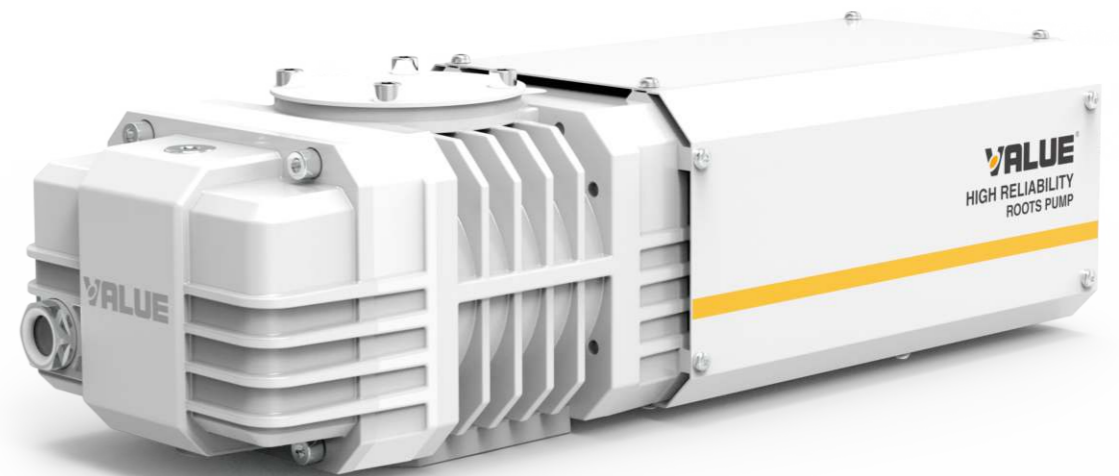


VBP i Series Energy-saving&Intelligent Roots Vacuum Pump

Operating Manual



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1. Use information

Thanks for choosing our company's VBP i energy-saving intelligent Roots vacuum pump (Hereinafter referred to as "the Pump / the Product"). Please check carefully whether the product received is the same as you ordered and the accessories, spare parts & operating manual are attached as well. Please also check if there's any damage occurred during transportation. If anything needed, contact the local distributor or our sales team.

In order to maintain a stable performance level of the pump, read this operating manual carefully to fully understand the safety instructions, technical data as well as operating procedures before installation, operation, repair and maintenance of the pump.

Warning

Failure to observe the terms could result in serious personal injury.

Notice

Failure to observe the terms could result in damage to the pump.



This warning label indicates that there may be a risk of electric shock. Cut off the power supply first in the process of electrical connection, repair and maintenance. Make sure the cover of the junction box is installed before running.



This warning label indicates high temperature while running the pump, do not touch the pump.

Notice

Please read the Instructions carefully prior to use and handle it according to the operation regulations. The Product (including the Instructions) is subject to changes without a prior notice. Make sure to fill vacuum pump oil before using the Product for the very first time.

2. Precautions

For personal safety, please read the following hints carefully before installation, operation, repair and maintenance.

Warning

Ensure effective grounding of the product and connect it to a motor protection switch of the rated value before startup.

Warning

The power supply connection must be operated by certified electricians under technical standards for electrical equipment and wiring regulations.

Warning

Keep the exhaust port unobstructed before running the product. Do not block or restrict airflow at the exhaust port.

Warning

When checking or repairing the pump, the power supply must be cut off before operation. This will avoid personal injury or death caused by electric shock or sudden startup of the pump.

Warning

Do not pump toxic, corrosive, inflammable or explosive gases.

Warning

Avoid using the pump near explosives and inflammable materials to prevent explosion or fire hazards.

Warning

Do not touch the motor and pump to avoid burns during prolonged operation or when the pump has just stopped running and the surface temperature is still high.

! Notice

The pump's ambient temperature range is 5-40°C.

! Notice

Do not place obstacles around the motor that prevent ventilation to avoid burns or fires, etc., caused by abnormal temperature rise.

! Notice

Use a power supply consistent with the product's marked power supply.

! Notice

Check the oil level of the pump before operation. Do not operate the pump if oil is insufficient or absent to avoid pump failure.

! Notice

Check for oil leakage to prevent operators from slipping due to leaked oil.

! Notice

Dispose of waste oil and other parts according to relevant environmental protection regulations.

! Notice

Install relevant accessories to pump gas with small amounts of dust or condensable gas.

3. Pump Acceptance & Storage

3.1 Pump Acceptance

Upon receiving the Product, unpack it and check if:

- The Product is consistent with your order;
- The accessories (including pump oil for single use and optional parts) are equipped as contracted;
- There's damage during transport;
- The bolts (screws) or nuts are loose or fallen during transport.

3.2 Pump Storage

The Pump must be stored at the following conditions to ensure its stable and reliable running:

- Ambient environment of storage:
 - 1) There's no corrosive, inflammable and explosive gas;
 - 2) The Pump must be placed indoors;
 - 3) Avoid direct sunlight;
 - 4) Keep away from heat sources;
 - 5) Be protected against dust;
 - 6) Be free from condensation.

! Notice

Place the pump horizontally and protect it against impacts to prevent damage.

4. Product Overview

The VBP i Series Roots Vacuum Pump is an upgraded version of the VBP Series Energy-saving Roots Vacuum Pump. It is a high-speed direct-connected vacuum pump with a sealed motor, compact structure and sleek appearance.

The Product is featured by well-designed structure, high safety and reliability, fast vacuuming, high ultimate vacuum degree, low noise, easy maintenance and no oil leakage.

The Product's cavity is mounted with one pair of double-blade rotors which can have reverse and high-speed rotation simultaneously, and the rotation of two rotors would inhale and exhaust air during operation; the Product can be used as booster pump. Under low pressure intensity, the gas molecule has longer Mean Free Path, so the gas will encounter higher resistance when passing the small gap, leading to high vacuum degree and compression ratio.

