

156 L/m Double Stage Rotary Vane Vacuum Pump with Exhaust Filter, Bellows & KF-D25 Inlet EQ-FYP

Operation Manual



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IMPORTANT NOTES

Thank you for purchasing from Materials Technology International Corporation. This manual contains important operation and safety information prepared for those intending on operating and utilizing the equipment. The prospective user is responsible for carefully reading and understanding the contents of this manual prior to operating the equipment.

MTI reserves the right to update or upgrade the product without informing customers of the data change(s) in this manual. Please visit www.mtixtl.com frequently for the latest information and manual.

GENERAL WARNINGS

MTI will not be responsible for equipment damage, accidents leading to minor or fatal injuries, and etc. caused by the user's negligence or lack of knowledge. Always read the manual fully beforehand and exercise the best judgment when handling the equipment.



To avoid electrical shock:

- Do not operate the equipment, unless you have precautions of electro-Static discharge.
- Use a properly grounded electrical outlet of correct voltage and current handling capacity.
- Disconnect equipment from the power supply before servicing.
- Always double check the wiring and consult a licensed electrician for installation.



To avoid Physical Injuries:

- Do not put this equipment near flammable or explosive environments and substances.
- Do not leave the internal circuit exposed after disassembly.
- Power should be cut off when performing external maintenance like cleaning.

WARRANTY

MTI Corporation provides one year limited warranty from date the product is shipped out. Any defective part(s) will be replaced free of charge during warranty period. However, the warranty does NOT cover any equipment damage caused by misuse or negligence. After the expiration of warranty, MTI will continue to provide technical support and spare parts at a reasonable cost.

ATTENTIONS

- Before the connection, please check the power supply is the same with the required power supply.
- Electrical connection work must only be carried out by a skilled electrician in accordance with the electrical equipment technical standard and connection regulation.
- Do not place obstacles which will influence the ventilation around the motor in order to avoid scald or fire.
- The products must be grounded and the motor circuit must be equipped with a suitable rated motor protection switch before starting up.
- The pump must be operated at ambient temperatures between 5-40 C.
- The exhaust line must be unblocked before operating. Make sure that the gas flow from the exhaust port is not blocked or restricted in anyway.
- Check the oil level before running. Do not operate the pump without oil or short of oil. Otherwise it will result in the pump failure.
- When opening the pump, do not touch the pump, until it has cooled
- FYP vacuum pumps shall not suitable for pumping of toxic, corrosive, flammable and explosive gas.
- FYP pumps are strictly prohibited to operate in the explosion hazard and flammable area in case of explosion or fire.
- If the medium pumped contains a small amount of dust, condensable gases, some corresponding accessory should at all events be installed. Otherwise, it will cause pump failure or deduction of performance.

PRODUCT INTRODUCTION

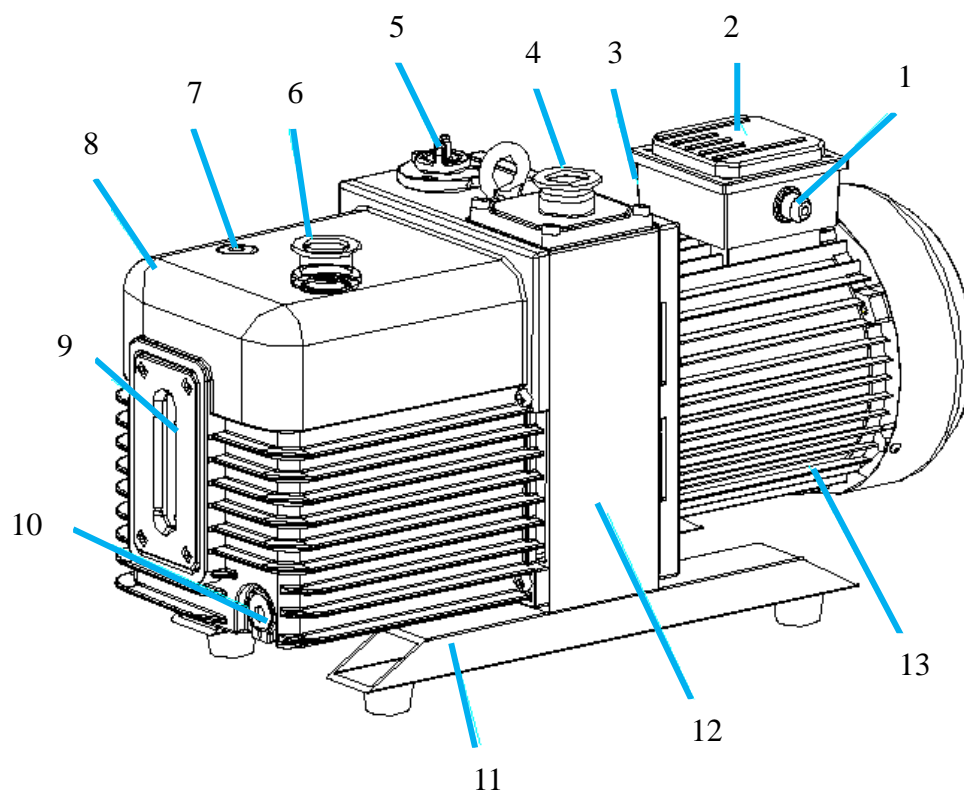
FYP vacuum pump is a high speed, motor direct drive, oil-sealed rotary vane vacuum pump. The pump adopts integrated cylinder structure, inner oil pump design, automatic anti-suck back valve design, oil pressure control system and adjustable gas ballast valve design. The pumps are designed with rational structure, safety and reliability. It has high flow rate, high ultimate pressure and low noise level. The pumps are free of oil leakage and easy for maintenance. It is a highly reliable vacuum pump proved by global customers Instrument.

