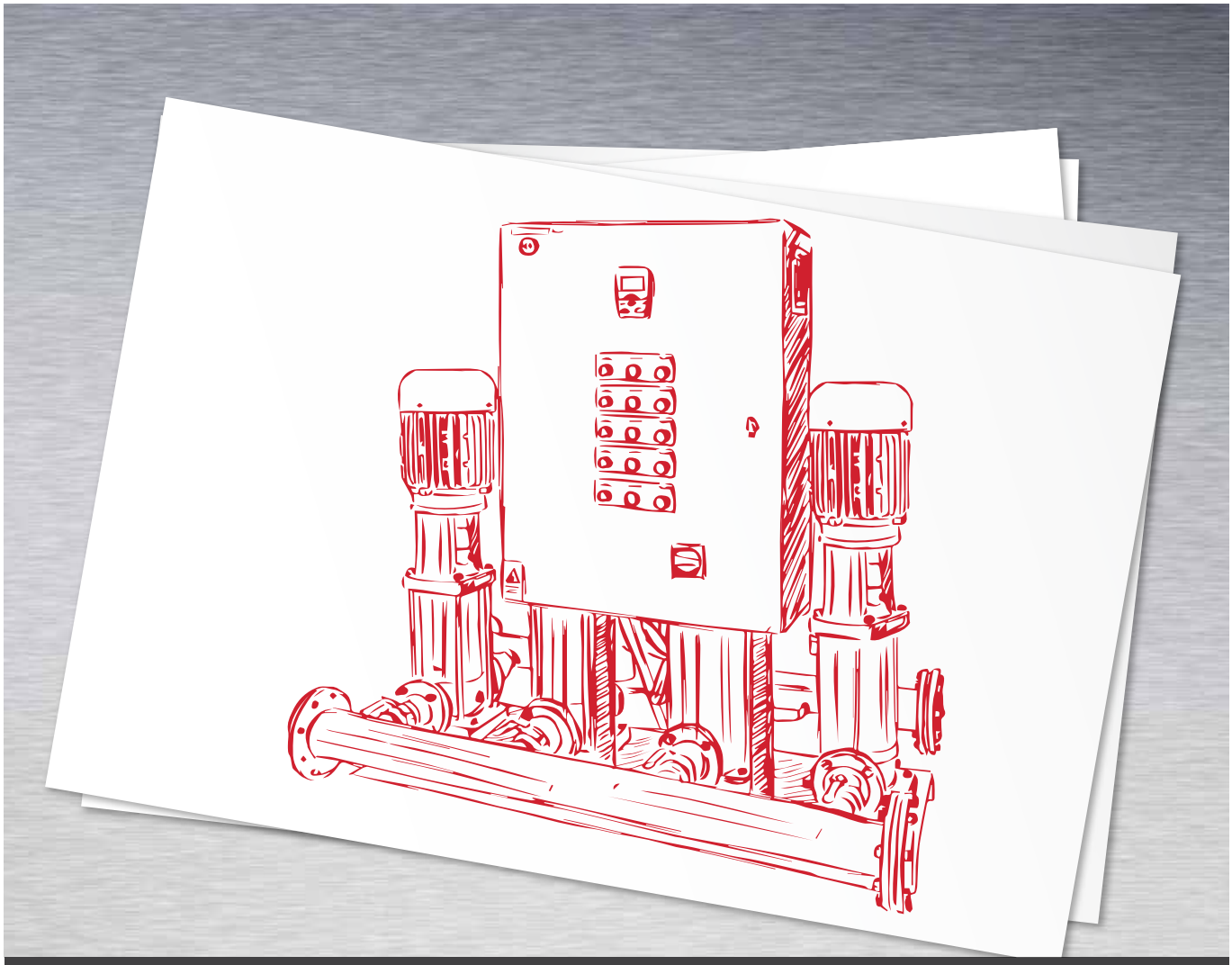
ETNA®



WATER BOOSTER SETS
INSTALLATION MANUEL

Constant and variable speed boosters (water pressure systems) are comfort-oriented devices that intend to provide the required water at the desired pressure continuously and back up the system against water supply interruptions or inadequate pressure etc. Areas of use of water boosters;

- Residences and commercial buildings
- Public buildings such as hospitals, schools etc.
- Hotels and resorts
- Industrial facilities

On-Off Water Booster Sets

- Each pump is activated or deactivated by means of a pressure switch installed on the water booster's outlet collector. When the use of water begins at the building where the water booster is installed, and the pressure drops to the lower pressure at which point the booster is to be activated, the pressure switch installed on the collector runs the relevant pump and water boosting begins. The pump continues running until the water pressure reaches the set value on the pressure switch. The pump stops when the target pressure is reached. A separate pressure switch is provided for each pump on the booster sets and the inlet-outlet pressures of the product were conducted during factory tests. The settings mentioned were checked by the authorized service during initial startup of the product and the required modifications are done.

