



flowboost[®]

J.H Pump Manual

OPERATION AND MAINTENANCE MANUAL

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General

Information

These instructions are to assist in the installation of the flowboost J.H Pump please follow them carefully.

If, having read this Operation & Maintenance Manual, there is any doubt about any aspect of the installation please don't hesitate to contact our technical team.

Definitions of Safety Warnings and Precautions



WARNING!

Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.



CAUTION!

Indicates a potentially hazardous situation which, if not avoided. Can result in minor to moderate injury, or serious damage to the product.

Safety

Information

It is essential that correct and safe working practices are adhered to at all times when installing, operating and/or maintaining any piece of equipment. Always consult safety data sheets, operating and maintenance manuals, Health & Safety legislation and recommendations and specific requirements of any equipment manufacturer, site controller, building manager or any other persons or organisation relating to the procurement, installation, operation and/or maintenance of any piece of equipment associated or in conjunction with any product provided by **flowtech** Water Solutions.

This document is intended for ALL installers, operators, users and persons carrying out maintenance of this equipment and must be kept with the equipment, for the life of the equipment and made available to all persons at all times. Prior to carrying out any work associated with the set it is essential that the following sheets are read, fully understood and adhered to at all times.

Equipment must only be installed, operated, used, and/or maintained by a competent person. A competent person is someone who is technically competent and familiar with all safety practices and all of the hazards involved.

Any damage caused to any equipment by misapplication, mishandling or misuse could lead to risk of Electrocutation, Burns, Fire, Flooding, death or injury to people and/or damage to property dependent upon the circumstances involved. **flowtech** Water Solutions accepts no responsibility or liability for any damage, losses, injury, fatalities or consequences of any kind due to misapplication, mishandling or misuse of any equipment, or as a result of failure to comply with this manual.

Failure to install, operate, use or maintain the equipment in accordance with the information contained within this document could cause damage to the equipment and any other equipment subsequently connected to it, invalidating any warranties provided by **flowtech** Water Solutions to the buyer.

Safety Warnings &

Precautions

These instructions should be read and clearly understood before working on the system. Please read this manual carefully and all of the warning signs attached before installing or operating the equipment keep this manual handy for your reference. This equipment should be installed, adjusted and serviced by trained and qualified personnel. Failure to observe this precaution could result in bodily injury.



WARNING! - Install an emergency stop key separately from the isolator. Rotating shafts can be hazardous.



WARNING! - This equipment has a high leakage current and must be permanently fixed to earth.



WARNING! - Do not attach or remove wiring or connectors when the power is applied. Do not check signals during operation. When the power is turned on and the running command is on, the motor will start rotating. The stop key is only effective when the function is set. If there is a power failure and an operation instruction is given the unit may start automatically when the power is reinstated.



WARNING! - Make sure that the input voltage is correct. Be sure to install the unit in a room that is not exposed to direct sunlight and is well ventilated.

Avoid environments which have a high ambient temperature, high humidity or excessive condensation. Avoid dust. Corrosive gas, explosive gas, inflammable gas, grinding-fluid mist and salt damage, etc.



WARNING! - Do not connect the power source to any terminals except power connectors.



WARNING! - Motor control equipment and electronic controllers are connected to hazardous line voltages. When servicing drives and electronic controllers, you may be exposed to components at or above the line potential. Extreme care should be taken to protect against shock. Dangerous voltage may exist after the power light is off.

Wait more than 5 minutes after turning off the power supply before performing maintenance or inspection. Hazard of electric shock. Disconnect incoming power before working on this unit.



WARNING! - The inverter should be protected separately against ground fault.

Observe the regional regulations for electrical installation!



CAUTION! - It is strongly recommended that all electrical equipment conforms to National Electrical Codes and local regulations. Only qualified personnel should perform installation, alignment and maintenance. The manufacturer reserves the right to alter the technical data in order to make improvements or update information.



CAUTION! - Failure to observe these rules will render the guarantee invalid. The same applies to repair jobs and/or replacement. Your legal rights are not affected.



CAUTION! - The manufacturer declines all responsibility in the event of damage or injury caused as a result of tampering with the equipment.



CAUTION! - Do not switch on/off power supply to run/stop the motor/system! Start the unit only by using run button or external run command.

Customer / Contractor

RESPONSIBILITIES

It is the responsibility of the customer and/or the contractor:

- To ensure that anyone working on the equipment is wearing all necessary protective gear and/or clothing.
- Is aware of appropriate health & safety warnings.
- Has read the information in this section of the manual.

The sets were designed for civil, industrial, and agricultural use. The manual contains all the information required to safely interact with the set over the entire product lifespan (transport, installation, use, maintenance, dismantling).

Carefully read all the documents before starting up the set and follow the instructions provided for the correct operation and optimal efficiency of the product. For further information, or if there are questions concerning the correct interpretation of the instructions, contact Flowtech specifying the data identifying the set located on the DATA PLATE.

This manual is intended for:

personnel assigned by the manufacturer to install the set and perform maintenance, specialised and qualified personnel for transport, installation, first start-up and maintenance operations; personnel assigned to operating the set, personnel assigned to operating, cleaning, and performing ordinary maintenance; personnel assigned to set dismantling.

This manual must be kept in an area where it can be stored as well as easily consulted. The company reserves the right to change the supplied technical documentation, if necessary, without updating previously issued documentation.

