Installation, Operation

& Maintenance Guide

Clack WS CI

Duplex Regenerating Systems

Including:

Softener

Crystal Right
(Iron & Manganese Removal)

Nitrate Removal

Colour Removal
(Organic Scavenger)

Contents

Accessories

5303024075	Bypass (suitable for 1” connections)
5303024084	Auxiliary Micro Switch (for 1” & 1.¼” valves)
5303020005	Auxiliary Micro Switch (for 1.½” & 2” valves)
5303028632	Service Wrench

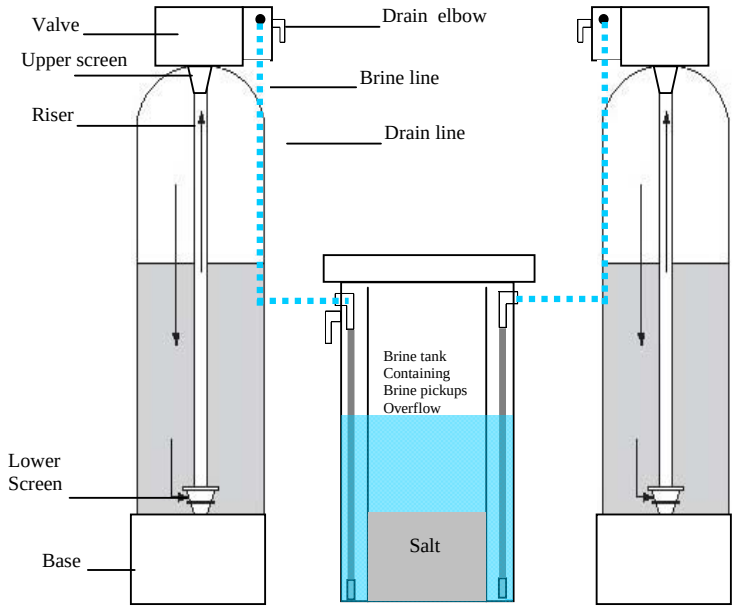
Thank you for purchasing this system. We are sure that it will provide you with trouble free service for many years to come. Please use the following pages to assist you with the assembly and installation of your new system.

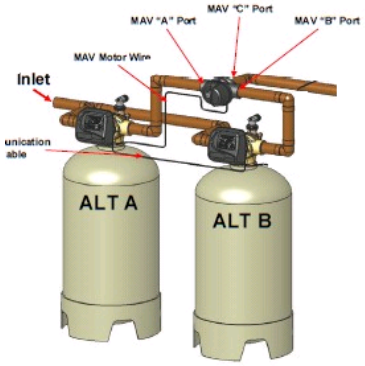
1. Unpacking

PLEASE USE THE ACCOMPANYING PACKING DOCUMENTS TO CHECK THAT ALL ITEMS ARE PRESENT AND CORRECT.

If any item is missing or damaged your carrier and supplier must be notified within 2 days of receipt if a claim is to be made.

The main parts of the system include**:**





2. Installation

Please observe the local regulations concerning the installation of your system. Check that you have allowed space for access to the unit for possible future maintenance. This installation may require plumbing work and will require an electrical outlet to be fitted near the system. Only attempt this if you have the necessary skills.

2.1 Pre-installation checks

The area needs to be level, frost free, have access to electricity and an open drain. Check the incoming water quality is within any parameters specified for that media (contact your supplier). In addition to this check the incoming water pressure is between 2 and 8 bar (preferably approx. 4 bar) and the water temperature is between 3ºC and 45ºC.

2.2 Fitting the Distribution Systems

Fit the bottom distribution systems into the vessels – the bottom screens should been pre glued to the riser tubes (fig A.1) (smaller systems). Alternatively if the system uses bottom laterals these need to be assembled inside the vessels (fig A.2), Move the vessels to their final positions as they will be difficult to move once the media has been added.

Fig A.1

Fig A.2

Fig A.3

2.3 Adding the Media

Block the top of the riser tubes to stop media getting down the tubes.(see fig A.3). Add about 1/3 by volume of water to the vessels so when the media is poured in it doesn't damage the bottom distribution system. If you have been supplied gravel with your kit this should be added first so it covers the bottom distribution systems. Add the media supplied but make sure there is approximately 30%. free space left above the media so when the system is backwashed the media can expand into the space and allow any sediment or contaminants to be backwashed away (there may be media left over). Unblock the riser tubes.

2.4 Fitting the Valves

Add a small amount of silicone grease to the valve outer and inner o-rings (fig A.4 & 5).

Fig A.4

Fig A.5

If top screens have been supplied these should be attached next.

Slide the valves onto the riser tubes and gently push it down onto the vessel treads. Screw the valve on until you start to squeeze the main O ring and then finally give the valve a final tighten by tapping the rear side of the valve with the palm of your hand (fig A.6)

Fig A.6

2.5 Brine Tank Connections.

Attach the brine line tubing to the brine tank and valves using the connectors fitted to the brine tank (fig A.7), and valve (fig A.8).

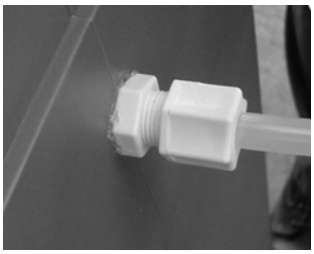


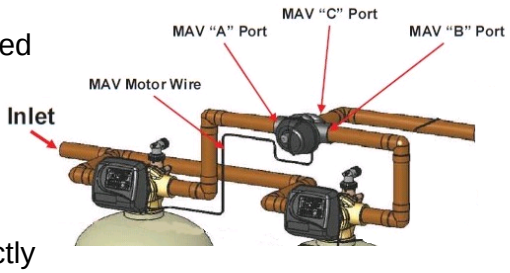
Fig A.7

Fig A.8

Sizes may vary depending on the valves used, please note to use the poly insert if provided with your specific valves.

2.6 Duplex Hydraulic Connections.

Vertical adapter kits are supplied with softeners using 1” or 1.25” valves with vessels up to 14”, these can be used to connect the MAV (Motorised Alternating Valve) to the valves. Larger systems would need to be plumbed together using BSP connections and standard pipe work.



Representative drawings only.

