GF-03 High Pressure Misting Pump
Operating & Installation Manual

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SABIO

A. GENERAL INFORMATION

This manual provides you with the information for proper use and maintenance of the GF-03 quadruple plunger high pressure pump. Please, carefully follow the instructions provided. The manufacturer / supplier is not liable for any damage to people or goods, or to the system itself, if the equipment is used differently from as described in this manual.

This manual is provided to the user / technician for correct use of the GF-03 quadruple piston high pressure pump. Information provided in this manual does not replace regulations on safety at work currently in force. Therefore, the user should comply with the regulations in the country where the pump is installed, as well as following common sense rules.

Do not use the product if you notice any defect or wear that may compromise the original safety standards. The user or the maintenance technician must report any fault to the supplier. The machine is meant for specific applications. Do not modify and /or use it for applications other than the specified ones.

Instructions, drawings, tables and all the contents of this document are confidential technical documentation and are the exclusive property of **Sabio Precision Industry Co. Ltd.** No information may be released to third parties without written permission by **Sabio Precision Industry Co. Ltd**. Descriptions and images in this document are meant as indications and practical examples. They may be modified at any time and without prior notice. If further technical and functional details are needed, please contact the manufacturer / supplier.

■ **IMPORTANT**

a. Please, read the information contained in this manual since they will provide you with the information and instructions required for safe installation, use and maintenance.
b. Keep this booklet in a safe place and make it available for future reference.
c. On delivery, check for any possible damages due to transport.

■ REALTED SYMBOLS AND MEANINGS

⚠ DANGER

It indicates that an unfair use can cause possible death or sustain serious injury.

⚠WARNING

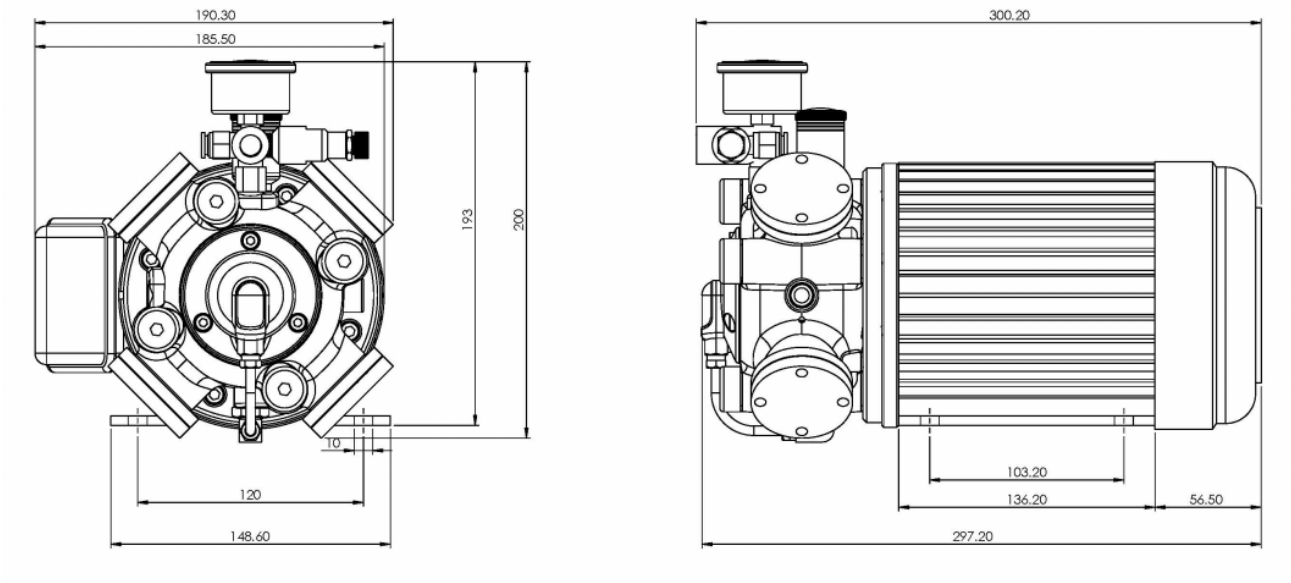
It indicates that an unfair use may highly cause possible death or sustain serious injury.

⚠ CAUTION

It indicates that an unfair use may highly wound the user and/or damage the product, also is possible to bring out an unpredictable event.