WARRANTY AND TECHNICAL SUPPORT

Failure to observe the instructions provided in this instruction manual and/or any work on the product that was not performed by our service team invalidates the warranty and relieves the manufacturer from any liability in the case of accidents involving personnel or damage to property and/or the product itself.

Once the product is received, check that the outside of the packaging was not damaged and that there are no significant dents, otherwise immediately inform the person who made the delivery. Then, after removing the product from the packaging, check that it was not damaged during transport; if it was damaged, inform us within 8 days of delivery. Then check the product plate to make sure that the characteristics stated are those you requested.

The warranty shall be voided if: disassembly or repair operations were performed by operators not authorised.; faulty operation derives from the incorrect installation and/or electrical connection, tampering, improper use or use beyond the limits indicated in this manual; corrosive liquids, sandy water, chemically or physically aggressive liquids were pumped without prior verification and authorisation by Flowtech; if alleged defects were reported more than two months after discovery; the alleged defect depends on normal wear following use.

The following parts, which are normally subject to wear, are covered by a limited warranty: bearings, mechanical seal, seal rings, condensers, adjustable pressure switch. For the warranty covering the various components, refer also to the relative documents (electric pump, electric panel/control device/protection panel). For technical support operations on the set, refer to the MAINTENANCE chapter.

TECHNICAL CONSTRUCTION CHARACTERISTICS

Pressure booster sets are automatic systems for supplying water to 1 or more pumps in parallel, for connection to diaphragm pressure vessels, to tanks with an air cushion, or to a normal water main. They are used whenever it is necessary to increase pressure or it is necessary to keep a water main pressurised. Drawing water from the connected system, when the pumps are stopped, causes the pressure to decrease and the resulting start of the first pump (or pilot pump for the GPJ/GPEJ sets). If the pressure drop continues or restoring is not sufficient, the second pump will start, and so on if the set has a second, third and fourth pump (main pumps for the GPJ/GPEJ sets). The restoration of the pressure in the system causes the staggered stopping of the pumps. An electronic device activates the automatic rotation of the starting order of the electric pumps to ensure uniform distribution of the starting operations, and therefore of the working hours (in sets with more than one pump).

The standard pressure booster sets are sets that operate with variable speed pumps.

The control systems for the sets are divided based on if there is an inverter or not, i.e. a frequency variator that makes it possible to vary the pump speed, and on the type of inverter.

For details concerning the operation of each panel/device, see the dedicated supplementary manual.

Note: sets with a control device have a MASTER pump (the first pump to the left when viewing the set from the panel side), whose inverter controls the activation sequence of all pumps.

COMPONENTS

The pressure booster sets are shown in the diagrams in fig. A in the ATTACHED DIAGRAMS chapter.

The code identifying the models is described in the MODEL IDENTIFICATION CODE chapter.

INTENDED USE

The sets are intended for civil, industrial, and agricultural applications for:

- lifting or pumping water.
- cooling.
- heating.
- irrigation.
- washing systems.

The treated liquid must be:

- potable, clean water, rainwater or groundwater, or a mixture.
- free of solid or fiber bodies in suspension.
- free of aggressive chemical substances.
- at a temperature between 0 and 50°C

The installation environment must:

- be covered and protected against the adverse weather conditions and frost.
- have an ambient operating temperature between 0 and 40°C.
- be at a maximum altitude of 1000 m above sea level.
- have a max. relative humidity of 50% at +40°C.

NB: The sets are designed to operate with a positive head.

If you decide to operate the set with a negative head, remember that the suction height decreases as the altitude and temperature increase. These characteristics, in function of the NPSH of the set, must be kept in consideration when dimensioning a system in order to avoid cavitation or insufficient performance: The NPSH available for the system must be greater than the NPSH required by the set.

Given the set's inlet pressure and the maximum pump head, make sure not to exceed the maximum outlet pressure permitted for the relative pump.

UNINTENDED USE

Improper product use could cause hazardous conditions as well as personal injury and/or property damage.

Unintended product use can invalidate the warranty.

The sets cannot be used for:

- pumping dirty water.
- pumping water with solid particles in suspension.
- pumping corrosive liquids or liquids with acid substances.

- pumping liquids at a temperature above 50°C.
- pumping seawater.
- pumping inflammable/explosive liquids.
- installation outside without protection against atmospheric agents or frost.
- operating without liquid.
- operating in ATEX environments.

For special applications that are not included in the Intended use chapter, contact our technical office.

COMPONENT TECHNICAL DATA

For the technical data for the single components (electric pumps, control panels or control devices and protection panel) see the relative attached documents.

INFORMATION ABOUT AIRBORNE NOISE

The noise levels of the pressure booster set are obtained starting from the sound levels emitted by the single main electric pump, which can be found in its operating and maintenance manual, adding the values indicated in the following table (applicable for 50Hz):

By sound pressure level is meant the mean value of the measurements taken at a distance of 1 m from the set in a free field. For the noise value tolerance, refer to the manual of the single main electric pump, as it is the main source of noise.

Configured set	LpA dB(A)	LWA dB(A)
1-pump sets	2	13
2-pump sets	4	15
3-pump sets	6	17
4-pump sets	7	18

TESTING

100% of the pressure booster sets are subjected to routine hydraulic, mechanical, and electrical tests before being packaged. In particular, the operation of the set and each individual pump is checked, a seal test is performed with the delivery outlet closed and the rated head is checked.