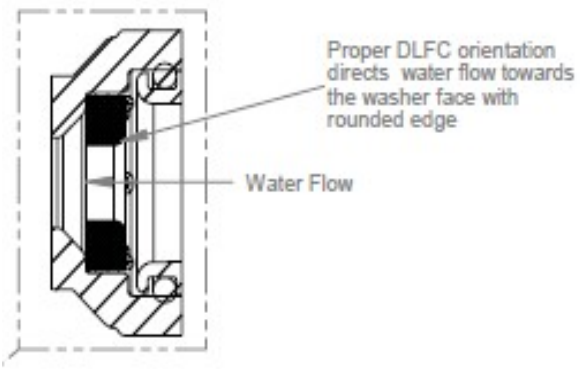
Meter turbines are internal on 1” & 1.25” valves; for 1.5” and 2” valves the meter turbines should be attached directly to the outlet of the valve.

Note**: Please make sure that valve A is connected to port A and valve B to port B of the MAV.**

2.7 DLFC's (drain line flow controls)

This is possibly one of the most important components to check has been installed; this will control the backwash flow rate and ensure the system will continue to function correctly. The DLFC will either be fitted inside the drain line elbow, the 1" adaptor or in an external housing. The larger external DLFC may have more than one flow controls fitted to gain the required flow rate. See below pictures of the drain line housings.

¾" Elbow



1" External Straight

1.½" External

Insert

2.8 Injectors

The injector is another important item in the functioning of the system, please check that it is fitted in the DN position and that the UP position has been plugged. The injector colour will vary depending on the size of the system, this should be listed on the items list.

2.9 Electrical connections

To connect the power cables you need to firstly remove the covers then remove the drive bracket assemblies by pressing up on the drive brackets release tabs and pulling towards you, the drive bracket including software can now be lifted away to reveal the back plate (fig A.9).

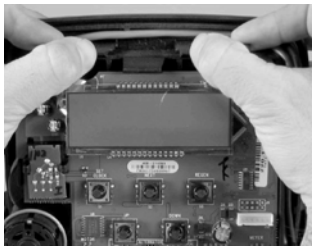


Fig A.9

The power cable should be threaded through the back plate And strain relief as shown in Fig A.9a

Fig A.9a

You can now re install the drive bracket into its original position.
Please make sure that this has been replaced correctly as this can cause problems at a later date.

If fitting a MAV or NHBP locate the knock out on the back plate Fig A.10 then remove the tabs at the bottom of the strain relief on the back side of the back plate fig A.11 thread the cables Fig A.12 and fit the cover Fig A13

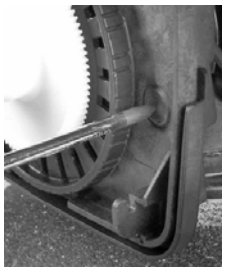


fig A.10

Fig A.11

Fig A.12

Fig A.13

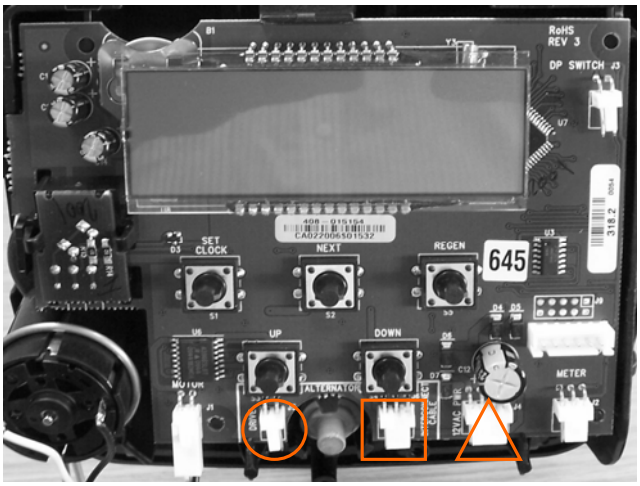
You can now make connections to the PCB board.

Connect MAV here ○ marked Drive.

Connect power here △ marked 12V DC

Connect the communication cable to both valves here □ marked as interconnecting cable.

When all connections have been made the power can be turned on and programming can take place.



Quick Start

2.10 Programming the Valves.

The valves are pre programmed with the exception of the time of day and the hardness, Nitrate and Colour setting.

All adjustment should be made using the up and down arrows when the setting you wish to adjust is displayed on screen.

Set Time of Day.

Press **SET CLOCK.**
Adjust the hours and press **NEXT** to adjust the minutes, press **NEXT** to return to the normal **TIME** display.

Hardness setting / Nitrate/ Colour setting.

Press **NEXT** and **UP** simultaneously for 3 seconds and release.
HARDNESS with 340 should appear on screen.

Softener: Adjust as necessary to your incoming supply hardness in ppm CaCO3 this can be obtained by using a purchased hardness test kit or by contacting your water supplier.

Crystal Right: Adjust as necessary to your incoming supply hardness in ppm CaCO3 + 2 x Sodium level (ppm) if the Sodium level is unknown add 60 to the total hardness + 1 x Fe Iron (ppm) & 1 x Mn Manganese (ppm).

Nitrate: Adjust as necessary to your incoming supply Nitrate reading in ppm.

Colour Removal: Set to regen on a timed basis (default every 2 days).

Press **NEXT** repeatedly until the display returns to the time of day.

2.11 Programming the Valves in case of memory loss.

Should the programming have been lost in transit the following instructions in conjunction with the relevant setting sheet will allow you to re set them.

When the power has been connected the valve will display the software number and initialise itself and then display **TIME**; you can then start to program the valve.

Selections are made using the **UP** and **DOWN** buttons until the required setting is displayed: after each setting press **NEXT** to continue.

These settings must be applied to both valves, please Take note of the Alternating settings in step 1.

Set Time of Day.

Press **SET CLOCK.**
Adjust the hours and press **NEXT** to adjust the minutes, press **NEXT** to return to the normal **TIME** display.

Step 1: Cycle Sequence.

Press **NEXT** and **DOWN** simultaneously for 3 seconds and release.
The screen will display SOFTENING flashing!
Press **NEXT** and **DOWN** simultaneously for 3 seconds.
The screen should display SET 25, adjust as necessary (see setting sheet page?) Press **NEXT** after each setting and set each setting accordingly until the display returns to **TIME**.
(See notes if fitting a untreated Water Bypass valve)

Step 2: System Setup.

