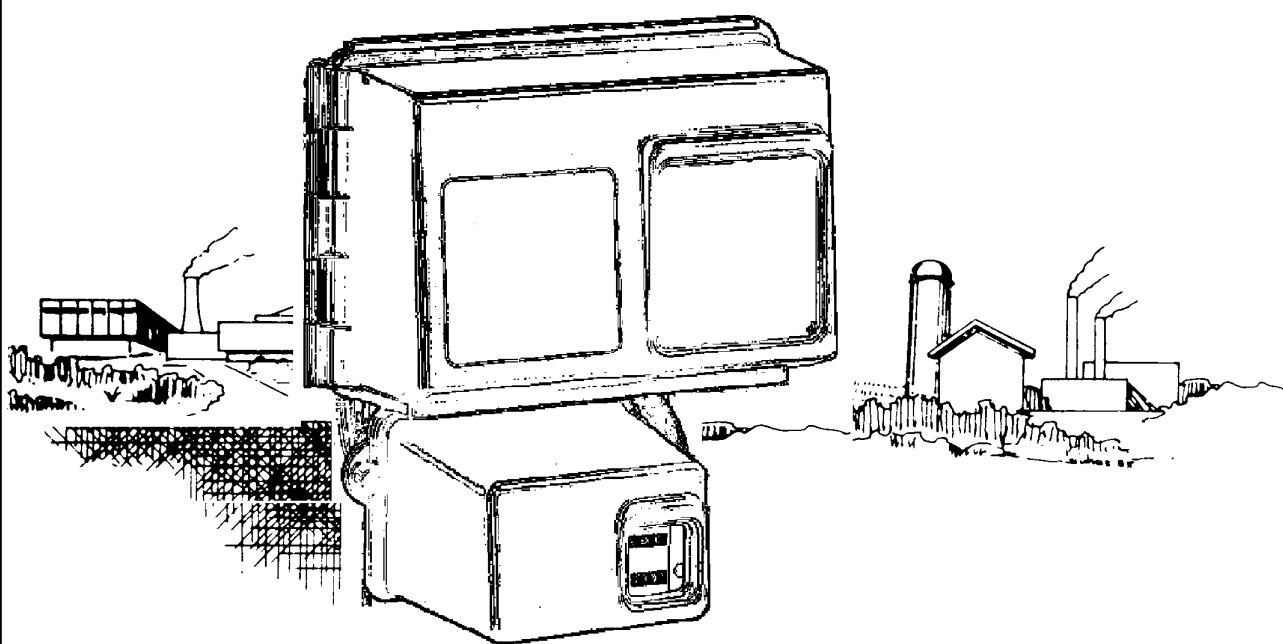


Model 2900NT

Customer Manual



MODEL 2900NT

Installation Information

JOB NO:

MODEL NO:

DESIGN HARDNESS: mg/l as CaCO₃

CAPACITY PER UNIT: kg. CaCO₃

RESIN VESSEL SIZE: DIA. x HIGH

BRINE TANK SIZE: DIA. x HIGH

SALT SETTING PER REGENERATION: Kg. NaCl

RESIN VOLUME: LITRES

2900 CONTROL VALVE SPECIFICATIONS & SETTINGS:

- 1) *Type of Timer: 3200NT
- 2) *Type of meter:in Hall effect *Delete as required
- 3) Meter setting m³
- 4) Regeneration programme settings:
 - a) Backwash min.
 - b) Brine & Slow Rinse min.
 - c) Rapid Rinse min.
 - d) Brine tank refill: min.
- 5) Drain Line Flow Control lpm.
- 6) Brine refill rate: US gpm/lpm
- 7) Ejector size:
- 8) Electrical: 24 volt 50 Hz 65VA

FOR SERVICE CONTACT:

MODEL 2900NT

general installation check list

WATER PRESSURE: A minimum water pressure of 1,8 bar is required for the regeneration valve to operate effectively. The maximum water pressure must not exceed 8,6 bar.

ELECTRICAL FACILITIES: A continuous 24 volt, 50 Hz. current supply is required. Make certain the current supply is always live and cannot be turned off with another switch.

EXISTING PLUMBING: Existing plumbing should be free from hardness scale and iron buildup. Piping that is built up heavily with hardness scale and/or iron should be replaced. If piping is clogged with iron, a separate iron filter unit should be installed ahead of the water softener.

LOCATION OF SOFTENER AND DRAIN: The softener should be located close to a drain.

BYPASS VALVES: Always provide for the installation of a bypass valve system.

CAUTION: Water pressure is not to exceed 8,0 bar. Water temperature is not to exceed 43°C. The unit must not be subjected to freezing conditions.

INSTALLATION AND START-UP INSTRUCTIONS

- 1). Place the softener resin vessel in position, making sure the vessel is level and on a firm base.
- 2). All plumbing should be in accordance with local water bylaws. The minimum pipe size for the drain line should not be less than 22mm (3/4") N.B.
- 3). The distributor tube should be cut 5mm BELOW the top of the vessel. *Note: Top of vessel includes any vessel adaptor if used.*
- 4). Lubricate the distributor O-Ring seal and vessel O-Ring seal with silicone lubricant (Dow Corning 7® compound).
- 5). Fit the control valve on the resin vessel.
- 6). Make sure that the floor beneath the salt storage tank is both clean and level.
- 7). Place water in the salt tank to a depth of approximately 25mm. Salt may be placed in the tank at this time. (Use only granular or pellet/tablet type salt if a combined saturator/measuring tank system is installed).
- 8). Place the installation in the bypass position. Turn on the main water supply. Open a cold soft water outlet nearby and let it run for a few minutes or until such time as the pipework system is flushed free from foreign material that may have resulted from the installation.
- 9). Place the installation in the service position and let the water flow slowly into the resin vessel(s). Air should be expelled via the open soft water outlet and this should be closed when the water runs free of air entrapment.
- 10). Electrical: All electrical connections must be made according to the appropriate codes. Connect the system to a suitable transformer if required.

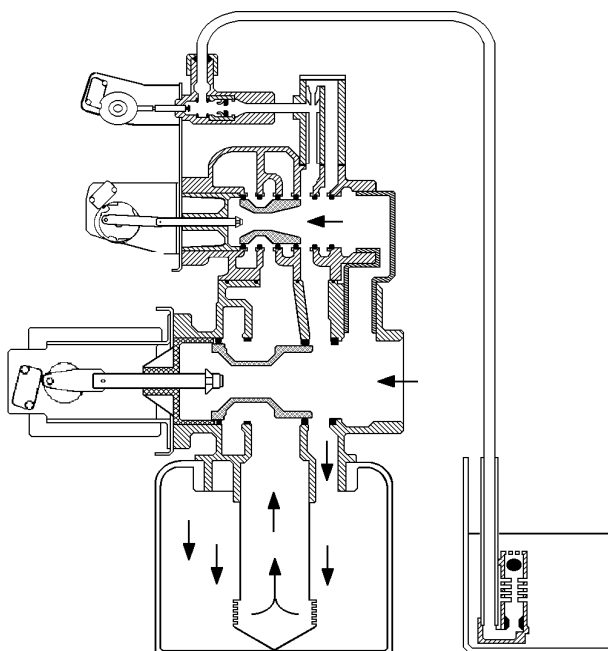
SPECIAL METER INSTALLATION NOTE:

It is important that the EM style meter is installed in the horizontal plane

MODEL 2900NT

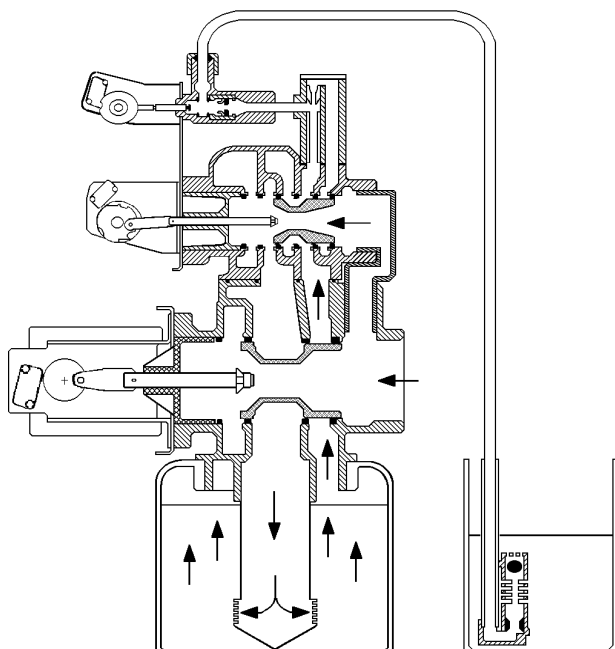
Flow diagrams

1 SERVICE POSITION



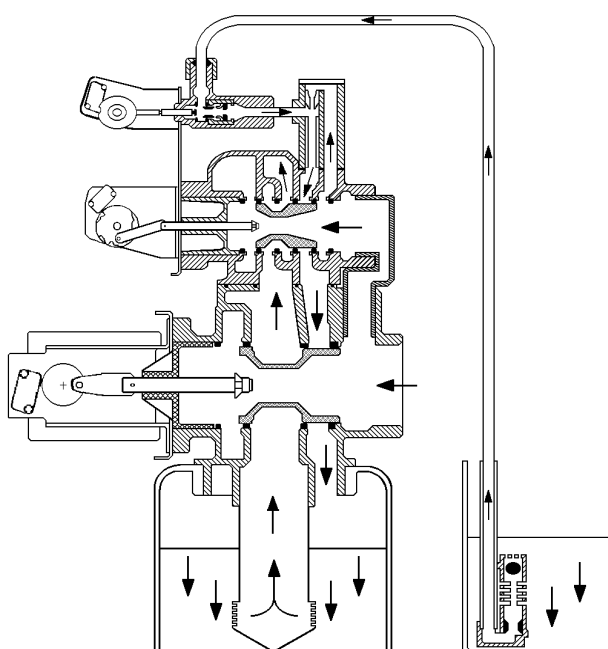
Hard water enters the unit at the valve inlet and flows down through the resin in the resin vessel. Softened water enters the centre tube through the bottom screen, then flows up through the centre tube, around the piston and exits from the valve outlet.

2 BACKWASH POSITION



Hard water enters the unit at the valve inlet, flows through the coupling to the regeneration valve inlet. It then flows through the regen valve piston, down the centre tube, through the bottom screen and up through the resin, around the piston and exits via the valve drain port.

3 BRINE POSITION

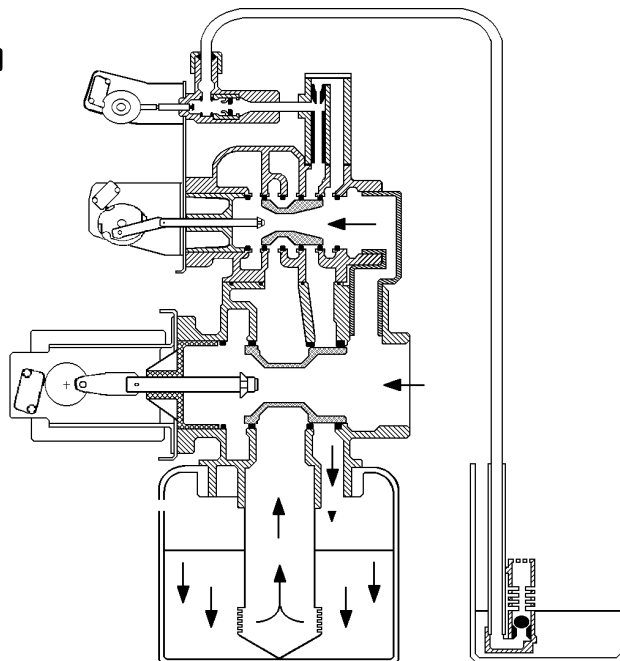


Hard water enters the unit at the valve inlet, flows up into the injector housing and down through the injector nozzle and throat, drawing brine from the brine tank. Brine flows down through the resin exits via the bottom screen, up through the centre tube and exits via the valve drain port.

MODEL 2900NT

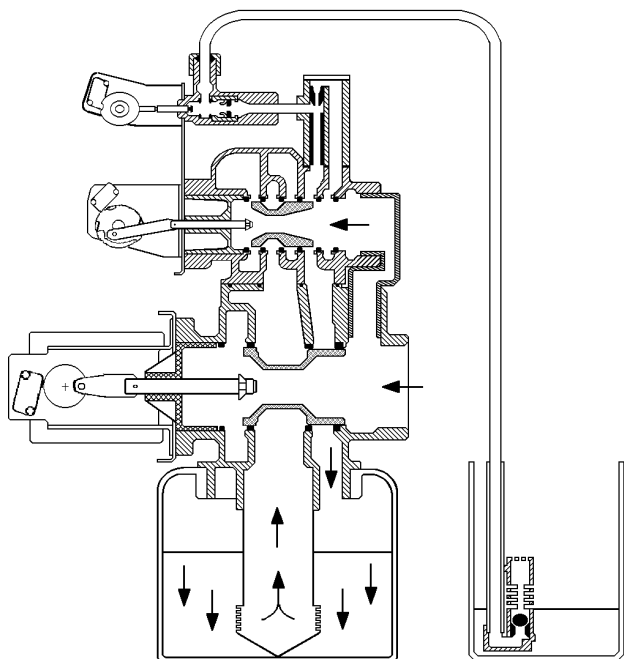
flow diagrams

4 SLOW RINSE POSITION



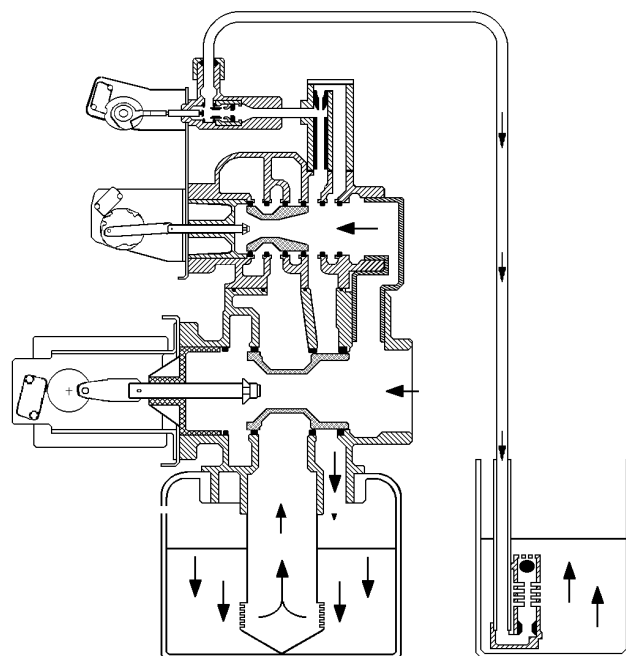
Hard water enters the unit at the valve inlet, flows up into the injector housing and down through the injector nozzle and throat, around the piston and down through the resin. It enters the bottom screen, up through the centre tube and exits via the valve drain port.

5 RAPID RINSE POSITION



Hard water enters the unit at the valve inlet, flows directly from the inlet down through the resin, into the bottom screen and up through the centre tube, around the piston and exits via the valve drain port.

