ALTAMIRA

INSTALLATION MANUAL

FLUX SERIES

HORIZONTAL CENTRIFUGAL MOTOR PUMPS IN STAINLESS STEEL, DESIGNED FOR LARGE FLOW APPLICATIONS.

V1.0
03/06/2023

Abstract

INSTALLATION MANUAL

Thank you for choosing our ALTAMIRA FLUX series horizontal centrifugal motor pumps.

This instruction manual will guide you through the proper installation and operation of this product. We strongly recommend following all included instructions carefully. Keep this manual in a safe place for future reference.

Table of Contents

1. INTRODUCTION

Thank you for your trust and preference in our products. The ALTAMIRA FLUX series horizontal centrifugal motor pumps are manufactured to the highest quality standards, ensuring exceptional performance and durability. This manual provides essential guidelines for proper installation, operation, and maintenance to maximize the lifespan of your equipment. Please pay close attention to the safety instructions and warning labels included herein. Keep this manual in a safe place for future reference.

2. SAFETY WARNINGS

The following symbols indicate imminent danger if the instructions and recommendations provided in this manual are not followed.

CAUTION

- FLUX motor pumps are designed for use with clean, non-aggressive, non-explosive liquids free of solid particles, with a maximum operating temperature of 70°C (158°F). The high-quality materials used in their construction ensure reliable operation and optimal performance. Proper installation is crucial for maximizing the equipment's lifespan. It is essential to follow the installation instructions precisely, including correct wiring procedures. Failure to do so may result in overvoltage conditions that can cause severe motor damage, which would void the warranty.
- Before beginning the installation, carefully read the instructions in this manual. Installation and operation must also comply with all applicable local regulations and codes.
- This equipment is not intended for use by individuals with reduced physical, sensory, or mental capabilities, or those lacking experience or knowledge, unless they are under supervision or have been properly trained by a person responsible for their safety.
- Children must be supervised to prevent them from using the equipment as a toy.
- If the power cord is damaged, it must be replaced by the manufacturer or a qualified service agent.

WARNING

- To ensure proper protection and startup of three-phase motor pumps, it is recommended to use an appropriate device (magnetic starter, solid-state starter, or variable speed drive) that includes, at a minimum, the following protections: phase loss, current imbalance, and voltage imbalance.
- Motor pumps must be properly grounded, comply with all electrical regulations, and be operated by qualified electrical engineers.

DANGER

- Before removing the terminal box cover or disassembling the pump, ensure that the power supply has been completely turned off.

3. FEATURES

FLUX series horizontal single-stage centrifugal stainless steel motor pump: features an axial inlet and radial outlet. The motor and pump design allow for easy disassembly of the motor and impeller, if necessary, without the need to disassemble the entire unit.

Main construction materials in 304 stainless steel

- The standard mechanical seal consists of carbon/ceramic/NBR materials. This seal is not suitable for liquids containing solid particles.
- The FLUX series motor pump is equipped with a long-shaft electric motor. It features a fully enclosed, fan-cooled (TEFC) design.
- The FLUX series motor pump utilizes advanced manufacturing techniques, including cold-pressed, hydroformed stainless steel and high-precision welding. This series of centrifugal motor pumps can replace traditional corrosion-resistant pumps, offering the following features:
  - Compact design, achieved through the innovative hydroforming manufacturing technique.
  - Efficient hydraulic design.
  - Main components constructed from stainless steel, including the pump body, pump cover, and impeller, ensuring durability and corrosion resistance.
  - Optimized motor design with a square shape, enhancing both aesthetics and functionality.
  - Safe and reliable mechanical shaft seal.
  - Standard DIN-type counterflange connection design for easy and secure installation.

3.1. OPERATING SPECIFICATIONS

- Maximum operating pressure: 1.0 MPa/10 bar/145 psi.
- Liquid temperature range: 5°C to 70°C (41°F to 158°F).
- Maximum ambient temperature: 50°C (122°F).
- Maximum inlet pressure: Based on the NPSH of the operating curve, not exceeding 0.5 m (1.64 ft).
- Maximum inlet pressure: Limited to maximum operating pressure
- pH range: 6-8
- Recommended density: 1 g/cm³ (1000 kg/m³).

