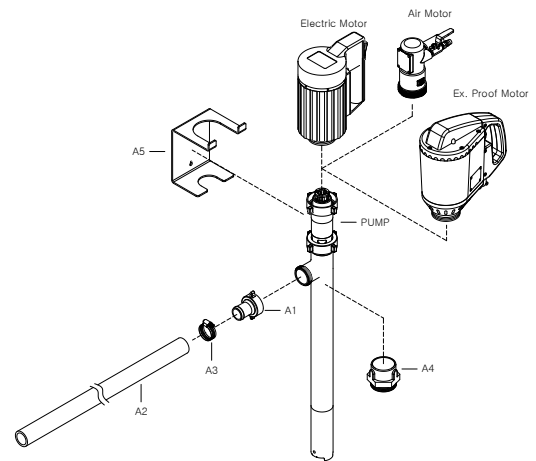
Check for the followings when the pump arrives at your side.

- ① Whether the pump is what you have ordered.
- ② Whether the pump misses any of the standard parts.
- ③ Whether the pump has suffered any damage due to vibrations or shocks during transportation.

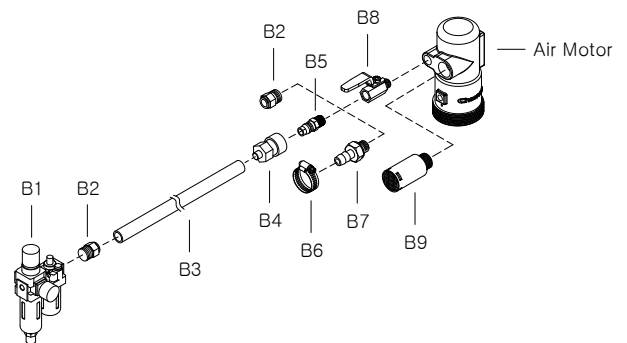
2-2 Standard parts

- Standard parts
- Optional parts

| No. | Part Name | Category |
|-----|------------------------|----------|
| A1 | Hose Connector | ● |
| A2 | PVC Spring Hose (1.5m) | ● |
| A3 | Hose Clamp (Ø19~Ø40) | ● |
| A4 | Drum Adaptor | ○ |
| A5 | Wall Mount | ○ |
| — | Instruction Manual | ● |



| No. | Part Name | Category |
|-----|--|----------|
| B1 | Air Unit (Regulator, Filter, Lubricator) | ○ |
| B2 | One-touch Fitting | ○ |
| B3 | Hose(Ø12~Ø9) | ○ |
| B4 | Air Coupler (Socket Nut) | ○ |
| B5 | Air Coupler (Plug) | ● |
| B6 | Hose Clamp | ● |
| B7 | Hose Nipple | ● |
| B8 | Ball Valve | ● |
| B9 | Silencer | ● |



3 Overview

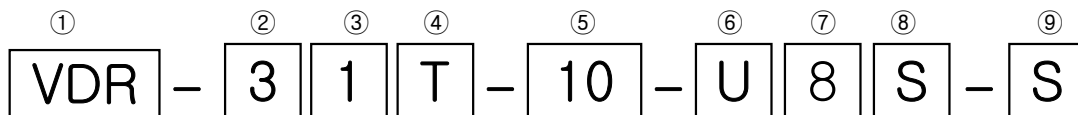
3-1 Features

- ① This is a single-axle eccentric screw pump, consisting of a rotor and a stator, that enables metering transfer.
- ② The motor is equipped with dual protections, designed to prevent the motor from getting damaged from overload.
- ③ The pump is easy-to-handle and convenient for replacement of parts without special tools.
- ④ The motor's casing is made of a material that is resistant to chemicals as well as to high-impact shocks.
- ⑤ This pump is suitable for the transfer of high-viscosity liquids.
- ⑥ The pump is easy to disassemble and clean.