HANDLING

(see the attached diagrams fig. B)

- Observe the current accident prevention regulations.
- Possible risk of crushing.
- Use safety footwear.

ATTENTION

Only use the procedures specified below and the lifting points provided for handling the package and the set after the packaging has been removed.

The pressure booster sets are sent packaged on wooden pallets and in a cardboard box for smaller sizes; in the case of larger sets, in addition to the pallet also a wooden crate is used and additionally covered with nylon film. In the case of obvious dimensional problems, the intake manifold can be supplied disassembled. Various packaging systems (by sea or other) will be used based on specific customer request.

The set must be handled with utmost caution during handling and transport. Particular attention must be paid when lifting and putting down the set: when the set is on a pallet, move it using a lifting carriage.

Pay attention to the weight indicated directly on the pallet.

Check the stability of the pallet on the lifting carriage before performing lifting or moving operations; after the pallet and packaging have been removed, only use the specific hooking points provided on the base for movement (note: to lift the set off the pallet, remove the fastening screws that anchor the set to the pallet itself).

For larger sets, there are 4 eyebolts on the base. For smaller sets, there are 4 holes on the base for lifting using pipes (not supplied with the set). It is recommended to use pipes with a section suitable for lifting and to pay attention when fastening the lifting belts to prevent the set from falling. For their movement, take the weight indicated on the pallet into account. Do not anchor on pumps, motors, manifolds, or other accessories. Make sure that the set is firmly fixed to the provided lifting points before performing the lifting and moving operations.

Blows, falls or swinging must be avoided, which could cause non apparent damage. Do not stand near the set while lifting, handling, or setting it down.

STORAGE

To maintain the full efficiency of the set:

store the product in a covered and dry location away from heat sources and protected against impacts, dirt, and vibrations; do not place heavy objects on the packaging; store the product at an ambient temperature between +5°C and +40°C with a relative humidity of 60%.

INSTALLATION

MECHANICAL FASTENING (see the attached diagrams fig. C)

The set must be positioned on a flat surface.

The set must be positioned in a protected area with reserved access where there is sufficient space for maintenance and removal. It is recommended to maintain at least three sides free, i.e. The side of the electric control panel or protection panel (minimum 100 cm of free space), the side opposite of the panel and the side with the connections to the delivery and intake lines (minimum 50 cm of free space).

If the set is provided with feet, the set must be placed on the ground.

The set arrives with the feet disassembled. The feet must be assembled with the set lifted off the ground. Therefore pay utmost attention during this operation to keep the set from falling.

Use safety footwear.

If the set does not have feet, it can be fixed to the ground by means of anchors using the provided holes.

CONNECTION TO THE HYDRAULIC SYSTEM

(see the attached diagrams fig. D)

The pipes must be sized to support the maximum operating pressure of the set.

If the set arrives with the intake manifold disassembled, make the connection using a pipe union. Connect the set's intake and delivery lines to the system. The unit is supplied with threaded flanges or flanged connections and with closing caps/flanges for the manifold side not used for the connection. The dimension of the connection pipes must be equal to or greater than the set's intake and delivery manifolds; they must be as short and straight as possible, and with a path that always ascends towards the pumps (intake), using as few elbows as possible, avoiding minimum number of elbows, avoiding goosenecks that could cause siphons or air pockets. Please note that in sets with 1 pump, the manifold is not present and the connection is made directly to the intake and delivery lines of the single pump.

All the threaded or flanged connections must be well sealed to prevent air infiltration.

Supports, anchors, unions, pipes and other system components must be independent of the set to prevent creating additional loads or stress. If there are support manifold to a structure in order to reduce the load on the pumps.

It is recommended to install an isolating valve immediately downstream of the set.

To avoid transmitting vibrations to the system pipes, it is recommended to install antivibration joints on the set's intake and delivery lines.

Always install a foot valve when installing above-head.

In order to test the set, install a union tee downstream of it with an isolating valve and the relative recirculation pipe connected to the intake tank or towards the discharge.

CONNECTION TO PRESSURE TANKS

(see the attached drawings fig. D)

It is possible to assemble diaphragm tanks with a capacity of up to 24 litres on the delivery manifold, depending on the number of pumps. It is recommended to only install tanks type approved according to Directive 2014/68/EU. They must only be installed on specific G1 pipe section. If using larger sized diaphragm pressure tanks (Precharge or supplied by a compressor), the connection must be made to the end of the delivery manifold not used for the connection to the system (for sets with more than 1 pump). For air cushion type pressure tanks, the automatic supply must be connected with the G ½ intake located on the pump intake line which is only present in sets with an EP electrical panel. In any case, refer to the tank's instruction manual.

PRIMING

(see the attached diagrams fig. E)

Set with positive head (priming tank with a level higher than the pump intake opening): open the set's intake isolating valves and close the delivery isolating valves remove the filling cap located on the top of the pumps (see the manual for the specific pump for additional information) and wait until water exits.

If there is no leakage (e.g. horizontal priming) from the stop valve, fill through the pump filling hole until it overflows, then reclose using the relative cap. Set with negative head. (priming tank with a level lower than the pump intake opening): open the set's intake isolating valves remove the filling cap from the pumps and fill until it overflows. Then reclose using the relative cap.