B. SPECIFICATION

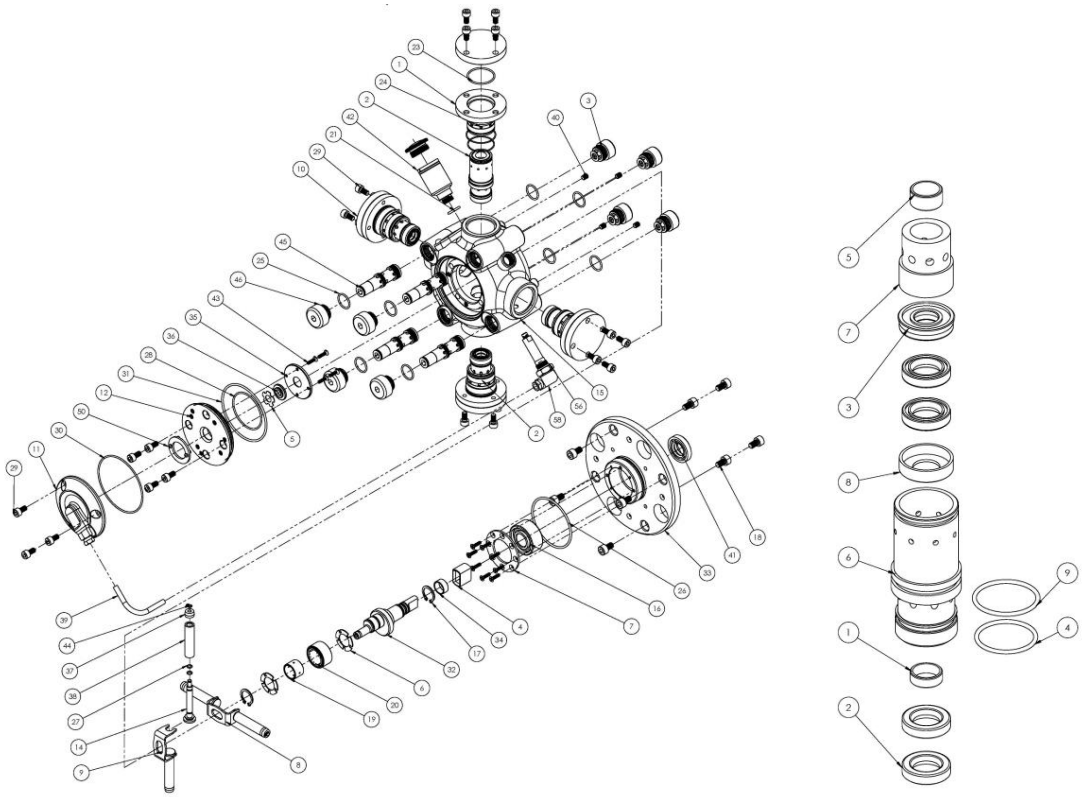
1. Dimension of GF-03 quadruple Plunger High Pressure Pump