Frequency Driver (Variable Flow) Booster Sets

- These are the water boosters run by frequency drivers that are connected to each pump. When water demand starts to occur in such boosters, the frequency driver adjusts the pump from low speed to rising speed and increases the speed until it reaches a frequency of 50 Hz and the pump motor remains activated to meet the water demand after reaching the nominal speed.

- After the water demand increases, the software in the panel activates the frequency driver of the second pump from a low speed to a rising speed, and if the water demand continues to increase, then the third pump is also similarly activated with the frequency driver.

- As the need is met, the frequency of the finally activated pump will be reduced and the rotation of the motor at a lower speed will be ensured, and it will result in the decrease of the flow of the pump. When the water demand decreases, the pumps will be deactivated one by one, the frequency driver of the latest pump running will reduce the rotation of the pump, and the pump will stop when reaching the set minimum frequency. The pumps will be activated again once water demand occurs.

- In such water boosters, the pressure fluctuations in the installation are minimized and mechanical wears are minimized thanks to slow-start pump motors.

Water Boosters Sets Controlled by Multiple Pumps with a Frequency Driver

- These water boosters are controlled from a panel and have a frequency driver in that panel. When water demand starts to occur in such boosters, the frequency driver adjusts the pump from low speed to rising speed and increases the speed until it reaches a frequency of 50 Hz and the pump motor remains activated to meet the water demand after reaching the nominal speed.

- When the water demand increases, the software in the panel sends a signal to the pump contactor for activating the second pump, the second pump is activated at full speed, the frequency of the first pump is reduced since the demand will be met, rotation of the motor at a lower speed is ensured, and it decreases the flow of the pump.

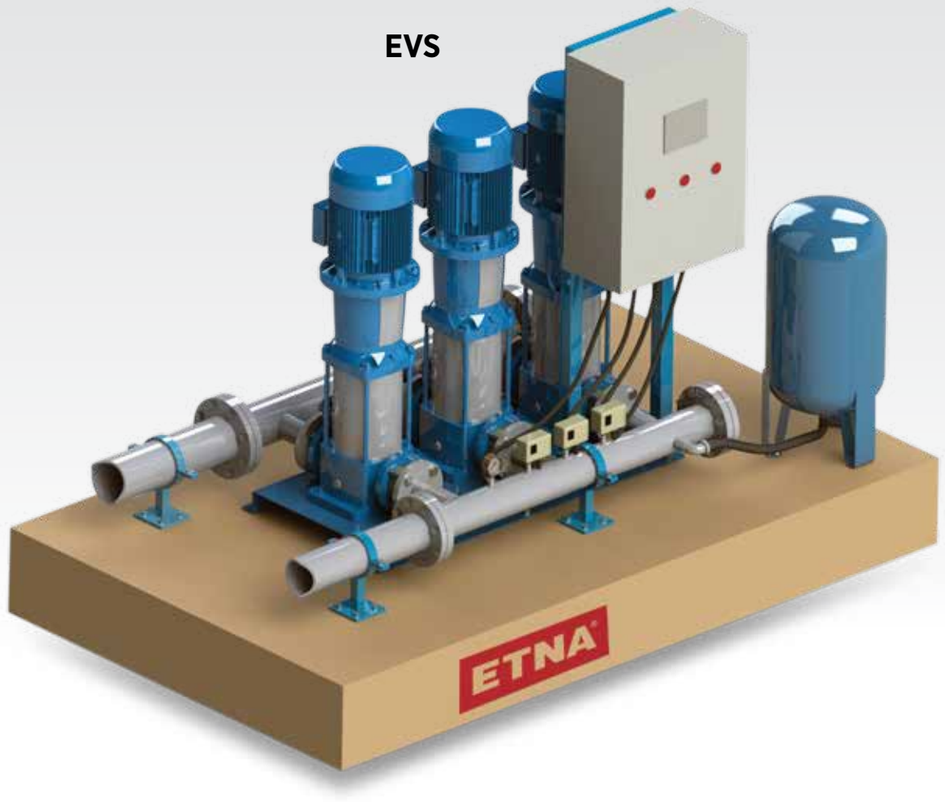
- If water demand increases further, the first pump will reach full speed and will send start command to the contactor of the third pump.