ELECTRICAL CONNECTION

The electrical connection must be performed by specialised and qualified personnel.

The set power supply must be supplied by means of a permanent connection to the system's electrical panel. The connection must include a switch, fuses and a thermal circuit-breaker adjusted to the current absorbed by the set. Make sure that the characteristics of the electrical panel are compatible with those of the set. Use connection cables with a section suitable for set absorption (refer to the attached electrical panel manual for technical absorption data).

Check that the mains to which the set is being connected has a functional earthing system according to the electrical regulations applicable in the country. Perform the earthing connection before performing any other work on the panel.

The sets can be equipped with electrical panels and single-phase or three-phase control devices with a thermoplastic or metal enclosure, depending on the size, the cable gland output, and the different degree of protection depending on the control device. The electrical components that protect the auxiliaries operate with very low voltage, are easy to replace and find commercially.

For connecting the set to the electrical mains, refer to the attached manuals and the instructions provided on the control panel or on the protection panel.

For the set's wiring diagram for connecting the electric pumps to the panel or the control device, refer to the ATTACHED DIAGRAMS chapter (fig. G).

For the characteristics and wiring diagram for the panel/control device, see the attached manual for the electrical panel or control device provided with the set.

For the electrical characteristics of the panel/control device, see the attached manual for the electric pumps.

If connecting pressure switches and transducers, see the information provided on the devices themselves.

For further information, or if there are questions concerning the correct connection, contact the closest authorised reseller or service centre, specifying the data identifying the set located on the DATA PLATE.

Note: for sets with a three-phase connection, after making the connection to the terminal board, immediately check the rotation direction of the motor cooling fan, which must be compatible with the instructions provided on the fan cover and in the pump manual. If the rotation is incorrect, completely disconnect the voltage from the panel and invert the connection of two of the three phases on the board, then check again. For sets with an inverter on the motor, use the keypad to invert the rotation direction.

STARTING THE SYSTEM

(see the attached diagrams fig. F):

For the first start-up of the set, follow the described procedure.

- make sure that the set is full of water; open the pump intake and delivery isolating valves.
- close the valve downstream of the system.
- provide voltage to the electrical panel or the protection panel.
- After checking that it starts, stop the pump manually; manually start the other pumps in the set one at a time (if present). For the procedure to follow, see the attached manual for the electrical panel. After checking that each single pump starts, stop each manually before proceeding with the next one.
- switch the sets operating mode to automatic for the procedure to follow, see the attached manual for the electrical panel.
- slowly open the isolating valve downstream of the system.
- the unit will activate automatically. Check the activation of the pumps, when starting and stopping, manoeuvring the downstream valve; if the pressure switches need adjusting, proceed as indicated in the MAINTENANCE AND REPAIR chapter.
- For versions with an inverter control device slowly open the isolating valve downstream of the system.

The set will activate automatically. Check the operation of the pumps, when starting and when stopping, manoeuvring the downstream valve.

NB: avoid prolonged operation with the isolating valve downstream of the system closed, to prevent damaging the pump (internal overheating).

MAINTENANCE

Maintenance and repair operations must be performed by qualified personnel. Failure to observe this rule voids the warranty and puts the health of workers and the efficiency of the set at serious risk.

Every maintenance and repair operation must be performed with the set disconnected from the electrical power supply.

Ordinary maintenance consists of simple control operations that can be performed by the operator who uses the set. The frequency of the checks is indicated in detail for each operation.

Check the state of wear of the set's electrical cables and the electrical connections. If breakage or deterioration is found in the cable's protective sheaths, in the case of insecure connections or any faults,

contact your closest service centre or distributor.

(EVERY 6 MONTHS).

Check that the set is operating efficiency by opening the valve downstream of the set itself to check that the pumps start, following the procedure described in the “starting the system” chapter.

If problems are found when starting the pumps, contact your closest service centre or distributor.

(MONTHLY).

Check that the hydraulic connections upstream and downstream of the pressure booster system do not leak while the system is operating. Check that the system isolating and stop valves are not clogged. If necessary, restore the line to its original state.

(EVERY 6 MONTHS).

Extraordinary maintenance, just like the repair operations, may only be performed by qualified personnel.

If faults are found during operation and ordinary maintenance (see what is described in the ordinary maintenance chapter) or if abnormal noises or vibrations are detected, stop the set and immediately contact Flowtech.

FAULT AND INTERVENTION TABLE

Fault	Probable causes	Interventions
The set does not start	Interruption of the electrical power	Contact your electric energy supplier
	Power supply cable not connected properly or interrupted	Correctly restore the connection
	Electrical connections between set components interrupted	Correctly restore the connections
	Problem related to the control panel/control device/protection panel	Check the fault and intervention in the attached control panel/control device/protection panel manual
Faulty operation of the unit with vibrations and noise	Friction between rotating parts and fixed parts	Check the impellers, shafts and seals
	Defective bearings	Replace the bearings
	The set operates outside the curve	Adjust the work conditions
Pumps continuously operating	Pressure switches not calibrated correctly (if present)	Recalibrate the pressure switches or replace them
System design pressure not reached	Isolating valves or stop valves partially closed or obstructed	Open or check the valves
	Excessive intake and/or delivery pressure loss	Reduce the pressure losses Check for clogging in the pipes
	Presence of air in the intake	Check the flanged or threaded connections and the gaskets for any liquid leaks or air infiltrations, install air bleed valves on the delivery line if necessary
	The three-phase pumps rotate in the inverse direction	Invert the two phases on the panel
	Pressure switches not calibrated correctly (if present)	Recalibrate the pressure switches or replace them
	Triggering of the minimum pressure switch (if present) due to a low level or lack of liquid in the intake manifold	Check the valves upstream of the intake manifold or check for leaks. Restore the liquid level
	Triggering of the float switches.	Check or restore the level in the tanks and correctly adjust the floats