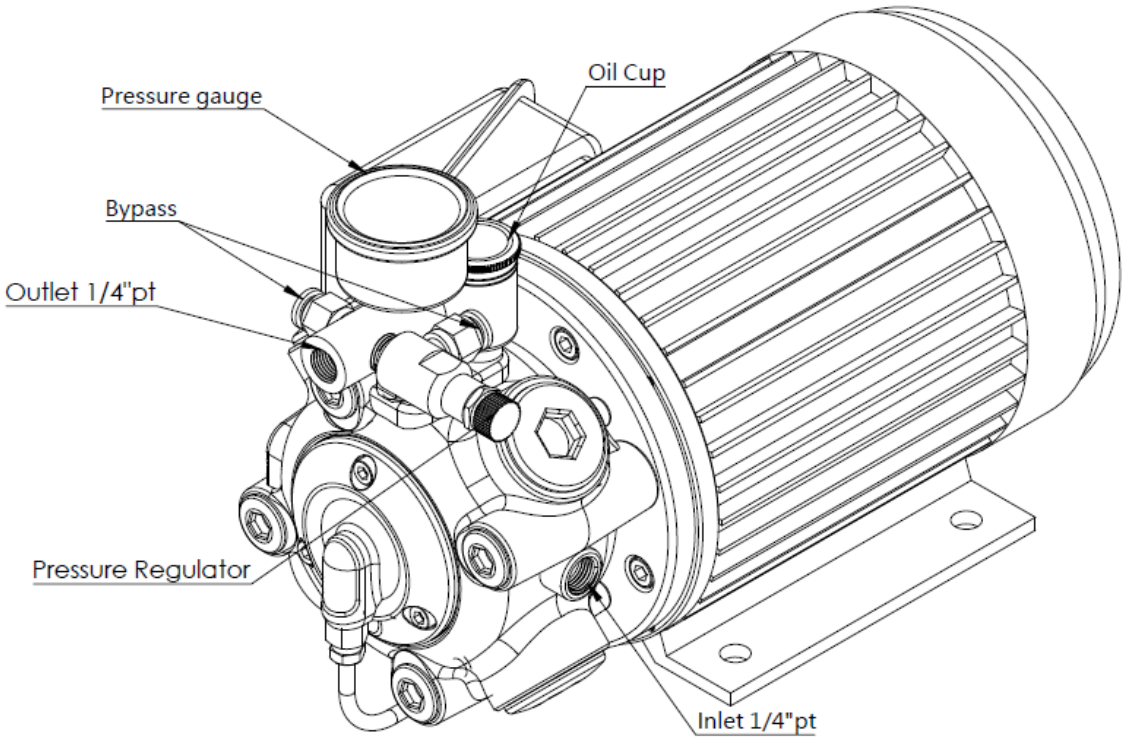


2. Specification of GF-03 Pumps

MODEL	GF-03
FLOW RATE	3.1/ 2.5 L/min (0.82/0.42 GPM)
MAX. OPERATING PRESSURE	70 bar (1,000psi)
VOLTAGE/Hz	110V/220V; 50Hz/60Hz
RATED RPM	1720/1120
NET WEIGHT	10.7 kg(with 1/2 hp motor)
INLET	1/4" PT
OUTLET	1/4" PT
INLET PRESSURE	0~5 bar

3. Exploded Drawing





C. PREPARATION BEFORE OPERATION

1. **Connecting the hoses or pipes on the pump. Ensure all joints between the water supply and water inlet are firmly connected. Water outlet should be only connected by high pressure hose if high pressure 70 bar is required.**

2. **LUBRICATION**：Fill crankcase with 10W40 oil in 55 C.C. **DO NOT RUN PUMP WITHOUT OIL IN THE OIL CUP**. Change initial fill after 100 hours operation. Thereafter, change the oil in every 1000 hours. Additional lubrication may be required with increased hours of operation and temperature.

3. Recommend to run the pump in the water temp around 5°C to 40°C

4. **MOTOR SELECTION**：The motor or engine driving the pump must be of adequate horsepower to maintain full RPM when the pump is under load. According to required pump flow rate, maximum pressure at the pump and drive losses of approximately 3-5%, the user shall be able to select a suitable driving power source. Consult the manufacturer of gas or diesel engine for the performance curve of engine. The following equation will help you to decide the required horsepower.

   Required Max. Pressure* Max. LPM/380

   The factor of δ stand for mechanical efficiency, normally shown as 95%.

5. For hygienic purpose, please use filtered tap water and avoid the following liquid.

   a. Unfiltered water with unwanted particles.

   b. Water in storage for a long time.

   c. River/Sea water. Industry water

d. **LOCATION**：If the pump is used in extremely dirty or humid or high temp conditions, it is recommended pump to be equipped with a proper cover if the pump is working outdoor with exposure of sunlight. Do not store or operate in excessively high temperature areas without proper ventilation.

e. **DISCHARGE CONDITIONS**：OPEN ALL VALVES BEFORE STARTING SYSTEM to avoid overpressure condition. The overpressure condition may be caused by a deadhead and will severely damage the pump or system. Install a Pulsation Dampener device on the discharge head or in the discharge line as close to the head as possible. Be certain the pulsation dampener is properly pre-charged for the system pressure.

f. **BY-PASS CONDITIONS**：If a large portion of the pumped liquid goes through by-pass

(not through nozzles) when the high pressure pump is running, this by-passed liquid should be routed to an adequately sized, baffled tank. If routed to the pump inlet, the **by-passed liquid can quickly produce excessive heat and result in damage to the pump.** A temperature control device to shut the system down within the pump is suggested to be installed in the by-pass line to protect the pump.

g. PUMPED LIQUIDS：Some liquids may require a **flush between operations or before storing.** For pumping liquids other than water, contact **SABIO** or your supplier.