- When the water demand decreases, the pumps will be deactivated one by one, the speed of the pump which runs with the latest frequency driver is reduced, and this pump is deactivated when the set minimum frequency is reached. As a result, comfort level in water supply increases as fewer pressure fluctuations will occur on the installation.

KO-EPH

Installation of a Water Booster with Positive Pressure Suction Line (Water Tank on the Surface)

- First examine the detailed drawing related to the installation of the booster set.
- The suction line diameter of the pumps should not be lower than the suction diameter of the pump.
- The diameter of the suction collector to be setup should not be smaller than that of the total suction line pipe.
- Water suction will be easier if the suction line is laid as described. Easy flow of water through the pump suction line will prevent the pump from running under negative conditions which are described as cavitation (local evaporation and condensation cycle of the fluid in the pump).
- The electric floater switch installed in the water tank will send a “Low Water” warning to the main panel if the water level in the tank decreases and will deactivate the water booster. The booster will be reactivated once the water level increases again. The floater mentioned is the main piece of security equipment that prevents dry running of the pump and the system should never be operated with this floater deactivated.

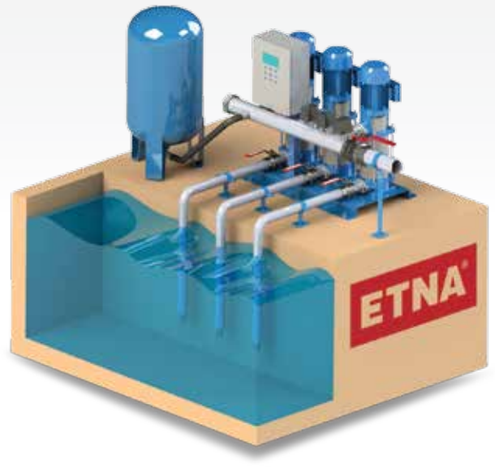


Installation of a Water Booster with Negative Pressure Suction Line (Water Tank under the Surface)

- First examine the detailed drawing related to the installation of the booster set.
- The suction line diameter of the pumps should not be lower than the suction diameter of the pump.
- A separate suction line is required to be laid for each pump. Water suction will be easier if the suction line is laid as described. Delivery of the water in the pump suction line to the pump easily at low speeds will prevent the pump from running under negative conditions which are described as cavitation (local evaporation and condensation cycle of the fluid in the pump).
- Foot valve must be installed on the end of the suction pipes extended to the water tank under the surface. The foot valve mentioned will prevent emptying the suction pipe filled with water. As a result, there will always be water in the pump suction line and the pump will not run dry.
- If it is informed during the ordering, that the water boosters will prime water from the underground water tank, then the check valves normally installed on the delivery collector of the outlet of the pumps will not be installed and system pressure will be provided up to the suction pipe. As a result, if the suction leaks water, the pump's suction line will not become emptied and filled with air, and dry running of the pumps will be prevented. Leakage will cause involuntary running of the pump, if the service technician notices a decrease in pressure by closing the water booster outlet valve, then he/she will understand that it means leakage of the foot valve and replace the foot valve. If it is not done, the air pockets that may occur instead of water leaking from suction will prevent water suction from the suction line and dry running pumps will be seriously damaged.

NOTE: The check valves on the delivery line must be removed.

- The electric floater switch installed in the water tank will send a “Low Water” warning to the main panel if the water level in the tank decreases and will deactivate the water booster. The booster will be reactivated once the water level increases again. The floater mentioned is the main piece of security equipment that prevents dry running of the pump and the system should never be operated with this floater deactivated.