CALIBRATING THE PRESSURE SWITCHES

The pressure switches are calibrated (at ambient temperature) according to the following standard table:

Pressure switch calibration table:

➔ With:

P0 = max pressure in bar of pump no. 1 (or pilot pump) with the opening closed

P1 - P8 = calibrating pressures in bar (see the following table)

AP = minimum differential in bar (see the following table)

NB: depending on the characteristics of certain types of pumps (with flat curve), the pressure switch for pump no.1 (or pilot) may be calibrated at a stopping pressure P1= P0 0.3 bar Any diaphragm tanks must be calibrated by the user at a pressure 0.3-0.5 bar lower than the starting pressure of the pressure switch of the last pump (minimum pressure).

Regulating range:

PRESSURE SWITCH TYPE	PUMP STOP PRESSURE [bar]	MINIMUM DIFFERENTIAL P [bar]	MAXIMUM DIFFERENTIAL P2 [bar]
PY06	1.5 - 4.5	0.8 - 1.2	-
PY12	4.5 - 10.3	1.2 - 2.1	-
XMP A06	1 - 6	0.8 - 1.2	0.8 - 4.2
XMP A12	1.3 - 12	1 - 1.7	1 - 8.4
XM A25	3.5 - 25	3.4 - 4.5	3.4 - 20
FSG 2NE-9NE	1.4 - 4.6	1 - 1.2	1.2 - 2.3
FYG 22NE	2.8 - 7	1.2 - 1.6	2.3 - 2.7

Note: check directly on the installed pressure switches for the identification code of the assembled model.

Adjustment procedure (see image fig. H):

Completely loosen the regulating nut or screw "B" of the pressure switch 1 of pump no. 1 (in this way you have the minimum differential) start pump no. 1 by means of the manual control (or the pilot pump when the set is provided with one); slowly close the isolating valve downstream of the set until obtaining the desired stop pressure (reading on the pressure gauge), adjust pressure switch no. 1 by rotating the nut or screw "A" until the contact clicks open, this operation will stop the pump; slowly open the isolating valve downstream of the set, which causes a loss of system pressure until the contact clicks shut for pressure switch no. 1(which is already set with minimum P), this operation will start the pump.

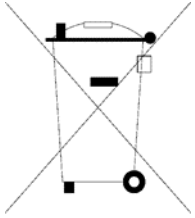
Check the adjustment by increasing and decreasing the pressure downstream of the system, always using the isolating valve; perform the same operations for the sets remaining pressure switches. To adjust the start and stop of the pumps, use the information provided above in the Pressure switch calibration table.

Pay particular attention to set the starting values for the pumps following the first one, with decreasing pressure values to prevent the simultaneous start of the pumps; discharge the downstream pressure, set automatic operation on the control panel, slowly open the isolating valve downstream of the set, check the sequential intervention calibration of the pumps at least twice to further check the inversion of the starting order of the pumps.

DISPOSAL

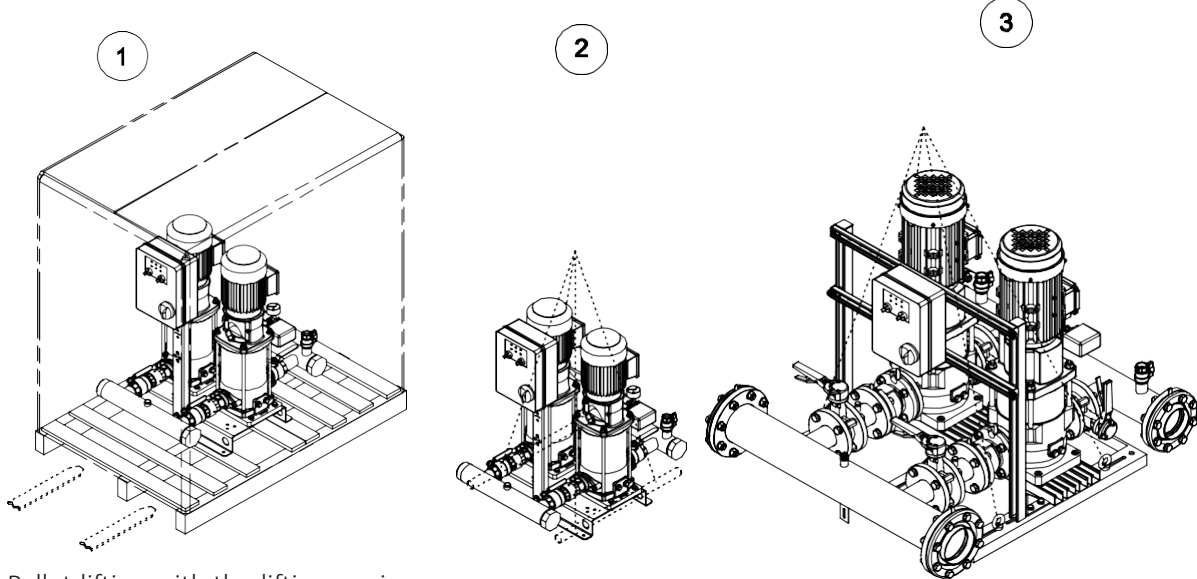
When discontinuing operation, the pressure booster set, or any of its components, must be disposed of in a separated manner according to what is set forth by the regulations in force in the country where the set is installed.