! Notice

The Product should not be used alone, but be in serial connection with the backing pump, as shown in Fig. 1:

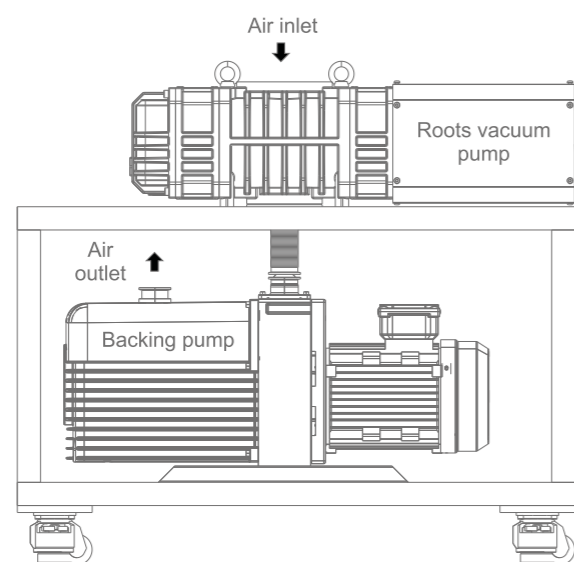


Fig. 1 Schematic Diagram of VBP i Series Roots Vacuum Pump

4.1 Characteristics of VBP i Pump

- The Pump's one pair of rotors are designed and processed by fully ensuring symmetry, and in compact structure and occupy a small area with the characteristics of high speed, small volume, light weight and small vibration.
- Based on fast startup, the Product can reach the ultimate vacuum degree in a short period, with no compression in pump cavity, in order to eliminate condensable gas;
- Certain clearance is reserved between rotors and between rotor and pump cavity, to avoid contact and friction, and ensure low power consumption and good energy conservation;
- As no oil lubricating is required in pump cavity, the contamination of the vacuum system caused by oil steam no longer exists and the pump becomes insensitive to fine dust.
- Capable of direct starting at atmospheric pressure (standard atmospheric pressure).

- Pumping efficiency can be enhanced via adjustment and control by a frequency converter, and overvoltage protection is provided.
- Featured by stable vacuuming speed within the pressure intensity of $1.3 \times 10^3 \sim 1.3 \text{ Pa}$, the Pump can quickly exhaust any suddenly released gas, eliminate the weaknesses of oil-sealed vacuum pump and diffusion pump. So, it is suggested to use it as a booster pump;
- Fitted with sealed motor structure on the basis of static seal, the Product can prevent oil leakage of shaft seal;
- Different backing pumps can be selected based on the Product's characteristics and use conditions. It can be matched with VRD/VSV series vacuum pumps when pumping large amount of vapor, small amount of dust and slightly corrosive gas under a relatively low vacuum degree. We can design different roots pump vacuum units based on the requirements and use conditions of vacuum equipment of users.

4.2 Scope of Application

As a kind of basic vacuum equipment in the field of vacuum application, the Product is widely applied in the industries such as chemistry, food, medicine, smelting, coating and refrigerating.

4.3 Structure & Principle

The operating principle of the pump is shown in Fig. 2:

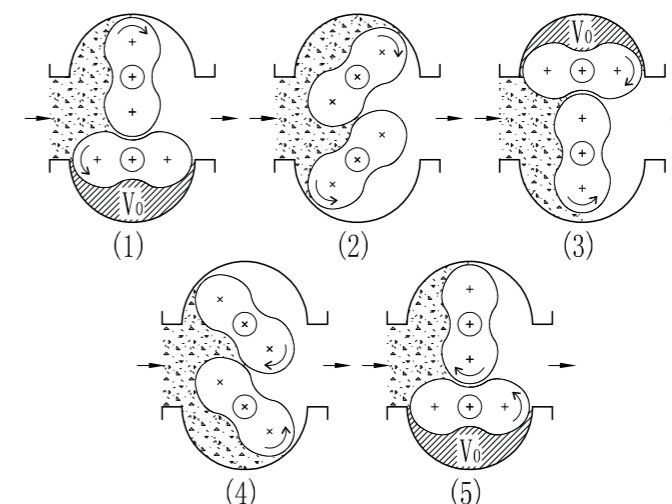


Fig. 2 Schematic Diagram of Working Principle

When the pump works, the gas in the pumped container enters into the pump chamber, the mixed gas in V_0 is just enclosed without compression and expansion, with the rotation of the rotor, the top of the rotor reaches the edge of the exhaust port, due to the pressure difference, the gas at the exhaust port of the pump will diffuse into the space to be pumped away by the backing pump. With the continuous operation of the rotor, more gases are sent to the exhaust port to be pumped away by the backing pump, above is the volumetric action principle of the pump; because the pump works in the case of very low inlet pressure, and the rotor speed of the pump is as high as 3,000r/min, and the linear velocity of the rotor surface is close to the speed of the molecular thermal movement, the gases colliding with the rotor are carried by the rotor to the exhaust port where the pressure is high, and then pumped away by the backing pump, this is the molecular action principle of the pump. This is the combined effect of the two principles prompts this type of pump to have a large and smooth pumping speed in the interval of $1.3 \times 10^3 \sim 1.3 \text{ Pa}$.

5. Technical Parameters

5.1 The technical parameters are as shown in Table 1

| Item | | VBP100i | VBP300Si | VBP300i | VBP600i | VBP1000i | VBP1200i | VBP1800i | VBP2400i |
|------------------------------------|-------------------|----------------------|-------------|--|-------------------|---------------------|---------------------|---------------------|--------------|
| Pumping rate | m ³ /h | 160 | 300 | 400 | 600 | 1200 | 1500 | 1800 | 2600 |
| Ultimate pressure | Pa | 3.0x10 ⁻² | | | | | | | |
| Max. allowed differential pressure | Pa | 8.0x10 ³ | | | 4x10 ³ | 8.0x10 ³ | 6.0x10 ³ | 4.3x10 ³ | |
| Backing pump (suggested) | / | VRD-30/48 | VRD-65/90 | VRD-90/VSV-100 | VRD-300/VSV-300 | | | | |
| Power supply* | / | 3-phase | | | | | | | |
| Power | kW | 0.37 | 1.1 | 1.5 | 1.5 | 3 | 4 | | |
| Rated speed | rpm | 3000 | | | 6000 | 3000 | | 4200 | |
| Cooling mode | / | Air cooling | | Standard: Air cooling (Customizable water cooling) | | | | | |
| Oil viscosity | / | 100 | | | | | | | |
| Oil capacity | L | 0.5 (gear end) | | 0.5 (gear end) | | 0.25 (motor end) | | 1.15 (gear end) | |
| Air inlet | mm | VG50 | DN80 | DN80 | DN100 | DN100 | DN160 | DN160 | DN160 |
| Air outlet | mm | VF50 | DN80 | DN63 | DN63 | DN63 | DN100 | DN100 | DN100 |
| Ambient temp. | °C | 5 ~ 40 | | | | | | | |
| Noise | dB | ≤62 | ≤62 | ≤63 | ≤63 | ≤65 | ≤65 | ≤65 | ≤65 |
| Weight | kg | 25 | 29 | 90 | 102 | 113 | 218 | 235 | 235 |
| Dimensions (L*W*H) | mm | 576x212x160 | 681x212x165 | 668x284x215 | 770x284x215 | 770x284x215 | 962x385x276 | 1021x385x276 | 1021x385x276 |

*The actual voltage to be used should be confirmed with our sales department or local distributor.