Press **NEXT** and **DOWN** simultaneously for 3 seconds and release.
The screen will display SOFTENING flashing. Press **NEXT.**
The screen should display CYCLE 1, adjust as necessary (see setting sheet that corresponds to your system!) Press **NEXT** and set each setting accordingly until the display returns to **TIME**.

Step 3: Display Settings.

Press **NEXT** and **UP** simultaneously for 3 seconds and release.
HARDNESS with 340 should appear on screen. Adjust as necessary (see quick start section.
Press **NEXT** and set each setting accordingly. The Regen Time settings, have a factory default of 02:00 am this can be adjusted if required the display will return to the time of day after setting the regen time.

3. Your System.

3.1 Identifying your System.

Your System will have an identification label fixed to the control valve, this will look similar to the picture shown here.

The information listed can be read as follows:

4202035013 Sno 03100137 Soft 1354-WS1CI	Stock Number: Serial No: Id Code: Configuration:	Manufacturers part number. Serial No. System type identification code (soft, CR100, CR200 Nitrate or Colour). Vessel size, Valve type & Controller type.

Identify the settings from the chart in the programming section.

The valves are supplied pre programmed!
(excluding settings that need to be done on site)
The settings are listed in case there is a need to re program the valves.

If you have any concerns or worries following the setting procedure please contact your supplier who will help you through the set up procedures.

Using the above information to identify your system you can then select the relevant setting sheet from the following pages.

3.2 Softener.

Clack WS / CI Valves Set up as DUPLEX Softeners. Software version from 320.1

Please apply the settings in the following sequence
Selections are made using the UP & DOWN buttons until the required setting is displayed,
After each setting press NEXT to continue,
Capacities based on 50g CaCO3 hardness removal per litre of resin,

Vessel Size	1044	1054	1248	1354	1465	1665	1865	2160	2160	2469	3072	3672
Media Volume (litres)	40	50	60	75	100	125	175	225	225	300	500	700
Valves	WS1CI	WS1CI	WS1CI	WS1CI	WS1CI	WS1CI	WS1CI	WS1CI	WS1CI			
	WS125CI	WS125CI	WS125CI	WS125CI	WS125CI	WS125CI	WS125CI	WS125CI	WS125CI			
			WS15CI	WS15CI	WS15CI	WS15CI	WS15CI	WS15CI	WS15CI			
			WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI
			WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI

Step 1, Cycle Sequence,
Press NEXT and DOWN simultaneously for 3 seconds and release.
Screen will display SOFTENING flashing
Press NEXT and DOWN simultaneously for three seconds, the screen should display SET 25, adjust to turbine setting below,

Turbine Size WS1	25	25	25	25	25	25	25	25	25			
Turbine Size WS1,25	32	32	32	32	32	32	32	32	32			
Turbine Size WS1,5			38	38	38	38	38	38	38			
Turbine Size WS2			50	50	50	50	50	50	50	50	50	50
Turbine Size WS2L			50L	50L	50L	50L	50L	50L	50L	50L	50L	50L

Additional screen will now show " FLo50 Select 50 if using 2" meters or 38 if using 1.5" Meters
Alternating **Alt A and ALT B respectively**
If 50 or 50L was entered the display will now show PrE 5 this is a time set for the bed of the standby unit to be refreshed before use, adjust accordingly.

DP Setting	Off or see note 1
Hardness	PPM
Set 1	Backwash
Set 2	Brine Draw dn
Set 3	Rinse
Set 4	Fill (Salt required)
Set 5	End

Step 2. System Setup,
Press NEXT and DOWN simultaneously for 3 seconds and release.
SET with SOFTENING flashing should appear on screen.

Cycle 1 Backwash	14	14	14	14	14	14	14	14	14	14	14	14
Cycle 2 Brine dn	60	70	62	64	86	71	84	61	68	66	81	72
Cycle 3 Rinse	6	6	6	6	6	6	6	6	6	6	6	6
Cycle 4 Fill Kg	6	7.5	9	11.25	15	18.5	27	33.5	33.5	45	75	105
Cycle 4 Fill Min 2" Only			3	4	6	7	10	12	12	16	27	38
Cycle 5						End						
Capacity Kg	2	2.5	3	3.8	5	6.3	8.8	11.2	11.2	15	25	35
Set Regen						Auto (automatic reserve calculation)						
Set Time Regen						on 0						
Set Salt						Off						

Step 3, Display Settings.
Press NEXT & UP simultaneously for three seconds and release.
HARDNESS with 340 flashing should appear on screen,

Hardness	Set on Site
Hardness 2	0 (not used)
Regen Day	Off
Set Time Regen	Default 2.00am

Step 4, Set time of day,
Press SET CLOCK
Set hours using the up and down buttons.
Set minutes using the up and down buttons,

Notes.
Reset: Press & Hold REGEN & NEXT for three seconds.
Total Reset: (Resets all values) Press & Hold REGEN & NEXT for three seconds, then press and hold the up and down buttons together for three seconds.
1. If the DP switch is to be used it must be set on both valves and have its own connection.
***** When 50 or 50L are selected for turbine size the Fill will be in minutes. 19/10/11 mgs

Notes:

When using a MAV this must be selected during programming and the MAV must be connected to the valve to prevent an error message. (Additional information will be provided with the MAV)

3.3 Crystal Right 100.

WS CI CR100 Duplex Systems

All figures based on a hardness setting of 100ppm using CR100 Crystal-Right
Please apply the settings in the following sequence
Selections are made using the UP & DOWN buttons until the required setting is displayed,
After each setting press NEXT to continue,