FEATURES

| | |
|---|--|
| Voltage / Frequency | AC 100~120V/60Hz or AC 208~240V/50/60Hz |
| Rate (m ³ /h) Please click here to convert metric to English unit) | <ul style="list-style-type: none"> • 50Hz: 8 m³/h (2.2 L/s) • 60Hz: 9.6 m³/h (2.6 L/s) |
| Body Material | Stainless Steel |

| | |
|---------------------|--|
| Maximum Pressure | $\leq 5 \times 10^{-2}$ Pa or 4×10^{-4} torr |
| Power (HP) | 0.4KW / 0.37KW |
| Motor Speed | <ul style="list-style-type: none"> • 50Hz: 1440 rpm • 60Hz: 1720 rpm |
| Volume of Oil (ml) | 1000 (included) |
| Working Temperature | 5-40 C |
| Vacuum port | Built in KF25D standard Inlet / outlet port |
| Accessories | <ul style="list-style-type: none"> • Stainless Steel Vacuum Pipe - 1 Meter is included • Three sets of quick clamps are included • One Exhaust filter is included to <ul style="list-style-type: none"> ○ Eliminates pump oil fumes ○ Returns used oil to vacuum pump ○ Traps Particles to 0.3 microns ○ Replaceable coalescing element |
| Dimension (mm) | 6.5" X 18" X 9.5" |
| Weight | 21 kg (47 lbs) |
| Certificated | CE approval |
| Warranty | <p>One year limited with lifetime support <i>(Attention: Improper use will cause all claims for liability and warranties to be forfeited. Improper use is deemed to be all use for purposes deviating from those mentioned in below, especially:</i></p> <ul style="list-style-type: none"> • Pumping of corrosive or explosive media. • Pumping of condensing vapors. • Pumping of liquids. • Pumping of dusts. • Operation with improper high levels of insulated heat input. • Operation in potentially explosive areas. |

STRUCTURE



- | | |
|-----------------------|--------------------|
| 1. Outlet | 8. Oil tank |
| 2. Junction box cover | 9. Sight glass |
| 3. Junction box | 10. Oil drain plug |
| 4. Intake port | 11. Pump support |
| 5. Gas ballast | 12. Trestle |
| 6. Exhaust port | 13. Motor |
| 7. Oil fill plug | |

