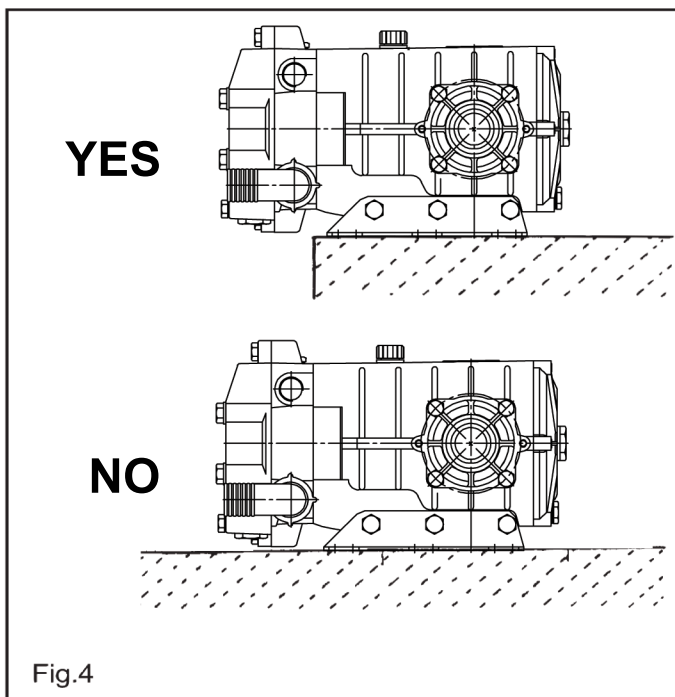


## PUMP INSTALLATION

### Positioning

The pump should be installed flat on a rigid base. The base should be rigid enough to avoid any misalignment or flexing of the pump/transmission coupling axis due to the torque involved during operation.

On no account should the pump be installed in such a way its fluid end rests on the base where the pump is mounted. The fluid end should be left free and not subjected to any force. (Fig 4).



### Direction of rotation

The pump can turn clockwise or anticlockwise.

### Water connections

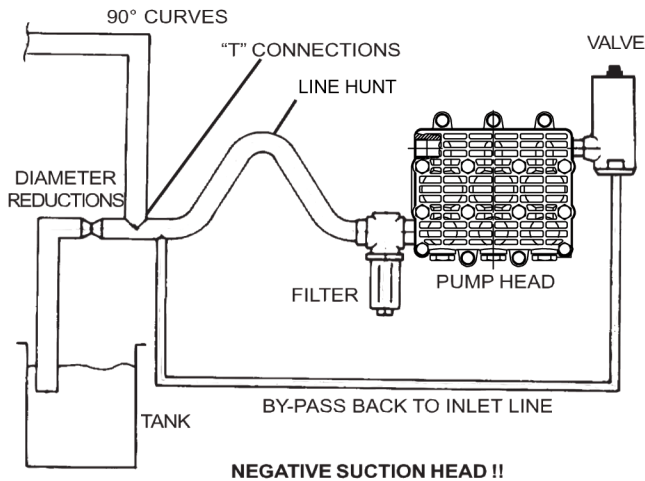
In order to isolate the high pressure equipment from the pump vibrations it is suggested, where applicable, to use flexible hoses for both suction and delivery lines at least for the first length. The flexible suction hose must be rigid enough to prevent it from collapsing during the suction stroke, when a partial vacuum may occur.

### Suction line

Plunger pumps are not self priming therefore a positive suction head should always be provided. Information for the correct suction line:

1. Internal diameter should be at least 2", in any point, possibly larger depending on the drop in pressure due to the length and shape of the line.
2. Should be as straight as possible minimizing changes in size and direction and positioned in such a way to allow air pockets and bubbles to escape.
3. Should be perfectly airtight.
4. Should be completely free from 90° elbows, diameter reductions, counter slopes, "T" connections and should not be connected to other pipelines.
5. Should be positioned in such a way to prevent the pipe emptying after the pump stops.
6. Do not use high pressure flexible hoses for the suction line.
7. Do not use high pressure hydraulic fittings like 90° elbows, high pressure adapters, high pressure 3 or 4 way nipples and so on.
8. Do not install any kind of detergent injector along the suction line.
9. Do not install standing valves, check valves or other kind of one-way valves.
10. Make sure that the feed tank capacity and the water minimum level do not give rise to turbulence at the tank outlet port, which, in turn, might create cavitation at the pump.
11. Do not connect the by-pass line from the valve directly to the pump suction line.
12. The water flow from the valve should be directed back in the tank. Make sure that the by-pass and tank feeding flows do not give rise to turbulence at the tank outlet port, which, in turn, might create cavitation at the pump.
13. Before connecting the suction line to the pump inlet port make sure the pipe is perfectly clean inside.

# NO



# YES

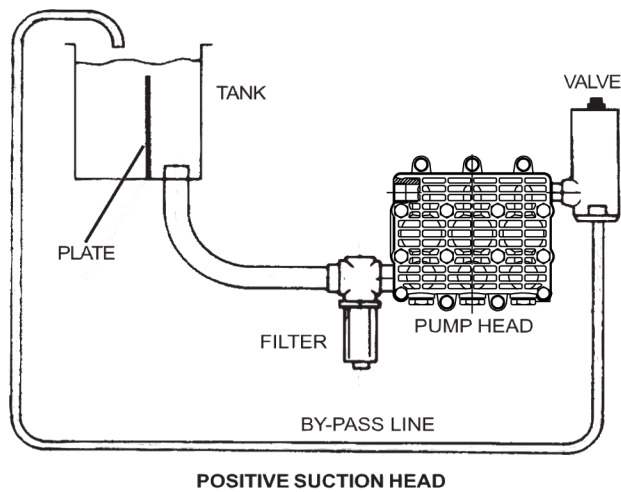


Fig.6

## Filtration

All pumps require a suitable filter. The filter should be installed as close as possible to the pump, should allow easy inspection and have the following characteristics:

1. The filter capacity should be at least three times the rated pump volume.
2. Filter port diameters should not be smaller than the pump inlet ports.
3. Filtration degree in between 50 and 80 mesh (360 to 200 microns).

**IMPORTANT NOTE:** In order to properly safeguard the pump it is very important to plan cleaning of the filter **with a frequency depending on the water quality, filtration degree and number of hours of each application.**

## Delivery line

For a correct delivery line comply with the following instructions:

1. The first length of delivery hose should be flexible in order to isolate the pump vibrations from the rest of the system.
2. Use only high pressure hoses and fittings able to guarantee the largest possible safety margins in any working conditions.
3. A suitable relief valve should be installed in the delivery line.
4. Use glycerine filled pressure gauges, as the most suitable for pulsating loads.
5. When designing the delivery line, take into proper account the unavoidable drop in pressure, due to its length and size.
6. If necessary, the effects of the pump pulsations can be reduced by installing a proper pulsation dampener in the pressure line.