6 BRINE TANK FILL POSITION



Hard water enters the unit at the valve inlet, flows up through the injector housing, through the brine valve and into the brine tank.

MODEL 2900NT

Timer operation

Set Time of Day

When the timer is **In Service**, push either the **Set Up** or **Set Down** button once to adjust the **Time of Day** by one digit. Push and hold to adjust by several digits.

Manually Initiating a Regeneration

1. When timer is **In Service**, press the **Extra Cycle** button for 5 seconds to force a manual regeneration.
2. The timer reaches **Regeneration Cycle Step #1**.
3. Press the **Extra Cycle** button once to advance valve to Regeneration Cycle Step #2 (if active).
4. Press the **Extra Cycle** button once to advance valve to Regeneration Cycle Step #3 (if active).
5. Press the **Extra Cycle** button once to advance valve to Regeneration Cycle Step #4 (if active).
6. Press the **Extra Cycle** button once to advance valve to Regeneration Cycle Step #5 (if active).
7. Press the **Extra Cycle** button once more to advance the valve back to **In Service**

Timer Operation During Regeneration

In the **Regeneration Cycle** step display, the timer shows the current regeneration step number the valve is advancing to, or has reached, and the time remaining in that step. The step number that displays flashes until the valve completes driving to this regeneration step position. Once all regeneration steps are complete the timer returns to **In Service** and resumes normal operation.

Example:



Less than 10 Minutes Remaining in Regen Step #1



Press the **Extra Cycle** button during a **Regeneration Cycle** to immediately advance the valve to the next cycle step position and resume normal step timing.

Start a Regeneration Today

With metered delayed timers, press the **Extra Cycle** button momentarily. The **In Service** indicator dot flashes and starts a **Regeneration** at the programmed **Regeneration Time**.

Day Regeneration Timer

During normal operation the **Time of Day** display is visible at all times. The timer operates normally until the number of days since the last regeneration reaches the **Regeneration Day Override** setting. Once this occurs, a regeneration cycle is initiated at the preset **Regeneration Time**.

Flow Meter Equipped Timer

During normal operation the **Time of Day** display alternates with the **Volume Remaining** display (m³).

- As treated water is used, the **Volume Remaining** display counts down from the calculated system capacity to zero or (---). When this occurs a **Regeneration Cycle** begins or delays to the set Regeneration Time.
- Water flow through the valve is indicated by the Flow Dot that flashes in a direct relationship to flow rate.

MODEL 2900NT

Timer operation

Immediate Regeneration Timer with Regeneration Day Override Set

When the valve reaches the set **Days Since Regeneration Override** value, a **Regeneration Cycle** initiates immediately. This occurs even if the **Volume Remaining** display has not reached zero.

Delayed Regeneration Timer with Regeneration Day Override Set

When the timer reaches the set **Days Since Regeneration Override** value a **Regeneration Cycle** initiates at the preset **Regeneration Time**. This occurs even if the **Volume Remaining** display has not reached zero.

Timer Operation During Programming

The timer only enters the Programme Mode with the timer **In Service**. While in the Programme Mode the timer continues to operate normally, monitoring water usage and keeping all displays up-to-date. Timer programming is stored in memory permanently. There is no need for battery backup power.

Timer Operation During A Power Failure

During a power failure all timer displays and programming are stored for use when power is restored. The timer retains all values, without loss. When power is restored the timer resumes normal operation from the point that it was interrupted.

NOTE: An inaccurate **Time of Day** display may indicate a previous power outage.

Remote Lockout

The timer does not allow the unit/system to go into **Regeneration** until the **Regeneration Lockout Input** signal to the unit/system is cleared. This requires a contact closure to activate. See wiring diagram, page 22

Remote Signal Start Regeneration

The control valve/system is initiated by a device other than a water meter. The timer receives a closed contact signal for the amount of time specified. Regeneration begins immediately. See wiring diagram, page 22

Day Override Feature

If the **Day Override** option is turned on and the valve reaches the set Regeneration Day Override value without the water meter initiating a **Regeneration Cycle**, a **Regeneration Cycle** queues. This occurs regardless of the remaining volume available.

MODEL 2900NT

Timer operation

System 4

Time Clock (1 Valve)

During normal operation the **Time of Day** display may be viewed at all times. The control operates normally until the number of days since the last regeneration reaches the **Regeneration Day Override** setting. Once this occurs, a **Regeneration Cycle** initiates at the preset **Regeneration Time**.

Meter Delayed (1 Valve)

During normal operation the **Time of Day** display alternates with the **Volume Remaining** display.

- As treated water is used, the **Volume Remaining** display counts down from the calculated system capacity.
- The system monitors the volume of water used. When the system calculates that there is not a sufficient capacity for the next day's operation, a regeneration cycle is initiated at the preset regeneration time.
- Water flow through the valve is indicated by the Flow Dot that flashes in a direct relationship to flow rate.

Meter Immediate (1 Valve)

During normal operation the **Time of Day** display alternates with the **Volume Remaining** display.

- As treated water is used, the **Volume Remaining** display counts down from the calculated system capacity to zero or (- - -). When this occurs a **Regeneration Cycle** is started.
- Water flow through the valve is indicated by the Flow Dot that flashes in a direct relationship to flow rate.

System 5

Interlock (2 – 4 Valves)

During normal operation the **Time of Day** display alternates with the **Volume Remaining** display.

- As treated water is used, the **Volume Remaining** display counts down from the calculated system capacity to zero or (- - -). When this occurs a **Regeneration Cycle** queues.
- If no other valve is in **Regeneration** the valve generates a lock command and starts a **Regeneration Cycle**.
- If another valve is in **Regeneration** (i.e. the system is already locked) the valve remains **In Service** with **Regeneration** queued until other valves complete **Regeneration**.
- Water flow through the valve is indicated by the Flow Dot that flashes in a direct relationship to flow rate.

System 6

Series (2 – 4 Valves)

During normal operation the **Time of Day** display alternates with the **Volume Remaining** display.

The **Volume Remaining** is the total volume for all units in the system.

- As treated water is used, the **Volume Remaining** display counts down from the calculated system capacity to zero or (- - -). When this occurs a **Regeneration Cycle** queues.
- If no other valve is in regeneration the valve sends a lock command and starts a **Regeneration Cycle**.
- If another valve is in regeneration (i.e. the system is already locked) the valve remains **In Service** until other valves complete regeneration, then regeneration is queued. The LEAd valve locks the system and **Regeneration** begins.
- When the LEAd valve completes regeneration cycle the remaining valve(s) in the system regenerate sequentially until all valves regenerate.
- Water flow through the valve is indicated by the Flow Dot that flashes in a direct relationship to flow rate.
- LAg valve volume remaining is updated every 5 seconds from the LEAd valve.
- A manually forced regeneration (**Extra Cycle** button) can only be done on the LEAd valve and only if the system is not in **Regeneration**.

MODEL 2900NT

Timer operation

System 7

Alternating (2 Valves)

During normal operation the **Time of Day** display alternates with the **Volume Remaining** display.

The **Volume Remaining** is the total volume for all units in the system.

- As treated water is used, the **Volume Remaining** display counts down from the calculated system capacity to zero or (- - -). When this occurs a **Regeneration Cycle** queues.
- The valve requiring **Regeneration** sends a lock command to the standby valve. The standby valve goes to **In Service** and exhausted unit valve starts a **Regeneration Cycle**.
- If a valve is in **Regeneration** and the other system exhausts its volume remaining, then the exhausted system valve remains **In Service** with **Regeneration** queued until the other valve goes into standby. The exhausted system valve goes into standby after completing **Regeneration**.
- Water flow through the valve is indicated by the Flow Dot that flashes in a direct relationship to flow rate.