Table 1 Technical Parameters

5.2 Flow Rate

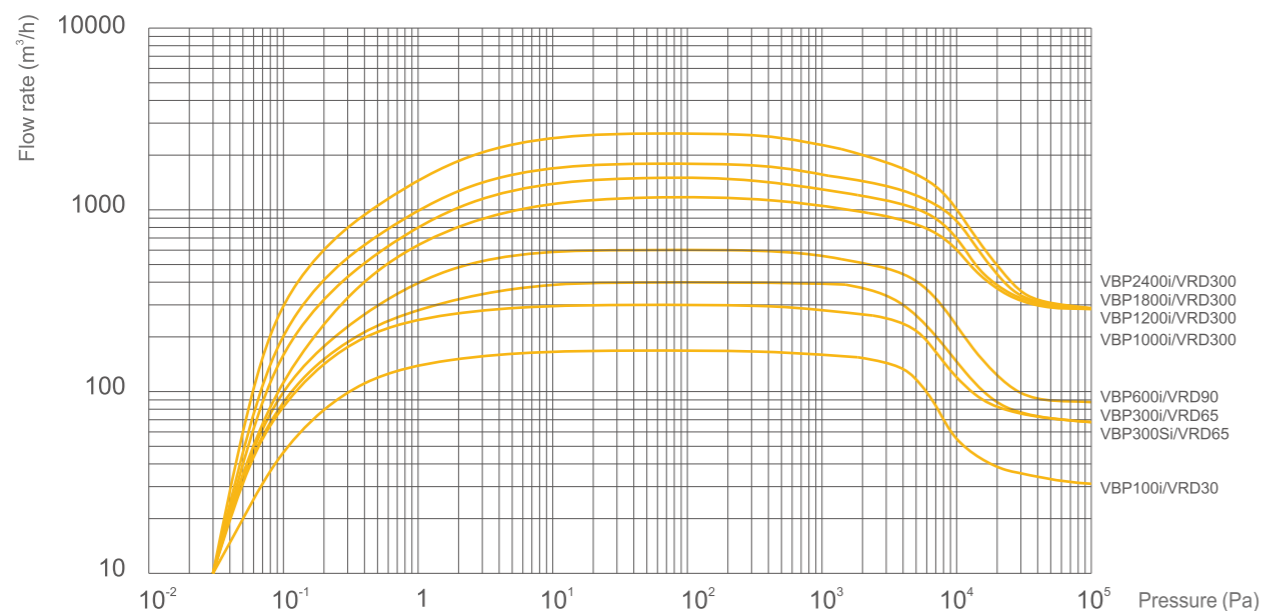
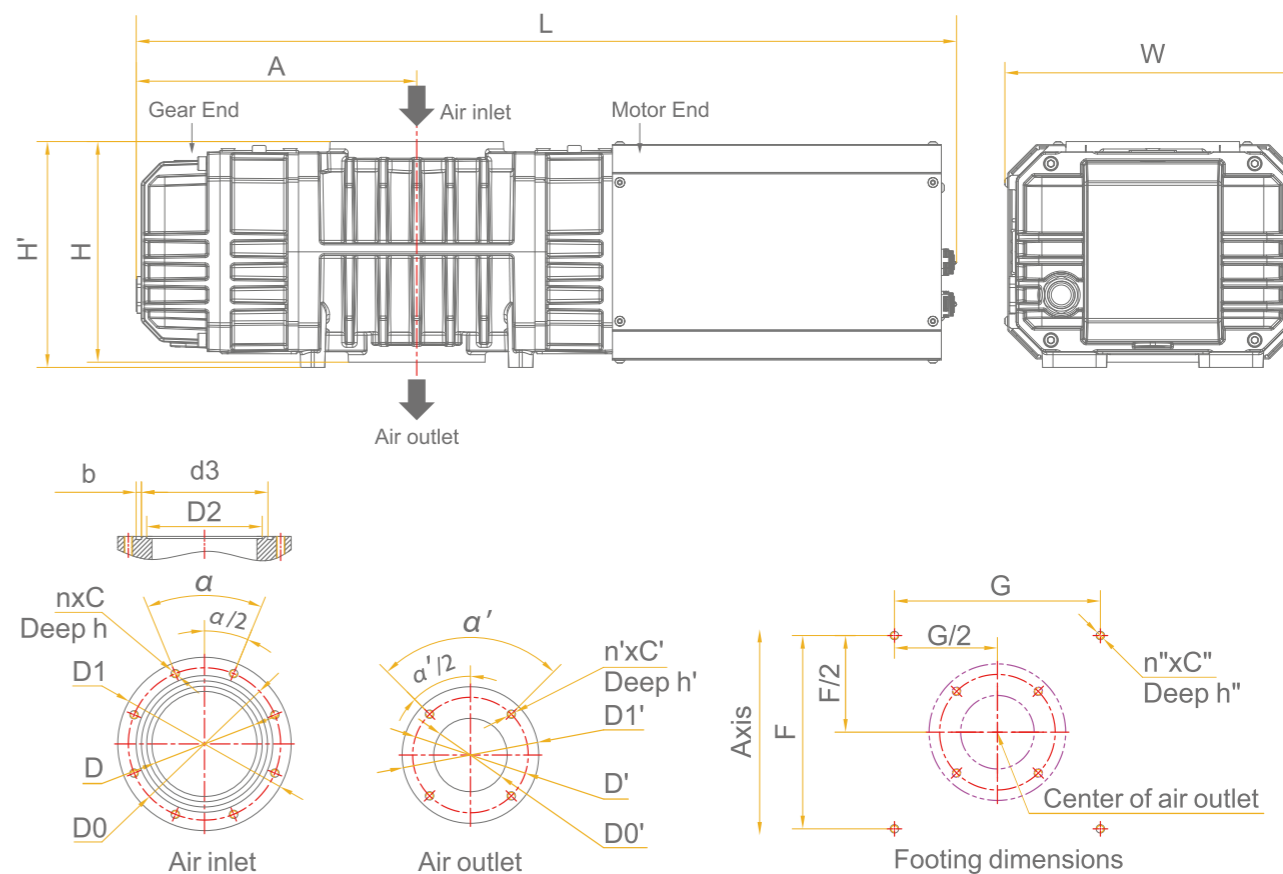