3.2. APPLICATIONS

The FLUX series is highly versatile, offering a wide range of applications, including:

- Water Supply: Water transportation in hydraulic systems, municipal water pumping, and related applications.
- Industrial Systems: Process water systems, cleaning systems, winemaking, and food industry applications.
- Industrial Liquid Transfer: Boiler feed, cooling systems, and condensation systems.
- Water Treatment: Inlet pump for reverse osmosis systems, water transfer systems, and related applications.
- Agricultural Applications: Farmland irrigation, aquaculture, and related uses.

3.3. PUMP SELECTION

1. **Pump specifications:**
   Required flow and pressure within the allowable operating range.
   Pressure losses due to elevation differences, long distances, fittings, and other factors must be considered.
   The optimal efficiency point should align with the estimated operating point.
2. **Pump efficiency:**
   Efforts should always be made to ensure operation at the point of maximum efficiency.
3. **Pump material:**
   Consider that the construction material is 304 stainless steel.
4. **Minimum Inlet Pressure-NPSH**
   It is recommended to calculate the inlet pressure “H” when:
   - The temperature of the liquid is high.
   - The flow rate exceeds the nominal flow by a significant margin.
   - The water is pumped from a tank with negative suction.
   - The water is drawn through long pipes.

To prevent cavitation, ensure that the inlet conditions are adequate by maintaining a minimum pressure on the suction side of the pump.

The maximum suction lift "H" in meters of head can be calculated using the following formula:

H = Pb* 10.2-nPSH-HF-HV-HS

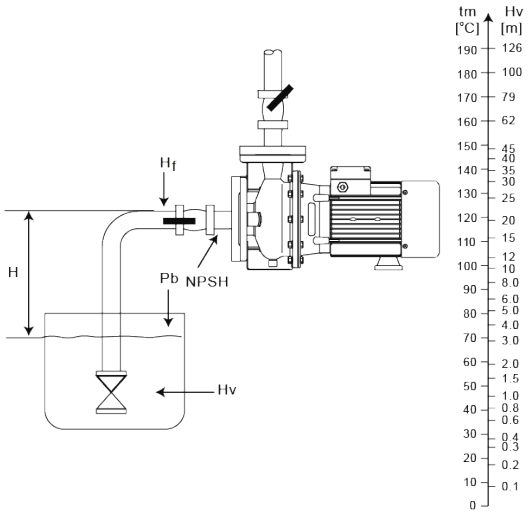
Pb = Barometric pressure in bars. (The barometric pressure can be set to 1 bar). In a closed system, Pb represents the system pressure in bars.

NPSH = Net positive charge in suction in meters of load. (To read from the NPSH curve at the highest flow that the motor pump can deliver)

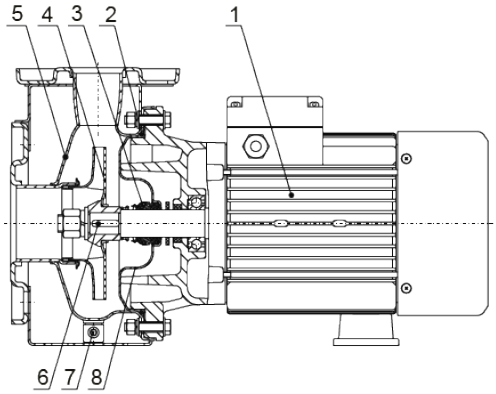
Hf = Loss of load friction during suction in meters of height. (at the highest flow that the motor pump can deliver

Hv = Steam pressure (unit: m) (to read from the steam pressure scale)