Vessel Size	1044	1054	1252	1354	1465	1665	1865	2160	2469	3072	3672
Media Volume (litres)	28.3	42.5	56.6	70	99	127	170	198	311	538	679
Valve	WS1	WS1	WS1	WS1	WS1	WS1	WS1	WS1			
	WS125	WS125	WS125	WS125	WS125	WS125	WS125	WS125			
			WS1,5	WS1,5	WS1,5	WS1,5	WS1,5	WS1,5	WS1,5		
			WS2	WS2	WS2	WS2	WS2	WS2	WS2	WS2	WS2
			WS2L	WS2L	WS2L	WS2L	WS2L	WS2L	WS2L	WS2L	WS2L
Step 1, Cycle Sequence.											
Press NEXT and DOWN simultaneously for 3 seconds and release.											
Screen will display SOFTENING flashing											
Press NEXT and DOWN simultaneously for three seconds, the screen should display SET 25, adjust to turbine setting below,											
Turbine Size WS1	25	25	25	25	25	25	25	25			
Turbine Size WS1,25	32	32	32	32	32	32	32	32			
Turbine Size WS1,5			38	38	38	38	38	38	38		
Turbine Size WS2			50	50	50	50	50	50	50	50	50
Turbine Size WS2L			50L	50L	50L	50L	50L	50L	50L	50L	50L
Alternating	**Alt A and Alt B respectively**										
DP	Off										
Hardness	PPM										
Set 1	Backwash										
Set 2	Brine dn										
Set 3	Rinse										
Set 4	Fill										
Set 5	End										
Step 2, System Setup.											
Press NEXT and DOWN simultaneously for 3 seconds and release.											
SET with SOFTENING flashing should appear on screen.											
Cycle 1 Backwash	14	14	14	14	14	14	14	14	14	14	14
Cycle 2 Brine Draw dn	66	52	64	57	81	67	75	55	61	49	67
Cycle 3 Rinse	7	7	7	7	7	7	7	7	7	7	7
Cycle 4 Fill Kg	4	5	6.75	8.5	12	15.25	20.5	23.75	37.5	64.5	81.5
Cycle 5 End	End										
Capacity (Kg)	0.7	1.3	1.7	2.2	3	3.8	5.1	5.9	9.3	16.1	22.1
Regen	Auto										
Regen	NORMAL on 0										
Salt	Off										
Step 3, Display Settings,											
Press NEXT and UP simultaneously for 3 seconds and release.											
HARDNESS with 340 flashing should appear on screen.											
Hardness	Set on Site										
Hardness 2	0 (Not used)										
Regen Day	System override days set to 5										
Regen on m3	0										
Step 4. Set time of day,											
Press SET CLOCK											
Set hours using the up and down buttons.											
Set minutes using the up and down buttons,											
Notes.											
Hardness calculated as follows: 1 x CaCO3 ppm + 2 x Na ppm + Fe ppm + Mn ppm.											
Total Reset: Press & Hold REGEN & NEXT for three seconds,											

26/04/2010

Notes:

When using a MAV this must be selected during programming and the MAV must be connected to the valve to prevent an error message. (Additional information will be provided with the MAV)

3.4 Crystal Right 200.

WS CI CR200 Duplex Systems

All figures based on a hardness setting of 100ppm using CR200 Crystal-Right
Please apply the settings in the following sequence
Selections are made using the UP & DOWN buttons until the required setting is displayed,
After each setting press NEXT to continue,

Vessel Size	1044	1054	1252	1354	1465	1665	1865	2160	2469	3072	3672
Media Volume (litres)	28.3	42.5	56.6	70	99	127	170	198	311	538	679
Valve	WS1	WS1	WS1	WS1	WS1	WS1	WS1	WS1			
	WS125	WS125	WS125	WS125	WS125	WS125	WS125	WS125			
			WS1,5	WS1,5	WS1,5	WS1,5	WS1,5	WS1,5	WS1,5		
			WS2	WS2	WS2	WS2	WS2	WS2	WS2	WS2	WS2
			WS2L	WS2L	WS2L	WS2L	WS2L	WS2L	WS2L	WS2L	WS2L
Step 1, Cycle Sequence.											
Press NEXT and DOWN simultaneously for 3 seconds and release.											
Screen will display SOFTENING flashing											
Press NEXT and DOWN simultaneously for three seconds, the screen should display SET 25, adjust to turbine setting below,											
Turbine Size WS1	25	25	25	25	25	25	25	25			
Turbine Size WS1,25	32	32	32	32	32	32	32	32			
Turbine Size WS1,5			38	38	38	38	38	38	38		
Turbine Size WS2			50	50	50	50	50	50	50	50	50
Turbine Size WS2L			50L	50L	50L	50L	50L	50L	50L	50L	50L
Alternating	**Alt A and Alt B respectively**										
DP	Off										
Hardness	PPM										
Set 1	Backwash										
Set 2	Brine dn										
Set 3	Rinse										
Set 4	Fill										
Set 5	End										
Step 2, System Setup.											
Press NEXT and DOWN simultaneously for 3 seconds and release.											
SET with SOFTENING flashing should appear on screen.											
Cycle 1 Backwash	14	14	14	14	14	14	14	14	14	14	14
Cycle 2 Brine Draw dn	66	52	64	57	81	67	75	55	61	49	67
Cycle 3 Rinse	7	7	7	7	7	7	7	7	7	7	7
Cycle 4 Fill Kg	4	5	6.75	8.5	12	15.25	20.5	23.75	37.5	64.5	81.5
Cycle 5 End	End										
Capacity (Kg)	1.2	2.1	2.2	3.1	4	5.1	6.8	7.9	12.4	21.5	29.4
Regen	Auto										
Regen	NORMAL on 0										
Salt	Off										
Step 3, Display Settings,											
Press NEXT and UP simultaneously for 3 seconds and release.											
HARDNESS with 340 flashing should appear on screen.											
Hardness	Set on Site										
Hardness 2	0 (Not used)										
Regen Day	System override days set to 5										
Regen on m3	0										
Step 4. Set time of day,											
Press SET CLOCK											
Set hours using the up and down buttons.											
Set minutes using the up and down buttons,											
Notes.											
Hardness calculated as follows: 1 x CaCO3 ppm + 2 x Na ppm + Fe ppm + Mn ppm.											
Total Reset: Press & Hold REGEN & NEXT for three seconds,											

26/04/2010

Notes:

When using a MAV this must be selected during programming and the MAV must be connected to the valve to prevent an error message. (Additional information will be provided with the MAV)