INSTALLATION

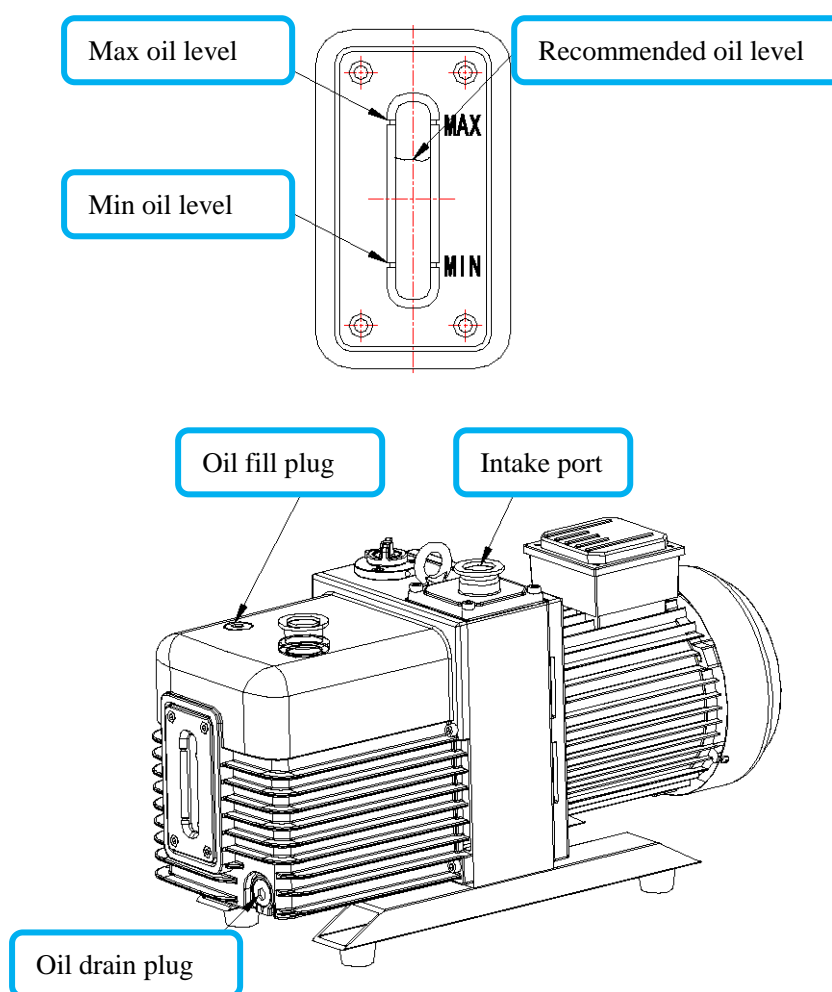
When connect the pump to vacuum system, please place the pump horizontally, or you can unload the rubber feet, connect it by feet-hole screw.

Oblique installation may result in pump's vibration, high noise or even damage. The pump should be set up on a flat and firm surface.

Adding oil

Open the oil fill plug, add the oil according to the technical data. Add oil to recommended oil level for the first time.

During the operation, the oil level of the pump must always be visible between the Max to Min mark. Oil at recommended level is better. Excessive or insufficient oil will decrease the pump performance or even cause malfunction of the pump.

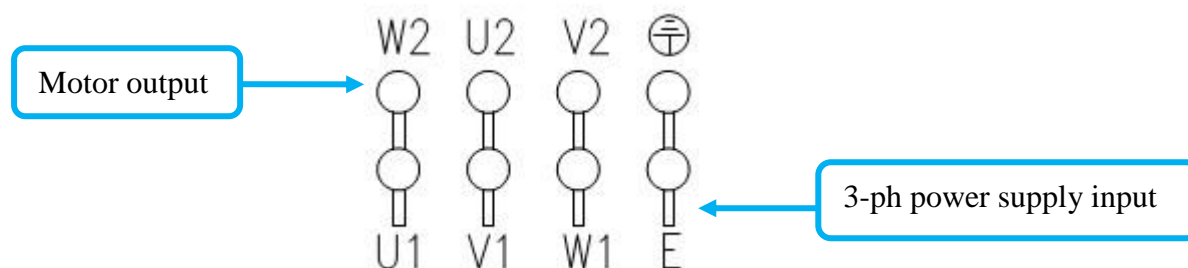


Pump with single phase motor

With single phase design, power supply cable, switch, overload protector are all connected. The direction of rotation need not be checked as it is fixed. The pump can be directly connected by means of the connection cable and plug to the single phase power supply. The motor is protected against overloading by a thermal overload protector.

Pump with three-phase motor electrical connection

When connecting three-phase motor pump, please open the junction box cover connect the pump. The pump is supplied without any accessories of electrical connection. You must connect the pump using an appropriately rated cable and a suitably rated motor protection switch. The value set on the motor protection switch must correspond to the current rating stated on the nameplate of the motor.