For components such as the pump inverter panels and pressure switches, see the specific component manuals.



This symbol on the product indicates that it cannot be disposed of together with domestic waste. This provision concerns only the disposal of equipment in the territory of the European Union (2012/19 EU).

B- LIFTING

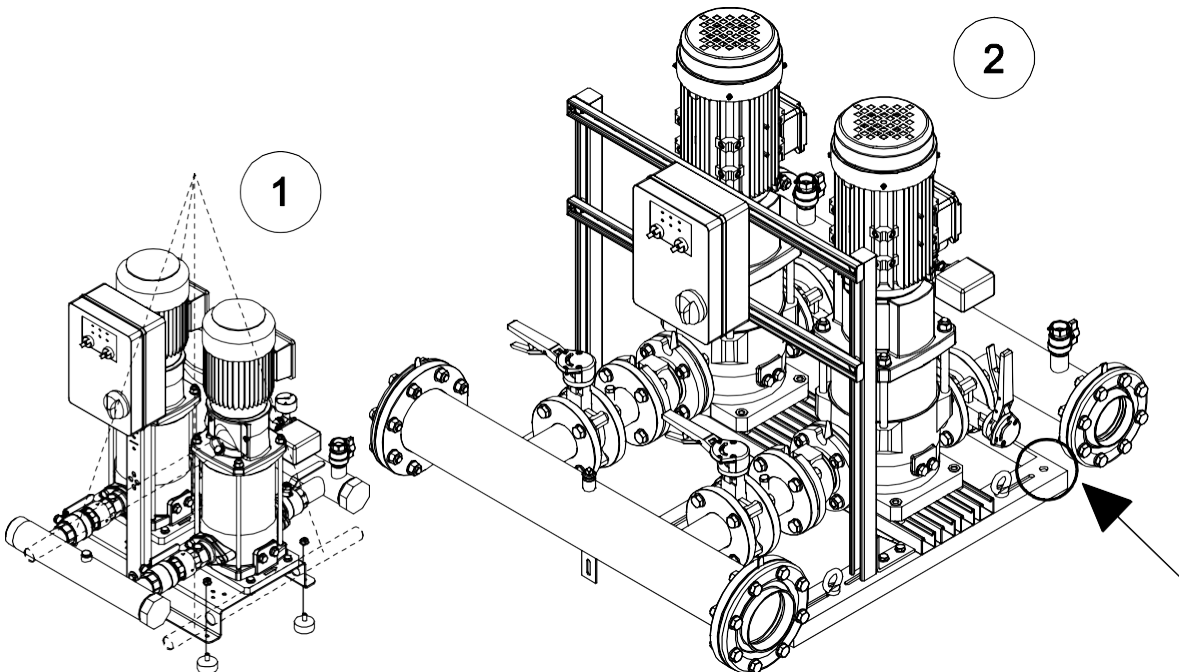


1-Pallet lifting with the lifting carriage

2-Lifting with pipes

3-Lifting with eyebolts

C MECHANICAL FASTENING

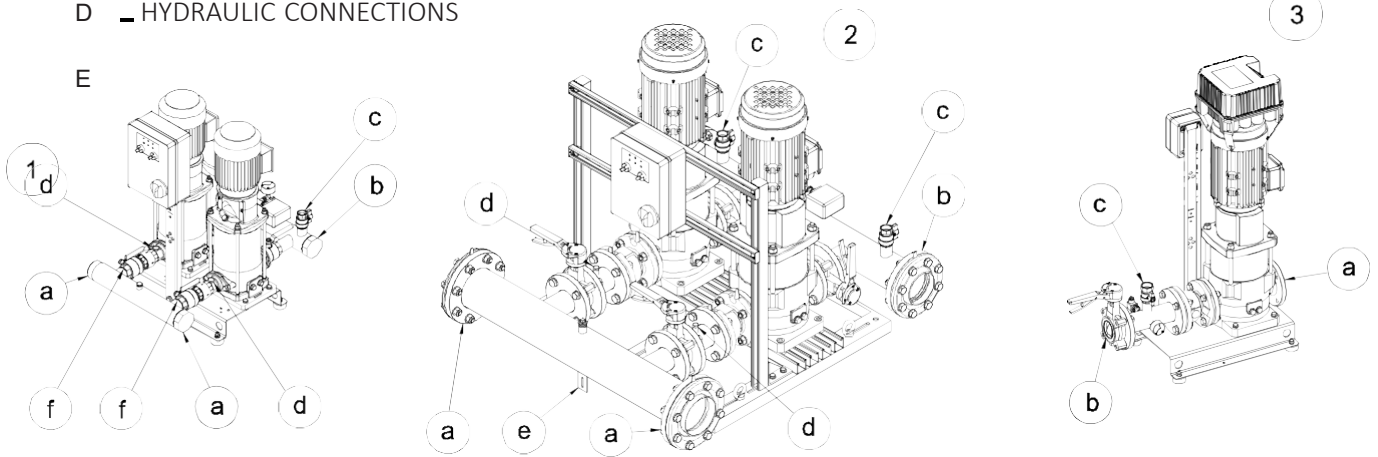


1-Fast fastening on the base

2-Fastening points for anchoring to the ground using anchors

D _ HYDRAULIC CONNECTIONS

