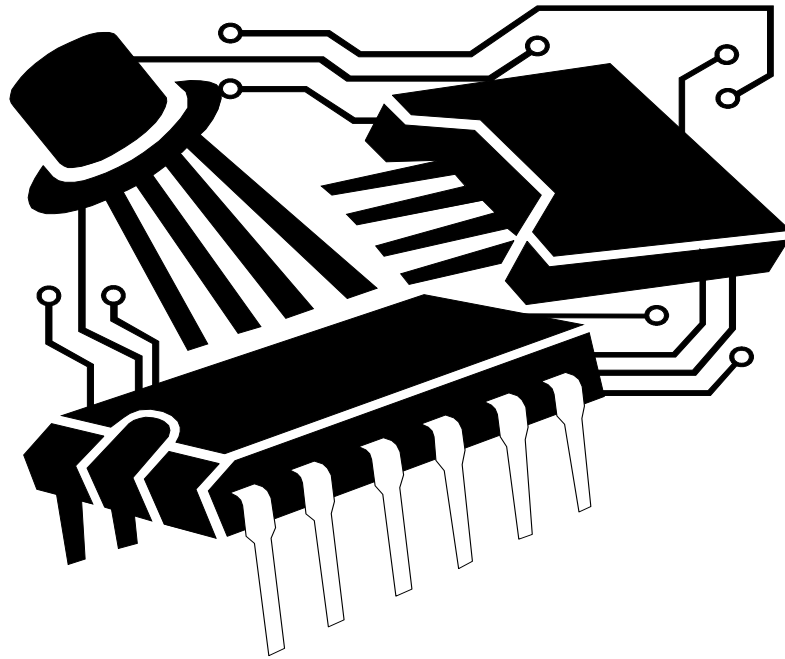


# Model 2850SE OEM Manual



To get into the master programming mode, which effectively tells the system what it is and what it is supposed to do, you have to get through the "security lock". This is done by setting the time of day to 12:01pm using the UP or DOWN arrows. When you have established the time at 12:01 you must then press the UP and DOWN arrow buttons simultaneously for 5 seconds. This lets you into the master programming mode.

**A word of caution.** When using the UP or DOWN arrow buttons you will notice that the longer you keep the button depressed, the faster the digits change. This can be annoying at first because you will keep missing the setting you require. A series of quick depressions on the appropriate button is usually the best way.

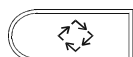
# MODEL 2850SE

## master programming mode

### 1. Display format [ U - - ? ]

This display is used to determine the display format and is identified by the letter 'U' as the first digit in the display window. Use the UP or DOWN arrow button to set this display to [ U - - 2 ]. In this format the volume unit displays will be in LITRES ( up to 9999 ) and time displays will be in 24 hour clock format.

Alternatively, set the display to [ U - - 4 ] and the volume unit displays will be in cubic metres (m<sup>3</sup>) ( up to 999.9 ) with the time displays also in 24 hour clock format. NOTE: The P.M. indicator is disabled. Regeneration timings will be in minutes with an accuracy of 0.1 minute. *See NOTE 2 at the end of this document*



←PRESS

### 2. Regeneration type [ 7 - - ? ]

This display is used to determine the regeneration initiation format. There are three possible options:

#### Timeclock Delayed [ 7 - - 1 ]

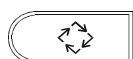
The control will determine that a regeneration is required when the set Regeneration Time has been reached. The Regeneration Day Override setting will determine on which days a regeneration cycle will be initiated.

#### Immediate meter [ 7 - - 2 ] - See supplementary note on page 7

The control will determine that a regeneration is required when the system capacity value reaches zero. Regeneration begins immediately, regardless of the time.

#### Delayed meter [ 7 - - 3 ]

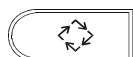
The control will determine that a regeneration is required when the system capacity value reaches zero. Regeneration begins immediately at the set Regeneration Time.