3-2 Use

- ① Transfer and split of high-viscosity organic and inorganic chemicals from their drums and containers
- ② Transfer and split of such materials as resins, coating liquids, and surfactants at chemical plants
- ③ Transfer, measuring, and filling of high-viscosity raw materials at cosmetics, food, and pharmaceutical plants
- ④ Transfer of high-viscosity lubricants and raw materials at various manufacturing companies
- ⑤ Transfer of raw materials at paint, ink, and adhesive makers

4 Model code



- ① Pump model name: VDR: High Viscosity Drum Pump
- ② Maximum flow: 3:30L/min
- ③ Stage: 1:1
- ④ Stator material: T:PTFE
- ⑤ Pipe length: 10:1000mm 12:1200mm
- ⑥ Motor type: U:Electric Motor A:Air Motor E:Ex. Proof Motor
- ⑦ Motor power: 4:400Wclass 8:800Wclass
- ⑧ Motor option: S:Standard
- ⑨ Motor voltage: S:1Phase 220~230V 50/60Hz
1:Ball Valve Type

5 Specification and performance table

■ Product specification

| | | VDR-31T-U4 | VDR-31T-E4 | VDR-31T-U8 | VDR-31T-A4 |
|------------------------------------|--------|---------------|------------|------------|------------|
| Max. Flow Rate(L/min) | | 30 | | | |
| Max. Pressure(bar) | | 8 | | | |
| Max. Viscosity(cp) | | 10,000 | | 30,000 | 10,000 |
| Insertion diameter (mm) | | 51 | | | |
| Hose connection diameter (mm) | | 32 | | | |
| Maximum operating temperature (°C) | | 140 | | | |
| Noise (dB) | | 85(11,000RPM) | | | |
| Weight (kg) | 1000mm | 8.2 | 10.4 | 9.1 | 6.4 |
| | 1200mm | 8.7 | 10.9 | 9.6 | 6.9 |

※ These specification details are subject to change without prior notice due to reasons such as improvements and updates.

■ Motor specification

–Electric motor

| Motor type | Power | Voltage | Frequency | Current | Protection degree | Insulation | Weight |
|--------------------------------|----------|------------|-----------|---------|-------------------|------------|--------|
| U4 | 420~430W | 220~230VAC | 50/60Hz | 2.8A | IP44 | B | 3.0kg |
| U8 | 800W | | | 4A | IP44 | B | 3.9kg |
| E4 | 420~430W | | | 2.8A | IP54 | F | 5.2kg |
| Ex-proof symbol : Ex de IIC T6 | | | | | | | |

Note)

1)The motor comes standard with a thermal protection and an overcurrent circuit breaker.

2)The motor is fitted with a 5m power cord with a plug as standard.

3)The ex-proof certification number of the explosion-proof electric motor (E4): 18-GA280-0494X

※ These specification details are subject to change without prior notice due to reasons such as improvements and updates.

–Air motor

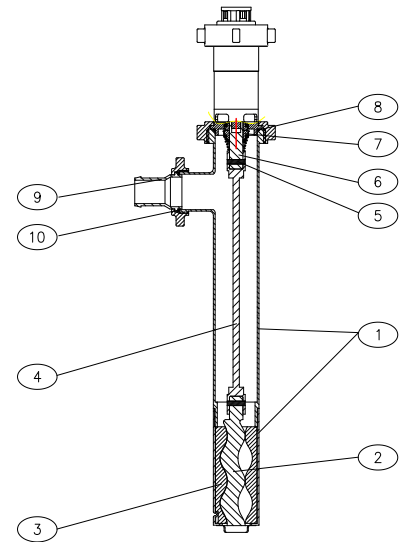
| Motor type | Power | Air pressure | Air consumption | Explosion-proof symbol | Weight |
|------------|-------|--------------|-----------------|------------------------|--------|
| A4 | 460W | 3~6bar | 920L/min | Ex II 2G cp IIC T6 | 1.2 |

Note) Explosion protection certification number: 0425 ATEX 2535

※ These specification details are subject to change without prior notice due to reasons such as improvements and updates.