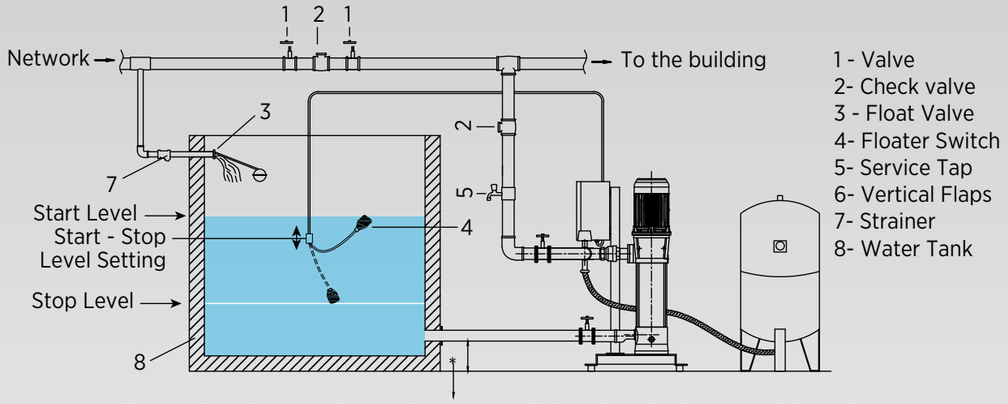
Explanations on the Installation Location of the Water Booster Sets

- The pump room where the booster is to be installed must be closed, where the temperature does not drop under + 4° C, (against the freezing risk of water), free of humidity and dust, and properly ventilated.
- In order to perform the service works easily around the water booster, it must be easily accessible from every side for a minimum of 80 cm.
- A required size of water discharge must be provided to evacuate water against risk of explosion of the pipe in the booster chamber.

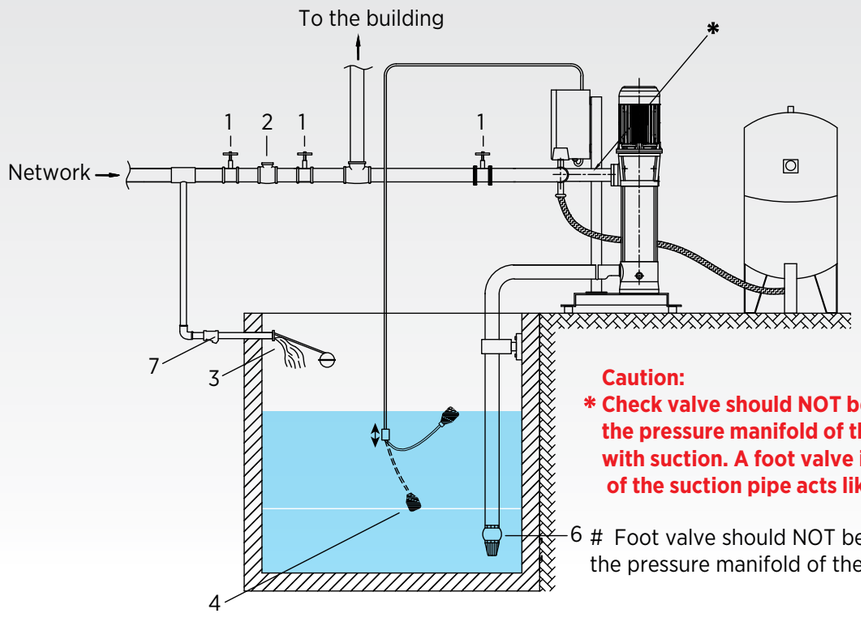
Details to be Considered During Installation of the Booster

- The boosters must be placed on a level surface and they must be tightly fixed on the floor's concrete by means of steel dowels.
- Securing the pipes on suction and delivery lines to the floor by means of metal struts will prevent weight pressure of those lines on the pump and will not allow the damaging of pump coupling settings.
- Using rubber compensators at the connection points of the suction-delivery line and installation will prevent transfer of vibration and noise to the installation.
- The strainers' filling with dirt and blocking the pump's suction damage the pumps as they are forgotten to be cleaned, therefore, use of a strainer at the suction line is not recommended. Instead, cleaning water tanks thoroughly and installing the strainer at the public network entry of the tank will be more correct.
- For the pump motors of the water boosters, energy cables in accordance with the total energy request of the pump motors must be laid. These cables laid from the main conduit box must have diameters suitable to the length.
- The floater switches must be installed in the water tank and set in order to stop the pumps at a higher point than the suction line and their tampering by unauthorized individuals must be prevented. Improper level settings will result in dry running of the pumps and will cause severe damage in the pumps.

