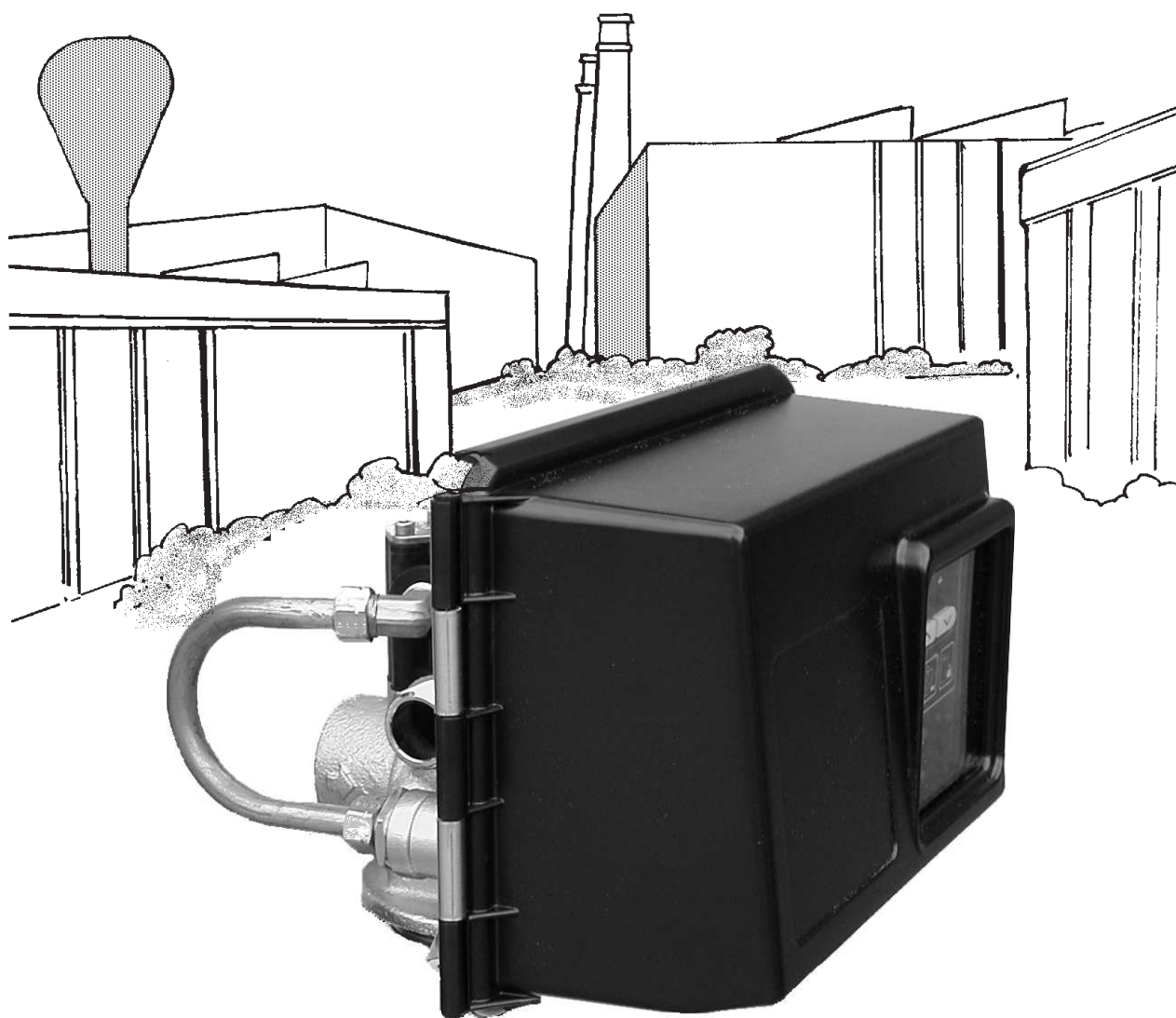


Model 2850SE

Customer Manual



installation information

MODEL 2850SE

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.

Physical Installation

- 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 **10mm 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 2850SE

Control Start-Up Procedures

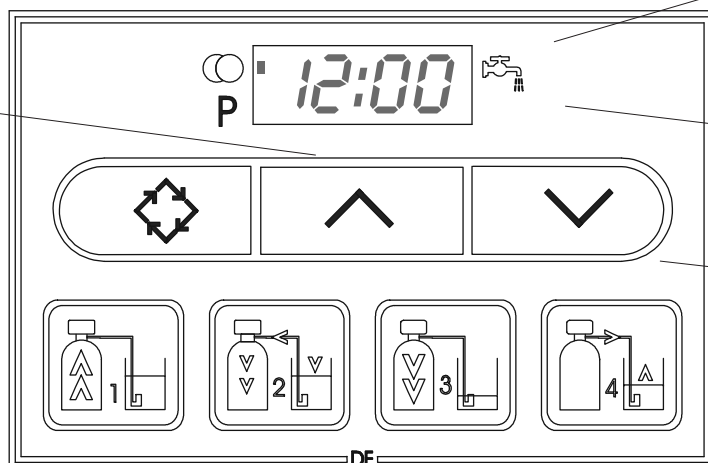
1. Set Time of Day

Whenever the valve is in Service the current time of day can be adjusted, the control programmed or an extra regeneration initiated

Service Indicator:

Valve in SERVICE - Dot ON
Extra Cycle Set - Dot flashing

Set UP
Button



Flow Indicator:
Flashing Dot when
water flows

P.M. Indicator

Set DOWN
Button

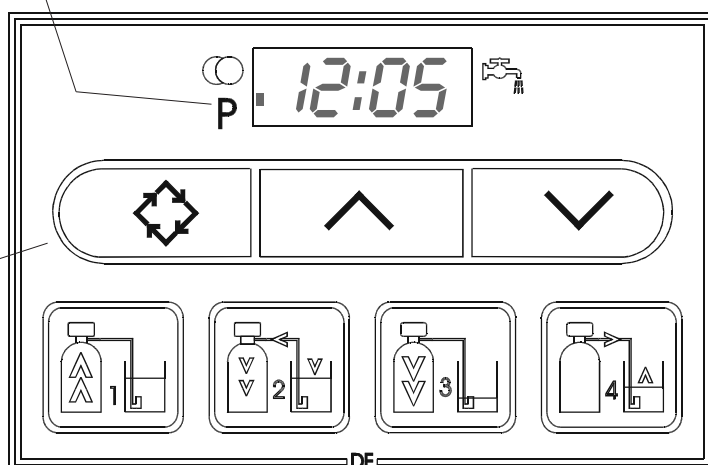
Push either the UP or DOWN set button once to adjust the Time of DAY display by one digit.
Push and HOLD either the UP or DOWN set button to adjust the Time of Day display by multiple digits

2. Enter Control Programming Mode

Programme Mode Indicator:

Programme mode entered - Dot ON

Extra Cycle
Button



1. Push and HOLD both the UP or DOWN set button to enter Programming Mode.
2. Push the Extra Cycle Button once per display until all have been viewed and this mode is exited and normal operation is resumed.

MODEL 2850SE

Control Start-Up Procedures

3. Set Control Programming

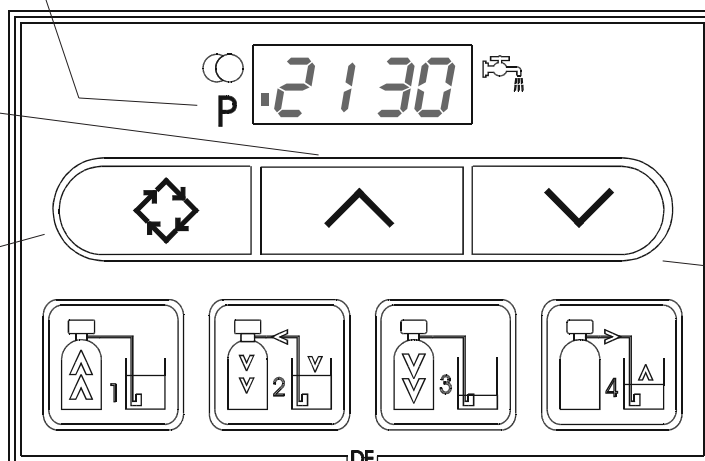
Depending on current control programming, option setting displays that are not required to be set will not be viewed.