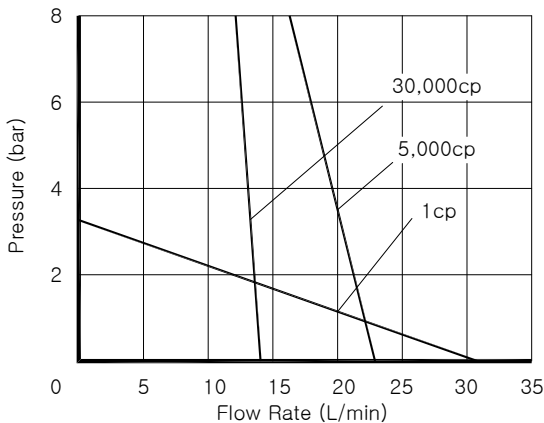
6 Standard materials for liquid end parts

| No. | Part Name | Material |
|-----|-----------------|------------------------|
| ① | Pipe | STS316 |
| ② | Rotor | STS316 |
| ③ | Stator | PTFE |
| ④ | Drive Shaft | STS316 |
| ⑤ | Pin | STS316 |
| ⑥ | Counter Shaft | STS316 |
| ⑦ | Mechanical Seal | CERAMIC / SIC / STS316 |
| ⑧ | O-ring | FEP(+SIL) |
| ⑨ | Hose Connector | SSC14 |
| ⑩ | Packing | PTFE |

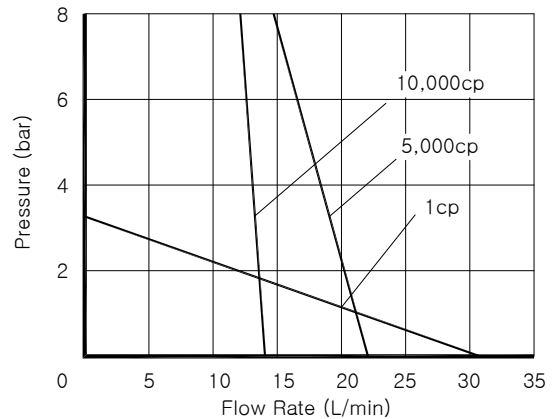


7 Performance curve

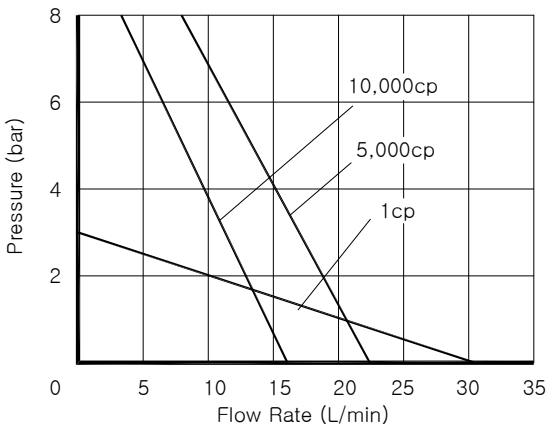
① VDR-31T-U8S



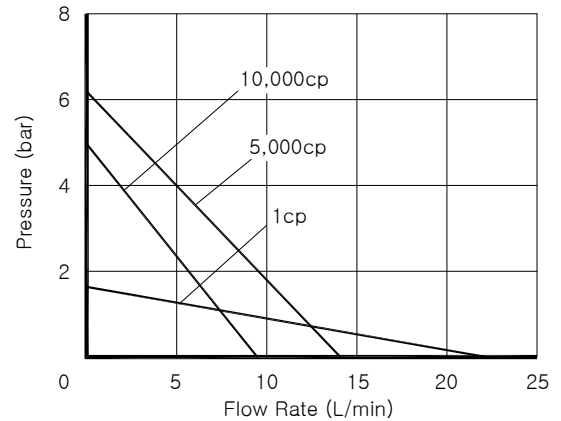
② VDR-31T-U4S (E4S)



③ VDR-31T-A4S (6bar)



④ VDR-31T-A4S (3bar)



Note) May differ depending on the conditions of use at each installation site.