E



1-Group with threaded connections

2-Group with flanged connections

3-Group with 1 pump

a-Intake line

b-Delivery line

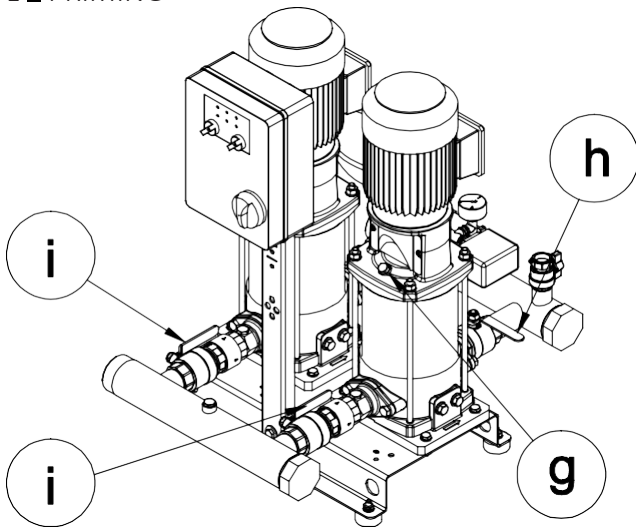
c-G1 pipe section

d-G1/2 intake

e-Manifold support bracket

f-Pipe union

E _ PRIMING

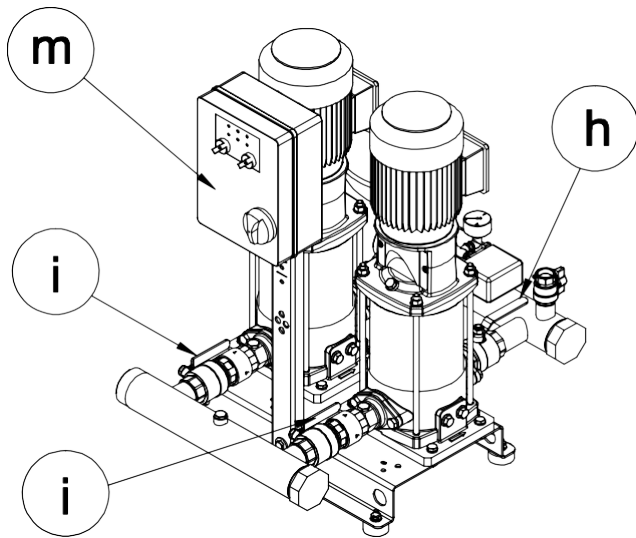


g-Filling cap

h-Delivery isolating valves

i- Intake isolating valves

F STARTING THE SYSTEM

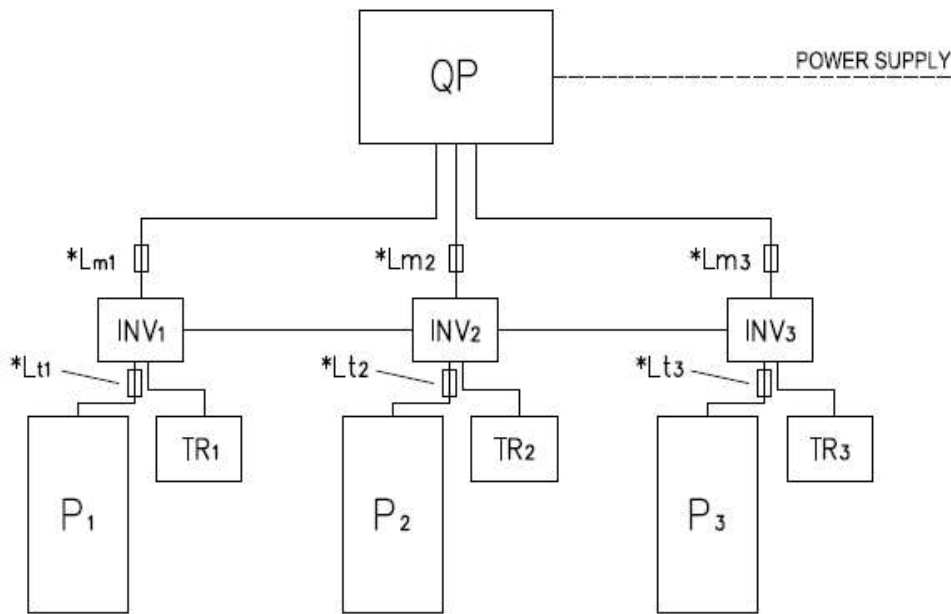


h-Delivery isolating valves

i-Intake isolating valves

m-Electrical panel or protection panel

MAIN DIAGRAM



QP = Protection panel

P1(2,3,4) = Electric pump 1(2,3,4)

TR1(2,3,4) =

Transducer 1(2,3,4)