Programme Mode Indicator:

Programme mode entered - Dot ON

Set UP
Button

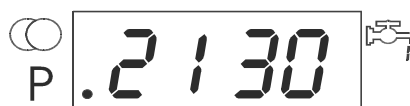
Extra Cycle
Button



Set DOWN
Button

1. The first option setting display that appears in the Programme Mode is Treated Water Capacity. using the Set UP or DOWN button, set the display to the capacity of the system in LITRES. For example:

2130 litres treated water capacity



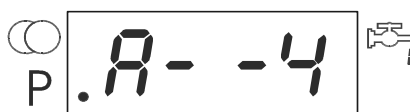
2. Push the Extra Cycle button. The second option setting display that appears is Regeneration Time. using the set UP or DOWN buttons, adjust the display to the time of day when you want a regeneration cycle to start. For example:

2:00 AM regeneration start



3. Push the Extra Cycle button. The third option setting that appears is the Regeneration Day Override. using the set UP or DOWN button, adjust the maximum number of days before a regeneration MUST occur (4 days is the recommended setting). For example:

Regenerate at least every 4 days



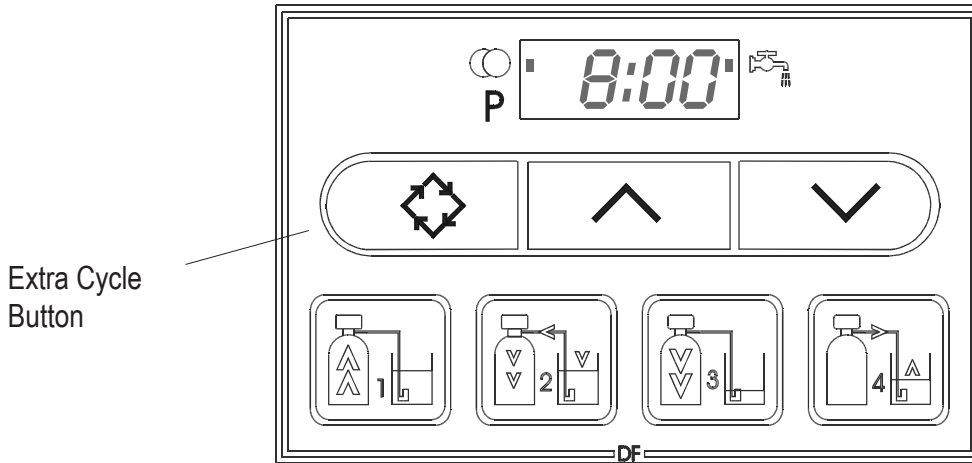
4. Control programming is now complete. Push the Extra Cycle button again to exit the programming mode and return to normal service.

MODEL 2850SE

Control Start-Up Procedures

4. Start an Immediate Regeneration

When starting an extra regeneration cycle you will have one or two options, depending on how your control is set up:



1. **Press and Release to Extra Cycle button:**































- With **Immediate Regeneration** controls the control will go into regeneration immediately.
- With **Delayed Regeneration** controls the service arrow will begin to flash immediately and a regeneration will occur at the preset regeneration time.

2. **Press and HOLD for the Extra Cycle button for 5 seconds:**

- With **Delayed Regeneration** controls this will force an immediate regeneration.

5. Regeneration Cycle Displays

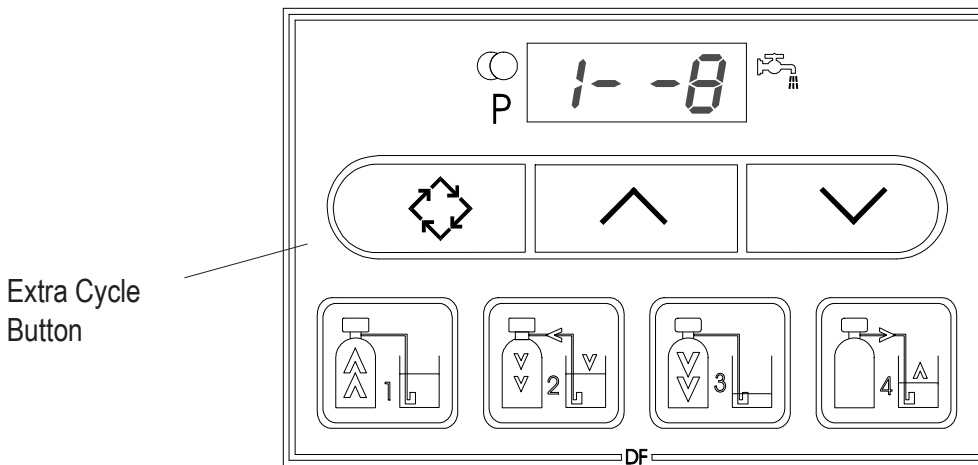
The following series of displays appear when the control enters a regeneration cycle.
(times indicated are examples only):

| | | | | | | |
|--|---|---|------|--|---|--|
| Valve driving to regen step #1 |  P  |  | Then |  P  |  | Less than 9 min. remains in regen step #1 |
| Valve driving to regen step #2 |  P  |  | Then |  P  |  | Less than 59 min. remains in regen step #2 |
| Valve driving to regen step #3 |  P  |  | Then |  P  |  | Less than 9 min. remains in regen step #3 |
| Valve driving to regen step #4 |  P  |  | Then |  P  |  | Less than 12 min. remains in regen step #4 |
| Regen complete. Valve driving to service position |  P  |  | Then |  P  |  | Valve has returned to service |

MODEL 2850SE

Control Start-Up Procedures

6. Fast Cycling the Valve through a Regeneration



- A. Initiate a regeneration - see step 4. Once the valve reaches Regen step #1 let water flow to drain for approx. 5 minutes.

Next, manually step the valve through a regeneration cycle, check valve function in each step:

- B. Push the **Extra Cycle** button once to advance the valve to Regen. step # 2
C. Push the **Extra Cycle** button once to advance the valve to Regen. step # 3
D. Push the **Extra Cycle** button once to advance the valve to Regen. step # 4
E. Push the **Extra Cycle** button a last time to advance the valve back to SERVICE

7. Final Set-Up

With proper valve operation verified:

- A. Add water to the salt container until the top of the air check is covered. Manually step the valve into the **BRINE DRAW** position (step #2) and allow the valve to draw water out of the salt container until the water level reduces no further. The water level should be at the midpoint of the screen section of the screen intake area,
- B. Manually step the valve to the **BRINE REFILL** position and then allow the valve to return to the **SERVICE** position automatically.
- C. With the valve in the **SERVICE** position, place salt into the salt container to the recommended level. - Use the type of salt recommended by your supplier.

Set-Up is now completed and the control can be left to run automatically.

MODEL 2850SE

Control Operation

Time Initiation Valves

In normal operation the Time of Day display will be viewed at all times. The control will operate normally until the number of days since the last regeneration reaches the Day Override setting. At this point a regeneration will be initiated at the Preset regeneration time.

Volume Initiated Valves

In normal operation the Time of day display will alternate with a Volume Remaining display. This volume displayed will be in LITRES. As treated water is produced, the Volume remaining display will count down towards zero (displayed as [- - -]). On reaching zero, a regeneration will be initiated either immediately or delayed until the pre-set regeneration time, depending on how the control is configured. Water flow through the valve is indicated by the Flow Dot flashing in direct relationship to the flow rate.

Immediate Regeneration set-up with Day Override programmed.

If the the valve reaches the Day Override value before the zero volume point is reached then the valve will regenerate at the same time as the previous regeneration. On completion of the regeneration cycle the system capacity will be reset to the pre-set maximum system capacity.

Delayed Regeneration set-up with Day Override programmed.

If the the valve reaches the Day Override value before the zero volume point is reached then the valve will set to regenerate at the pre-set regeneration time. On completion of the regeneration cycle the system capacity will be reset to the pre-set maximum system capacity.

Control Operation during regeneration.