Hs = Safety margin = minimum height of 0.5 meters



3.4. MAIN PARTS



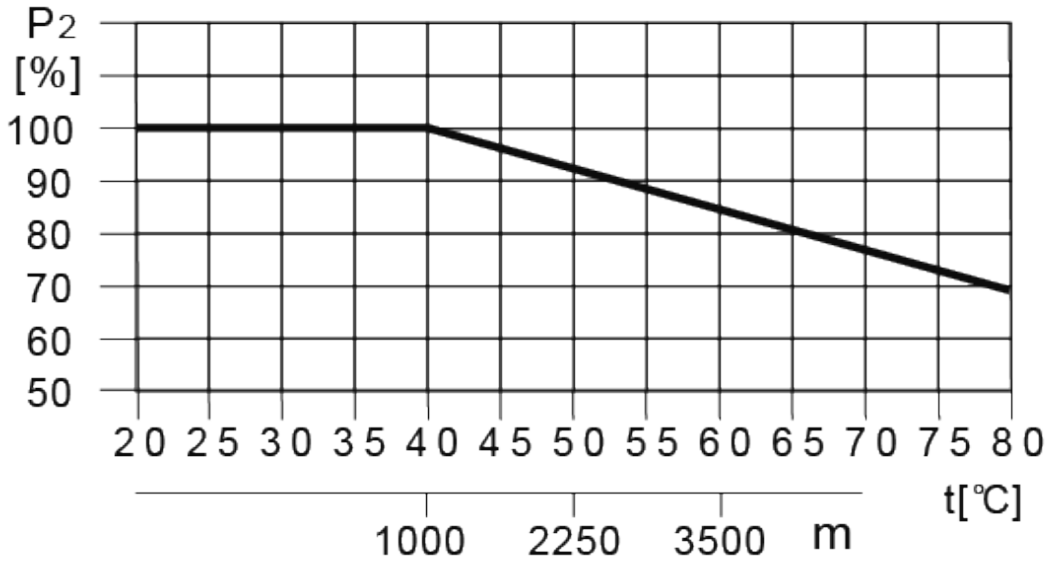
No.	Description	Material
1	Motor	
2	O-Ring	NBR
3	Mechanical Seal	Carbon / Ceramic / NBR
4	Impeller	304 STAINLESS STEEL
5	Pump body	304 STAINLESS STEEL
6	Wedge	304 STAINLESS STEEL
7	Drain plug	304 STAINLESS STEEL
8	Pump cover	304 STAINLESS STEEL

3.5. CURVE SELECTION

1. The tolerance of the curve according to ISO 9906 should be considered. It is recommended to operate within the thick lines on the curve's range, as exceeding this range may lead to the risk of overload.
2. All curves are based on the engine speed of 3450 RPM.
3. The measurements were performed with water free of air and solid particles, at a temperature of 20°C.
4. To prevent overheating, motor pumps must not operate beyond their performance curves or in dotted-line zones.
5. When pumping liquids with a viscosity or density greater than that of water, a higher-powered motor must be used to accommodate the increased resistance.
6. The NPSH curve displays average values under conditions matching the performance curve. During pump selection, ensure a minimum of 3.3 feet (1 meter) with an additional 1.6 feet (0.5 meters) safety margin.

3.6. AMBIENT TEMPERATURE

Maximum ambient temperature: 104°F (40°C). If temperatures exceed this value or the engine is installed above 3,280 ft (1,000 m) elevation, select a higher-performance engine due to reduced air cooling efficiency. Refer to the following graph for clarification.



From the previous figure, if the motor pump is installed at an altitude of 11,483 feet (3500 meters), P2 will decrease to 88%. However, if the ambient temperature rises to 158°F (70°C), P2 will decrease to 78%.

4. INSTALLATION

1. When the installation pipeline is in operation, you must ensure that the pump casing is not stressing the pipe.
2. The motor should never be at the bottom of the pump.
3. The pump must be mounted horizontally on a flat, solid base that allows for an axial inlet and a radial outlet.
4. For inspection, maintenance, and proper ventilation, there must be at least 12 inches (0.3 meters) of space behind the motor.
5. The inlet diameter of the pump must not be smaller than the specified size.
6. The pump must be installed in well-ventilated areas where operating specifications are met.
7. If the pump is installed outdoors, adequate protection must be provided to ensure the integrity of the motor pump and its components.
8. It must be ensured that the electrical connections provide at least the following protections for the motor pump: phase loss, electrical shock, unstable voltage, overload, and dry running.
9. For better operating efficiency and to minimize noise, you should consider implementing measures to reduce vibration.

4.1. PROPER INSTALLATION

A= Eccentric adapter.

B= Positive suction.

C = Good submergence greater than 6.56 feet (2 meters).

D= Long curves and radii.

E = The pipe diameters must be greater than or equal to the suction and discharge diameter of the pump.

