

# REVERSE OSMOSIS



## COMMERCIAL RO SYSTEM OPTIONS

### Recirculation System

All RO membrane elements require a minimum concentrate flow out of the membrane element, i.e., 3 gpm for a 4 inch diameter membrane element. Without recirculation, this amount of water must completely go to drain. With the recirculation system, a fixed amount of water (equal to the design capacity of the system) is sent to the drain and the remainder is recycled into the feed to the membrane element thereby conserving water. This option is standard on most of our RO systems

### Low Feed Pressure Control Switch

The low pressure protection switch is installed on the outlet side of the system prefilter(s). It is a safety protection device to protect the high pressure pump from running dry by electrically shutting down the RO system if the water pressure after the prefilter(s) drops less than 10 psi. The RO will automatically restart if the pressure rises above 15 psi. Initial start-up of the high pressure pump creates an instantaneous high demand for water. If the inlet pressure is marginal, the RO unit could attempt to start and then shut-down because of low pressure. The pressure will then rise, the unit will attempt to start again, and shut-down again. This cycle could repeat itself many times. This usually results in damage to the high pressure pump and/or motor. It is important to have adequate incoming pressure (> 30 psi) and adequately sized feed piping to the RO unit. We recommend the feed piping to the RO unit be at least the same size as the inlet connection, but we would prefer that it be one size larger. For instance, the inlet connection on a BLS 1900 RO unit is 1/2 inch NPTF. The inlet piping should be at least 1/2 inch pipe but preferably 3/4 inch pipe. This option is standard on most of our RO systems.

### Carbon Block Prefilter

The carbon block prefilter is used for two purposes. TFC and High Flow membranes are manufactured from a material that is chemically attacked by chlorine and other oxidizing agents. Activated carbon removes the chlorine from the feed water to the system. Activated carbon also removes some organics and can improve taste and odor.

### Feed Water Pressure Gauges

The feed water pressure gauge is installed on the inlet side of the system prefilter(s). It measures the pressure of the feed water before it enters the system. When used in conjunction with the filter pressure gauge, it can be used to calculate the pressure drop across the system prefilter(s). When the pressure drop reaches 12 psi higher than the pressure drop across the new clean filter cartridge(s), it is time to replace the filter cartridge(s).

### Filter Pressure Gauge

The filter pressure gauge is installed on the outlet side of the system prefilter(s). It measures the pressure of the feed water after the system prefilter(s). This is the pressure that is seen by the low feed pressure control switch. When used in conjunction with the feed water pressure gauge, it can be used to calculate the pressure drop across the system prefilter(s). When the pressure drop reaches 12 psi higher than the pressure drop across the new clean filter cartridge(s), it is time to replace the filter cartridge(s).

### Product Water Control Switch

If you are storing the system product water in a pressurized storage tank, the product water control switch will automatically stop the system when the tank pressure reaches 40 psi and restarts the system when the pressure reaches 20 psi. It can also be used as a safety switch if the product water line is blocked, i.e., a valve is closed. The reason this is important is that the RO membrane is supported in the direction of normal flow to withstand the high pressure required to produce product water but it is not supported in the reverse direction. Excessive pressure on the product side of the membrane could cause the membrane to rupture resulting in high product flow and TDS.

### Product Pressure Relief Valve

The product pressure relief valve is a mechanical safety relief valve which will release excessive pressure if the product water line is blocked, i.e., a valve is closed. The reason this is important is that the RO membrane is supported in the direction of normal flow to withstand the high pressure required to produce product water but it is not supported in the reverse direction. Excessive pressure on the product side of the membrane could cause the membrane to rupture resulting in high product flow and TDS.

### Stainless Steel Pressure Vessels

Stainless steel pressure vessels are replacements for the standard PVC pressure vessels on most systems. They are usually selected for aesthetic reasons since the standard PVC pressure vessels have a working pressure rating of 230 psi.

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### Product & Reject Water Flowmeters

The basic design of a majority of our RO systems is a fixed orifice reject flow controller which is rated at the system theoretical product output, i.e., a BLS 400 has a 400 gpd reject flow controller. The actual product output of any RO system is dependent on many factors—including feed water TDS, feed water temperature, and product water back pressure. To conserve water usage, the reject water can be regulated to the same flow rate as the product output while increasing the amount of recirculation. By installing a product flowmeter, you can directly read the actual amount of product being produced. By replacing the reject flow controller with a reject flowmeter and valve, you can regulate the reject flow to be equal to the product flow.

### TDS Inline Monitor

On our smaller systems, we offer a TDS inline monitor. It is a monitor which has eight different TDS dip switch settings. You select the visual alarm point. It is battery operated. There is a push button on the face of the monitor that, when pushed, activates the monitor. If the product water TDS is less than the set point, a **GREEN** light illuminates. If the product water TDS is more than the set point, a **RED** light illuminates.

### TDS Analog Meter

On our larger systems, we offer a TDS analog meter. It is powered from the system control circuitry and provides a constant analog read out of the product TDS while the system is operating.

### TDS Digital Meter

On our larger systems, we also offer a TDS digital meter. It is powered from the system control circuitry and provides a constant digital read out of the product TDS while the system is operating. You can set an exact alarm set-point. A **GREEN** light is continuously illuminated when the product water TDS is below the set-point or a **RED** light is continuously illuminated when it is above the set-point. It also has dry (non-powered) N.O. and N.C. contacts which could be used for an external alarm if you so desire.

### Manual Flush System

A periodic increase of the flow rate past the membrane increases the turbulence on the membrane surface which can help prevent membrane element fouling. By opening the manual flush system ball valve for as few as five minutes once per week, you may increase the life of the membrane element. This option is standard on most of our RO systems.

### Automatic Flush System

A periodic increase of the flow rate past the membrane increases the turbulence on the membrane surface which can help prevent membrane element fouling. Setting the auto flush timer is as simple as pushing a few buttons. You simply set the correct time and then select Monday-Friday, Saturday-Sunday, Monday-Sunday, or any single day for the number of times per week you would like the RO system to automatically flush. You can then select from one to six times per day for that flush to occur and finally you decide the length of time for the flush. Care should be taken to try to select a time when the RO system will most likely not be operating. The auto flush timer will automatically open the auto flush solenoid valve on the day, at the time, and for the duration you programmed.

### Time Delay Air Purge

When RO systems do not operate for long periods of time, the system can drain, allowing air to replace the water. Almost all of our systems have recirculation of reject water as a part of the standard design. If air is in the system, this air is recirculated through the system and can cause damage to the pump and membrane element. The time delay air purge is an adjustable timer (or timer with delay) which can be easily set to delay the start-up of the system high pressure pump for a period of time (usually one minute) after the inlet solenoid valve opens to fill the system with water before the high pressure pump starts.

### Tank Level Float Control

If the product water is going to be stored in an atmospheric storage tank, some type of level switch is required to stop the RO system when the tank is full or the storage tank will overflow. The tank level float control is a mechanically-activated, wide-angle, normally-closed, float switch which is easily installed and can be adjusted to activate in as little as 3 inches or as much as 22 inches of tank height.

### Low Level Float Cut-Out Switch

Running dry can damage most centrifugal pumps. The low level float cut-out switch is a mechanically-activated, wide-angle, normally-open, float switch which is easily installed and can be adjusted to activate in as little as 3 inches or as much as 22 inches of tank height to stop a re-pressurization pump before the tank is empty.