←PRESS

### 3. System capacity ( no display code )

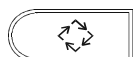
This display is used to establish the volume of softened water that the system can produce between regenerations. If [ U - - 2 ] was set previously then the value to be set in the display should be in LITRES using the UP or DOWN arrow buttons. If [ U - - 4 ] was set then the value to be set in the display should be in m<sup>3</sup> and it can be set to an accuracy of 1 decimal place ( 100 litres ). *Please carefully consider the implications of the Brine Refill setting .*



←PRESS

### 4. Regeneration Time ( no display code )

This display is used to establish the Regeneration Time. It is identified by a non-flashing colon between two sets of numbers. Set the desired time of day that a regeneration may occur, if required. This display will not be viewed with Immediate Meter Regeneration option set.



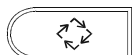
←PRESS

# MODEL 2850SE

## *master programming mode*

### **5. Regeneration day override [ A - - - ]**

This display is used to establish the maximum number of days between regenerations. This setting is not usually appropriate for a duty/standby duplex system and it is recommended that you set this function to [ A OFF ]. The only exception to this might be if the system is likely to be left unused for some time in which case you can set [ A - - 4 ] for example. This will force a regeneration every 4 days regardless of water use.



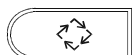
←PRESS

### **6. Regeneration cycle step programming [ 1 thru 4 ]**

This series of displays is used to establish the timings of the various regeneration steps. Up to 4 steps can be programmed and for normal softener operations, ALL steps should be programmed.

#### **Backwash step [ 1 - - ? ]**

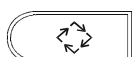
This is one of the major regeneration water consumption steps and should be carefully considered. On smaller systems where the resin vessel is very full and the system is treating clean mains water then backwash is of limited value. A setting of 2 minutes [ 1 - 2.0 ] will usually be sufficient to loosen the resin bed prior to brine injection. If sufficient resin bed expansion has been allowed for and the water supply contains particulate matter then a setting of 6 minutes [ 1 - 6.0 ] may be more appropriate. If you programme this step to 0 minutes [ 1 - - 0 ] then the step will be skipped.



←PRESS

#### **Brine injection and slow rinse [ 2 - - ? ]**

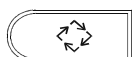
This step needs to be considered in relation to the values you intend to establish in step 4 - Brine tank refill. The amount of water refilled into the brine tank must be fully drawn out during the first phase of this step. The first phase is completed when the brine air check device shuts off, allowing the system to enter the second phase of this step - Slow rinse. When establishing the total time to be set in this step you must add the time required to draw out the brine from the brine tank PLUS the contact time / slow rinse time. In the absence of any other information, a typical setting would be 50 minutes [ 2 50.0 ].



←PRESS

#### **Rapid rinse [ 3 - - ? ]**

This is the other major regeneration water consumption step which also needs to be carefully considered. If the time set is too short then the brine regenerant will not be rinsed out and will be present in the water flowing to service - leading to customer complaints and possible corrosion damage. If the time set is too long then system capacity will be wasted as you will simply be putting softened water down the drain. Again, in the absence of other information, a typical setting of 10 minutes [ 3 10.0 ] should be sufficient on typical installations.



←PRESS

# MODEL 2850SE

## master programming mode

### Brine tank refill [ 4 - - ? ]

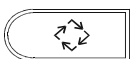
This is the key step that influences system performance, both in terms of capacity and treated water quality. Several factors have to be taken into account when determining the time to set in this step. Detailed discussion is not appropriate to this document and the following examples are for illustration purposes only. The refill flow rate is controlled by the brine line flow control (BLFC) fitted in the injector assembly. Assume this is sized at 2.0 US gpm which equals 7.57 l/min. For most purposes you can assume that 1 kg. NaCl ( salt ) is dissolved in 3 litres of water. The amount of salt used per regeneration is a function of resin volume and regeneration level. The regeneration level used should be given some thought, particularly with regard to regeneration efficiency vs. available softening capacity and appropriate residual hardness. Please refer to resin data sheets for details of these considerations. For the purposes of this example, assume a regeneration level of 160 kg. NaCl / m<sup>3</sup> resin which would provide a nominal resin capacity of 60.0 kg CaCO<sub>3</sub>/m<sup>3</sup> resin. If we assume 125 litres of resin then to establish the salt required per regeneration multiply 160 x 0.125 which gives you 20 kg. salt. Multiply this value by 3 and you get 60 litres of water required to dissolve this amount of salt. If we divide 60 by 7.57 we get 7.9 minutes.

In this example, using the UP or DOWN arrow buttons set the display to show [ 4 - 7.9 ]

NOTE: The relationship of this setting to the value set in section 3 is shown by the following formula:

System capacity ( in litres ) equals:

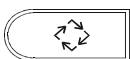
$$\frac{\text{Resin capacity ( kg CaCO}_3\text{/m}^3 \text{ )} \times \text{resin volume ( litres )} \times 1000}{\text{water hardness ( mg/l as CaCO}_3 \text{ )}}$$



←PRESS

### Spare cycle [ 5 - - ? ]

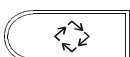
This cycle does not apply to the 2850SE valve and MUST be programmed to show [ 5 OFF ]



←PRESS

### 7. Flow meter size [ F - - ? ]

This display is used to define the water meter characteristics and MUST be set to show [ F -1.0 ]. Any other value will cause false operation of the system.



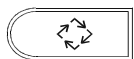
←PRESS

# MODEL 2850SE

## master programming mode

### 8. Valve type [ o - - ? ]

This display is used to tell the control what type of system it is operating and MUST be set to show [ o - 1 ]

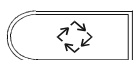


←PRESS

### 9. Line frequency [ L F - - ]

This display is used to tell the control the characteristics of the electrical power supply. It needs this information in order to properly determine both the time of day and the duration of the various steps. In Europe the value MUST be set to [ L F 50 ] representing 50 Hz.

Exiting the programming mode is done by a final touch of the Extra Cycle button.



←PRESS

**NOTE 1:** If everything gets screwed up you can restore the permanent programme memory by pressing the UP and DOWN arrow buttons simultaneously for 25 seconds or until the time of day display shows [ 1 2:0 0 ]. The control will then have been reset to default values and you must then start back at the beginning to establish the required programme.

**NOTE 2:** This programmer device is also used in conjunction with other controls and has functions that are irrelevant to the 5000SE series valve. If you stray from the non optional settings described then your system may not work and you will find yourself in programming areas that fall outside the scope of these instructions.

## programming calculations - Example

### Example - Setting the system capacity

Knowing the amount of resin in each vessel and the salt setting per regeneration (see page 4), calculate the system capacity available using the following guide:

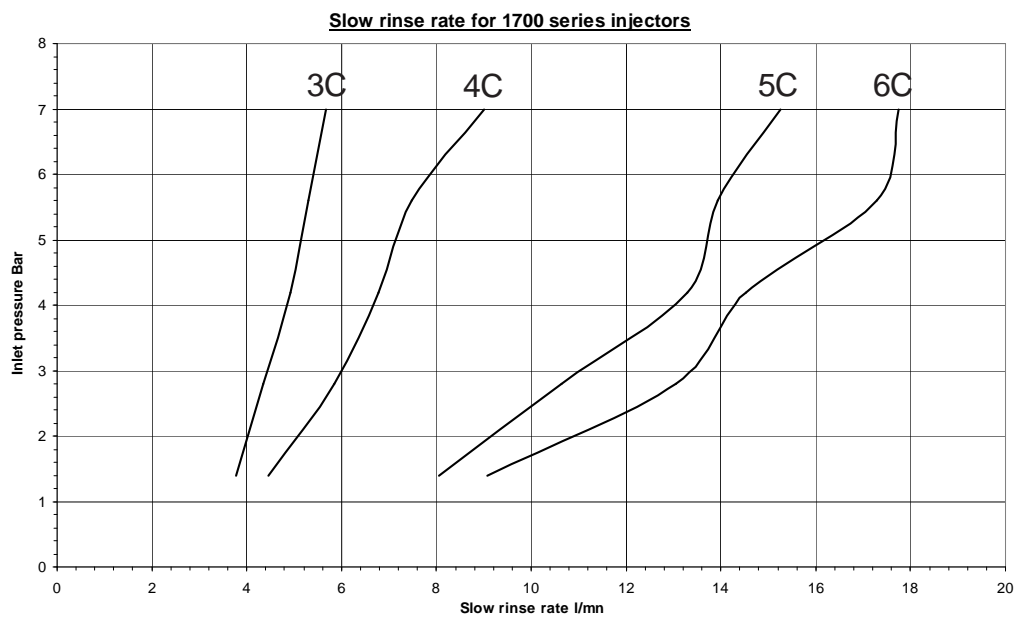
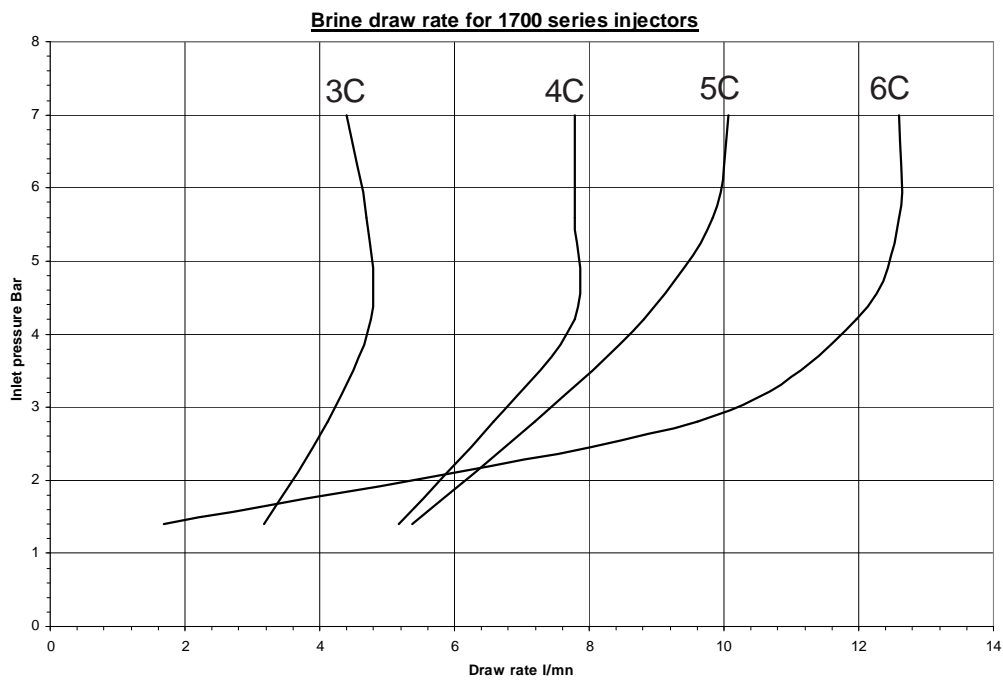
Kg NaCl/m <sup>3</sup> resin	Approx. resin capacity Kg. CaCO <sub>3</sub> /m <sup>3</sup> resin
100	48
130	55
160	60

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

# 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

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## ***supplementary note:***

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If a non Fleck meter system is being used to initiate a regeneration the please carefully follow these instructions.

### ***In the initial SE timer programming:***

- Step 1. Establish the display format as [ **U - - 2** ]
- Step 2. Establish the system for **Immediate** regeneration [ **7 - - 2** ]
- Step 3. Set the system capacity to 1 [ **1** ]
- Step 7. Set the meter factor to [ **F - - .1** ]

### ***For the physical connection to the external meter controller:***

The valve has a short cable tail and plug attached to the SE timer. This is normally used to connect a Fleck meter system to the SE timer. The three wire harness is used for the Fleck "Hall Effect" meter system. After removing the plug end, the two outer wires can be used by an external relay or switch - the middle wire becomes redundant - to initiate a regeneration cycle. Please carefully note that you must use a volt free external device to close the circuit between the two outer wires only. Under no circumstances should any other signal voltage be applied to the SE device. The SE timer only requires a momentary contact closure - the shorter the better. The SE timer does not provide a reset signal back to the external device although it might be possible to use the valve auxiliary microswitch contact to do this

Used in this way, the SE timer will not present any meaningful flow or capacity data and you must rely on the external meter and controller system to provide such information.

# MODEL 2850SE

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