INV1(2,3,4) = Inverter 1(2,3,4)

*Lm1(2.3) = Ferrite, only for MV models

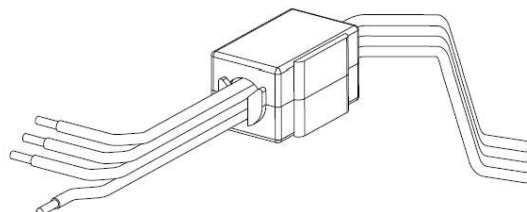
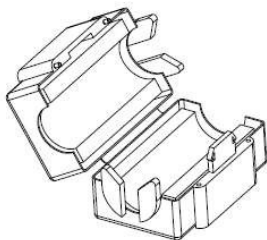
*Lt1(2.3) = Ferrite, only for TT models

Notes:

- for connecting the protection panel to the power supply line, see the attached panel manual.
- The connections with dash lines are the responsibility of the installer.

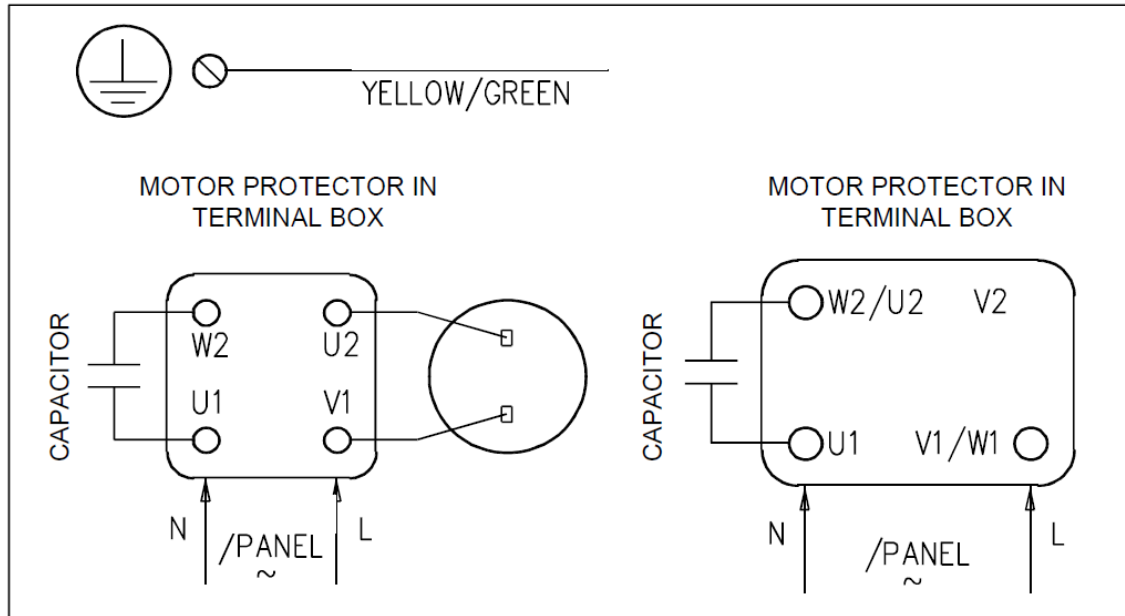
For single-phase models the ferrite is positioned close to the inverter, encasing the power cable, as shown in the inverter’s specific instruction manual.

For three-phase models , the ferrite is positioned encasing the 4 motor power connecting cables, therefore close to the “motor output” terminal block of the internal board.

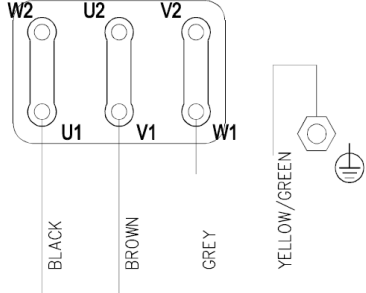
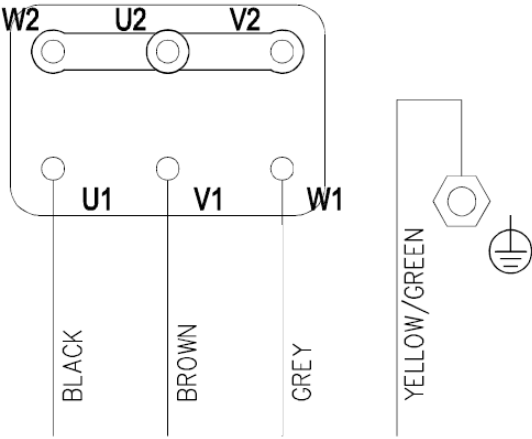


FERRITE APPLICATION TT

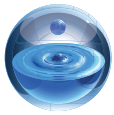
MOTOR CONNECTION DIAGRAMS
SINGLE-PHASE MOTOR CONNECTION



THREE-PHASE MOTOR CONNECTION WITH ON-BOARD PUMP INVERTER

<p>TRIANGLE CONNECTION</p> <p>With single-phase power supply < 2.2Kw</p> <p>three-phase power supply (from 5.5 to 45 kW*)</p>	 <p>INVERTER CONNECTION</p>
<p>STAR CONNECTION</p> <p>With three-phase power supply <4 KW</p>	 <p>INVERTER CONNECTION</p>

*Motor power indicated, check the type of control device in the device manual.



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