System 9

Alternating (2 – 4 Valves)

During normal operation the **Time of Day** display alternates with the **Volume Remaining** display.

The **Volume Remaining** is the total volume for all units in the system.

- As treated water is used, the **Volume Remaining** display counts down from the calculated system capacity to zero or (- - -). When this occurs a **Regeneration Cycle** queues.
- The valve requiring **Regeneration** sends a lock command to the standby valve. The standby valve goes to **In Service** and exhausted valve starts a **Regeneration Cycle**.
- If a valve is in **Regeneration** and another valve exhausts its volume remaining, then the exhausted valve remains **In Service** with **Regeneration** queued until the other valve goes into standby. The exhausted valve goes into standby after completing **Regeneration**.
- All units remain **In Service** except those in standby or **Regeneration**.
- Water flow through the valve is indicated by the Flow Dot that flashes in a direct relationship to flow rate.

Important System Operation Tips

When programming multi-unit systems, programme LAg units first and then the LEAd unit. This eliminates or minimizes lower drive movement due to system type changes and errors.

When changing a valve from one system type to another system type, perform a Master Reset first.

System 6, 7 and 9 valves coming out of programme mode or on power-up calculate their volume (display = **CALC**) and then wait for a good communication signal.

- When a good communication signal is received, the system resume normal operations.
- If the system does not receive a good communication signal, **CALC** displays and the system goes into a wait. Press the **Extra Cycle** button to force the system out of the wait and resume normal operation.

The System 4, 5 and 6 LEAd valve drive sequence going into **Regeneration** is:

- The lower drive moves to off-line and the upper drive moves to first **Regeneration** position. System 6 LAg valves and all system 7 and 9 valves:
- The off-line valve moves to online, the valve requiring **Regeneration** moves its lower drive to off-line and then the upper drive moves to first **Regeneration** position.

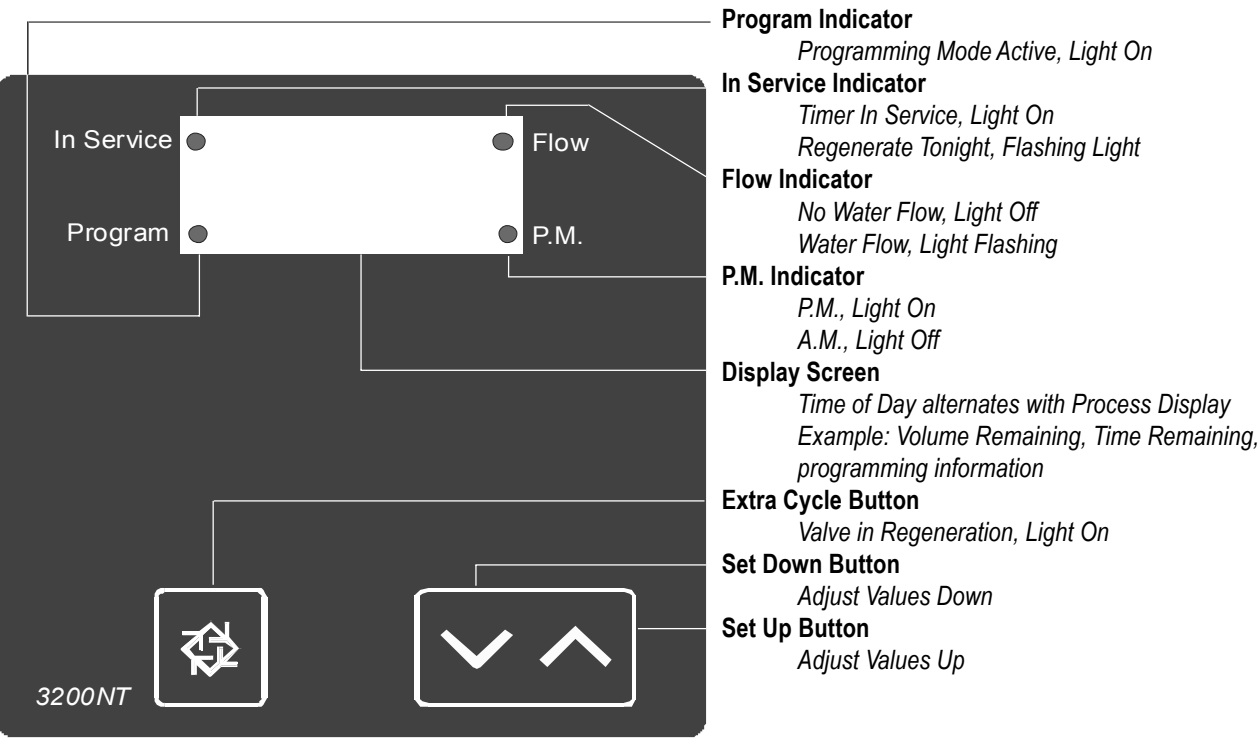
Reserve capacity–System 4Fd only. After power-up or Master Reset, the reserve is set to one-third of the calculated capacity. Reserve is limited to a range of zero–capacity.

System 6 and 7, LEAd units only, respond to remote lock and chemical pump. Also chemical pump is available only if the auxiliary relay in regeneration is not used [**AroF**]

MODEL 2900NT

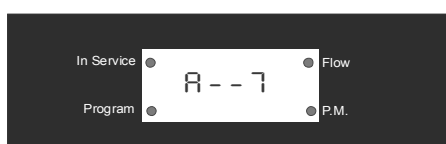
Timer Displays

Timer Display Identification



MODEL 2900NT

Timer Programming Mode



1. Enter 3200NT Programming Mode

Press and hold both the **Set Up** and **Set Down** buttons for five (5) seconds to enter Programming Mode. When the programme mode is entered, the programme light illuminates.

2. Set Feed Water Hardness

The feed water hardness setting displays only if the Regeneration Type is set to Meter Immediate or Meter Delayed.

- Press the **Set Up** and **Set Down** buttons to set the amount of feed water hardness (mg/l $\text{CaCO}_3 \div 10$). The system automatically calculates treated water capacity based on the feed water hardness and the system capacity.
- Press the **Extra Cycle** button to proceed to the next step.

3. Set Regeneration Time

A non-flashing colon between two sets of numbers identifies the **Regeneration Time** display. Set the desired time of day that you want **Regeneration** to occur.

- Press the **Set Up** and **Set Down** buttons to adjust this value.
- Press the **Extra Cycle** button to proceed to the next step.

4. Set Regeneration Day Override

Use this display to set the maximum amount of time (in days) the unit can be **In Service** without a **Regeneration**.

- For System 4 Time Clock regeneration mode the system regenerates at the time set in Step 4 after the number of days programmed in this step.
- For all other System Types (4 Meter Immediate, 4 Meter Delayed, 5, 6, 7, 9) the system regenerates after the number of days programmed in this step unless the meter initiates a **Regeneration** cycle earlier.
- Press the **Extra Cycle** button to proceed to the next step.

Timer programming is complete and exits from the Programming Mode. Normal operation resumes.