WATER BOOSTER INSTALLATION AND FLOATER SETTING



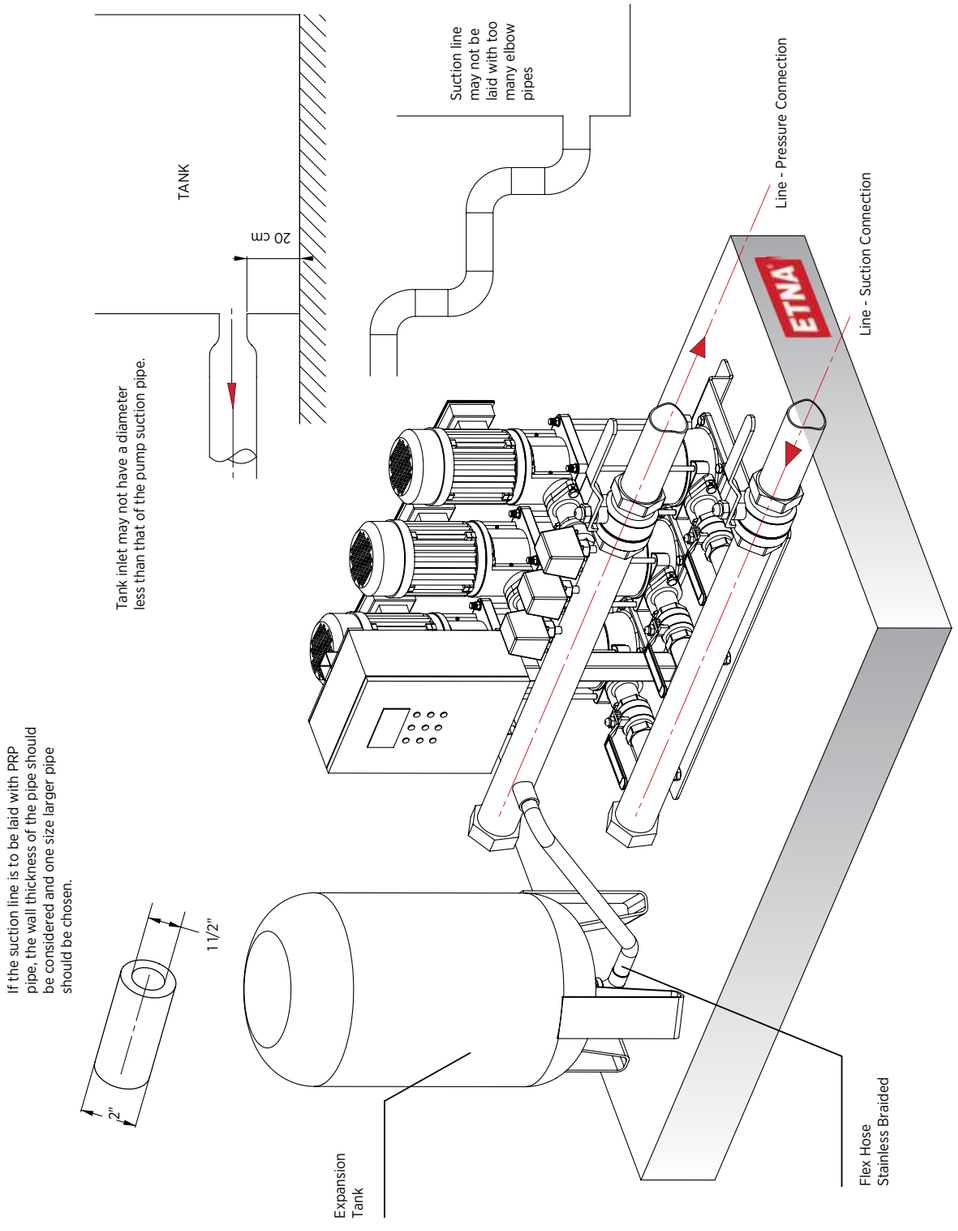
* The suction pipe must be minimum 15 cm higher than the bottom of the tank.



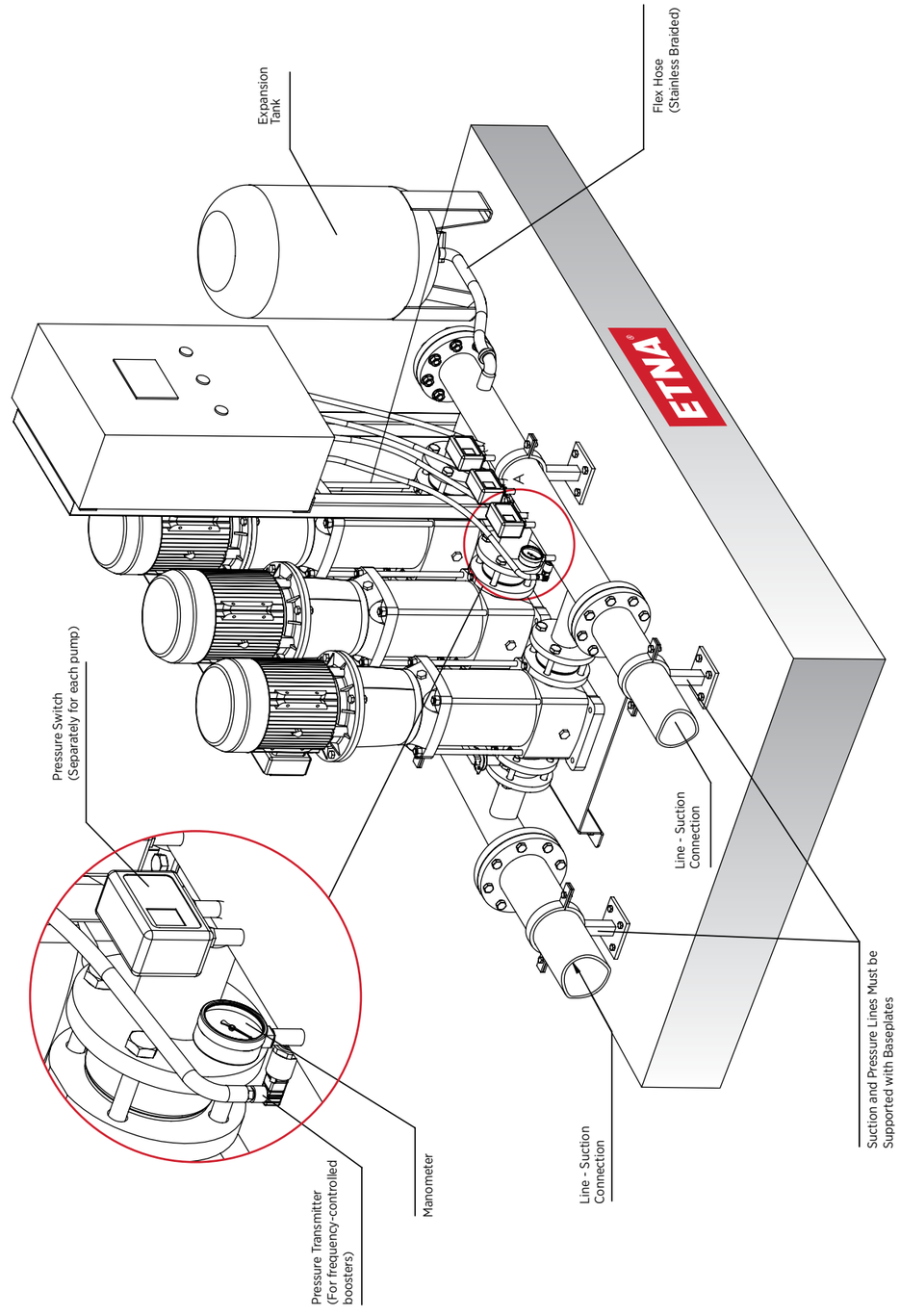
Caution:
*** Check valve should NOT be installed on the pressure manifold of the water boosters with suction. A foot valve installed at the end of the suction pipe acts like a check valve.**

6 # Foot valve should NOT be installed on the pressure manifold of the plumbing either.