Pump with three-phase motor direction

Check whether the motor rotate direction is same as motor arrowhead. Please cut off the power immediately and interchange two phases of the connection (any 2 from W1, U1, V1) if the motor rotate direction is not same as the motor.

Motor direction test

Open the inlet port, exhaust port, put a slip of paper 50mm top of the exhaust port, switch on/off the motor immediately to see the direction of the slip of paper. If the slip of paper upward away from the exhaust port, then the motor direction is correct. The direction arrow on the motor is the pump's direction.

If the pump runs for too long in the wrong direction, it may cause the damage of pump parts.

Requests for vacuum system connection

- Between vacuum pump and vacuum system, the connecting lines should be as short as possible
- Make sure the DN of connecting line between vacuum pump and vacuum system should be same as intake port. Check the inlet port filter regularly and keep its

cleanness.

- Make sure the DN of exhaust fitting should be same as intake port. The exhaust line should preferably be installed with a downward slope so as to prevent condensate from flowing back into the pump and contaminating the oil, please periodically drain the condensed oil in the exhaust pipe for avoiding of exhaust pipe block. If the exhaust line has an upward slope, a condensate trap must at all events be installed.
- Leak check of the connection between pipe and flange. vacuum-tight connection of the pump is essential so that the pump can reach the ultimate vacuum.

OPERATION

Before operating

- The exhaust line must be unblocked. On no account may the pump be operated with a blocked exhaust line.
- The oil capacity in the housing should be suitable.
- Running direction of the motor as requested.
- Well grounded for the motor.
- Check the power supply and ensures it matches the specifications on the pump

Operating

Vacuum system without condensable gases

In the presence of permanent gases, the gas ballast valve knob should be switched off, pointing to C. It may cause the rise of ultimate pressure (decrease of ultimate pressure) if open the gas ballast valve.

Vacuum system with condensable gases

When the vacuum system contains a small amount of condensable gas, open the gas ballast valve. It can pump a small amount of condensable gas effectively. Close the gas ballast valve when the vacuum system pressure reduced to a certain value.

Gas will be dissolved in the pump oil when putting the pump out of operation for long, It is recommended to let the pump continue to operate for 30 minutes with the intake line closed and the gas ballast valve open. The pump can resume normal use after the pump be degassed.

MAINTENANCE

Disconnect the power supply before repairing. It's forbidden to connect the power supply during repairing. Otherwise, the risk of injury may occur.

Pump temperature is very high when the pump just stopped. Do all the checking when the

pump is cooled down to avoid the scald.

Oil checking

Please use clean and appropriate oil to ensure the pump performance and life. Arrange for the frequency of changing oil as your different operation situation. Check the oil regularly.

Checking the oil level

During the operation the oil level of the pump must always be visible between the Max to Min mark. Add oil if the oil level is lower than Min mark and discharge oil if the oil level is higher than Max mark. Liquid height at recommended level is the best.

Oil change

Change the oil in time if the oil contains mass liquid, organic solvents or corrosive gases

- Change the oil if the pressure declines as time by.
- Oil should be changed after the first 100 operating hours for the first usage.
- Add oil if the pump is operated under hyper-3000pa higher pressure for long time

It is recommended to change the oil every 2000 operating hours.

Oil change procedure

- Remove the oil drain plug and let the used oil drain into a suitable receptacle. When the flow of oil stops, screw the oil drain plug back in, briefly switch on the pump (max, 10s) and switch it off. Remove the oil-drain plug again and drain off the remaining oil. It can remove the residual oil from the pump chamber.
- Screw the oil-drain plug back in (check the o ring and replace it if necessary)
- Remove the oil filling plug back in and fill fresh oil.

Cleaning the dirt trap

During the process of dirt trap, some dust, grease will be adsorbed and piled up, which resulting the reduction of the pumping speed, and even obstructive. At the meantime, dirt entering into the pump body chamber and results heavy wear and tear. Clean the dirt trap regularly as your different operate situation. If cleaning is needed, remove the dirt trap and clean with a cleaning agent, blow it out with compressed air and then re-install. Replace the defective trap in necessary.

Routine checking

| | Inspection | Testing | Period | Remarks |
|---|------------------|---|------------------|---|
| 1 | Oil level | Eyeballing oil level | Every Three Days | Add oil if the oil level is low Refer to Section 2.4 drawing5 |
| 2 | Oil color | Eyeballing the oil color in the oil sight level | Every Three Days | Normally the oil is clear and transparent . If the oil darkens , it should be changed . Refer to section 6.3 |
| 3 | Pump noise | Whether the noise is normal | Every three days | Refer to 6.6 if the noise level is abnormal |
| 4 | Pump vibration | Whether there is any abnormal vibration | Every Three Days | Check whether any pump feet , feet screws loosen |
| 5 | Pump temperature | Temperature measuring meter | Every one week | Check the fan of the pump and motor for deposits and clean as required . |
| 6 | Seal & O ring | Eyeballing | Every one month | Change it as required |
| 7 | Dirt trap | Check whether any foreign matter enters | Every one month | Clean the dirt trap and blow it out with compressed air |

TROUBLE SHOOTING

| Fault | Possible reason | Solution |
|--|--|--|
| Pump can not be started | 1.Out of electrical 2.Operation voltage is abnormal 3.Motor is malfunctioning 4.Overload protector start up 5.Oil temperature is below 10℃ 6. Pump is jammed 7. Out of operation for long , liquid and organic solvents result rust of the pump body 8. Pump inner accessories are damaged | 1.Check the connection of power supply , switch 2.Voltage wave within $\pm 10\%$ 3.Replace the motor 4.Press the overload protector 5.Heat the pump and pump oil 6.Repair the pump 7. Repair the pump 8. Repair the pump |
| Pump can not reach to the maximum pressure | 1.Pump is too small 2.Vacuum system leak 3.Measuring technique or gauge is unsuitable 4.Vacuum gauge not correct 5.Oil level is too low 6. Oil is unsuitable or deteriorated 7. Lubricate seal oil channel inside pump blocked 8. Intake line is dirty 9.Exhaust valve is malfunctioning | 1.Replace the pump 2.Check the leakage 3.Use correct measuring technique and gauge . Measure the pressure directly at pump's intake port 4.Chose suitable vacuum gauge. 5.Add oil 6.Change oil 7. Clean oil channel 8. Clean the vacuum lines. 9.Repair the valve. |
| Pumping speed is too low | 1.Intake port channel is clogged 2.Connecting lines are too narrow or too long 3.Exhaust port channel is clogged unsuitable 4.Exhaust filter is clogged | 1.Clean the intake port channel 2.Use adequately wide and short connecting lines . 3.Keep the exhaust port channel free 4.Clean or change the exhaust filter |
| Abnormal voice | 1.Abnormal input power supply 2.Motor is malfunction 3.Foreign body into the pump 4.Oil level is too low 5. Coupling element is worn 6. Pump inner accessories are damaged. | 1.Check the connection of power supply , switch 2.Voltage wave within $\pm 10\%$ 3.Clean the pump body 4.Add oil 5. Install new coupling element 6. Repair or change the accessories |
| Higher temperature than normal | 1.Continuous operation under high pressure in the intake port 2.Oil level is too low 3.Process gas is too hot 4.Cooling air supply is obstructed 5. Pump fan is malfunction 6. Oil cycle is obstructed 7. Ambient temperature is too high | 1.Shorten exhaust time as far as possible 2.Add oil 3.Set pump up correctly . 4.Set pump up correctly. 5. Change the pump fan 6. Clean and repair the oil lines and channels . 7. Reduce the ambient temperature |
| Oil in the intake line or in vacuum vessel | 1.Oil comes from the vacuum system 2.Anti-suckback valve spring is obstructed 3.Anti-suckback valve board is obstructed 4.Oil level is too high | 1.Check the vacuum system 2.Change the anti-suckback valve spring 3.Change the anti-suckback valve board 4.Drain the excess oil |
| After switching the pump , pressure in system rises too fast | 1.System has a leak 2.Anti-suckback valve is malfunctioning | 1.Check the vacuum system 2.Repair the anti-suckback valve |
| Too much oil in the exhaust port | 1.Too much oil in the pump 2.Continuous operation under high pressure in the intake port | 1.Drain some oil 2.Shorten exhaust time as far as possible |
| Oil seal leak | 1.Oil seal broken 2.Seal ring was deformed | 1.Replace new oil seal 2.Replace new seal ring |