3.5 Nitrate Removal.

Clack WS / CI Valves Set up as Duplex Nitrate System.											
Please apply the settings in the following sequence											
Selections are made using the UP & DOWN buttons until the required setting is displayed,											
After each setting press NEXT to continue,											
Capacities based on 20g NO3 removal per litre of resin,											
Vessel Size	S735	S835	S935	S1035	1044	1054	1248/52	1354	1465	1665	1865
Media Volume (litres)	18	25	30	35	35	42	50	75	100	125	175
Valves	WS1CI WS125CI	WS1CI WS125CI	WS1CI WS125CI	WS1CI WS125CI	WS1CI WS125CI	WS1CI WS125CI	WS1CI WS125CI WS15CI WS2CI WS2LCI	WS1CI WS125CI WS15CI WS2CI WS2LCI	WS1CI WS125CI WS15CI WS2CI WS2LCI	WS1CI WS125CI WS15CI WS2CI WS2LCI	WS1CI WS125CI WS15CI WS2CI WS2LCI
Step 1, Cycle Sequence,											
Press NEXT and DOWN simultaneously for 3 seconds and release.											
Screen will display SOFTENING flashing											
Press NEXT and DOWN simultaneously for three seconds, the screen should display SET 25, adjust to turbine setting below,											
Turbine Size WS1	25	25	25	25	25	25	25	25	25	25	25
Turbine Size WS1,25	32	32	32	32	32	32	32	32	32	32	32
Turbine Size WS1,5							38	38	38	38	38
Turbine Size WS2							50	50	50	50	50
Turbine Size WS2L							50L	50L	50L	50L	50L
Set (Alternating)	**Alt A and Alt B respectively**										
SET dp	Off										
Hardness / Nitrate	PPM										
Set 1	Backwash										
Set 2	Brine Draw dn										
Set 3	Rinse										
Set 4	Fill (Salt required)										
Set 5	End										
Step 2. System Setup,											
Press NEXT and DOWN simultaneously for 3 seconds and release.											
SET with SOFTENING flashing should appear on screen.											
Cycle 1 Backwash	5	5	5	5	5	5	5	5	5	5	5
Cycle 2 Brine dn	64	59	63	63	60	70	62	64	86	71	84
Cycle 3 Rinse	6	6	6	6	6	6	6	6	6	6	6
Cycle 4 Fill Kg	3.05	4.3	5.05	5.05	6.05	7.3	8.55	12.8	17.05	21.55	29.55
Cycle 4 Fill Min 2" Only							3	4	6	7	10
Cycle 5								End			
Set Capacity Kg	0.36	0.5	0.6	0.7	0.7	0.84	1	1.5	2	2.5	3.5
Set Regen	Auto (automatic reserve calculation)										
Set Time Regen	NORMAL on 0										
Set Salt	(Salt Alarm Off)										
Step 3, Display Settings.											
Press NEXT & UP simultaneously for three seconds and release.											
HARDNESS with 340 flashing should appear on screen,											
Hardness / Nitrate	Set on site using the Nitrate reading in ppm										
Hardness 2	0 (not used)										
Regen Day	Off										
Set Time Regen	Default 2.00am										
Step 4, Set time of day,											
Press SET CLOCK											
Set hours using the up and down buttons.											
Set minutes using the up and down buttons,											
Notes.											
Total Reset: Press & Hold REGEN & NEXT for three seconds.											

Notes:

When using a MAV this must be selected during programming and the MAV must be connected to the valve to prevent an error message. (Additional information will be provided with the MAV)

3.6 Colour Removal (Organic Scavenger).

Clack WS / CI Valves Set up as Duplex Colour Removal,

Please apply the settings in the following sequence.
Selections are made using the UP and DOWN buttons until the required setting is displayed.
After each setting press NEXT to continue.

Vessel Size	1054	1248	1354	1465	1665	1865	2160	2160	2469	3072	3672
Media Volume (litres)	50	60	75	100	125	175	225	225	300	500	700
Valves	WS1CI	WS1CI	WS1CI	WS1CI	WS1CI	WS1CI	WS1CI	WS1CI			
	WS125CI	WS125CI	WS125CI	WS125CI	WS125CI	WS125CI	WS125CI	WS125CI			
	WS15CI	WS15CI	WS15CI	WS15CI	WS15CI	WS15CI	WS15CI	WS15CI			
		WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI
		WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI
Step 1, Cycle Sequence,											
Press NEXT and DOWN simultaneously for 3 seconds and release.											
Screen will display SOFTENING flashing.											
Press NEXT and DOWN simultaneously for 3 seconds, the screen will display SET 25, Adjust to the turbine setting below.											
Turbine Size WS1	25	25	25	25	25	25	25	25			
Turbine Size WS1,25	32	32	32	32	32	32	32	32			
Turbine Size WS1,5	38	38	38	38	38	38	38	38			
Turbine Size WS2		50	50	50	50	50	50	50	50	50	50
Turbine Size WS2L		50L	50L	50L	50L	50L	50L	50L	50L	50L	50L
Alternating						Alt A and Alt B respeectively.					
DP						Off					
Hardness						Off					
Set Cycle 1						Backwash					
Set Cycle 2						Brine Draw dn					
Set Cycle 3						Fast Rinse					
Set Cycle 4						Fill					
Set Cycle 5						End					
Step 2, System Setup.											
Press NEXT and DOWN simultaneously for 3 seconds and release.											
SET with SOFTENING flashing should appear on screen.											
Cycle 1 Backwash	14	14	14	14	14	14	14	14	14	14	14
Cycle 2 Brine draw dn	74	74	78	104	110	77					
Cycle 3 Fast Rinse	6	6	6	6	6	6	6	6	6	6	6
Cycle 4 Fill Kg	13	15.6	19.5	26	32.5	45.5	58.5	58.5	78	130	182
Cycle 5						End					
Capacity Kg	2.5	3	3.8	5	6.3	8.8	11.2	11.2	15	25	35
Regen						Auto					
Regen						NORMAL					
Salt						Off					
Step 3, Display Settings,											
Press NEXT and UP simultaneously for 3 seconds and release.											
HARDNESS with 340 flashing should appear on screen.											
Hardness						Na					
Hardness 2						Na					
Regen Day						Initial setting 2 Days					
Regen on m3						Na					
Step 4. Set time of day,											
Press SET CLOCK											
Set hours using the up and down buttons.											
Set minutes using the up and down buttons,											
Notes.											
Total Reset: Press & Hold REGEN & NEXT for three seconds.											