8 Installation

⚠ 경고 Warnings

- Install the product in a place away from the reach of outsiders and children, other than authorized persons.
- Touching the motor with wet hands may result in electric shock. (electric motor)
- The plug of an ex-proof electric motor can be used outside of a potentially explosive area. Be sure to substitute an ex-proof plug and an ex-proof socket when the motor is used in a potentially explosive place.

⚠ 주의 Cautions

- Check with the pump if its parts and connections are properly engaged.
- Install the pump vertically.
- Avoid submerging the pump deeper in a liquid tub than its discharge level.
- Be familiar with such values as the voltage, constants, and frequency of the motor, and make sure that it should be supplied with the specified power. Supplying incorrect power can cause a failure or fire. (electric motor)
- Make sure that the motor be switched OFF ("0") before power is supplied to it. (electric motor)
- Check if the power cord is damaged every time the pump is used. (electric motor)

① In case you purchase a motor and a pump as self-finished items, tighten them firmly with union nuts.

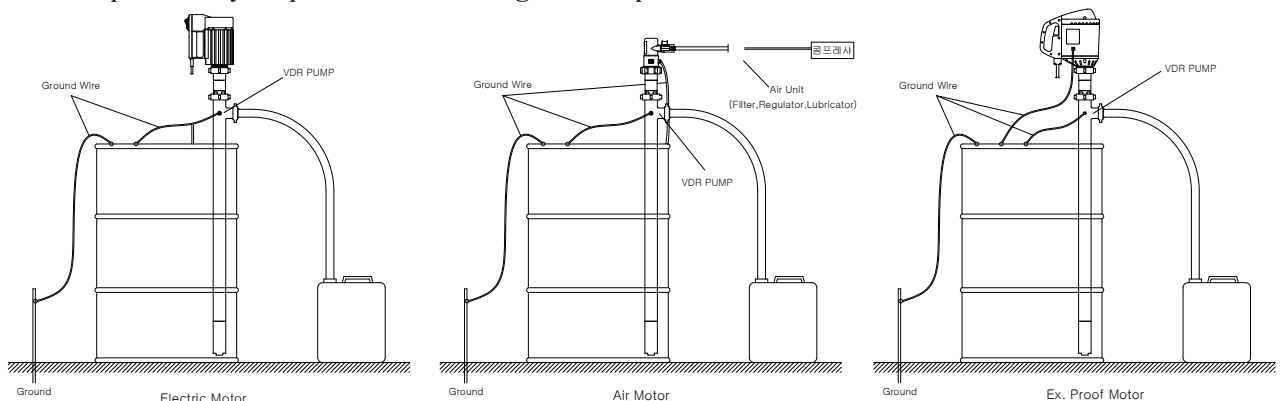
② Mount a drum adaptor so you can keep the pump vertically to a drum or a liquid vessel.

③ Avoid using a fiber-based liquid as it can cause rotating parts to be damaged.

④ Insert a hose into the hose connector and tighten it with a hose clamp.

⑤ Be sure to have a grounding connection using an earth conductor, as shown below, for there is otherwise a danger of electric shock.

⑥ Check if an equipotential bonding (earth wire) is connected between the pump and the motor, if an electrically conductive hose and an electrically conductive connector are used, and if an ex-proof plug with a socket of same protection degree are used, before you pump a flammable liquid in a potentially explosive area using an ex-proof electric motor.



9 Operation

주의 Cautions

- Wear protective gears (such as protective gloves, mask, goggles, and chemical-resistant work clothes) when you handle a hazardous liquid.
- There might be a chance of the water used in the final performance test remaining inside the pump. Be sure to remove the water and dry up the pump when a liquid that can react with water is used.
- Do not operate the motor without connecting the hose (drainage pipe) on the discharge side of the pump.
- Do not leave the pump unattended while it is in operation.
- Never leave the pump run dry.
- Do not use a liquid that contains contaminated liquid or slurry.