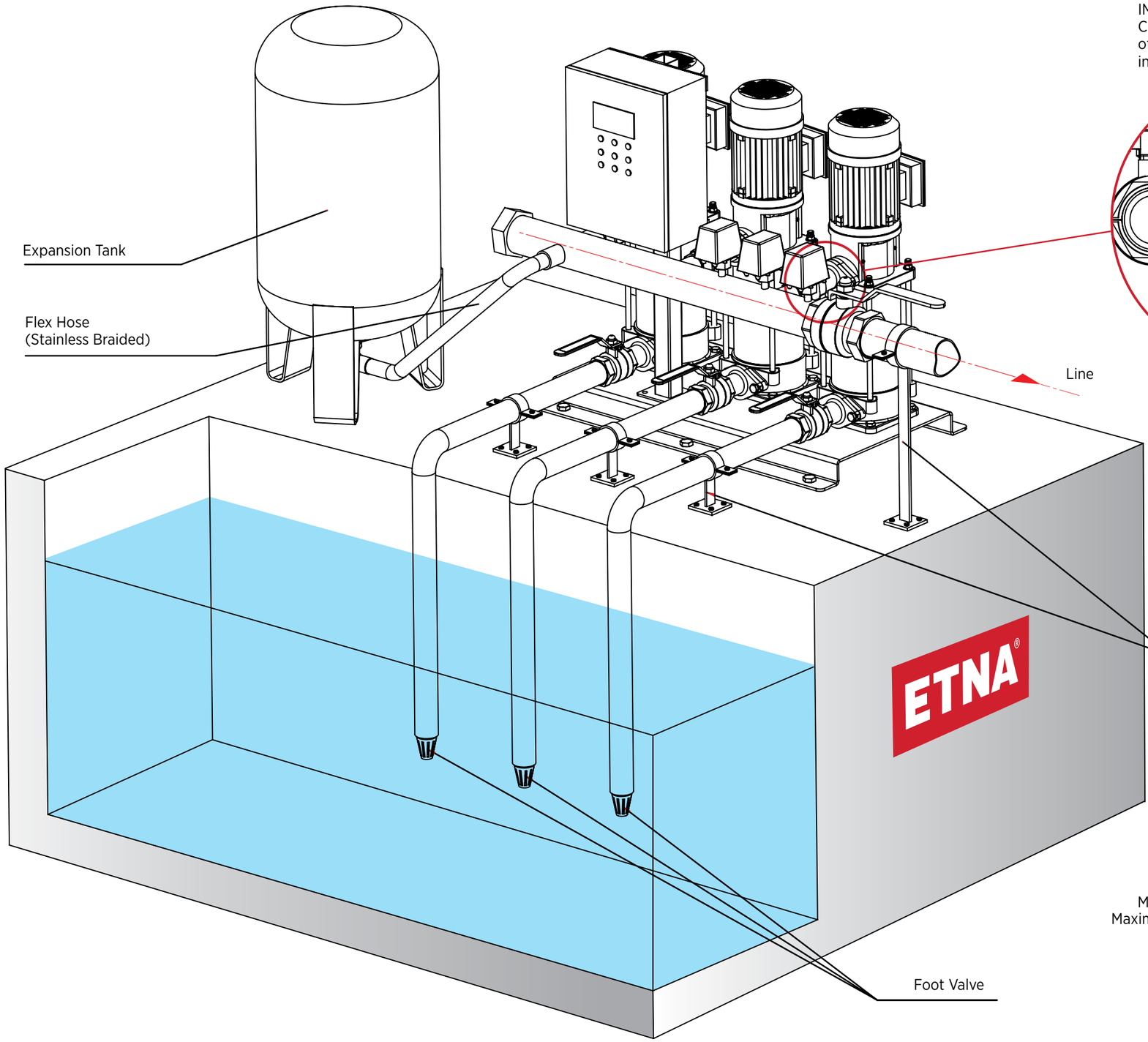
POSITIVE SUCTION CONNECTION FOR KO- EP B/ C SERIES



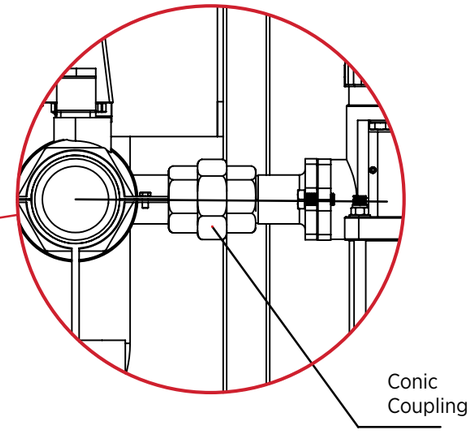
POSITIVE SUCTION CONNECTION FOR EVS SERIES

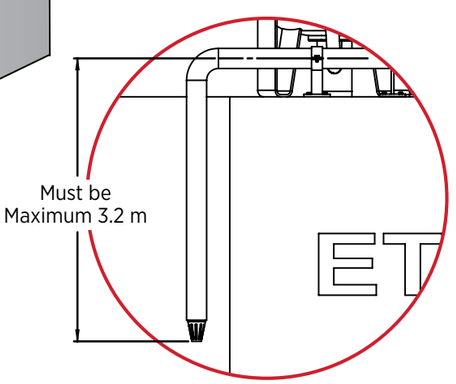


NEGATIVE SUCTION CONNECTION FOR WATER BOOSTER SETS



IMPORTANT:
Check valve should NOT be installed on the force line of the water boosters with negative suction. The flap installed on suction also acts like a check valve.





CAVITATION AND BALANCE TANK CALCULATION

WHAT IS CAVITATION?

Local evaporation and condensation cycle of the fluid (water) in the pump is defined as “cavitation”. The calculation of net suction depth is critical for pump life in order to prevent cavitation in the pump. Local evaporations and condensations occur in the pump during cavitation, and as a result, the pump does not run regularly and a decrease in the pump's outlet pressure is observed. The pump should not be run in the case of cavitation. (Under cavitation, the pump will run noisily, and serious abrasion will occur on the metal surfaces of the pump.)

There is a picture of the cast fan of a pump exposed to cavitation on top.
On the pump inlet port, abrasion on the cast fan (impeller) is clearly noticed.

MEMBRANE-TANK VOLUME CALCULATION (Vmt)

- The objective of using a balancing tank is to conform to the switch numbers (z) allowed on the clock of the pump motors of the booster set under pressure and balance the pressure shocks which may occur on the installation.
- The pressure tanks may have airbags or membranes. Those with airbags do not make a clear difference between water and air. As some of the pressured air mixes in water, air transfer is required by a compressor or an air charging unit.
- Air charging unit or a compressor is not required on those with membranes. Because there is a flexible membrane on the contact surfaces between air and water. Therefore, membrane-tanks are preferred.
- The following calculation method is used for the calculation of the required volume of vertical or horizontal tanks.
- In the calculation of volume, only one of the main pumps in the booster set is taken into consideration.

The number of motor switches allowed in one hour, pump flow, and pump running pressure relations must be identified.

$$Vmt = \frac{Qp}{4xZ} \times \frac{1}{1-\frac{(Pmin\ -2)}{Pmax}}$$

Vmt = Volume of pressure tank with membrane (m³/h)
Qp = Average pump flow rate (m³/h) (Qmin + Qmax/2 = Qp)
Pmax = Max. pressure setting (mSS)
Pmin = Min. pressure setting (mSS)
Z = Number of motor switches allowed in an hour

Recommended maximum switch number for electric motors (z)	
For 1.5 kW and lower	max. 80
For 2.2 and 3 kW	max. 60
For 4 - 7.5 kW	max. 40
For 11 and 15 kW	max. 30
For 18 and 22 kW	max. 24
For 30 and 37 kW	max. 16
For 45 kW and higher.	max. 8

EXAMPLE

For 2KO 25-8/75 Booster;
Pmax. = 82 mSS
Pmin. = 60 mSS
Qmax. = 25 m³/h
Qmin. = 17 m³/h
Z = 40 (found from the table)

$$Qp = \frac{25 + 17}{2} = 21\ m^3/h$$

$$Vmt = \frac{21}{4x40} \times \frac{1}{1-\frac{60 - 2}{82}} = 0.43\ m^3/h$$

min. 500 lt. membranlı tank gerekir.

After-Sales Services

We are by your side with our more than 35 years of sector experience, 104 service points all around Turkey, and customer-oriented after-sales approach to service (commissioning, maintenance and repair, spare part supply).

Dudullu Organize Sanayi Bölgesi Nato Yolu Caddesi No: 267/B
34775 Ümraniye Istanbul / Turkey
Tel. +90 216 561 47 74 (Pbx) • Fax : +90 (216) 561 47 50
www.etna.com.tr • info@etna.com.tr

ETNA®

0850 455 38 62
customer service