MODEL 2900NT

Timer Display Definitions & Examples

Time of Day



m3 Treated Water Remaining (4 digit)



m3 Treated Water Remaining (More than 4 digits t = x 1000)



Zero Treated Water Remaining



Communication Error



Calculating the Volume Remaining



Programming Error



Timer is Locked Out



Remote Start Signal Applied



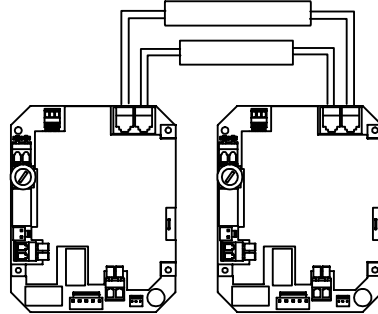
Timer is Remotely Locked Out



MODEL 2900NT

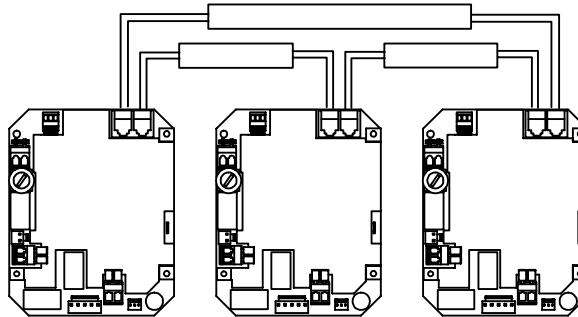
Multi-Tank Networked Timer Configuration Schemes

Two Timers



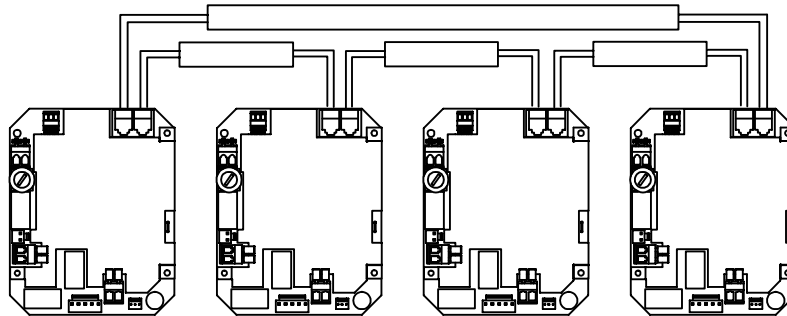
Network Timer System Wiring Scheme for System 5, 6, 7 and 9 Duplex

Three Timers



Network Timer System Wiring Scheme for System 5, 6 and 9 Triplex

Four Timers



Network Timer System Wiring Scheme for System 5, 6 and 9 Quadplex

Interlocking 3200NT's

Note: Use only 6-place, 4-conductor, RJ11 phone or extension cables.

1. Connect phone or extension cables before attempting programming.
 - System Tuype 7 and 6: Flow meter cable must be connected to the timer defined as the **LEAd** timer.
2. A maximum cable length of 7,6m can be used between timers.
3. Always connect "IN" communication port to the "OUT" communication port of the next timer. Connect the last timer back to the first timer.

MODEL 2900NT

Troubleshooting

Communication Error

If a communication error is detected, **cErr** displays. It may take several minutes for all of the units in a system to display the error message.

- All units **In Service** remain in the **In Service** position.
- All units in standby go to **In Service**.
- Any unit in regeneration when the error occurs completes regeneration and goes to **In Service**.
- No units are allowed to start a regeneration cycle while the error condition exists.
- When the communication problem is corrected and the error no longer displays (it may take several minutes for all of the units in a system to stop displaying the error message), the system returns to normal operation.

NOTE: During the error condition the control continues to monitor the flow meter and update the remaining volume. Once the error condition is corrected all units return to the operating status they were in prior to the error and regeneration is queued according to the normal system operation. If reprogramming the unit in the Master Programming Mode clears the error, the volume remaining may be reset to the full unit capacity (i.e. as though it were just regenerated).

NOTE: System 4 units retain their normal display and do not display **cErr**.

Cause	Correction
A. One or more units have a missing or bad communication cable.	A. Connecting the communication cables.
B. One or more units has a communication cable plugged into the wrong receptacle.	B. Connecting the communication cable as shown on the wiring diagrams.
C. One or more units is not powered.	C. Powering all units.
D. One or more of the units programmed as a stand alone system 4tc, 4FI or 4Fd and one or more units programmed as a multi-unit system 5FI, 6FI, 7FI or 9FI.	D. Programming the units for the same system type in the Master Programming Mode.
E. All of the units programmed as LAg. With no unit programmed as a LEAd (there is no unit to start the communications).	E. Programming the units correctly in the Master Programming Mode.

MODEL 2900NT

Troubleshooting

Programming Error

Units display **PErr** when a programming error occurs.

- If multiple units are programmed as LEAd, **PErr** displays on all units.
- All units **In Service** remain in the **In Service** position.
- All units in standby go to **In Service**.
- Any unit in regeneration when the error occurs completes regeneration and goes to **In Service**.
- No units are allowed to start a regeneration cycle while the error condition exists.
- When the problem is corrected and the error no longer displays (it may take several minutes for all of the units in a system to stop displaying the error message), the system returns to normal operation.

NOTE: During the error condition the control continues to monitor the flow meter and update the remaining capacity. Once the error condition is corrected all units return to the operating status they were in prior to the error and regeneration is queued according to the normal system operation. If reprogramming the unit in the Master Programming Mode clears the error, the volume remaining may be reset to the full unit capacity (i.e. as though it were just regenerated).

NOTE: System 4 units retain their normal display and do not display **PErr**.

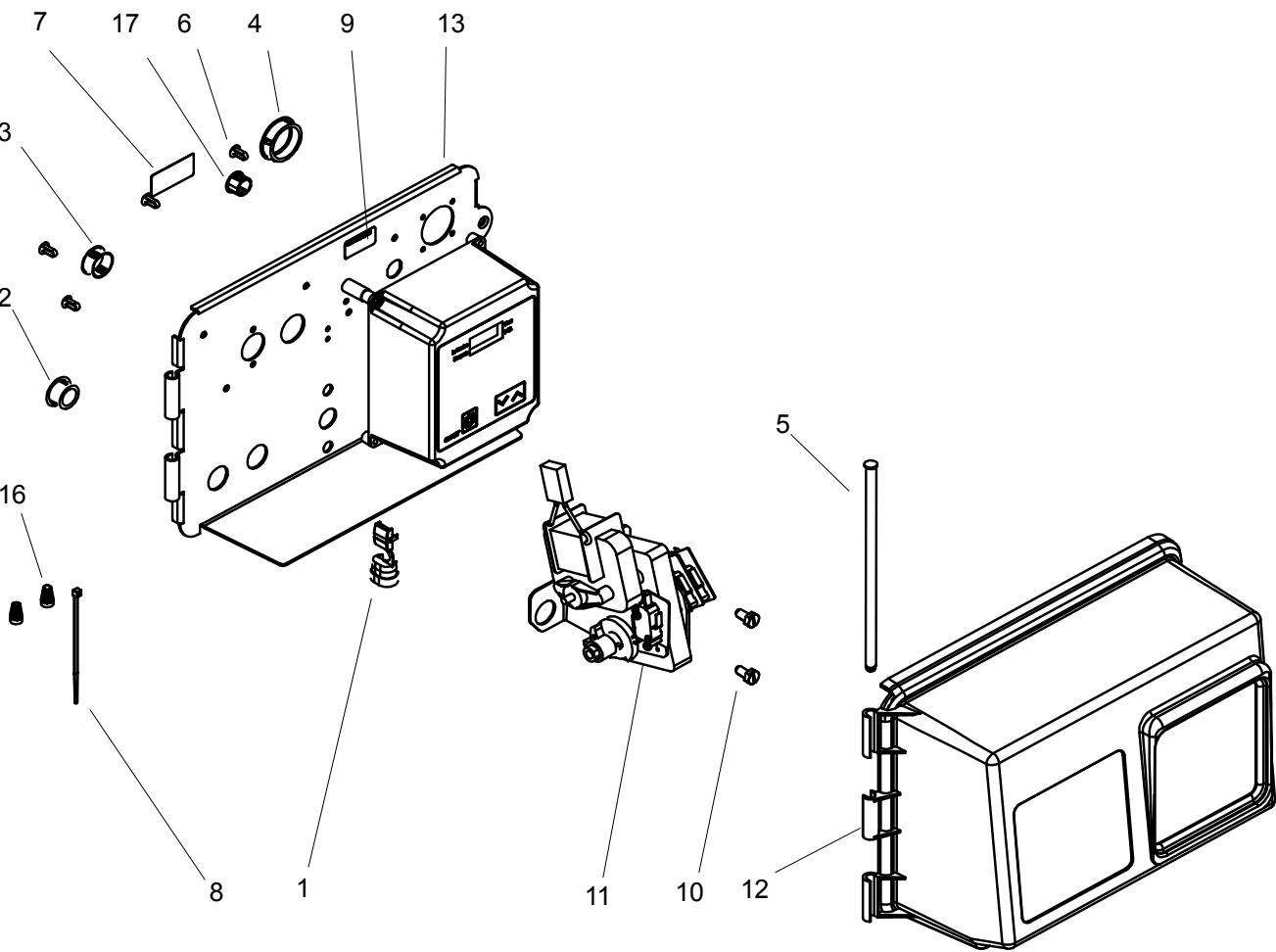
Cause	Correction
A. One or more units programmed as System type different from the LEAd unit.	A. Programming the units correctly in the Master Programming Mode.
B. More than one unit programmed as the S unit.	B. Programming the units correctly in the Master Programming Mode.
C. One or more units programmed with different hardness, day override or line frequency values.	C. Program these values to be the same on all units.