9-1 Electric motor

- 1 Allow power to the motor and then switch it ON (“I”) to set it in motion.
- 2 Tilt the drum or vessel if you want to completely transfer the liquid contained inside.
- 3 Re-start the motor after an interval for cooling when it comes to a stop due to overload.
- 4 When power is shut off during pumping, the motor is still switched ON (“O”). Be sure to turn the switch OFF (“I”) so that it can be avoided being re-started unintentionally after the power is resumed.
- 5 When stopping the pump, switch it OFF (“O”) the motor before shutting down the power to it.
- 6 Paying attention to the liquid remaining in the hose or pump pipe connected to the pump, you need to take the pump out of a drum or vessel carefully.

9-2 Air motor

- 1 Check whether an air unit (of regulator, filter, and lubricator) has been mounted before the air motor is installed.
- 2 Check with the lubricator for the amount of oil (where it is best when the oil is filled up to maximum).
- 3 Check with the lubricator if oil is properly supplied. (2~3 drops a minute)
- 4 The hose must have an inner diameter of Ø8~Ø9.
- 5 Check if the air motor is equipped with a silencer. (As the latter discharges compressed air and oil, it should not be installed in a direction where there are persons or equipment.)
- 6 Install the air hose after checking if the suction line of the air motor and the ball valve are in the OFF state (crossed with each other).
- 7 Set the pressure using the air unit after the air hose is installed (3~6bar).
- 8 After the pressure is set with the air unit, turn the ball valve to the ON position and set it in motion.

10 Storage

⚠️ 주의 Cautions

- Drain out the liquid from the inside of the pump and clean it with water at all times before it is kept in storage.
- Use a wall mount to prevent the pump from being turned over and protect pipes.
- Keep the pump in a place away from heat, direct sunlight, and rain.

11 Repair and maintenance

⚠️ 경고 Warning

- Be sure to shut off the power whenever you start work, as there is a danger of electric shock. (electric motor)

⚠️ 주의 Cautions

- Wear protective gears when you do the (disassembly or assembly) work.
- Drain out the liquid from inside of the pump before you start doing repair or maintenance work.
- Only qualified electrical engineers are allowed to replace power cords.
- Only the manufacturer can do the repair of explosion-proof electric motors.

① Check, as part of the repair and maintenance work, if the pump makes noise during operation or if it displays abnormal current and/or excessive discharge rates.

② Turn off the power quickly when there is any abnormality and refer to the “Causes and troubleshooting” section to solve the problem.

③ Switch off the motor when there is leakage from the rotating axle at the bottom of the planetary gear reducer and check on and repair it immediately.

④ The carbon brush of the motor is a consumable part with the service life of 200 hours. Continuous use of a worn-out carbon brush causes the commutator to get damaged, leading to a failure of the motor. The use of other manufacturer’s carbon brushes is not warranted of the service life of this motor. Be sure to contact the store of purchase or our service center for information on replacement parts.

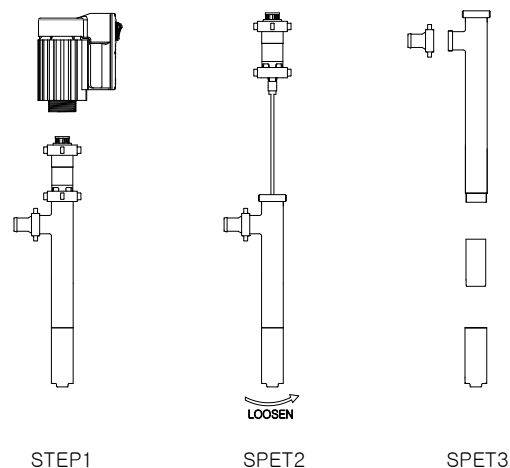
⑤ When the motor has its power cord worn out or damaged, replace it with a H05RN-F cable. In case of an explosion-proof motor, H07RN-Fs are recommended.

⑥ Dismantling the pump

① Separate the assembly by turning counter-clockwise the union nut engaging the pump to the motor.

② Disconnect the assembly by turning clockwise the union nut between the planetary gear reducer and the external pipe. Hold the external pipe to separate the planetary gear reducer block (planetary gear reducer+ driving shaft+ rotor).