F = Good suction. It depends on the pump and proper installation (*).

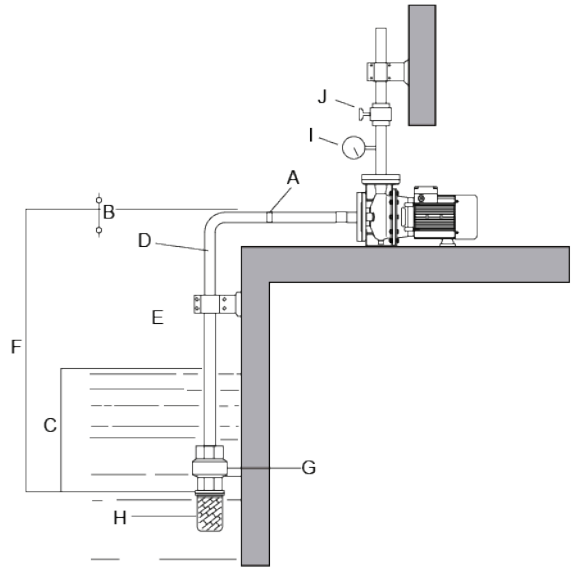
G = There should be no pressure in the suction pipe when the motor pump is operating.

H= Foot-check valve.

I= Pressure gauge.

J= Control valve.

(*) The suction height is determined by factors such as liquid temperature, altitude, flow resistance, and the NPSH required by the motor pump.



NOTE

As a general rule, when the suction pipe is longer than 32.8 feet (10 meters) or the suction height exceeds 13.12 feet (4 meters), the diameter of the suction pipe must be larger than the suction diameter of the motor pump.

4.1.1. SUCTION PIPE

The diameter of the suction pipe must be at least equal to the suction diameter of the motor pump, but it is even more advisable to install a pipe with a slightly larger diameter. For example, if the pump has a suction diameter of 1 inch, it is recommended to install a 1.25-inch suction pipe.

IMPORTANT

- When increasing the diameter of the pipe to the next larger size, you must install a section with a length equal to 5 times the diameter of the pipe being installed. This is to avoid turbulence and achieve a more proper flow towards the suction of the pump.
- It is important that in pump installations with negative suction (where the pump is positioned above the water level, such as in a tank), the suction pipe must be installed with a continuous upward slope. This means leaving a slight incline in the pipe path until it reaches the pump's suction. This helps expel any air bubbles that may be present and prevents air accumulations (air pockets) that could interrupt the continuous flow, thus minimizing the risk of cavitation and/or dry running.
- Ensure that all joints (couplings, nipples, union nuts, pipes, hoses, etc.) are properly tightened and sealed, free from potential leaks or air inlets. Loose joints or any pores or cracks on the suction side can significantly affect the motor pump's performance, preventing it from meeting the expected flow and pressure.
- The length and path of the suction pipe should be as short and straight as possible, with as few fittings (elbows) as necessary. The fewer changes in direction the suction pipe has and the closer it is to the water level, the more the friction losses are minimized.

4.1.2. DISCHARGE PIPE

The diameter of the discharge pipe must be at least equal to the discharge diameter of the motor pump. During installation, it is essential to avoid traps or obstructions in the hydraulic system, as they not only affect the system's efficiency but also prevent the complete emptying of the pipe and the proper operation of the pump.

4.2. ELECTRICAL CONNECTIONS

Check that the voltage supplied matches the specifications on the motor nameplate, and refer to the wiring diagram inside the junction box when making the electrical connection.

Ensure the power cable gauge is sufficient to maintain a stable power supply.

Using an undersized cable will cause overheating and premature engine failure. For proper sizing, consult a certified electrician.

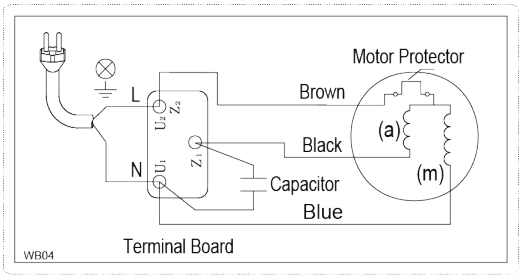
For proper protection against electric shock hazards, the installation must be performed by qualified personnel. We recommend the following:

- The electrical protection of the system shall be provided by a thermomagnetic switch with instantaneous tripping for ground leakage currents, featuring a trip sensitivity of 30 mA maximum. This threshold must not be exceeded under any operational conditions.
- The power cable must meet electrical standards.
- The cable's grounding connection must be properly installed and fully compliant with applicable electrical codes to ensure reliable operation.
- The starter cables must possess proper wire gauge and remain undamaged (per specifications on the installation diagram's label).

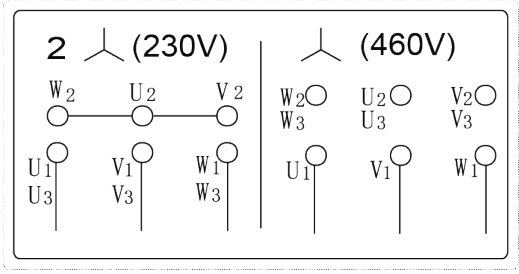
DANGER

- Electric shock hazard. Ground all electrical circuit components of the installation and protect using a fault current protection device. Qualified personnel must verify proper operation of the fault protection system.
- To reduce the risk of electric shock, immediately replace any damaged connector cable and never use extension cords to reach the power supply.

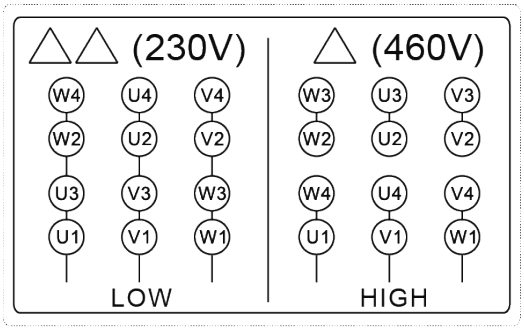
Connection diagram of single-phase models



Three-phase connection diagram for models under 10 HP.



Three-phase connection diagram for models rated 10 HP and above.



5. RECOMMENDATIONS BEFORE STARTING UP THE EQUIPMENT

- Verify free rotation of the motor pump shaft before operation.
- Verify the supply voltage and frequency match the specifications on the motor pump's nameplate.
- Confirm the motor rotation direction aligns with the arrow indicator on the equipment's fan cover.
- If the engine fails to start, refer to the troubleshooting guide located at the end of the manual to identify the issue.

NOTE
The motor pump should never operate dry.

6. START-UP

Before the equipment is connected for the first time or reconnected after a period of inactivity, it must be primed. Follow the steps outlined below:

1. Unscrew the drain plug and fill the system with clean water until it reaches the level of the suction pipe.
2. Reinstall the drain plug, ensuring it is securely tightened to prevent water leakage. The presence of air bubbles entering through the traps indicates improper adjustment.
3. The equipment should not be operated with the drain plug loose. Operating under these conditions may cause the pump motor to cavitate, potentially leading to permanent damage.

If shutoff valves are used, ensure that the entire installation is fully open at startup, as the pump should never operate with the valves closed.

Before starting the pump motor, ensure that the suction and discharge connections are properly secured and free of leaks.

Ensure that there are no obstructions in the pipes.

When starting the pump motor, verify that the pipes are free of leaks and that priming has been completed correctly to achieve the desired flow rate.

7. MAINTENANCE AND CLEANING

To extend the lifespan of the FLUX series motor pumps, scheduled preventive maintenance is required. Periodically cleaning the heat sinks is recommended to maintain their efficiency.

Be sure to follow the following steps when servicing your equipment:

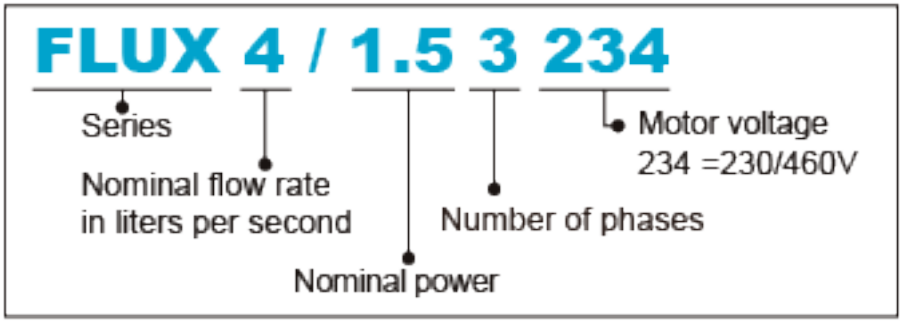
1. Switch off the motor pump and disconnect the power supply.
2. Verify that the insulation readings of the winch are within the allowed limits.
3. Check the resistance (ohm) between the lines.
4. Physically inspect the external and internal components of both the motor and the pump. If any component shows signs of wear or potential failure, replace it immediately.
5. Close all valves in the system.
6. If preventive and corrective maintenance has been completed, restore the hydraulic system components to their original position.
7. Open all the valves used.
8. Turn on the equipment

If there is an issue with the equipment, it should be inspected by qualified personnel.

If the thermal protector is activated, the electrical connections must be inspected by qualified personnel.

If the pump motor will be inactive for an extended period, it is recommended to disassemble, clean, and store it in a dry, well-ventilated area.

DESCRIPTION OF THE CODE



8. POSSIBLE ANOMALIES, CAUSES AND SOLUTIONS

POSSIBLE ANOMALIES	CAUSES	SOLUTIONS
When the engine is started it does not work.	• Power failure. • The main switch is damaged. • Overload protection is turned on. • The main switch has been protected. • The motor connection is not properly connected. • The control wiring is not well done. • The engine is damaged.	• Check the electricity supply. • Replace the main switch. • Reset overload protection. • Reset the main switch. • Check the motor connection. • Check the control circuit. • Replace the engine.
The motor overload protection is triggered immediately after the motor starts.	• Damaged automatic circuit breaker. • The motor overload relay terminals are damaged. • The wiring connection is damaged or faulty. • The motor winch is damaged. • The pump is blocked. • The configuration of the overload relay is incorrect.	• Replace the switch. • Replace the terminals. • Fix or replace the wiring connection. • Change the engine. • Check and unlock the pump. • Adjust the range of the relay correctly.
The relay overload is activated intermittently.	• The configuration of the overload relay is incorrect. • Low voltage during peak hours.	• Adjust the range of the relay correctly. • Check the electricity supply.
The starter has not been disconnected, yet the pump is not working.	• Failure in the supply. • The thermals are molten. • The thermomagnetic has exploded. • The contactor coil is faulty. • The control circuit is faulty.	• Connect the electricity supply. • Change the thermomagnetic switches. • Check the thermal protection. • Replace the starter contactor. • Replace the control circuit.
The pump capacity is not constant.	• The pump is cavitating. • Suction pipe blocked by dirt. • The pump is sucking in air.	• Check the suction conditions. • Clean the suction pipe and pump. • Check suction conditions.
The pump works but does not deliver water.	• Suction pipe blocked by dirt. • Pie check locked or closed. • Leak in the suction pipe. • Air in the suction pipe or pump. • The motor is spinning incorrectly.	• Clean the suction pipe and pump. • Repair or replace foot check valve. • Repair the suction pipe. • Check suction conditions. • Change the direction of rotation of the motor.
The pump rotates in reverse when turned off.	• Leak in the suction pipe. • The foot check valve is not working.	• Repair the suction pipe. • Replace the foot check valve.
Leak in the shaft seal.	• Faulty mechanical seal.	• Replace mechanical seal.
Noise.	• The pump is cavitating. • The pump does not rotate freely. • System load that is too low. • Damaged variable frequency drive.	• Check the suction conditions. • Adjust the pump shaft. • Choosing a suitable pump. • Check the operation of the drive.

9. USES AND PROHIBITIONS

USES

Agricultural applications, such as irrigation or aquaculture.

Agricultural applications such as irrigation

Operation in ambient conditions up to 40°C and liquids up to 70°C.

PROHIBITIONS

Do not operate dry. Operation without water permanently damages the equipment

Do not use with liquids at temperatures or pressures outside the specified range (max. 10 bar or 145 psi).

Do not connect if the equipment has damage to the electrical wiring or its components.

Do not operate without the valves being fully open.