25/05/2011

Notes:

When using a MAV this must be selected during programming and the MAV must be connected to the valve to prevent an error message. (Additional information will be provided with the MAV)

4. Commissioning the System

4.1 Introduction.

With the system fully plumbed and the valves programmed commissioning can start.

4.2 Regeneration.

When the system is fully functional the regeneration will happen when capacity or period has expired. However, running a manual regeneration during commissioning is the best way of removing air from the system, bedding in the resin and flushing the system through.

Make sure the water inlet and outlet are closed. Press and hold the regeneration button for 3 seconds. The piston will move to the backwash position. Slowly half open the water inlet to the system, and then slowly open the outlet to allow the air to be purged from the system. Once this has been done you can fully open the inlet and outlet and allow the system to continue through the regeneration cycle, this will allow you to check for leaks and also purge any remaining air from the system. After a backwash the system will move through a brine draw routine, rinse and fill before stopping in the service position.

This will need to be done on both valves.

For new systems or after a media change it maybe necessary to run two regenerations to fully charge the media (check the water at the end of the backwash is running clear).

To initiate a delayed regeneration press the regeneration button once quickly this will start flashing Regen Today in the bottom left corner of the screen and the system will regenerate at the pre-set regeneration time. If you wish to cancel this just press the regeneration button again and the display will disappear.

To initiate an immediate regeneration press and hold the regeneration button until the valve motor starts to turn.

If during a regeneration cycle you need to skip through the cycle this can be done in the following way. To skip to the next stage quickly press the regeneration button and this will take it to the next stage of the regeneration, this can be repeated to get to the end of the regeneration cycle.

4.3 Service.

Water flows into the valve at the top, down through the media and then up through the ‘riser’ tube in the middle of the vessel. As the water travels through the media the ion exchange takes place. The controllers are set to automatically regenerate on capacity.
The display on the control can show either of the following; Time, current flow in litres per minute or remaining capacity, this can be changed by pressing the NEXT button.

5.Routine Maintenance

Your system is designed to run with the minimum of maintenance and does not normally require much adjustment.

Weekly

Check the salt level (this may need to be done more regularly dependant on consumption) **The salt level should always be above the water level.**
Check there is no sign of damage or leaks,
Check the quality of the treated water.

Monthly

Check the quality of the incoming water to see if it has changed significantly.

Yearly

Check for leaks or damage.
Soda Ash Regeneration **CR100 & CR200 units only)**

Soda Ash Regeneration (CR100 & CR200 Only)

GUIDELINES FOR THE USE OF SODA ASH AS A REGENERANT IN CRYSTAL – RIGHT INSTALLATIONS

Crystal Right is a well proven iron and manganese reduction media. Provided that the guidelines are followed with regard to the water analysis and selecting the correct grade and volume of media, then problems are rare. However there can be certain ground conditions where dissolved gases in the raw water may lead to a reduction in operating capacity.
During the normal service run gases present in ground water will be absorbed by the Crystal Right, and most of these gases are released during the standard brine regeneration. However some gases [especially CO2] may not be and stay retained in the crystals. This leads to a small reduction in Crystal-Right's exchange capacity per cycle which after a while can lead to a significant decrease in the exchange capacity of the unit.
To reverse the loss of capacity we have to carry out a regeneration that will release the remaining elements retained by the crystals that have not been removed by the standard brine regenerations. The way we can achieve this is to do regeneration with Sodium Carbonate [Na2CO3] which is also known as Soda Ash.
To reverse capacity loss we would suggest 'shock treatment' regeneration with Soda Ash followed by further routine regenerations at set intervals to prevent a further build up of problem elements on the crystals. It can also be beneficial to periodically regenerate Crystal-Right units that are working satisfactorily with Soda Ash purely as a preventative measure; it will be beneficial to the crystals.

Soda Ash Regeneration Procedure As a Routine Maintenance

Soda Ash is a powder which needs to be dissolved in water to make a liquid that can be drawn into the unit during a regeneration cycle, warm water will dissolve the Soda Ash faster, stirring the mixture also helps to dissolve it. Once the measured amount has been dissolved it is added to the brine solution in the brine tank and regeneration is initiated, during the injection cycle the mixture of brine and liquid soda ash will be drawn into the Crystal-Right bed in the normal way. If the brine tank is fitted with a brine well you can ensure the liquid soda ash makes direct contact with the brine by introducing it via the top of the brine well.

Soda Ash Shock Treatment

The Soda Ash is prepared in the same way and to the same strength as the routine procedure, the difference being during the shock procedure it is drawn direct from the container it is prepared in. The easiest way to do this is to disconnect the regular brine draw tube from the brine elbow, re-connect a piece of flexible tube to the elbow the other end of which is put into the Soda Ash solution.

I. The first stage of the shock treatment is to backwash the unit for the standard length of time

II. After the backwash the liquid soda ash is drawn into the bed as per the above guidelines, **immediately** all the soda ash solution has been drawn into the valve the original brine line is re attached to the brine elbow and the brine draw initiated and the standard regeneration cycle allowed to run its course.

III. **Important** When using the shock method monitor the pH of the rinse water going to drain, if CO2 is being released from the Crystal-Right the pH of the rinse water will drop, the lower the pH the more gas is being released from the crystals.

What Concentration and how much Soda Ash

The correct solution strength is made by dissolving 200 grams of Soda Ash in 1 litre of water. Each cubic foot of Crystal Right will require 2 Litres of Soda Ash solution for regeneration.

CRYSTAL RIGHT SODA ASH REGENERATION CHART			
Vessel Size	Crystal Right Volume	Soda Ash Ammount	Dissolved In Water
1044	1.0 CU,FT	400 Gramms	2 Ltrs
1054	1.5 CU,FT	600 Gramms	3 Ltrs
1252	2.0 CU,FT	800 Gramms	4 Ltrs
1354	2.5 CU,FT	1.0 KG	5 Ltrs
1465	3.5 CU,FT	1.4 KG	7 Ltrs
1665	4.5 CU,FT	1.8 KG	9 Ltrs
1865	6.0 CU,FT	2.4 KG	12 Ltrs
2160	7.0 CU,FT	2.8 KG	14 ltrs
2469	11 CU,FT	4.4 KG	22 Ltrs
3072	19 CU,FT	7.6 KG	38 Ltrs
3672	26 CU,FT	10.4 KG	52 Ltrs
Mixing the Soda Ash with warm water will dissolve the granuals quicker			

6. Troubleshooting

On the following pages you will find a guide as to the most common problems that may arise; please consult this section before contacting your supplying dealer as most problems are easily cured using the troubleshooting information.