Fig. 3 Flow Rate

6. Installation & Wiring

6.1 Installation Dimensions



| Model | L | W | H | H' | H'' | A | D | D0 | D1 | n | C | h | α |
|-------------------|------|-------|-----|-----|-------|-------|-----|-----|-----|---|-----|----|-----|
| VBP100i | 576 | 212 | 160 | 160 | / | 164 | 50 | 100 | 116 | 4 | M8 | 12 | 90° |
| VBP300Si | 681 | 212 | 160 | 165 | / | 214 | 83 | 125 | 145 | 8 | M8 | 12 | 45° |
| VBP300i | 668 | 283.5 | 210 | 215 | 232 | 232 | 83 | 125 | 145 | 8 | M8 | 16 | 45° |
| VBP600i/1000i | 770 | 283.5 | 210 | 215 | 232 | 267 | 100 | 145 | 165 | 8 | M8 | 16 | 45° |
| VBP1200i | 962 | 384.5 | 268 | 276 | 292.5 | 342.5 | 150 | 200 | 225 | 8 | M10 | 16 | 45° |
| VBP1800i/VBP2400i | 1021 | 384.5 | 268 | 276 | 292.5 | 372 | 150 | 200 | 225 | 8 | M10 | 16 | 45° |

| Model | d3 | b | D2 | D' | D0' | D1' | n' | C' | h' | α' | F | G | n'' | C'' | h'' |
|-------------------|----|---|-----|-----|-----|-----|----|----|----|-----|-----|-----|-----|-----|-----|
| VBP100i | 70 | 5 | 64 | 50 | 100 | / | / | M8 | 12 | 90° | 82 | 118 | 4 | M8 | 12 |
| VBP300Si | / | / | 90 | 83 | 125 | 145 | 8 | M8 | 12 | 45° | 184 | 132 | 4 | M8 | 14 |
| VBP300i | / | / | 90 | 70 | 110 | 130 | 4 | M8 | 16 | 90° | 126 | 184 | 4 | M8 | 22 |
| VBP600i/1000i | / | / | 110 | 70 | 110 | 130 | 4 | M8 | 16 | 90° | 196 | 184 | 4 | M8 | 22 |
| VBP1200i | / | / | 160 | 100 | 145 | 165 | 8 | M8 | 16 | 45° | 255 | 250 | 4 | M8 | 23 |
| VBP1800i/VBP2400i | / | / | 160 | 100 | 145 | 165 | 8 | M8 | 16 | 45° | 315 | 250 | 4 | M12 | 23 |

Fig. 4 Dimension Drawing of VBP i Series Roots Pump

6.2 Handling

Please handle the Product with care, for any negligence may lead to damages of the Product.

! Warning

Do not relocate the Pump until it is stopped and powered off.

! Warning

Check for oil leakage to prevent operators from slipping due to leaked oil.

! Notice

The Pump must be hoisted through the lifting bolts on it.

6.3 Installation

! Notice

Install the pump in well-ventilated places where installation, maintenance, dismantling, and wiring can be easily done.

! Warning

Avoid using the pump near explosives and inflammable materials to prevent explosion or fire hazards.

! Warning

Keep obstacles away from the motor to prevent scalding or fire hazards due to abnormal temperature rise.

! Notice

Install the pump in clean places. Use anti-dust devices as required on the air inlet.

! Notice

The pump footing can be placed horizontally on the ground or connected through bolts when connecting to the vacuum system.

! Notice

Install the pump stably and firmly within a horizontal degree of 10° to prevent pump vibration, increased noise, and damage.

! Notice

Use the pump in places with ambient temperatures of 5-40°C and moisture not exceeding 85%. Increase the ambient temperature properly if it is below 5°C to prevent oil viscosity increase and startup difficulty.

6.4 Power Supply & Rotation Direction

! Warning

Use a power supply consistent with the product's marked power supply. Certified electricians should connect the power supply correctly according to technical standards and wiring regulations. Measure the phase sequence of the incoming power supply clockwise for 3-phase motors and connect them accordingly.

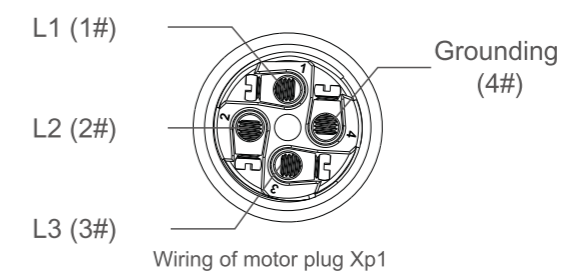


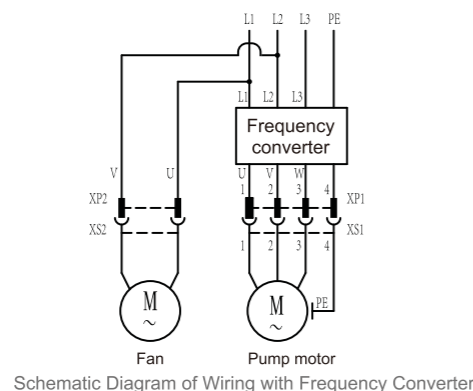
Fig. 5 Wiring of 3-phase Motor

Definition of 3-phase power cable:

1. Phase A line: Also known as Line L1 or Line U;
2. Phase B line: Also known as Line L2 or Line V;
3. Phase C line: Also known as Line L3 or Line W;
4. Grounding line: Also known as Line PE.

When the Product is used for the very first time, make sure to disconnect the air inlet and outlet pipe, open the air inlet of roots pump, connect the Product's power supply according to sequence in Fig. 6.

- This pump is equipped with a Feiyue dedicated frequency converter to ensure optimal and reliable performance.
- The frequency converter has been pre-wired into the circuit before delivery, requiring no additional wiring.
- When matching with inverters of different manufacturers, it is necessary to confirm with VALUE.



Schematic Diagram of Wiring with Frequency Converter

Fig. 6 Schematic Diagram of Wiring

! Notice

"XP" stands for plug, "XS" stands for socket. Wiring must follow the sequence shown in Fig. 6. Incorrect wiring may lead to electrical safety accidents.

6.5 System Wiring

The VBP i series pump is connected to vacuum system through flange, the size of which should be confirmed carefully. The Product must be fitted with a vacuum fore pump as the backing pump instead of being used independently. If oil-sealed mechanical vacuum pump is used as backing pump, it should not be used for pumping explosive gas that has high oxygen content, has corrosion to ferrous metal, chemical reaction to vacuum oil and contains dust; otherwise, the service life of backing pump can be shortened.