During regeneration the control will display the system status. The display window will indicate the regeneration step that the valve is advancing to, or has reached, and the time remaining in that step. The step number displayed will flash until the valve has completed driving to its next step position. Once all regeneration steps have been completed the valve will return automatically to the SERVICE position and resume normal operation. NOTE: Pushing the Extra Cycle button during a regeneration cycle will immediately advance the valve to the next cycle step position. Avoid doing this unless you understand the consequences of your actions.

Control Operation during programming.

The control will only enter the Programming Mode with the valve in the SERVICE position. While in the Programme Mode the control will continue to operate normally, monitoring water flow and maintaining time etc. NOTE: Control programming is stored in permanent memory so battery backup is not required.

Control Operation during power failure.

During a power failure all displays and programming will be retained. Water will continue to flow but the volume will not be monitored. When power is restored the control will resume operation from the point when power was lost. An indication of power loss is an inaccurate Time of Day display.

MODEL 2850SE

Timer setting

To determine the appropriate frequency of regeneration:

The following data is for general guidance only. Many factors influence water consumption and water softener capacity. Your water softener supplier/installer should be consulted for expert guidance.

- a). Establish the total likely 24 hour water consumption in cubic meters (m³).
- b). *Determine the hardness of the incoming water supply in mole/m³ (mg/l as CaCO₃).
- c). *Determine the quantity of resin contained in your pressure vessel in cubic meters (m³).
- d). *Determine the optimum regeneration level for your requirements in kg NaCl /m³ resin

** see page 1 for original setting data*

From the following table, determine the approximate softening capacity of your installation:

| kg NaCl /m ³ resin | Softening capacity kg. CaCO ₃ / m ³ resin |
|-------------------------------|---|
| 100 | 48 |
| 130 | 55 |
| 160 | 60 |

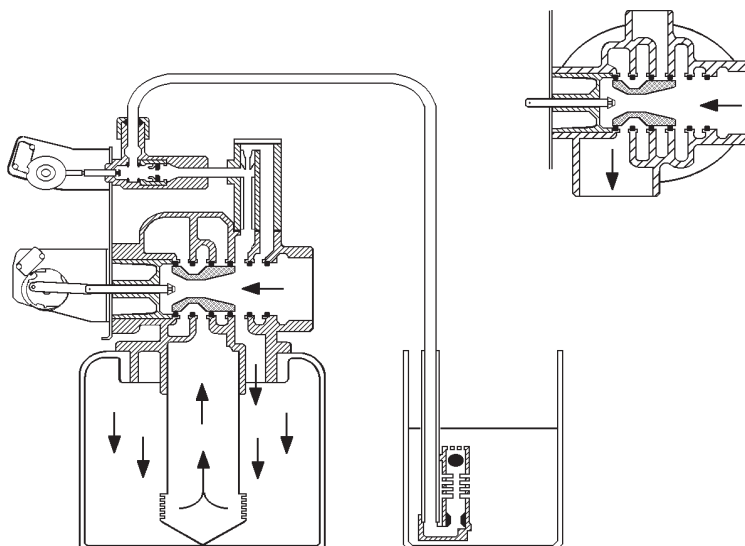
$$\text{Softening capacity (m}^3\text{)} = \frac{\text{resin capacity (kg. CaCO}_3\text{ / m}^3\text{)} \times \text{resin volume (m}^3\text{)} \times 1000}{\text{water hardness (mg/l CaCO}_3\text{)}}$$

$$\text{Regeneration frequency} = \frac{\text{softening capacity (m}^3\text{) rounded down to a whole number}}{\text{24 hour consumption (m}^3\text{)}}$$

MODEL 2850SE

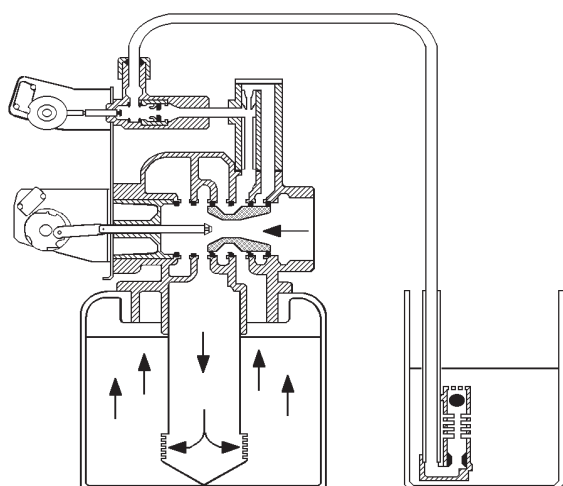
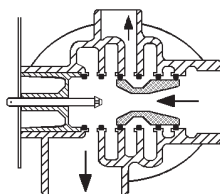
Flow diagrams

1 SERVICE POSITION



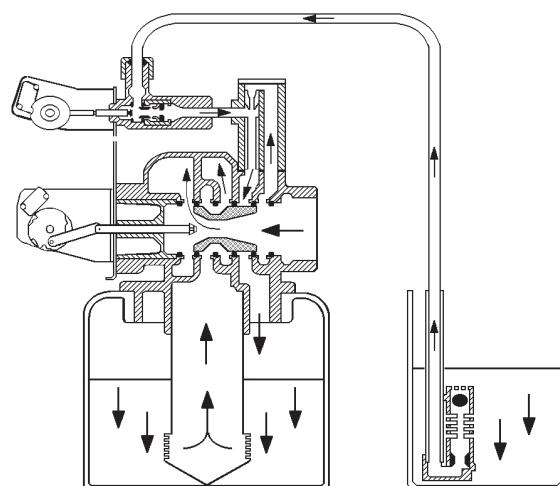
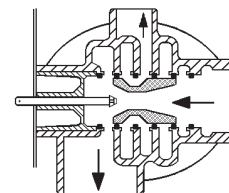
Hard water enters the unit at the valve inlet and flows down through the resin in the resin vessel. Softened water enters the centre tube through the bottom screen, then flows up through the centre tube, around the piston and exits from the valve outlet.

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

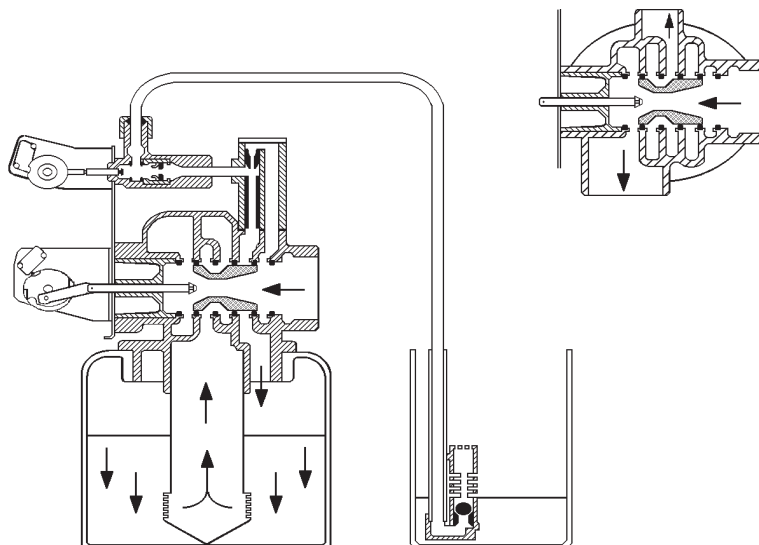


Hard water enters the unit at the valve inlet, flows up into the injector housing and down through the injector nozzle and throat, drawing brine from the brine tank. Brine flows down through the resin exits via the bottom screen, up through the centre tube and exits via the valve drain port.

MODEL 2850SE

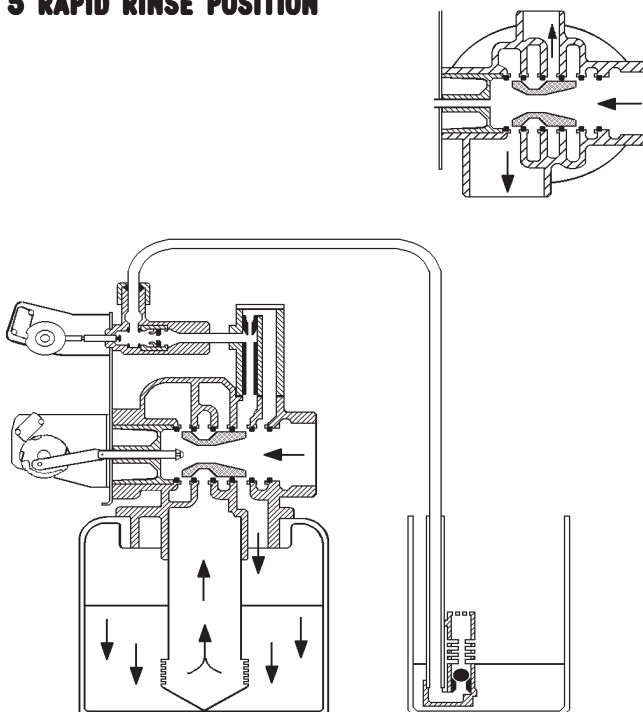
flow diagrams

4 SLOW RINSE POSITION



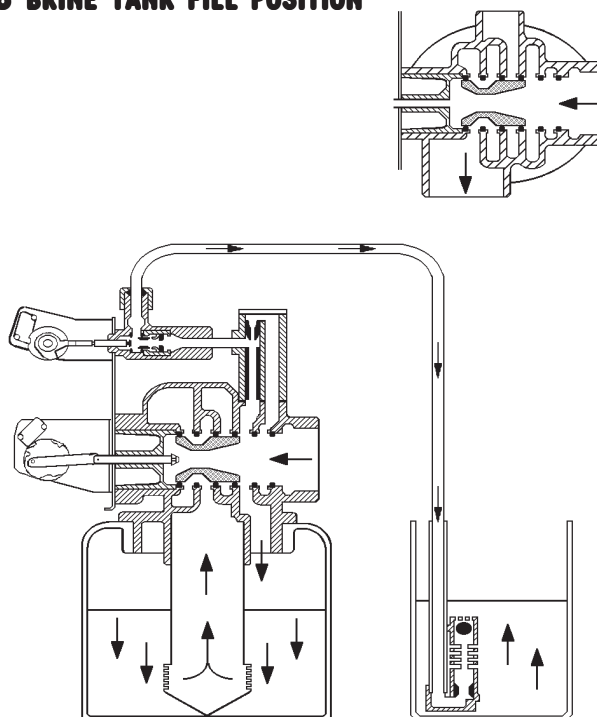
Hard water enters the unit at the valve inlet, flows up into the injector housing and down through the injector nozzle and throat, around the piston and down through the resin. It enters the bottom screen, up through the centre tube and exits via the valve drain port.

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.