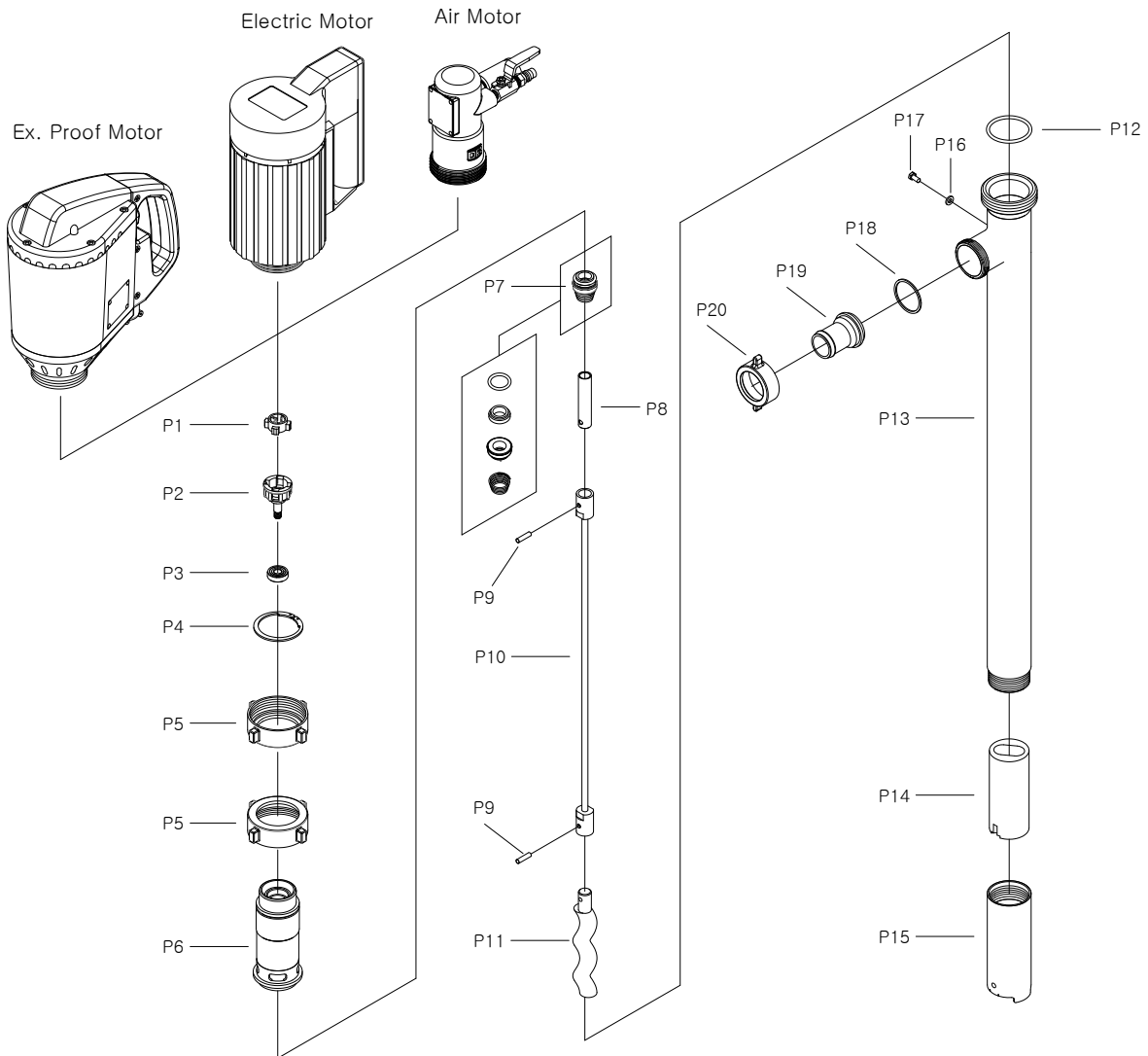
③ Hold the external pipe, turn the housing (stator) clockwise, and disassemble it. Separate the stator from the housing (stator). Then, separate the assembly by turning counter-clockwise the union nut between the external pipe and the hose connector.



12 Causes and troubleshooting

| Problem | Cause | Action |
|--|-----------------------------|--------------------------------------|
| Motor does not work. | Plug in poor contact | Check |
| | Power cord in short circuit | Repair and replace |
| | Motor is broken | Repair and replace |
| | Motor in overload state | Check and replace with a normal pump |
| | Carbon brush worn out | Replace |
| Not achieve pumping. | Discharge outlet clogged | Disassemble and clean |
| | Suction inlet clogged | Disassemble and clean |
| | Stator worn out or damaged | Check and replace |
| | Driving shaft damaged | Check and replace |
| | Motor running dry | Check on drum and replace |
| Able to pump, but only a small amount. | Clogged by foreign matter | Disassemble and clean |
| | Stator worn out or damaged | Check and replace |
| | Voltage lowered | Check and add a voltage regulator |
| Abnormal noise and vibration | Bearing worn out | Check and replace |
| | Foreign matter ingressed | Disassemble and clean |
| | Motor out of order | Repair and replace |
| | Reducer out of order | Check and replace |
| | Dry running | Check on drum and replace |
| Liquid leaks | Mechanical seal damaged | Check and replace |
| | Pipe screwing loosened | Check and replace |

13 Assembly drawing and parts list



| No. | Part Name | Q'ty |
|-----|------------------------|------|
| - | Ex. Proof Motor | 1 |
| - | Electric Motor | 1 |
| - | Air Motor | 1 |
| P1 | Coupling(Star) | 1 |
| P2 | Coupling(Pump) | 1 |
| P3 | Bearing(Ball) | 1 |
| P4 | Snap Ring | 1 |
| P5 | Union Nut (Motor) | 2 |
| P6 | Planetary Gear Reducer | 1 |
| P7 | Mechanical Seal | 1 |

| No. | Part Name | Q'ty |
|-----|-----------------|------|
| P8 | Counter Shaft | 1 |
| P9 | Pin | 2 |
| P10 | Drive Shaft | 1 |
| P11 | Rotor | 1 |
| P12 | O-ring | 1 |
| P13 | External Pipe | 1 |
| P14 | Stator | 1 |
| P15 | Housing(Stator) | 1 |
| P16 | Washer(Flat) | 1 |
| P17 | Bolt(Hex.) | 1 |

| No. | Part Name | Q'ty |
|-----|------------------|------|
| P18 | Packing | 1 |
| P19 | Hose Connector | 1 |
| P20 | Union Nut (Pump) | 1 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

14 Warranty

경고 Warning

- We are not responsible for any defects arising from and in connection with the arbitrary alteration or modification of the pump or the use of non-specified parts, in which case any costs and expenses incurred resulting from any accidents and/or mechanical failures shall not be covered under our warranty.

- ① This product comes with a one-year warranty effective from the date of purchase.
- ② This product is warranted during the warranty period against failures and defects in material and workmanship, which can be repaired or replaced free of charge.
- ③ The repair and/or replacement of any failures and/or defects in connection with any of the following causes shall be charged regardless of the warranty period.
 - ① Developed after the warranty period expires
 - ② Arising from the user's wrong handling or careless use
 - ③ Resulting from the use of a part not provided by us or the arbitrary alteration of any part
 - ④ In connection with force majeure events such as fire and natural disasters

15 Repair service

주의 Cautions

- Be sure to drain out and clean the pump when you send it to the factory for repair.
- Do not return the pump in case the pump is used with a liquid lethal to the human body.

- ① Contact the dealer or our A/S team indicated on the back of this Instruction Manual if you have a problem with your pump or you have any questions.
- ② Be sure to inform us of the following details when you inquire for a repair service.
 - ① The model name and serial number indicated on the plate
 - ② The period and conditions of use, physical appearance, and name of the liquid
- ③ Contact the dealer in advance, as the service may be charged in the event the warranty period has expired.
- ④ Our company maintains parts for repair and replacement for at least 5 years from the date of manufacture of the product.



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