Simultaneous Communication and Programming Errors

If both a communication and programming errors occur simultaneously, the communications error (**cErr**) has precedence and masks the programming error (**PErr**). When the communications error (**cErr**) is corrected, the programming error (**PErr**) displays until corrected.

MODEL 2900NT

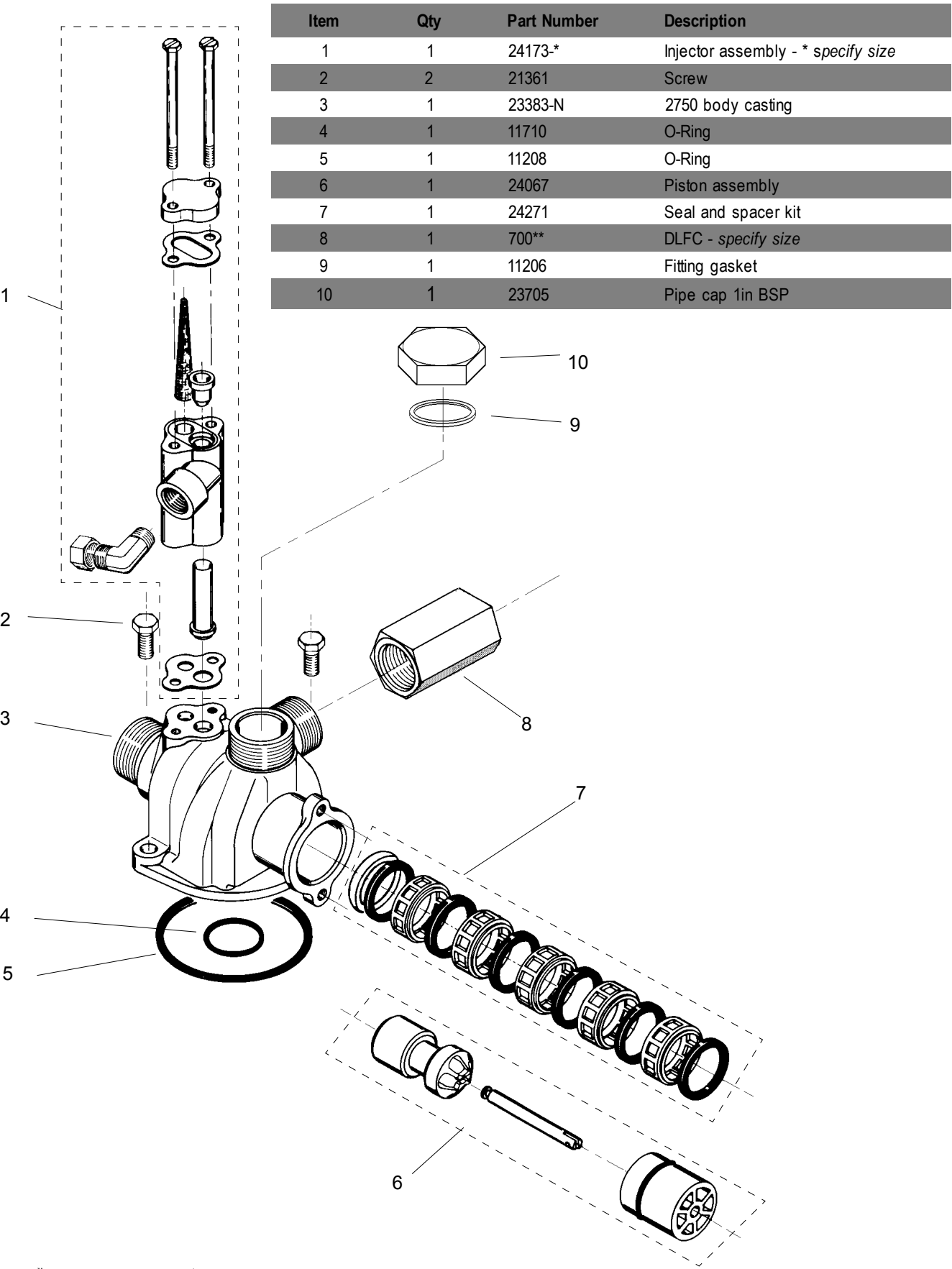
control valve assembly



Item	Qty	Part No.	Description
1	1	13547	Strain relief
2	2	13741	Hole plug - 3/4in
3	1	15806	Hole plug - 20.6mm
4	1	17421	Hole plug - 1.20mm
5	1	17845-02	Hinge pin
6	4	19801	Hole plug 0.19
7	1	21271	Serial number label
8	1	21759	Tie wrap
9	1	23474	Assembly label
10	2	23728	Screw
11	1	27204	Drive motor assy 24vac - 50Hz.
12	1	26217	Cover assembly
13	1	28111	Backplate
14	1	28255	3200NT timer assy
15	1	40941	Wire harness (not shown)
16	2	40422	Wire nut
17	1	41035	Strain relief plug

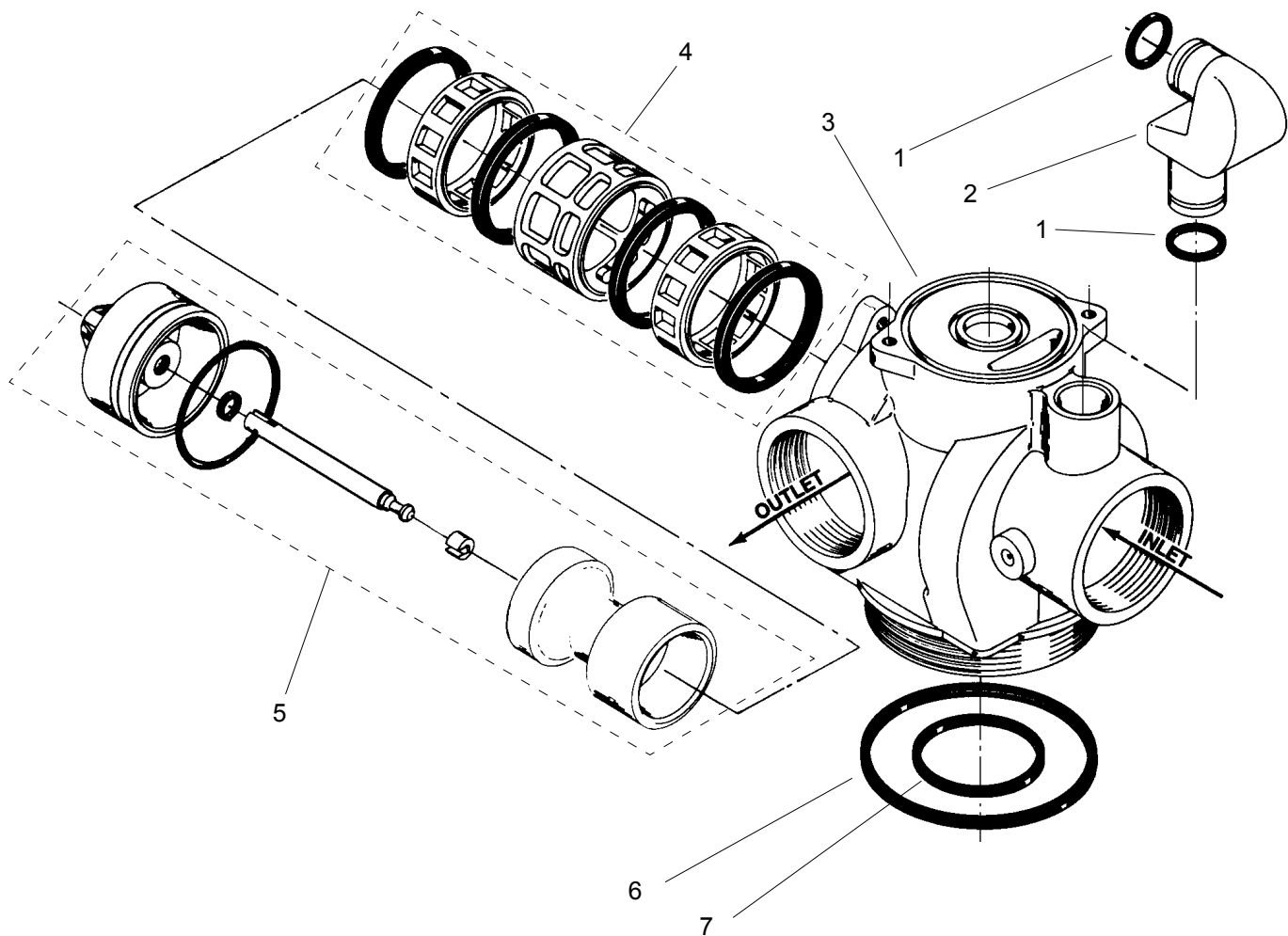
MODEL 2900NT

valve body assembly



MODEL 2900NT

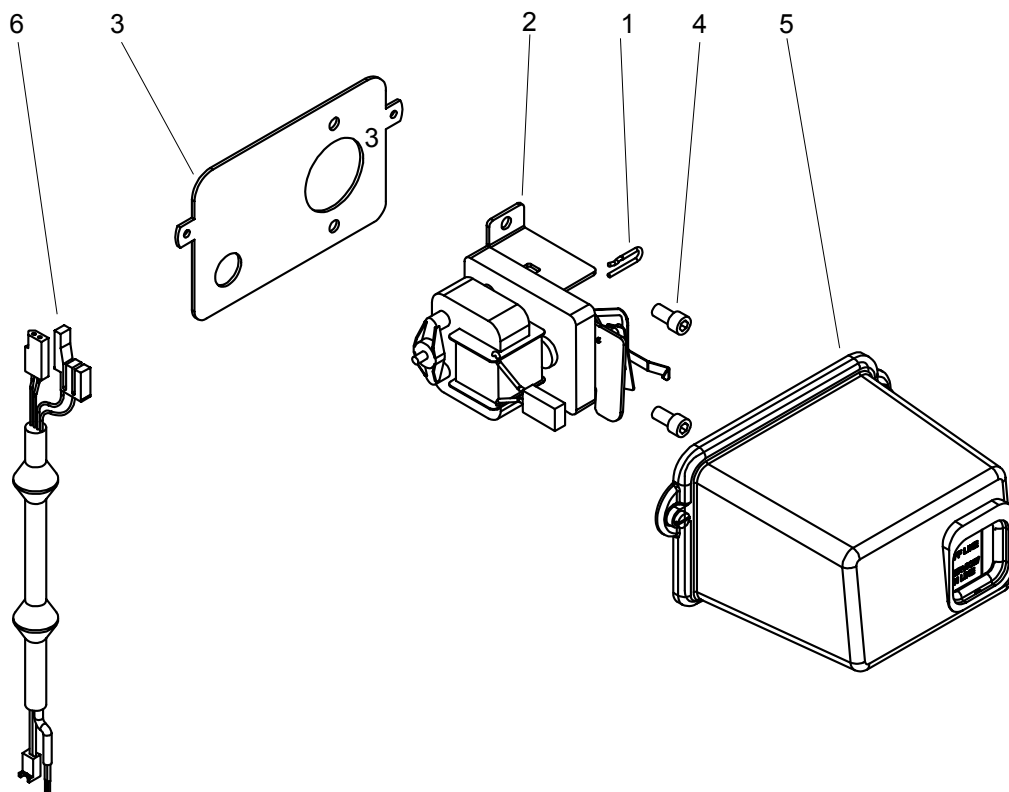
adaptor control valve assembly



Item	Qty	Part No.	Description
1	2	14812	O-Ring 560-CD
2	1	14751	Coupling
3	1	14750-21-N	2in Adaptor
4	1	24205	Seal and spacer kit
5	1	24206	Piston assy - NBP
6	1	15210	O-Ring (Park tank)
7	1	13577	O-Ring