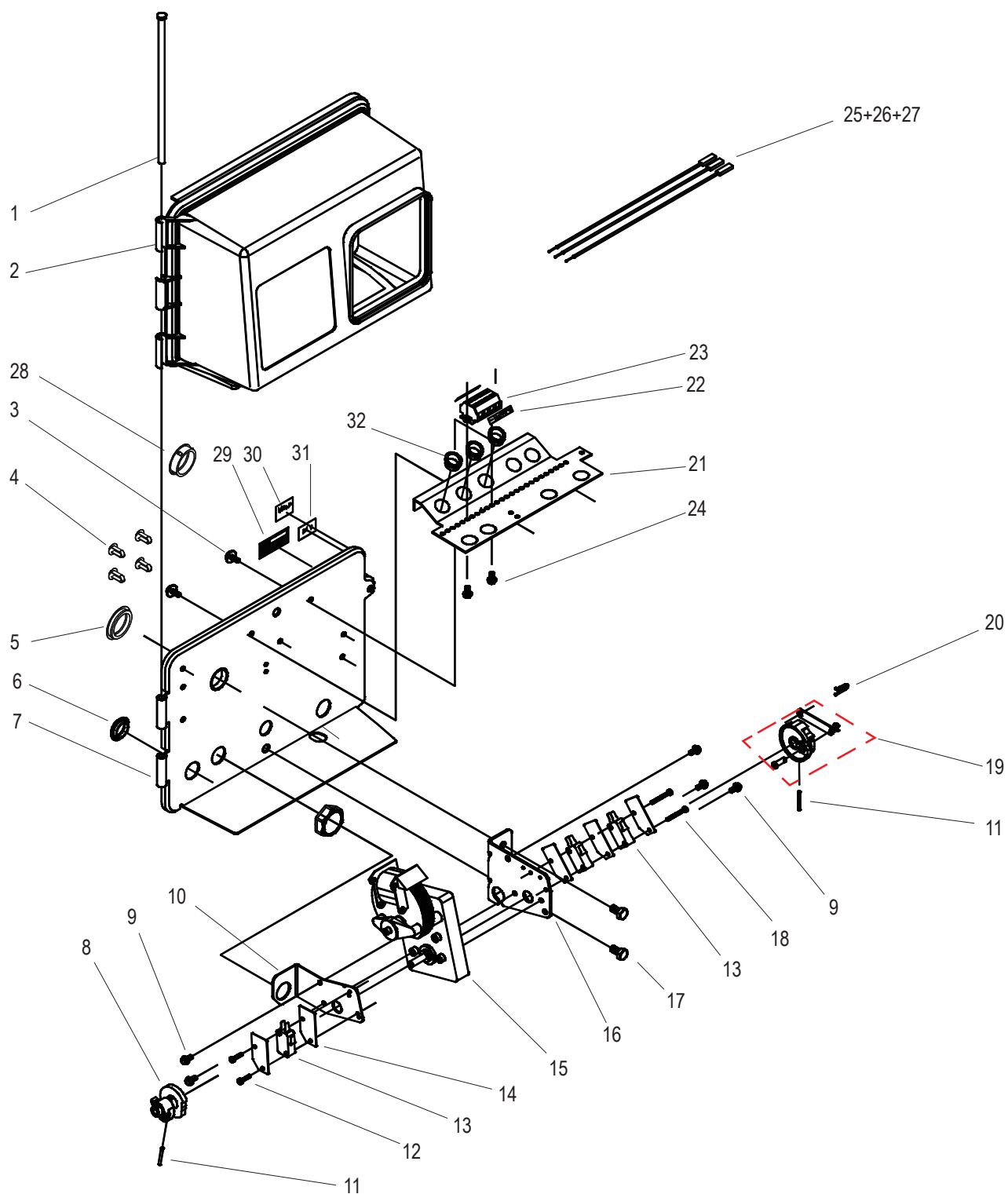
6 BRINE TANK FILL POSITION



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 2850SE

control drive assembly



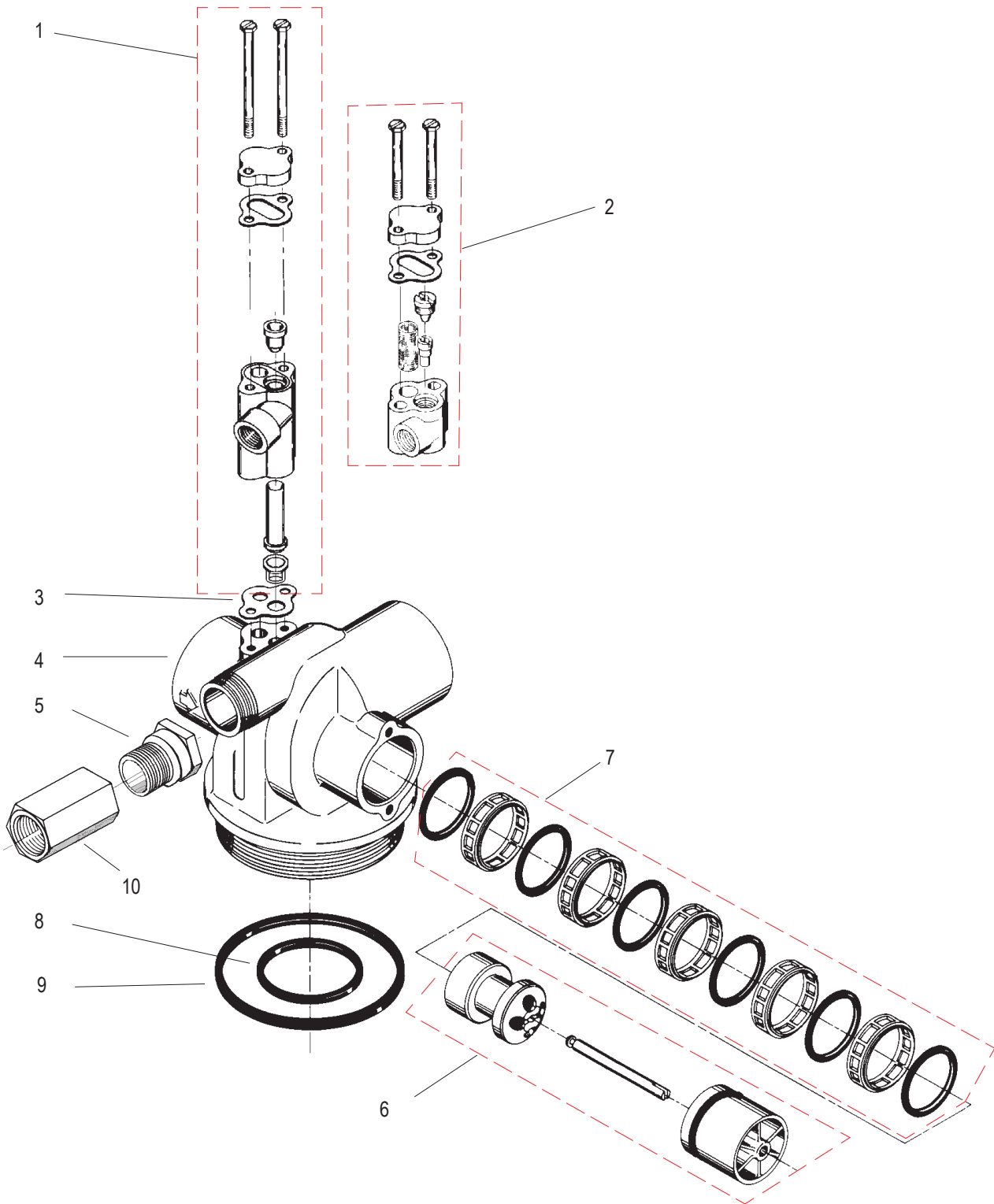
MODEL 2850SE

control drive assembly

| Item | Qty | Part No. | Decription |
|------|-----|----------|----------------------------|
| 1 | 1 | 17845-02 | Hinge pin |
| 2 | 1 | 26217 | Cover assembly |
| 3 | 2 | 10330 | Screw |
| 4 | 4 | 19801 | Blanking plug |
| 5 | 2 | 19590 | Plug |
| 6 | 2 | 17967 | Plug |
| 7 | 1 | 18697-14 | Backplate |
| 8 | 1 | 12777 | Brine valve cam - short |
| 9 | 5 | 10872 | Motor mount screw |
| 10 | 1 | 11826 | Motor bracket - Brine side |
| 11 | 2 | 10338 | Drive roll pin |
| 12 | 2 | 11805 | Screw |
| 13 | 3 | 10218 | Microswitch |
| 14 | 5 | 10302 | Insulator |
| 15 | 1 | 40385 | Drive motor 24vac |
| 16 | 1 | 10774 | Motor bracket - Drive side |
| 17 | 2 | 23728 | Screw - M6 X 12 |
| 18 | 2 | 25178 | Screw |
| 19 | 1 | 24267 | Drive cam assy - STF |
| 20 | 1 | 10909 | Connecting rod clip |
| 21 | 1 | 19772 | Terminal bracket |
| 22 | 1 | 24934-60 | Terminal label |
| 23 | 1 | 23511 | Terminal strip |
| 24 | 2 | 13296 | Screw |
| 25 | 1 | 27171 | Motor wire - Blue |
| 26 | 1 | 27169 | Motor wire - Brown |
| 27 | 1 | 27170 | Motor wire - White |
| 28 | 1 | 17421 | Plug |
| 29 | 1 | 21271 | Serial number label |
| 30 | 1 | 26210k | CE label |
| 31 | 1 | 24388 | 24v label |
| 32 | 2 | 19704 | Wire sleeve |

MODEL 2850SE

valve body assembly



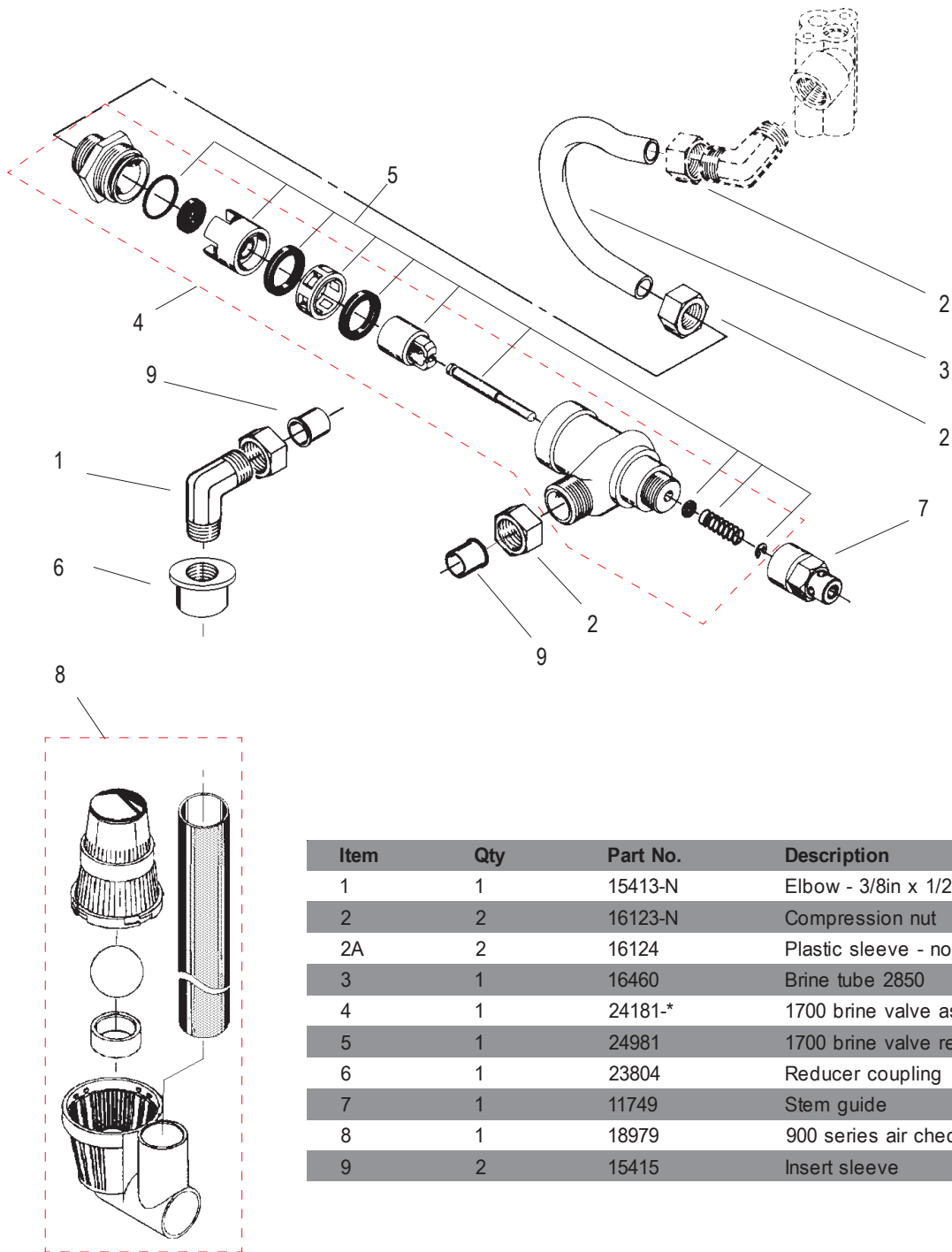
MODEL 2850SE

valve body assembly

| Item | Qty | Part Number | Description |
|------|-----|-------------|--|
| 1 | 1 | 18921-* | Injector assembly - <i>*specify size</i> |
| or | | | |
| 2 | 1 | 24199-* | Injector assembly - <i>*specify size</i> |
| 3 | 1 | 23304 | Injector body gasket |
| 4 | 1 | 16250-21-N | 2850 body casting |
| 5 | 1 | 3-003 | Drain line adaptor |
| 6 | 1 | 25155 | Piston assembly |
| 7 | 1 | 25156 | Seal and spacer kit |
| 8 | 1 | 13577-01 | O-Ring |
| 9 | 1 | 16455-01 | O-Ring |
| 10 | 1 | 700** | DLFC - <i>specify size</i> |

MODEL 2850SE

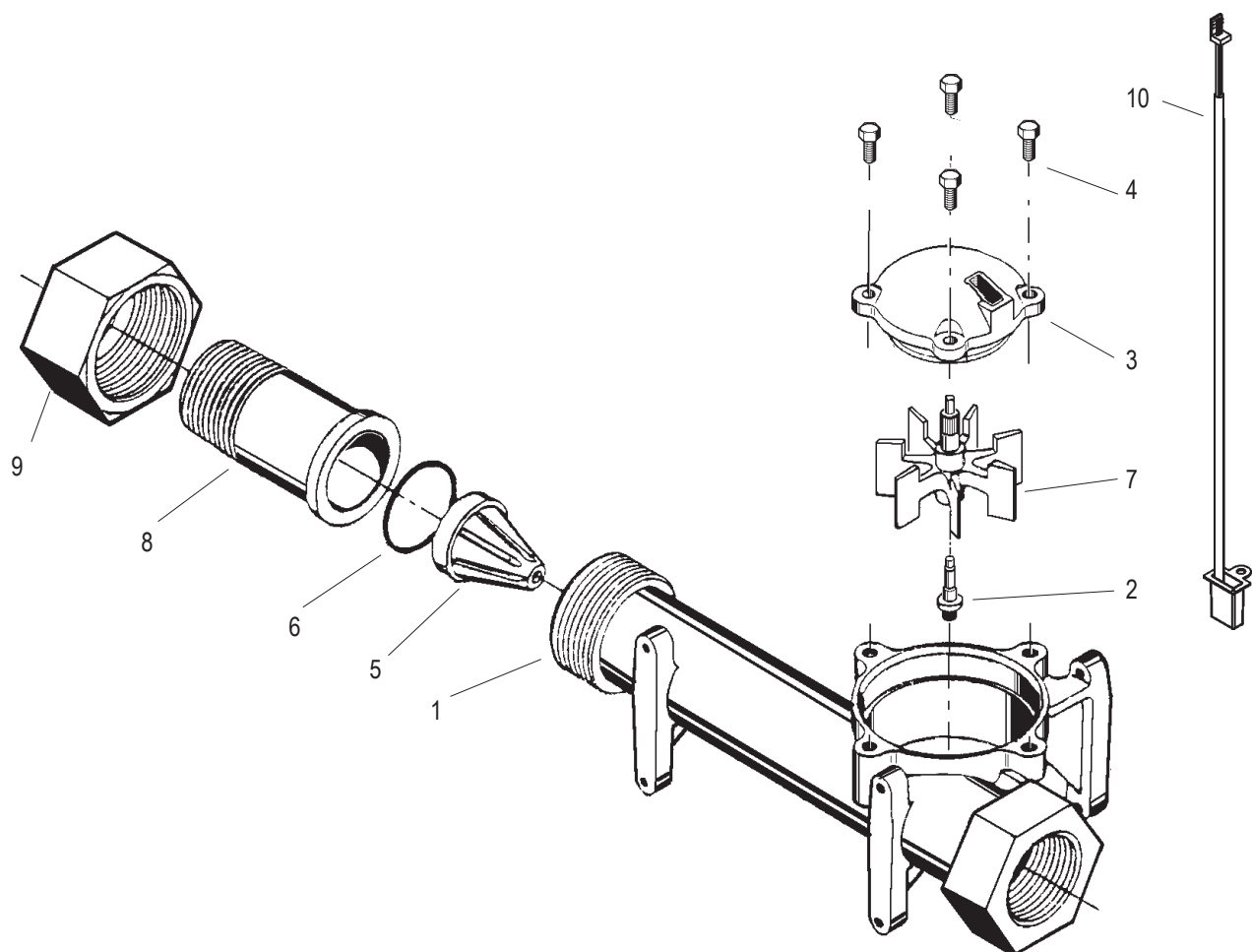
1700 brine valve assembly



| 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 | 16460 | Brine tube 2850 |
| 4 | 1 | 24181-* | 1700 brine valve assy - <i>*specify size</i> |
| 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 2850SE

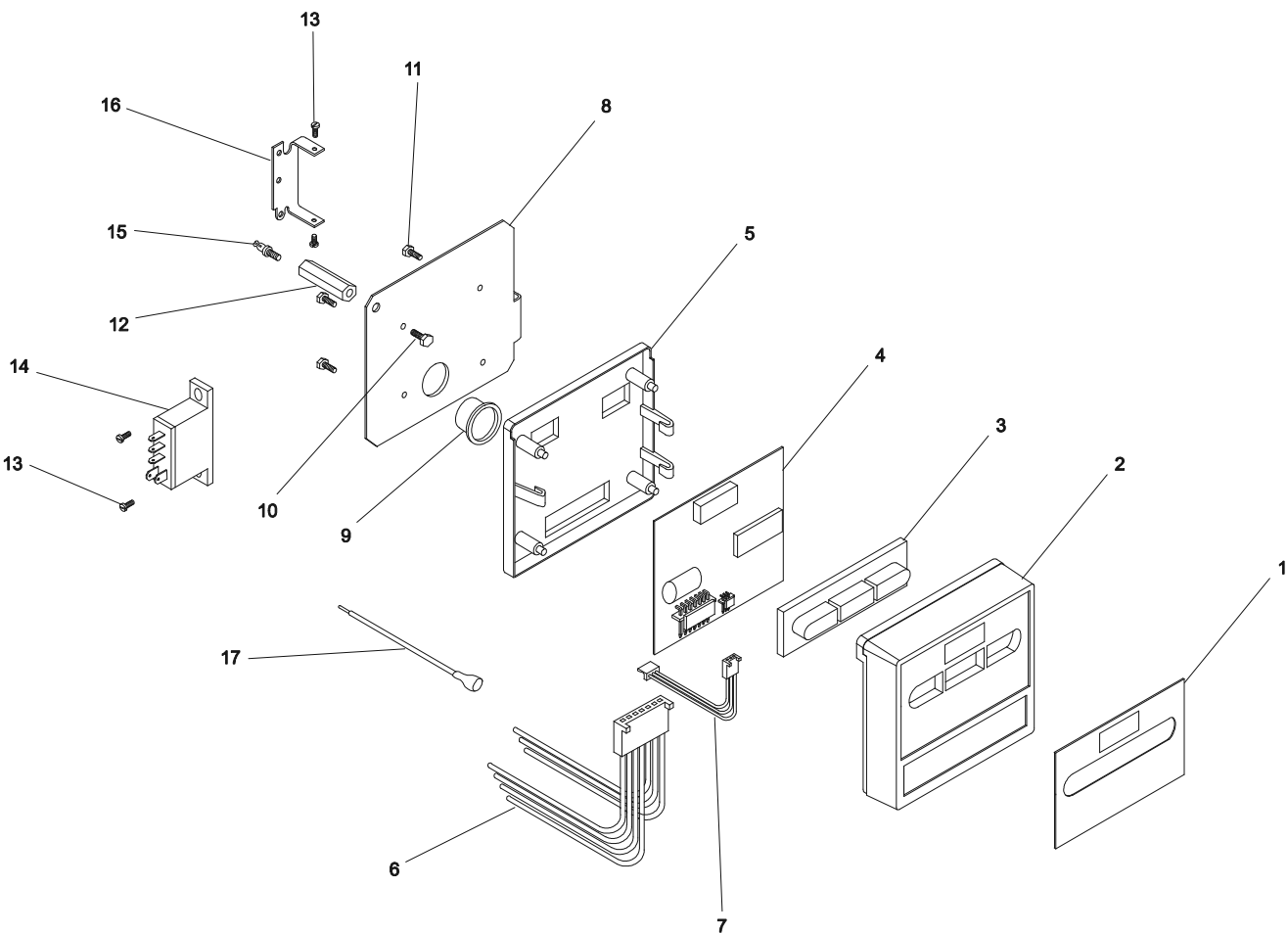
1-1/2" meter assembly



| Item | Qty | Part No. | Description |
|------|-----|----------|-----------------------------|
| 1 | 1 | 17569-20 | Meter body - 1-1/2in BSP |
| 2 | 1 | 13882 | Impeller post |
| 3 | 1 | 18330 | Electronic meter cover assy |
| 4 | 4 | 11737 | Hex hd. machine screw |
| 5 | 1 | 17542 | Flow straightener |
| 6 | 1 | 12733 | O-Ring |
| 7 | 1 | 13509 | Impeller |
| 8 | 1 | 17544 | Quick connect nipple |
| 9 | 1 | 17543 | Quick connect nut |
| 10 | 1 | 19121-06 | Meter harness |

MODEL 2850SE

SE timer assembly

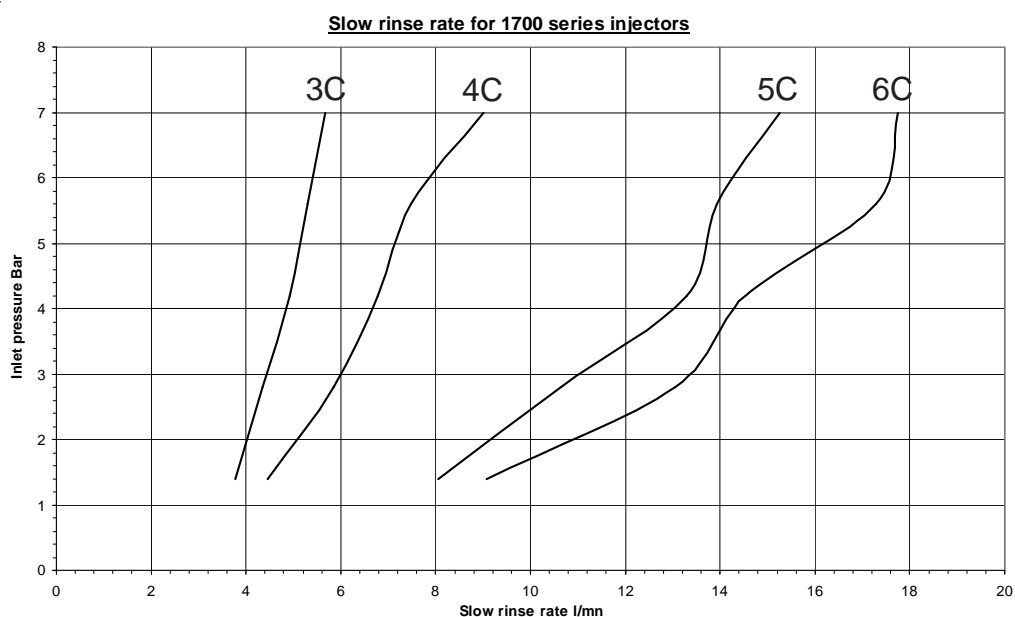
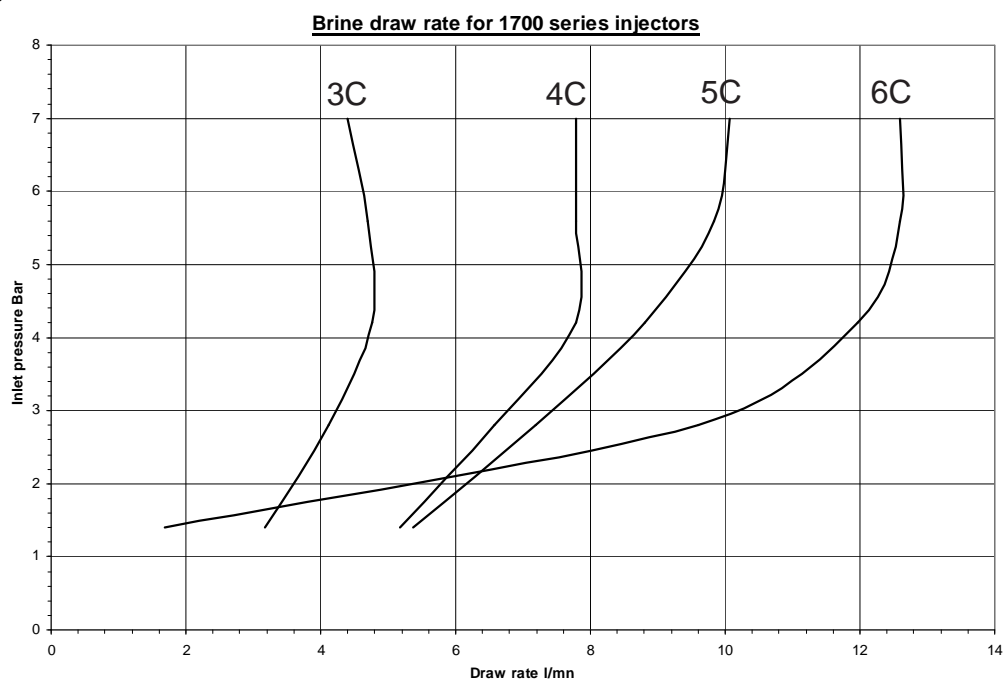


| Item | Qty | Part No. | Description |
|------|-----|-----------|-----------------------------|
| 1 | 1 | 27793 | Display front panel - DF |
| 2 | 1 | 19471-02 | Front panel cover |
| 3 | 1 | See 27074 | Rubber button assy |
| 4 | 1 | 27074 | Circuit board + button assy |
| 5 | 1 | 19889 | Circuit board housing |
| 6 | 1 | 27167 | Wire harness - Power |
| 7 | 1 | 27808 | Harness assy - Flow meter |
| 8 | 1 | 27168 | Timer mounting plate |
| 9 | 1 | 17904 | Bushing |
| 10 | 1 | 21363 | Screw |
| 11 | 4 | 13296 | Screw |
| 12 | 1 | 27172 | Stand-off |
| 13 | 4 | 11384 | Screw |
| 14 | 1 | 17749 | Relay |
| 15 | 1 | 14265 | Spring clip |
| 16 | 1 | 13881 | Hing bracket |
| 17 | 1 | 27169 | Connector lead |

MODEL 2850SE

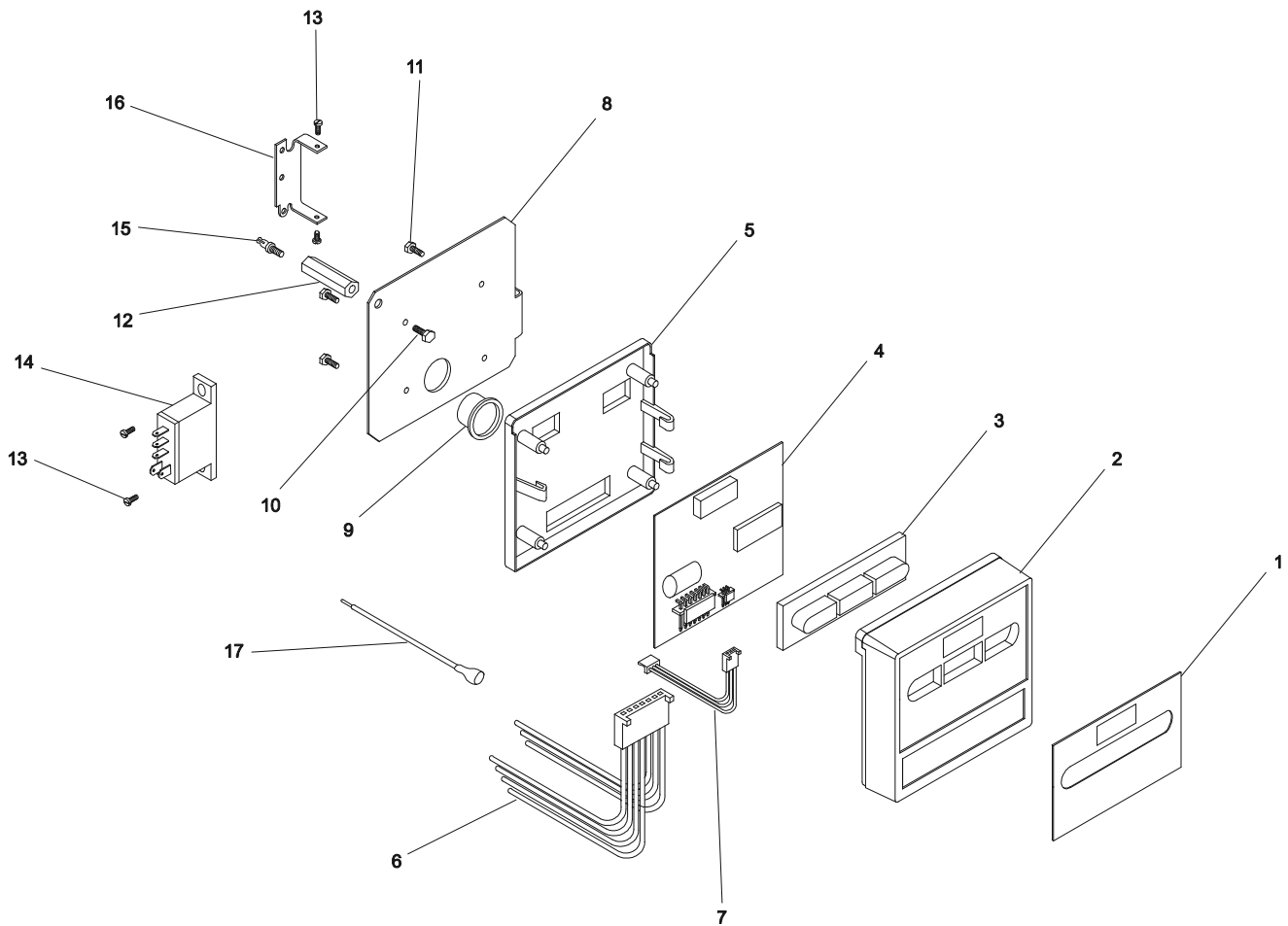
ejector performance data

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 2850SE

SE timer assembly - Sub assembly p/n 27173

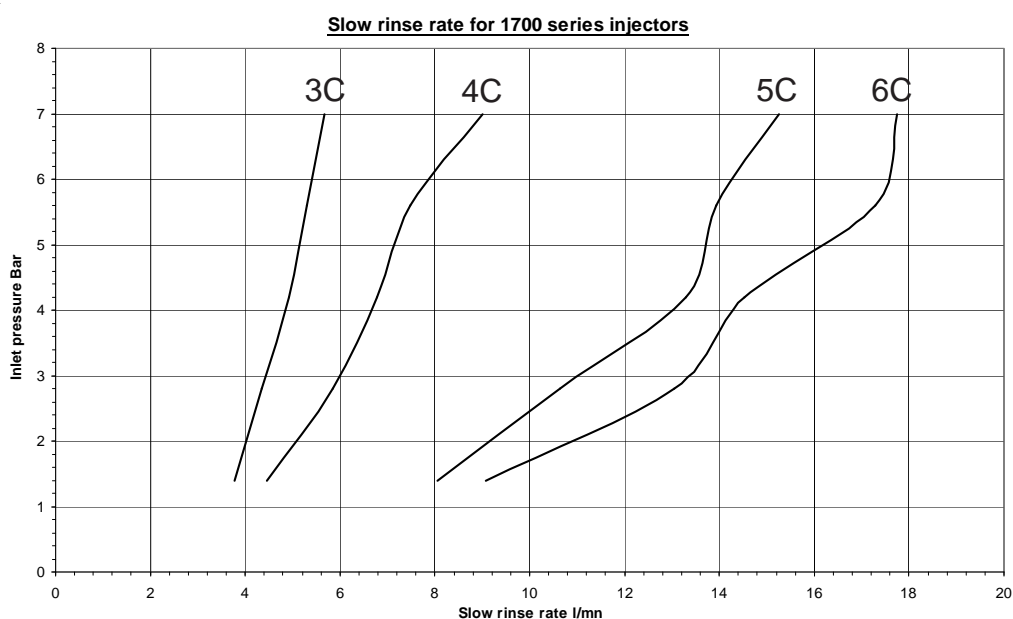
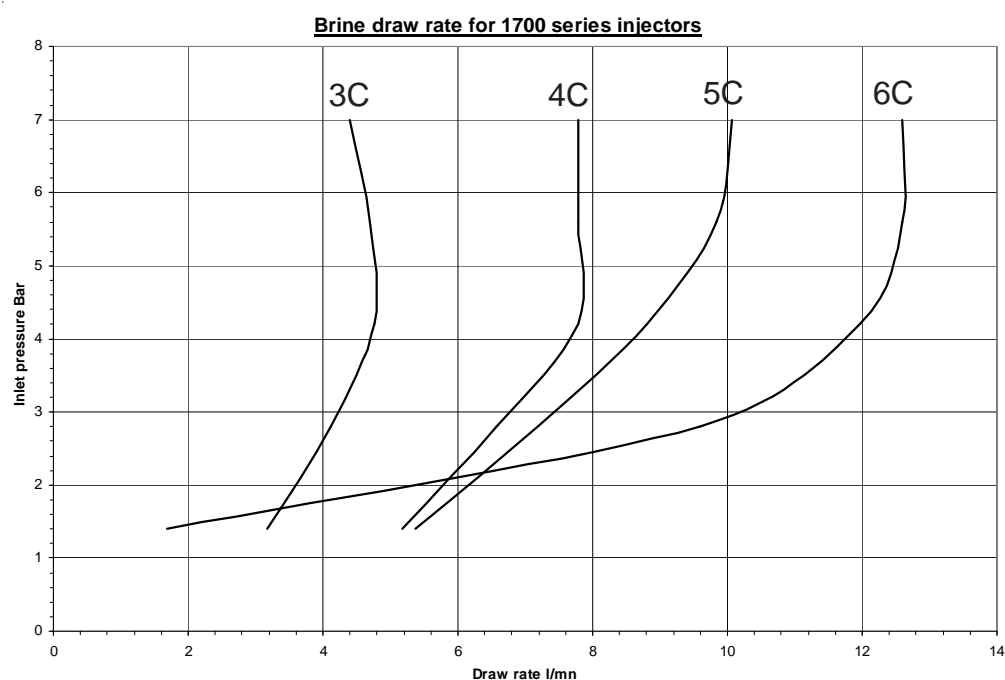


| Item | Qty | Part No. | Description |
|------|-----|----------|---------------------------|
| 1 | 1 | 27793 | Display front panel - DF |
| 2 | 1 | 19471-02 | Front panel cover |
| 3 | 1 | 40376 | Rubber button assy |
| 4 | 1 | 40283 | Circuit board |
| 5 | 1 | 19889 | Circuit board housing |
| 6 | 1 | 27167 | Wire harness - Power |
| 7 | 1 | 27808 | Harness assy - Flow meter |
| 8 | 1 | 27168 | Timer mounting plate |
| 9 | 1 | 17904 | Bushing |
| 10 | 1 | 21363 | Screw |
| 11 | 4 | 13296 | Screw |
| 12 | 1 | 27172 | Stand-off |
| 13 | 4 | 11384 | Screw |
| 14 | 1 | 17749 | Relay |
| 15 | 1 | 14265 | Spring clip |
| 16 | 1 | 13881 | Hing bracket |
| 17 | 1 | 27169 | Connector lead |

MODEL 2850SE

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 2850SE

wiring diagram for valve drive & timers

Electrical supply connections:

24vac 50 Hz. 60 Va

Negative to TERMINAL 1

Positive to TERMINAL 4