h. OTHER CONDITIONS NEEDED TO PAY ATTENTION：

- Make sure that the inlet and outlet ports have been connected firmly and the supply of liquid that has to be pumped is sufficient. **Insufficiency of liquid supply may damage the pump seriously**.
- **DO NOT RUN PUMP DRY**. All running components of a dry run pump will be severely damaged.
- A reliable 150(kg/cm^2) Pressure Gauge should be installed near the discharge outlet of the high pressure manifold. This is extremely important for adjusting pressure regulator and also for proper sizing of the nozzle or restricting orifice.
- All systems require a primary pressure regulator or unloader. The primary pressure device must be installed on the discharge side of the pump. The function of the primary pressure regulator is to protect the pump from over pressurization, which can be caused by a plugged or closed off discharge line. Over pressurization can severely damage the pump, system components and injury users' body.
- A safety valve is strongly suggested to be installed in-line between the primary regulator and pump or on the opposite side of the manifold if the operating pressure is more than 1,400 psi. This will ensure pressure relief of the system if the primary regulator fails.

D. SAFETY INSTRUCTIONS

⚠ DANGER

- Never approach the moving parts of the pump, even if adequately protected. **The approach of the moving parts while the pump is operating may cause a serious harm on body.**
- Do not carry out the maintenance on the pump if it is running.
- Be sure the pump system is on a stable, flat location. Set the whole system with good ventilation and keep at least 1 meter away from other equipment.
- Untrained people or unauthorized workers are not allowed to run the high pressure pump system.
- Ignoring the potential hazard of a high pressure pump can cause serious injury.

⚠ WARNING

- Before carry out maintenance, shut off drive (electric motor, gas or diesel engine) and turn off water supply to pump. Relieve all discharge line pressure by triggering gun or opening valve in discharge line.
- All parts of the pump are designed for high pressure purpose. If any part gets damaged, please replace it with the parts from original manufacturer. **DO NOT** modify the pump without being authorized by the manufacturer.
- High pressure hoses, pipes, connectors, joins, nozzles all have much to do with the safety operation of the high pressure pump system. Please contact to SABIO or your supplier for more information.

⚠ CAUTION

- Check the oil level and oil quality before running the pump. Inadequate oil will damage those running parts inside the crankcase.
- Make sure that the inlet and outlet ports have been connected firmly and the supply of liquid that has to be pumped is sufficient. **Insufficiency of liquid supply may damage the pump seriously**.
- Do not run the pump under freezing point (for water is below 0ºC). Running pump with frozen liquid in the hose or pump will cause damage to the pump. Run the pump dry approximately 10 seconds to drain the water before storing under freezing temperature.
- Make sure that the inlet and outlet ports have been connected firmly and the supply of liquid that has to be pumped is sufficient. **Insufficiency of liquid supply may damage the pump seriously**.

- Always make sure that the outlet line is smooth and unhindered while the pump is running. A blocked line will trigger an overpressure condition and severe damage to the pump or system.
- Do not exceed the max operating pressure, RPM and volume indicated by pumps' manual. **Over operating pressure may break the pump and hurt operators.**
- The rated maximum pressure is the pressure which would be read at the discharge manifold of the pump, **NOT AT THE GUN OR NOZZLE**.
- The line connect to the inlet and outlet port of the pump must be a flexible hose instead of a rigid pipe, and reinforced on suction systems to avoid fail of water supply.

E. TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
Low Pressure	■ Worn nozzle ■ Air leak in inlet plumbing ■ Pressure gauge inoperative or no registering accurately ■ Unloader stuck partially plugged or improperly adjusted ■ Worn seat or valves ■ Inlet filter clogged or improperly sized ■ Worn seals. Abrasives in pumped fluid. ■ Severe cavitation, inadequate water supply, stressful inlet conditions ■ Fouled or dirty inlet or discharge valves ■ Leaky discharge hose	■ Replace nozzle of proper size. ■ Use PTFE liquid or tape on all connections. ■ Check pressure with new gauge and replace as needed ■ Clean and reset relief valve to system pressure and correct by-pass. Service valve on seal replacement schedule. ■ Replace the valve kit. Use covered reservoir. Do not pump abrasive fluids ■ Initiate a more frequent service cycle. Check supply tank for contamination ■ Replace the Seal Kit. Install and maintain proper filter. ■ Check line size, use reinforced flexible hose at pump inlet and eliminate elbows. ■ Increase line size. Clean filter. Check water temperature. ■ Clean inlet and discharge valves and replace with kit as needed ■ Replace hose. Check connections.
Pulsation, pump runs extremely rough, pressure low	■ Restricted inlet or air entering inlet plumbing ■ Stuck inlet or discharge valve ■ Worn High-Pressure Seals ■ Particles in the inlet or discharge valve ■ Worn or pitted inlet and/or discharge valves	■ Clean filters as needed. Check fittings and use PTFE liquid or tape for airtight connection. Check line size and flow to pump. ■ Clean or replace Valve Kit. Check supply tank for contamination. ■ Replace with Seal Kit. Initiate more frequent service cycle ■ Check for smooth surfaces on inlet and discharge valve seats. Replace with kit. ■ Check supply tank for contamination. ■ Install and regularly clean filter. ■ Do not pump abrasive fluids.
Water in crankcase	■ Humid air condensing into water inside of the crankcase ■ Continued operation with worn seals and packings ■ Crankcase oil seals leaking or seals installed backward	■ Change oil every 3 months or 500 hour intervals. ■ Initiate more frequent service cycle. Change oil. ■ Replace seals. Follow proper installation procedure.

