Hard water enters the system, flows around the center of the piston, divides, and flows through twin ports, down through the upper distributor and to the resin bed. The total flow of water is conditioned as it flows through the resin bed. Softened water returns through the bottom distributor and flows up the center riser tube, raising the stem check and out the valve to service.

The stem check in the service mode acts as a safety to prevent the back-up of hot water into the resin bed. Hot water under pressure will raise the piston sightly against the piston spring blinding the hot water off to the inlet line.

All solenoids are de-energized (closed). All lines without flow arrows are static.

*All multi-tank models have a bypass plug inserted in the threaded bypass opening to prevent the hard water bypass and to provide soft water from the parallel tanks installed in the multi-tank system. A multi-tank system will not bypass hard water at any time.
BRINE DRAW POSITION
UP FLOW

The #1 solenoid is energized (open) allowing a flow from the cavity above the piston to flow to the drain. The pressure drop above the piston causes the pressure under the piston to force the piston to its upper limit. At this time the only water flowing to the drain will be through the nozzle of the aspirator at a flow rate of .5 to 1.0 gpm.

With the piston in its upper position a full flow by-pass of hard water to service will occur in all Genus 1 models.

× All multi-tank models have a by-pass plug inserted in the threaded by-pass opening to prevent the hard water by-pass and to provide soft water from the parallel tanks installed in the multi-tank system. A multi-tank system will not by-pass hard water at any time.

The high velocity of water through the nozzle of the aspirator passing the venturi causes a vacuum due to the pressure drop. The vacuum having no outlet to atmosphere except through the brine line to the salt tank causes the higher atmospheric pressure to force the saturated brine out of the salt tank into the riser tube, down through the tube to the bottom distributor and up through the resin bed saturating it completely. A ball check in the float safety valve will seat when the low liquid level is reached preventing air from entering the system. The brine saturated resin bed then soaks for the balance of the brine draw time period programmed into the cycle.

Solenoids #2 and #3 are de-energized (closed) during the brine draw. All lines without flow arrows are static.
SLOW PULSATING RINSE
UP FLOW

Solenoid #1 to the drain is still energized (open) discharging effluent from the aspirator and slow rinse process.

Solenoid #2 is energized (open) intermittently to provide water for the slow rinse and to give the resin a scrubbing action by gently raising and lowering the resin beads slightly at each pulse. The pulsing rate is 1:4 on and off to give a rinse rate of 25% of the fast rinse rate.

The flow of water is controlled by the flow control button and the rate of flow is controlled by the intermittently energized #2 solenoid. This flow is directed to the bottom distributor and up through the resin bed and out the drain.

Solenoid #3 remains de-energized (closed). All lines without flow arrows are static.
FAST RINSE UP FLOW

Solenoid #1 is still energized (open) to discharge the effluent from the aspirator and the rinse process.

Solenoid #2 is now energized (open) continuously providing an upflow rinse four times greater than the slow rinse.

The flow path is the same as the slow rinse path. The extra fast rinse or flow expands the resin bed to fluidize it and release any turbidity or salt pockets and at the same time classifying the resin beads for best filtration.

The #3 solenoid remains de-energized (closed). All lines without flow arrows are static.
PURGE AND REFILL DOWN FLOW

Solenoids #1 and #2 are de-energized (closed) allowing hydraulic pressure above the piston to push it down to its service position.

Solenoid #3 is energized (open) directing a flow of water from the inlet, around the piston, down the twin outside ports, through the upper distributor, down through the resin bed, to the lower distributor, up through the riser tube raising the stem check and out to service and to the #3 solenoid which directs a flow through the refill flow control and to the brine tank refilling it with the correct amount of water for the next charge. The balance of water is also directed to the purge gate which regulates the water flowing through the purge check and to the drain.

This down flow purge packs the bed to its normal operating position and at the same time purges any raw water remaining in the bottom of the bed during the regeneration of the Genus 1 models.

All multi-tank systems having no raw water by-pass are fully regenerated and rinsed with soft water from the other tanks installed in the multi-tank systems.

MTS BY-PASS PLUG

When #3 solenoid closes at the end of the regeneration cycle, the vacuum breaker in the drain will allow air to enter the drain line, preventing it from freezing and to also prevent the drain vacuum from siphoning the brine out of the salt tank.

All lines without flow arrows are static.