MODEL 2900NT

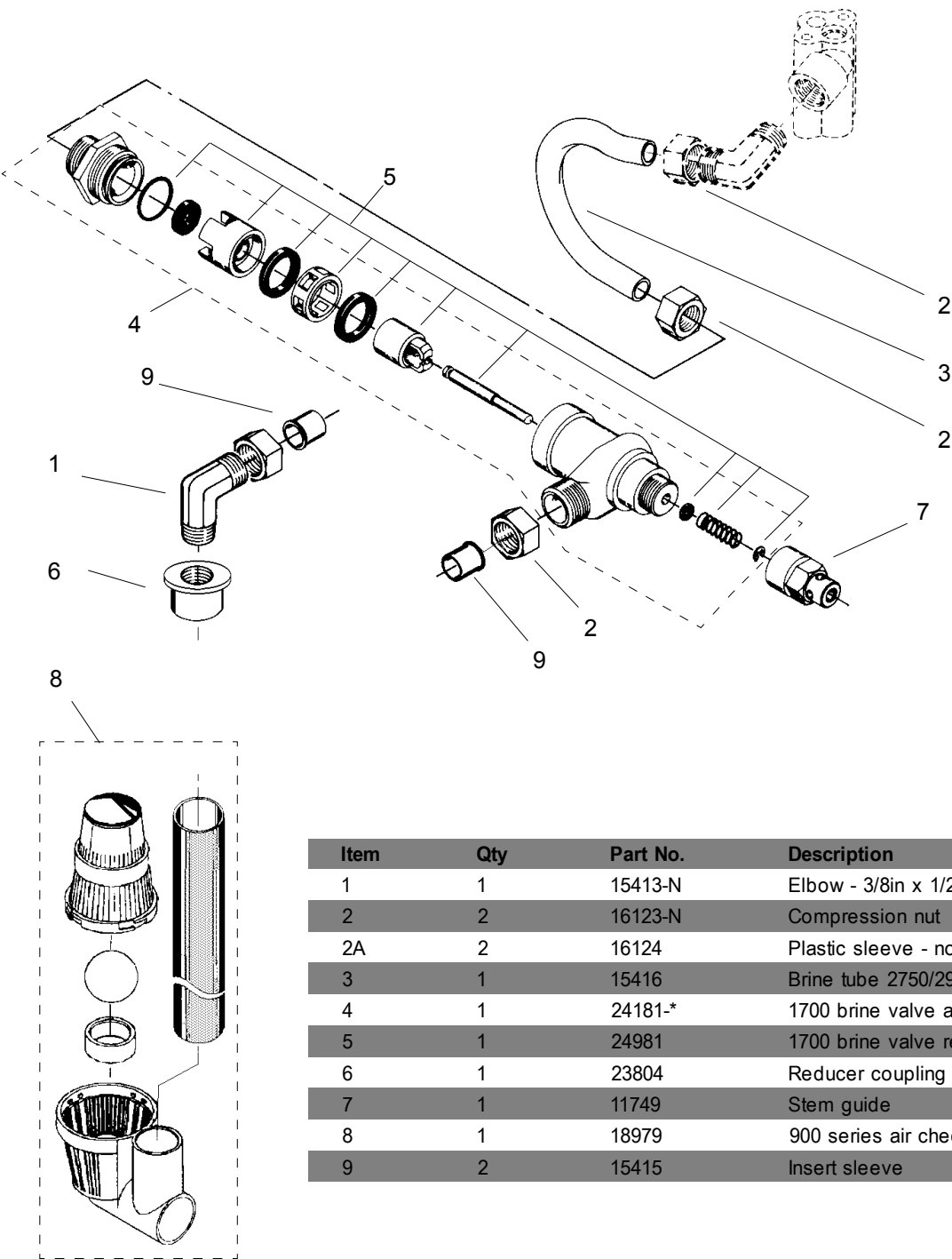
adaptor control drive assembly



Item	Qty	Part No.	Description
1	1	14831	Connecting link pin
2	1	18357	Drive motor assy 24vac- 50Hz
3	1	18709-50	Backplate
4	2	21361	Screw - M8x16
5	1	26218	Cover assembly
6	1	40943	Wire harness

MODEL 2900NT

1700 brine valve assembly

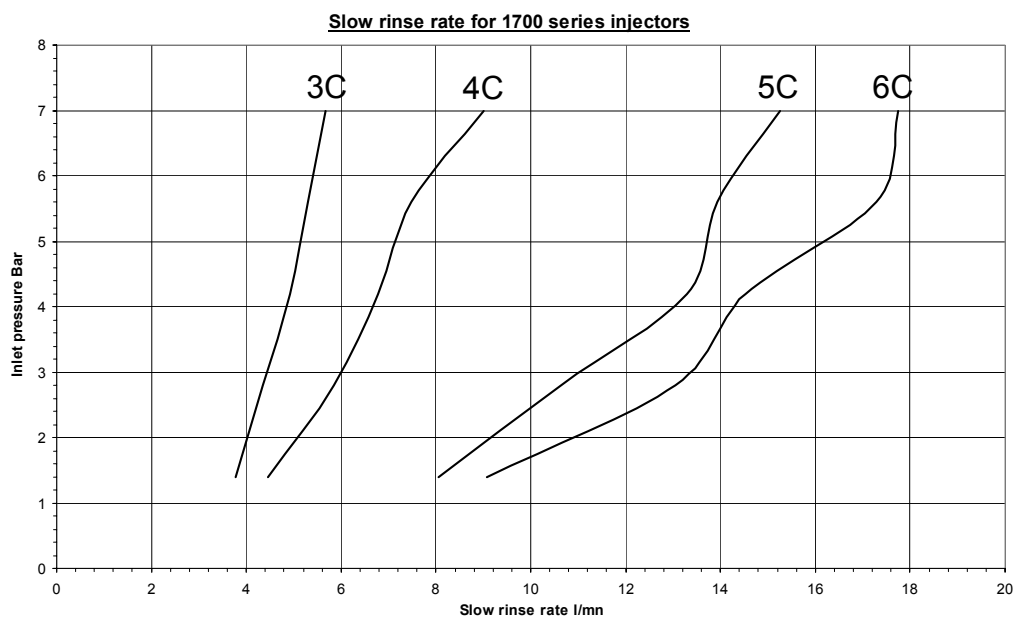
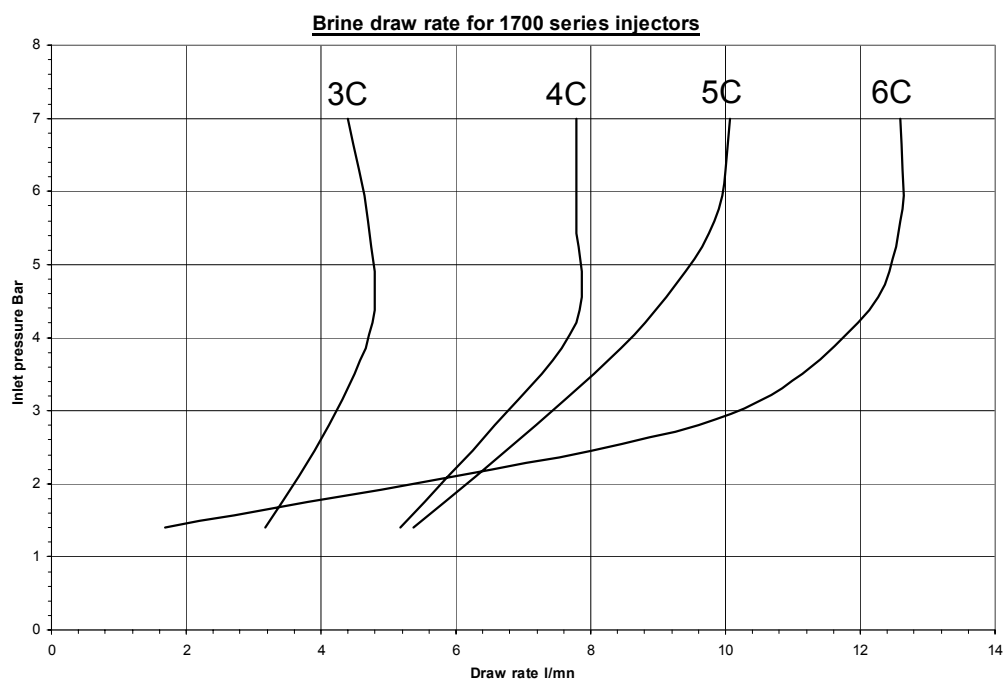


Item	Qty	Part No.	Description
1	1	15413-N	Elbow - 3/8in x 1/2in tube
2	2	16123-N	Compression nut
2A	2	16124	Plastic sleeve - not shown
3	1	15416	Brine tube 2750/2900
4	1	24181-*	1700 brine valve assy - *specify size
5	1	24981	1700 brine valve repair kit
6	1	23804	Reducer coupling
7	1	11749	Stem guide
8	1	18979	900 series air check assy
9	2	15415	Insert sleeve

MODEL 2900NT

ejector performance data

Please carefully note: The indicated ejector data is for guidance only on the relative performance between sizes. Many factors influence actual performance, particularly the Ejector Draw Rate. As a result, the Brine Draw & Slow Rinse phase of the regeneration cycle should be established as part of the on site commissioning procedure.



MODEL 2900NT

Wiring scheme