Troubleshooting

TC control valves do not have meters so shaded ares are not applicable for TC control valves

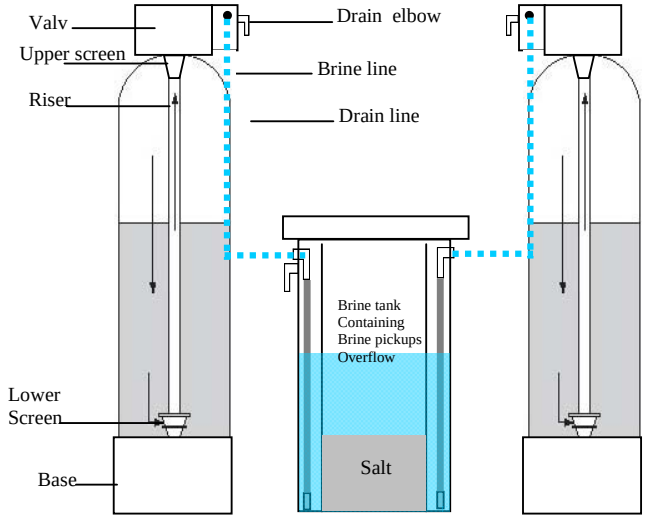
Problem	Possible Cause	Solution
1. No Display on PC Board	a. No power at electric outlet	a. Repair outlet or use working outlet
	b. Control valve Power Adapter not plugged into outlet or power cord end not connected to PC board connection	b. Plug Power Adapter into outlet or connect power cord end to PC Board connection
	c. Improper power supply	c. Verify proper voltage is being delivered to PC Board
	d. Defective Power Adapter	d. Replace Power Adapter
	e. Defective PC Board	e. Replace PC Board
2. PC Board does not display correct time of day	a. Power Adapter plugged into electric outlet controlled by light switch	a. Use uninterrupted outlet
	b. Tripped breaker switch and/or tripped GFI	b. Reset breaker switch and/ or GFI switch
	c. Power outage	c. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	d. Defective PC Board	d. Replace PC Board
3. Display does not indicate that water is flowing. Refer to user instructions for how the display indicates water is flowing	a. Bypass valve in bypass position	a. Turn bypass handles to place bypass in service position
	b. Meter is not connected to meter connection on PC Board	b. Connect meter to three pin connection labeled METER on PC Board
	c. Restricted/ stalled meter turbine	c. Remove meter and check for rotation or foreign material
	d. Meter wire not installed securely into three pin connector	d. Verify meter cable wires are installed securely into three pin connector labeled METER
	e. Defective meter	e. Replace meter
	f. Defective PC Board	f. Replace PC Board
4. Control valve regenerates at wrong time of day	a. Power outage	a. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	b. Time of day not set correctly	b. Reset to correct time of day
	c. Time of regeneration set incorrectly	c. Reset regeneration time
	d. Control valve set at "on 0" (immediate regeneration)	d. Check programming setting and reset to NORMAL (for a delayed regen time)
	e. Control valve set at "NORMAL + on 0" (delayed and/ or immediate)	e. Check programming setting and reset to NORMAL (for a delayed regen time)
5. Time of day flashes on and off	a. Power outage	a. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
6. Control valve does not regenerate automatically when the correct button(s) is depressed and held. For TC valves the buttons are ▲&▼. For all other valves the button is REGEN	a. Broken drive gear or drive cap assembly	a. Replace drive gear or drive cap assembly
	b. Broken Piston Rod	b. Replace piston rod
	c. Defective PC Board	c. Defective PC Board
7. Control valve does not regenerate automatically but does when the correct button(s) is depressed and held. For TC valves the buttons are ▲&▼. For all other valves the button is REGEN	a. Bypass valve in bypass position	a. Turn bypass handles to place bypass in service position
	b. Meter is not connected to meter connection on PC Board	b. Connect meter to three pin connection labeled METER on PC Board
	c. Restricted/ stalled meter turbine	c. Remove meter and check for rotation or foreign material
	d. Incorrect programming	d. Check for programming error
	e. Meter wire not installed securely into three pin connector	e. Verify meter cable wires are installed securely into three pin connector labeled METER
	f. Defective meter	f. Replace meter
	g. Defective PC Board	g. Replace PC Board

Problem	Possible Cause	Solution
8. Hard or untreated water is being delivered	a. Bypass valve is open or faulty	a. Fully close bypass valve or replace
	b. Media is exhausted due to high water usage	b. Check program settings or diagnostics for abnormal water usage
	c. Meter not registering	c. Remove meter and check for rotation or foreign material
	d. Water quality fluctuation	d. Test water and adjust program values accordingly
	e. No regenerant or low level of regenerant in regenerant tank	e. Add proper regenerant to tank
	f. Control fails to draw in regenerant	f. Refer to Trouble Shooting Guide number 12
	g. Insufficient regenerant level in regenerant tank	g. Check refill setting in programming. Check refill flow control for restrictions or debris and clean or replace
	h. Damaged seal/stack assembly	h. Replace seal/stack assembly
	i. Control valve body type and piston type mix matched	i. Verify proper control valve body type and piston type match
	j. Fouled media bed	j. Replace media bed
9. Control valve uses too much regenerant	a. Improper refill setting	a. Check refill setting
	b. Improper program settings	b. Check program setting to make sure they are specific to the water quality and application needs
	c. Control valve regenerates frequently	c. Check for leaking fixtures that may be exhausting capacity or system is undersized
10. Residual regenerant being delivered to service	a. Low water pressure	a. Check incoming water pressure – water pressure must remain at minimum of 25 psi
	b. Incorrect injector size	b. Replace injector with correct size for the application
	c. Restricted drain line	c. Check drain line for restrictions or debris and clean
11. Excessive water in regenerant tank	a. Improper program settings	a. Check refill setting
	b. Plugged injector	b. Remove injector and clean or replace
	c. Drive cap assembly not tightened in properly	c. Re-tighten the drive cap assembly
	d. Damaged seal/ stack assembly	d. Replace seal/ stack
	e. Restricted or kinked drain line	e. Check drain line for restrictions or debris and or un-kink drain line
	f. Plugged backwash flow controller	f. Remove backwash flow controller and clean or replace
	g. Missing refill flow controller	g. Replace refill flow controller
12. Control valve fails to draw in regenerant	a. Injector is plugged	a. Remove injector and clean or replace
	b. Faulty regenerant piston	b. Replace regenerant piston
	c. Regenerant line connection leak	c. Inspect regenerant line for air leak
	d. Drain line restriction or debris cause excess back pressure	d. Inspect drain line and clean to correct restriction
	e. Drain line too long or too high	e. Shorten length and or height
	f. Low water pressure	f. Check incoming water pressure – water pressure must remain at minimum of 25 psi