Wiring of vacuum system:

- It is recommended to install a hose (metal corrugated pipe) to the connection pipeline between the Product and the backing pump; the pipe should be as short as possible, have few joints and bends; the pipe diameter should not be less than that of pump;
- The pipe that connects the Product and vacuum system should be as short as possible;
- The pipe that connects the Product and vacuum system should have consistent diameter with the air inlet. Inspect the filter screen of air inlet regularly and keep it clean;
- The connection pipe of pump exhaust port should have a consistent diameter with the exhaust port;
- Carry out leakage inspection to the position where pipe and flange are connected. Good vacuum airtightness is crucial for the Product to reach the ultimate pressure;
- It is recommended to install vacuum valve to the Product's air inlet pipe, in order to maintain vacuum state of pump cavity when the pump is stopped.

! Warning

Do not use blocked or narrow exhaust pipes. Ensure baffles or similar block devices are open to prevent exhaust pipe blockage due to sediments before starting the product.

7. Initial Startup & Functioning

7.1 Functioning

Pre-operation Inspection:

- The pump exhaust port must be unobstructed. Do not start the pump with the exhaust port blocked.
- Check that the motor rotation direction is correct.
- Check that the motor is properly grounded.
- Check that the power supply voltage and frequency match the values on the nameplate.

Pump Operation:

This pump is equipped with a built-in frequency converter, allowing it to start at atmospheric pressure while increasing speed. The startup and acceleration time varies depending on the volume of the vacuum container, and the pump is provided with certain overload protection.

- Start the backing pump.

! Notice

It is recommended to start the Roots pump 30 seconds after the backing pump has been started.

- Open the pump inlet valve.
- Check that the pump operates smoothly; no knocking noise from the rotor is allowed. Otherwise, stop the pump immediately for inspection.
- During operation, if any abnormality occurs such as excessive local temperature rise, sudden current fluctuation or irregular noise, stop the pump for inspection.

Stop running:

- Close the air inlet valve on air inlet pipe firstly;
- Shut down the roots vacuum pump;
- When the roots vacuum pump is stopped, shut down the backing pump.

! Notice

After the Roots pump is stopped, wait at least 30 seconds before restarting it.

Long-term idling of pump:

- Close the air inlet valve on air inlet pipe firstly;
- Shut down the roots vacuum pump;
- When the roots vacuum pump is stopped, shut down the backing pump.
- Disconnect the water and electric circuit; disconnect the air inlet pipe if necessary, cover the air inlet with cover plate against dust and moisture.

8. Inspection & Maintenance

Warning

Cut off power supply before inspection. Do not connect power supply during inspection to prevent personal injury.

Warning

Ensure the product is completely cooled before inspection to prevent burns, as the product remains hot after stopping.

8.1 Daily Maintenance Method

Warning

For a better performance and life, please pay often attention to the lubrication state of all parts and refuel the lubricating oil in time. Under any circumstances like deterioration, oil turbidity, please replace the oil in time and make sure that all parts are sealed.

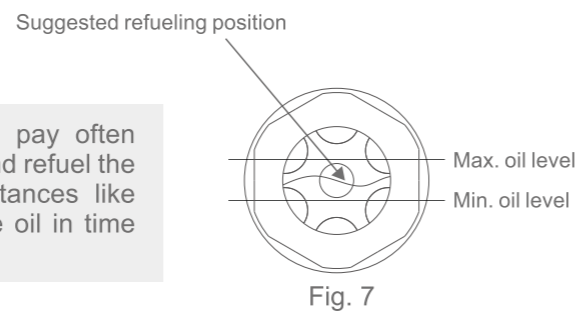


Fig. 7

Warning

While working, the oil level should stay within Max~ Min. Refuel the lubricating oil when it's lower than Min; Drain the excessive oil when it's above Max.

Caution

Observe the pump oil color, which should be clean and transparent. Replace oil if it becomes dark or turbid.

Warning

Confirm hazard properties and follow relevant safety regulations if hazardous substances exist. Treat pollution before running the product if potential hazards persist.

Notice

Do not change the oil while the pump is hot. Allow the pump to cool down to below 50 °C and wear appropriate protective clothing before oil replacement.

8.1.1 Oil Replacement

- Open the oil drain plug, drain the used oil into a proper container, then fasten the oil drain plug when oil flow stops;
- Fasten the oil drain plug (check the O-ring and replace it in case of damage);
- Open the oil drain plug, inject fresh oil, keep the oil level within the Max ~ Min range of oil indicator, or at the upper level of oil cup; then fasten the oil drain plug or close the seal cover.

Notice

Oil replacement must be performed only when the pump is disconnected from power and the temperature of both the pump and motor is low.

8.2 Daily Maintenance Schedule

| Inspection Contents | Operation & Test | Maintenance Frequency | Remarks |
|---------------------------------------|--|------------------------------|---|
| Inspection of lubricating oil level | Do visual inspection to the oil level | For every 3 days | Please fill oil when oil level is lowered |
| Inspection of lubricating oil color | Do visual inspection to see if pump at oil observation window has abnormal color | For every 3 days | The oil should be clean and transparent. If oil becomes dark, please replace it by referring to 8.1.1 |
| Inspection of pump sound | Check if there's abnormal sound | For every 3 days | For any abnormal sound or high noise, please refer to IX Fault Analysis |
| Inspection of pump vibration | Check if there's excessive vibration | For every 3 days | Check if pump footing and foundation bolts are loose |
| Inspection of pump temperature | Measure the pump temperature with a thermometer | Weekly | Check if the fan of pump and motor has sediments; if so, please clean it. |
| Inspection of air inlet filter screen | Check if there are foreign matters | Trimonthly | Remove the foreign matters and dry it with compressed air |
| First oil replacement | Do statistics of running period | 500h after the first running | Refer to 8.1.1 for the oil replacement method |

Table 2

9. Fault Analysis

| Fault | Cause | Troubleshooting |
|---|--|---|
| Pump start failure | 1. Power supply is disconnected | 1. Inspect the power supply, switch and wiring conditions |
| | 2. Input power supply has voltage error | 2. Make sure voltage fluctuation is within the range of $\pm 10\%$ of rated voltage |
| | 3. Motor failure | 3. Replace the motor |
| | 4. The ambient temperature is too low | 4. Increase the ambient temperature |
| | 5. The pump is blocked by a foreign matter | 5. Repair the pump |
| | 6. The pump body is rusted due to long-term idling, inhalation of water and organic solvents | 6. Repair the pump |
| | 7. The internal parts of pump are damaged | 7. Repair the pump |
| The pump fails to reach ultimate pressure | 1. The vacuum system configuration is improper, or the pump is too small | 1. Reselect the pump |
| | 2. The connected container or connection pipe has air leakage | 2. Inspect and eliminate the air leakage |
| | 3. Measurement method or gauge is improper | 3. Please use the proper measurement method or gauge; measure the vacuum degree directly at the air inlet of pump |
| | 4. Vacuum gauge is inaccurate or improper | 4. Select proper vacuum gauge |
| Pumping is too slow | 1. The air inlet pipe is blocked | 1. Clean the air inlet pipe |
| | 2. The air inlet pipe is too narrow or too long | 2. Please use short and thick air inlet pipe |
| | 3. Air exhaust pipe is unsmooth | 3. Keep the air exhaust pipe smooth |
| | 4. Air exhaust filter screen is blocked | 4. Clean or replace the air exhaust filter screen |

| Fault | Cause | Troubleshooting |
|------------------------------|--|---|
| Pump has abnormal sound | 1. Input power voltage is abnormal | 1. Inspect the power supply, switch and wiring conditions |
| | 2. Motor error | 2. Make sure voltage fluctuation is within the range of $\pm 10\%$ of rated voltage |
| | 3. The pump has foreign matters | 3. Dismantle the pump for repairing and removing the foreign matters |
| | 4. The oil level of pump is too low | 4. Fill oil to proper level |
| | 5. The internal parts of pump are damaged | 5. Dismantle, repair and replace the parts |
| | 6. The bearing has fatigue damage | 6. Replace the bearing |
| | 7. Rotor clearance is changed | 7. Remove the gear for cleaning, reinstall it and adjust the clearance |
| | 8. Gear has fatigue damage | 8. Replace the gear |
| Pump temperature is too high | 1. Pressure intensity between air inlet/outlet has high difference | 1. Inspect the pressure of vacuum system |
| | 2. Oil level of pump is too low | 2. Fill oil as specified |
| | 3. Temperature of pumped gas is too high | 3. Install a cold trap at the air inlet |
| | 4. Poor ventilation | 4. Improve the ventilation environment |
| | 5. The ambient temperature is too high | 5. Lower the ambient temperature |
| | 6. Friction resistance is too high; the bearing or oil is polluted | 6. Clean the bearing or replace the oil |

Table 3

10. Warranty

The Product enjoys 1-year warranty since the date of procurement. For any fault of the Product within the warranty when used at normal conditions, the Company will offer maintenance services for free. The Company will offer paid services in any of the following cases:

- (1)The fault caused by natural disasters or human factors;
- (2)The fault caused by special operation environment;
- (3)Damage of sealing elements and quick-wear parts (see Table 4, 5);
- (4)The fault caused by misoperation or misuse according to identification of our technicians;
- (5)Please explain whether the pump is polluted or contains hazardous substances before returning it to the factory for maintenance; if the pump is polluted, please describe it in details; otherwise, the pump will be returned to the consigner if no pollution statement is provided.

11. Supplied Equipment

11.1 Standard Equipment

The supplied equipment includes standard pump, air inlet dust cover, sealing pads, motor plug, fan plug, excluding switch and power cable.

11.2 Accessories

Please use the attached accessories to keep the Product stable. Please provide the model of pump when placing an order.

1. Inlet vacuum filter
2. Inlet/outlet interface
3. Frequency converter
4. Vacuum gauge
5. Corrugated pipe
6. Other accessories

Note: The accessories are optional parts. For any demand, please contact us.

12. Main Parts of VBP i Roots Pump

12.1 The breakdown drawing of VBP100i/300Si pump is as shown in Fig. 8-9:

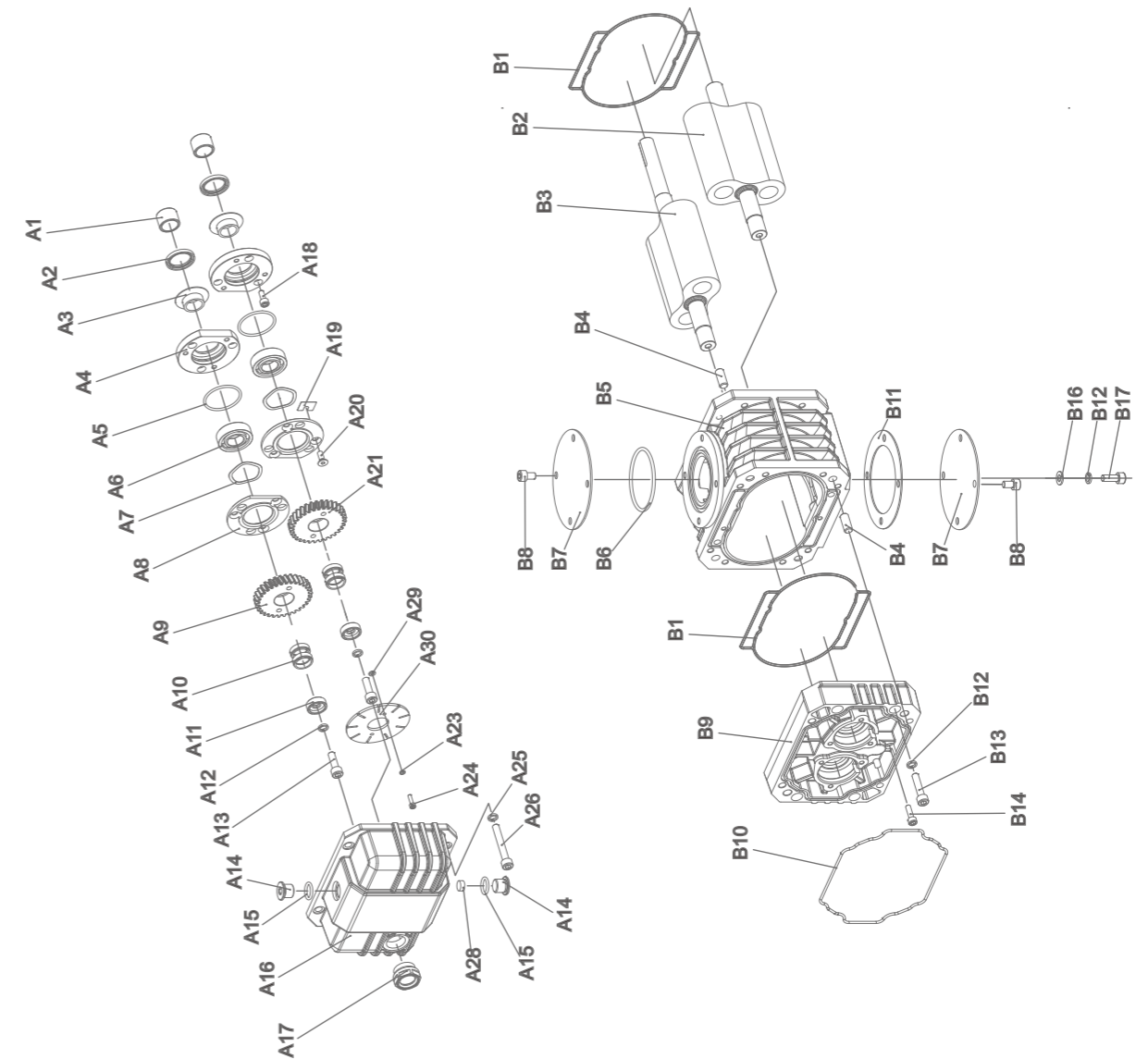


Fig. 8

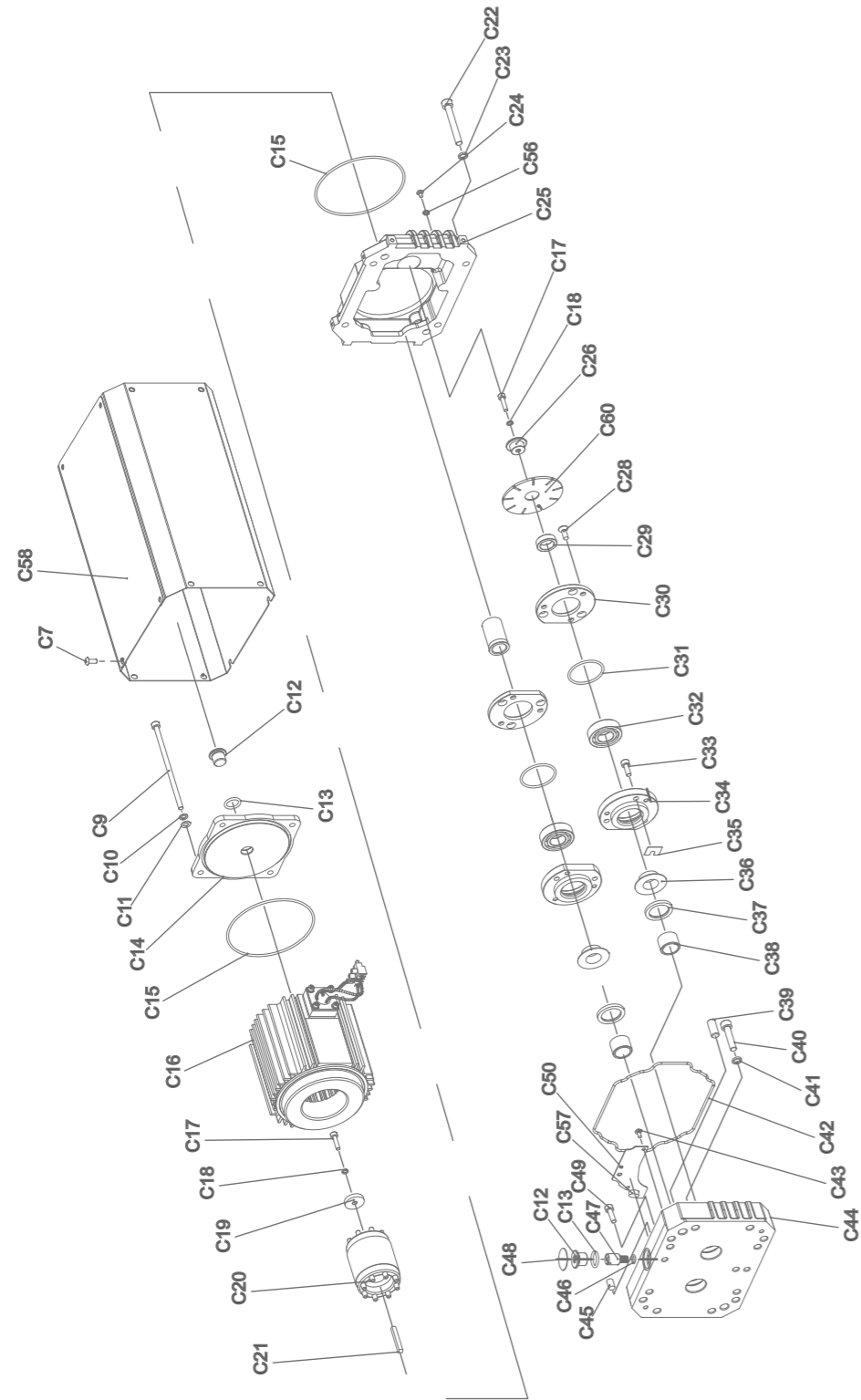


Fig. 9

12.2 The breakdown drawing of VBP300i/600i/1000i/1200i/1800i/2400i pump is as shown in Fig. 10-11:

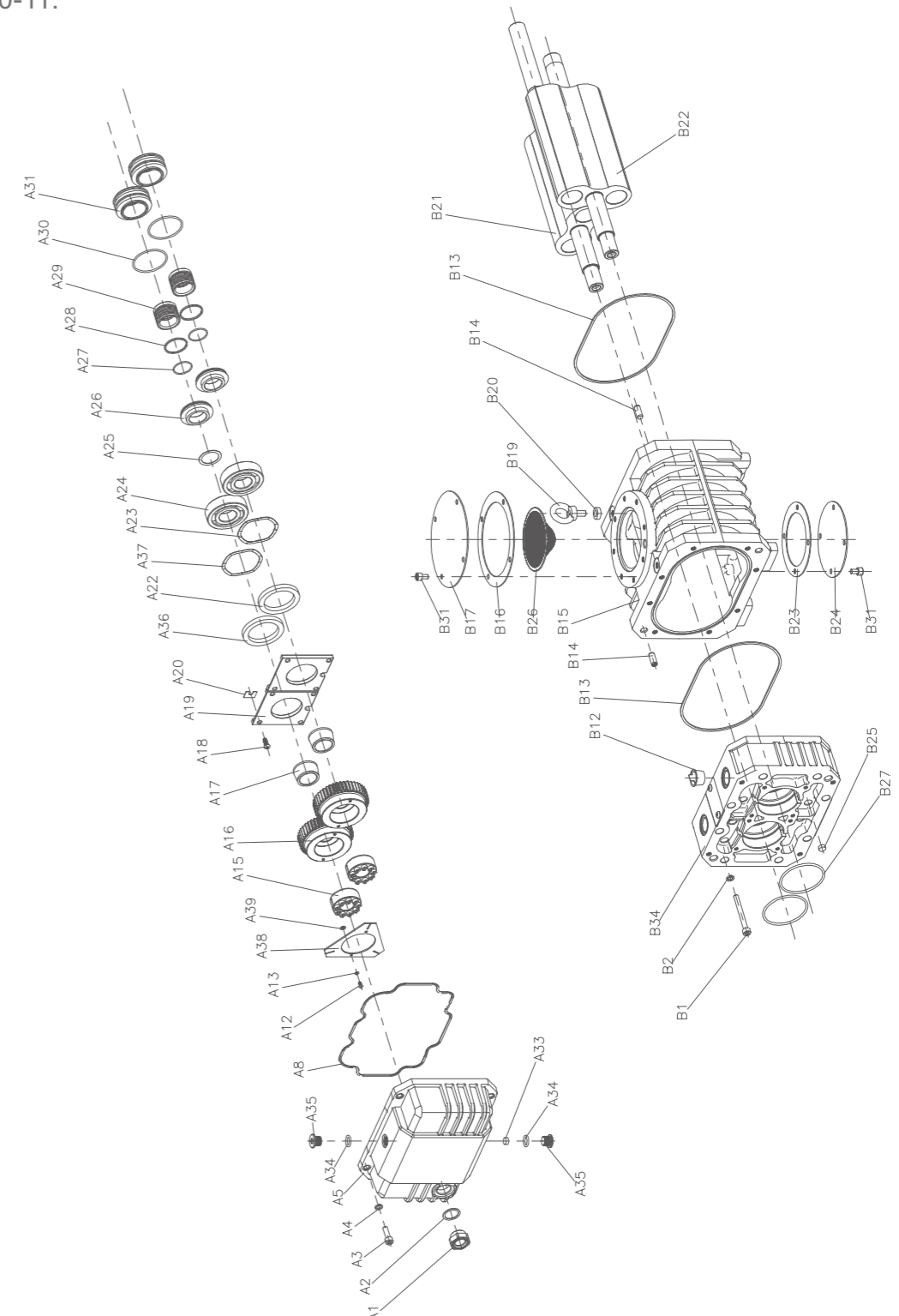


Fig. 10

12.3 List of Quick-wear Parts for VBP i Series Roots Pump

| S/N | Product Name | Material | Code | Qty. |
|-----|--------------------------------|--------------|------------|------|
| B6 | O-ring Φ 69 (inner) *3.55 | Fluororubber | 1100019767 | 1 |
| A15 | O-ring Φ 14 (inner) *3 | Fluororubber | 1100020352 | 2 |

Table 4 List of Quick-wear Parts for VBP100i/VBP300Si Roots Pump

| S/N | Product Name | Material | Code | Qty. |
|---------|-----------------------------|--------------|------------|------|
| A34/C49 | O-ring Φ 14 (inner) *3 | Fluororubber | 1100020352 | 4 |

Table 5 List of Quick-wear Parts for VBP300i/600i/1000i/1200i/1800i/2400i Roots Pump

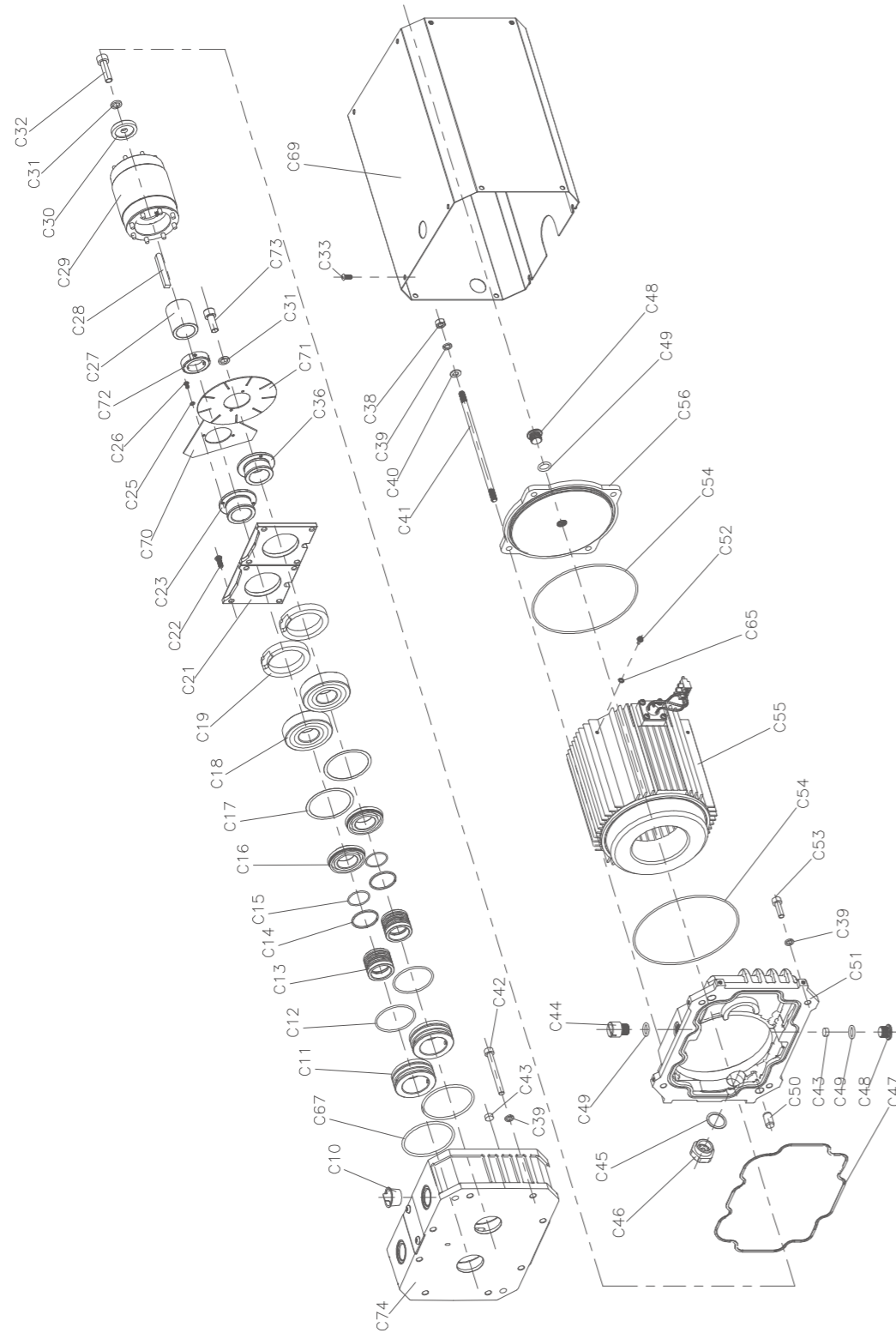


Fig .11

Correct Disposal of this product:

This marking indicates that this product should not be disposed with other household wastes. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.