PROBLEM	PROBABLE CAUSE	SOLUTION
The pump fails to water suction	■ The valves worn out and stop working. ■ The water filter is blocked ■ The seals worn out	■ Clean the nozzle. If it still does not work, then change the nozzle ■ Tighten all joins connecting to the water inlet. ■ Clean the filter and make sure the tunnel inside pump is not blocked ■ Clean or change the valves.
Nozzles cannot produce the mist.	■ The nozzles are blocked ■ Air exist the pipe line ■ Air get into the pump ■ Nozzles worn out	■ Install Thermo Valve. ■ Replace seals with kit. ■ Install inlet filter. ■ Replace plungers. Review fluid specifications. ■ Install pressure reducing valve. ■ Check inlet fluid supply line for adequate size. Clean filters.
Oil or water leaks	■ Worn water /oil seals	■ Small water leakage is normal as it is for drain the extra water out. ■ Replace the damaged oil seals
Motor stop running	■ The power supply is not stable ■ The cable extension is too long to make a stable power supply	■ Using adequate length of power cable and stable power supply ■ Run the pump in a ventilation space ■ Check the pressure is within regular range
Loud knocking noise from pump	■ Worn bearing, connecting rod or crankshaft ■ Stressful inlet conditions	■ Consult SABIO or your supplier for crankcase servicing. ■ Increase line size, use flexible hose to pump inlet, install properly sized baffled supply tank.

F. PERRODIC INSPECTION & MAINTENANCE

1. Periodic Inspection Checking List

Check	Daily	Weekly	Every 500HR	Every 1200HR	Every 3000 HR	Every 10000HR
Oil level/quality		■				
Oil leaks		■				
Water leaks		■				
Initial oil change			■			
Oil change			■			
Seals/O-rings change					■	
Valves change					■	
Plunger/eccentric shaft						■
Clean filter	■					

- If system performance decreases, check immediately. If no wear after 1500 HRs operating, check again at every 500 HRs until wear is observed
- Check unloader and oil at each seal service.
- After maintenance is completed, turn on water supply to pump, start drive, reset pressure regulating device and secondary valve. Check for any leaks, vibration or pressure fluctuations and resume operation.
- The manufacturer offer a maintenance kit for all kind of seals. Contact with the supplier if necessary.

WARRANTY

The GF-03 quadruple plunger high pressure pumps are warranted for two full years from date of shipment to the purchaser to be free from any defect in materials and workmanship. This warranty does not cover damages from abuse, failure to properly install, operate or maintain the product in accordance with the printed materials provided.

Listed below is void of the warranty：

- Any modifications or intervention which are not authorized by the manufacturer.
- Use contrary to specific normative in force.
- Use of pump different from those indicated in this manual and/or lack of regular maintenance.
- Result from the malfunction or improper use of customer due to force majeure caused by the incident.
- Any parts or labor to repair or adjust any system that the customer has installed themselves or by a third party other than an authorized installer.
- Use of non-original or not specified parts for the pump.
- The damages caused by natural disasters, faulty usages or consumable purposes.
- Seal, bearing, valve, connecting rod kits for pumps.
- Pump crankcase oil or other lubricants.
- Manufacturer shall not be liable for any further loss, damages or expenses, including incidental or consequential damages, directly or indirectly arising from the sale or use of this product.
- This warranty does not cover repair or replacement of any item that should be replaced or maintained under normal operating and maintenance practices within the stated warranty period of one year.

All products subject to the warranty shall be returned SABIO via local distributor.

SABIO

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