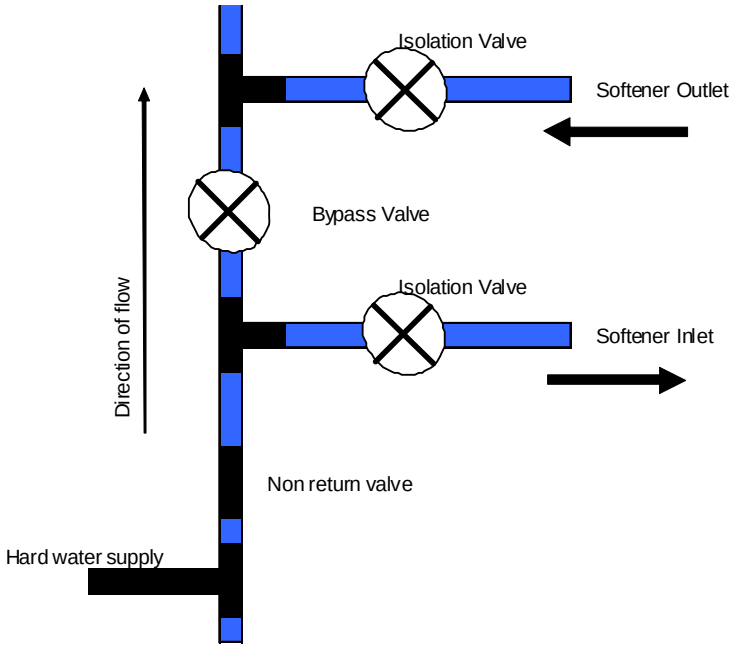
Problem	Possible Cause	Solution
13. Water running to drain	a. Power outage during regeneration	a. Upon power being restored control will finish the remaining regeneration time. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	b. Damaged seal/ stack assembly	b. Replace seal/ stack assembly
	c. Piston assembly failure	c. Replace piston assembly
	d. Drive cap assembly not tightened in properly	d. Re-tighten the drive cap assembly
14. E1, Err – 1001, Err – 101 = Control unable to sense motor movement	a. Motor not inserted full to engage pinion, motor wires broken or disconnected	a. Disconnect power, make sure motor is fully engaged, check for broken wires, make sure two pin connector on motor is connected to the two pin connection on the PC Board labeled MOTOR. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. PC Board not properly snapped into drive bracket	b. Properly snap PC Board into drive bracket and then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Missing reduction gears	c. Replace missing gears
15. E2, Err – 1002, Err – 102 = Control valve motor ran too short and was unable to find the next cycle position and stalled	a. Foreign material is lodged in control valve	a. Open up control valve and pull out piston assembly and seal/ stack assembly for inspection. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. Mechanical binding	b. Check piston and seal/ stack assembly, check reduction gears, check drive bracket and main drive gear interface. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Main drive gear too tight	c. Loosen main drive gear. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	d. Improper voltage being delivered to PC Board	d. Verify that proper voltage is being supplied. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.

Problem	Possible Cause	Solution
16. E3, Err – 1003, Err – 103 = Control valve motor ran too long and was unable to find the next cycle position	a. Motor failure during a regeneration	a. Check motor connections then Press NEXT and REGEN buttons for 3 s seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	b. Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	c. Snap drive bracket in properly then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
17. E4, Err – 1004, Err – 104 = Control valve motor ran too long and timed out trying to reach home position	a. Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	a. Snap drive bracket in properly then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
18. Err -1006, Err – 106, Err - 116 = MAV/ SEPS/ NHBP/ AUX MAV valve motor ran too long and unable to find the proper park position Motorized Alternating Valve = MAV Separate Source = SEPS No Hard Water Bypass = NHBP Auxiliary MAV = AUX MAV	a. Control valve programmed for ALT A or b, nHbP, SEPS, or AUX MAV with out having a MAV or NHBP valve attached to operate that function	a. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect. Then re-program valve to proper setting
	b. MAV/ NHBP motor wire not connected to PC Board	b. Connect MAV/ NHBP motor to PC Board two pin connection labeled DRIVE. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. MAV/ NHBP motor not fully engaged with reduction gears	c. Properly insert motor into casing, do not force into casing Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	d. Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	d. Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
19. Err – 1007, Err – 107, Err - 117 = MAV/ SEPS/ NHBP/ AUX MAV valve motor ran too short (stalled) while looking for proper park position Motorized Alternating Valve = MAV Separate Source = SEPS No Hard Water Bypass = NHBP Auxiliary MAV = AUX MAV	a. Foreign material is lodged in MAV/ NHBP valve	a. Open up MAV/ NHBP valve and check piston and seal/ stack assembly for foreign material. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. Mechanical binding	b. Check piston and seal/ stack assembly, check reduction gears, drive gear interface, and check MAV/ NHBP black drive pinion on motor for being jammed into motor body. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.

Typical Installation Layout.



Typical bypass setup using three isolation valves plus a non return valve.



Standard Hydraulic Connections (BSP).

Valve	WS1 CI	WS1.25 CI	WS1.5 CI	WS2 CI
Inlet	1”	1.25”	1.5”	2”
Outlet	1”	1.25”	1.5”	2”
Drain	.75”	.75”	.75”	1.5”

Notes: