Installation, Operation & Maintenance Guide

Clack WS CI & TC

Filter Systems

Including Birm, Filox, pH, Sediment, Carbon & Arsenic Removal Filters

WS CI

WS1TC

Contents

Accessories

5303024075	Bypass (suitable for 1” connections)
5303024084	Auxiliary Micro Switch (for 1” & 1.25” valves)
5303020005	Auxiliary Micro Switch (for 1.5” & 2” valves)
5303028632	Service Wrench
5303024087	Vertical Adaptor Assy (1” connections up to 14” vessel) **(CI only)**
5303020765	No untreated water bypass 1” & 1.25” valves **(CI only)**
5303020763	Motorized Alternating Valve 1” & 1.25” valves **(CI only)**
5302036536	Motorised Alt Valve 1.5” valve (can use as no untreated water bypass) **(CI only)**
5303028622	Motorised Alt Valve 2” valve (can used as no untreated water bypass) **(CI only)**
5303027234	2” Meter Assy **(CI only)**

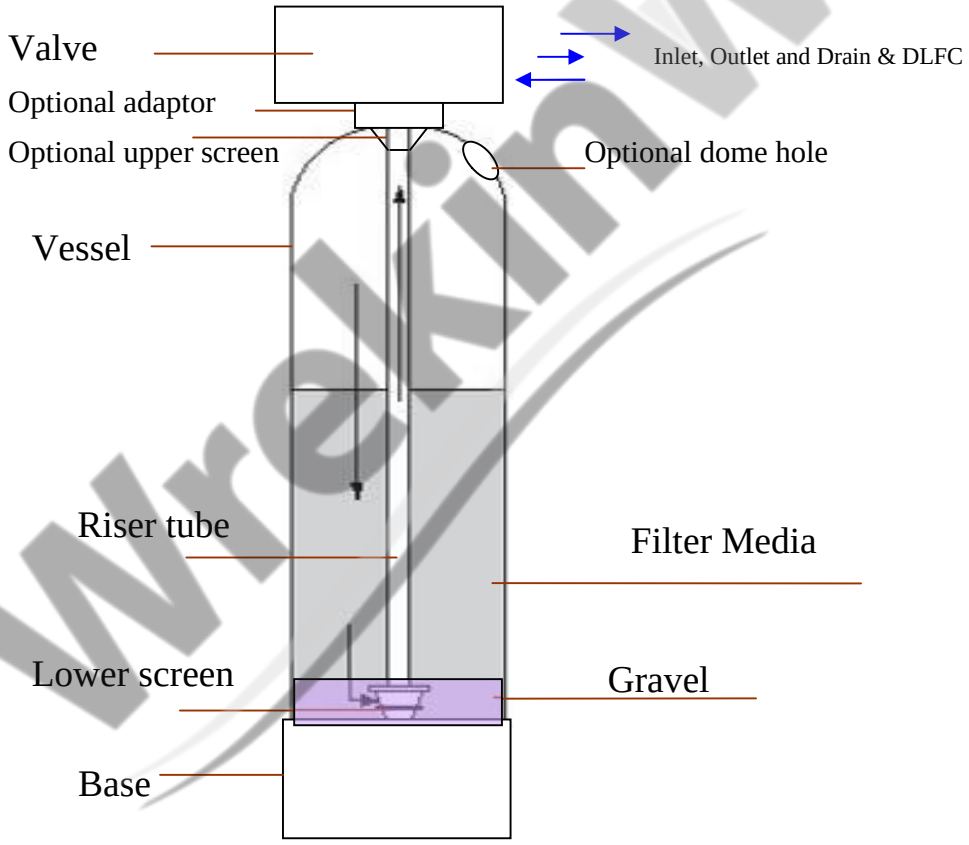
Thank you for purchasing this Filter System. We are sure that it will provide you with trouble free service for many years to come. Please use the following pages to assist you with the assembly and installation of your new system.

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 regulations concerning the installation of your filter 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 (see technical information later in the manual). 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 System

Fit the bottom distribution system into the vessel – the bottom screen should been pre glued to the riser tube (fig A.1) (smaller systems). Alternatively if the system uses bottom laterals these need to be assembled inside the vessel (fig A.2), Move the vessel in its final position as it 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 tube to stop media getting down the tube.(see fig A.3). Add about 1/3 by volume of water to the vessel 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 system. Add the other media supplied but make sure there is 30%. free space left above the media so when the system is backwashed the media can expand into the space and the sediment and contaminants can be backwashed away (there may be media left over). See section 5.4 for more information on the Medias.

Unblock the riser tube.

2.4 Fitting the Valve

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 a top screen is supplied this should be attached next. (Not always used)

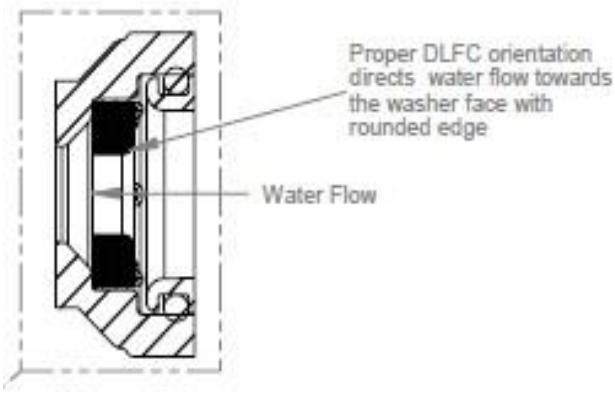
Slide the valve onto the riser tube and gently push it down onto the vessel treads. Screw the valve on until you start to squeeze the main O ring and then finally give the valve a final tighten by tapping the rear side of the valve with the palm of your hand (fig A.6)

Fig A.6

2.5 DLFC (drain line flow control)

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

2.6 Electrical connection

To connect the power cable you need to firstly remove the cover then remove the drive bracket assembly 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.7).

Fig A.7

When the drive plate has been removed, locate the knockout on the backplate. You can use a punch or a Phillips screwdriver to do this. (fig A.8)

Fig A.8

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.

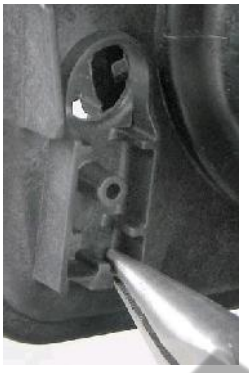


Fig A.9

Fig A.10

Fig A.11

Remove the tabs at the bottom of the strain relief on the back side of the back plate (fig A.9).

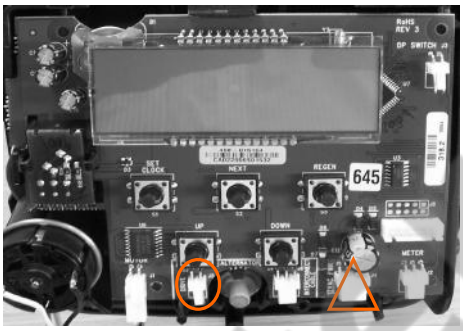
You can now connect the power cable to the valve and any additional cables that may be needed for no hard water bypass **(CI only)** or micro switch cables through the knockout. After connecting the cables you can weave the wires through the strain relief (fig A.10) and fit the cover supplied (fig A.11)

CI Valve connections.

Connect NHWB here ○ marked Drive if used.

Connect power here △ marked 12V DC

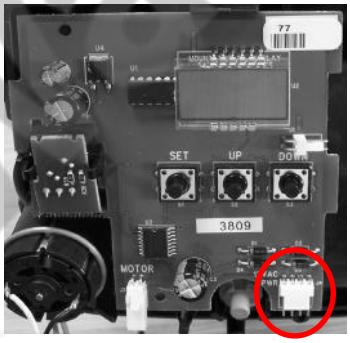
When all connections have been made the power can be turned on and programming can take place.



CI connection

TC Valve connection.

Connect power here ○ marked 12V DC



TC connection

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

2.7 Identifying your system.

Your Filter 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 08090137 Mis 0919-255-760	Stock Number: Serial No: Id Code: Configuration:	Manufacturers part number. Serial No. System type identification code. Vessel size, Valve type & Controller type.

Identify the settings from the charts in the programming section by looking at the vessel size and controller type.

The valve is 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 unit.

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

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

2.8 Programming the Valve (CI Only)

Quick Start CI.

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.

Should the programming have been lost in transit the following instructions in conjunction with the 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.

Set the Time of Day (As above)

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** and set each setting accordingly until the display returns to **TIME**. (See notes if fitting a Motorised Alternating Valve or No Hard / untreated Water Bypass valve)

Step 2: System Setup.

Press **NEXT** and **DOWN** simultaneously for 3 seconds and release.
The screen will display SOFTENING flashing. **Change this to FILTERING.**
The screen should display CYCLE 1, adjust as necessary (see setting sheet page?) 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 –nA- should appear on screen. Adjust as necessary (see setting sheet page?) Press **NEXT** and set each setting accordingly; please pay particular attention to the Regen Day and Regen Time settings, the display will return to the time of day after setting the regen time (minutes) has been set.

The valves are supplied pre programmed. Listed below are the settings in case there is a need to re program the unit.

Clack WS / CI Valves Set up as Filters.	**pH, Sand, Turbidex, Aquamandix, Birm, Arsenic.**										
								Software version from 332.2			
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	1044	1054	1252	1354	1465	1665	1865	2160	2469	3072	3672
Media Vol (1/2 Cuft) Filox		2	3	4	6	8	10	12	16	22	
Media Vol (Cuft) Birm		1.5	2	2.5	3	3.5	5	6.5	9	15	20
Media Vol (Cuft) Turbidex		1		2	2.5	4	5	7	8	11	
Media Vol (Kg) Sand	32	50	37.5	100	125	150	225	250	400	625	900
Media Vol (Kg) pH		50	62.5	100	125	150	225	250	400	650	925
Media Vol (Kg) Bayoxide	15			30	45	60	75	105	150	225	300
Media Vol (Kg) Carbon		20	25	35	50	63	85	100	150	200	300
Valves	1"	1"	1"	1"	1"	1"	1"				
							1.25"				
								1.5"	1.5"		
									2"	2"	2"
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 1, Adjust to the turbine setting below.											
Turbine Size WS1	1	1	1	1	1	1	1				
Turbine Size WS1.25							1.25				
Turbine Size WS1.5								1.5	1.5		
Turbine Size WS2									2	2	2
Alternating	Off						or (see note 1 for options)				
DP	Off						or (see note 2 for options)				
Set Hardness	PPM										
SET Cycle 1	Backwash										
SET Cycle 2	Rinse										
SET Cycle 3	2nd Backwash										
SET Cycle 4	2nd Rinse										
SET Cycle 5	END										
Step 2, System Setup.											
Press NEXT and DOWN simultaneously for 3 seconds and release.											
Screen will display SOFTENING flashing. **Change this to FILTERING.**											
Cycle 1 Backwash	5	5	5	5	5	5	5	5	5	5	5
Cycle 2 Rinse	3	3	3	3	3	3	3	3	3	3	3
Cycle 3 2nd Backwash	5	5	5	5	5	5	5	5	5	5	5
Cycle 4 2nd Rinse	3	3	3	3	3	3	3	3	3	3	3
Cycle 5 End	End										
Set Regen	Off						or (see note 3 for options)				
Set Time Regen	(will not show if Off selected above)						or (see note 4 for options)				
Set rLY 1 (Relay 1)	Off						or (see note 5 for options)				
Set rLY 2 (Relay 2)	Off						or (see note 6 for options)				
Step 3, Display Settings.											
Press NEXT and UP simultaneously for 3 seconds and release.											
Regen Day	**3**										
Regen Day (Arsenic)	**14**										
Set Time Regen Hrs	Default 2:										
Set Time Regen Min	Default :00										
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.											31/05/2017

Notes:

Notes for CI valves software version 332.2			
Starting a manual Regeneration			Press and hold the REGEN button until the motor starts.
Set a delayed regeneration			Press the REGEN button (REGEN TODAY) will flash on screen) press
			the REGEN button again to clear.
Advancing through a regeneration			Press the REGEN button to move to the next stage of regeneration.
Doing a soft reset			Press & Hold REGEB & NEXT for 3 seconds. (resets valve in error).
Doing a total reset			Press & Hold REGEB & NEXT for 3 seconds, then press & hold the
			UP & DOWN buttons togeter for 3 seconds. (resets valves history).
Changing the service display			Press NEXT to toggle to the next available display.
Note	**Options**		
1	Off	Feature not used (standard setting)	
	ALT A	Set on primary valve is using a standard duplex alternating systen (Duplex only)	
	ALT B	Secondary valve if using a standard duplex alternating system (Duplex only)	
	SYS	If being used with a system controller.	
	SEPS	Used if a separate source MAV is being fitted (requires 3 way Mav valve)	
	nHbP	Used if a No Untreated Water valve is being fitted (no untreated water during regen)	
2	Off	Feature not used (standard setting) If used the following options are available)	
	dpon0	If the contact is closed it will initiate an immediate regeneration.	
	dPdEL	If the contact is closed it will initiate a delayed regeneration.	
	Hold	If the contact is closed a regeneration will be prevented.	
3	Auto	Capacity is automatically calculated and a reserve will be estimated.	
	OFF	Regenerations will be controlled from the day override setting (user settings)	
	M^3	Regeneration will occur immediately when the set capacity has expired.	
		If off or M^3 is selected the hardness setting will not display in settings.	
4	NORMAL	Regenerations will occur at the pre set time. (not available on alternating duplex)	
	On 0	Regenerations will occur immediately when capacity reaches zero.	
	Normal on 0	Regeneration will occur at the preset time when volume is below the reserve or if	
		volume is below the reserve after 10 minutes of no water usage.	
5	OFF	Feature not used.	
	Time on	Activates after a set time from the start of a regeneration for a set period of time.	
	L Softening on	Activates in service after a set number of litres for a set time and deactivates after	
		a set period of flow stops.	
L Softening Regen on		As above but during regeneration.	
6	OFF	Feature not used.	
	Time on	Activates after a set time from the start of a regeneration for a set period of time.	
	L Softening on	Activates in service after a set number of litres for a set time and deactivates after	
		a set period of flow stops.	
L Softening Regen on		As above but during regeneration.	
	Error	Activates whenever the valve enters an error mode.	
7		Add the KG of salt added to the brine bin each fill, doe's not show for 1.5 & 2" valves.	
8	OFF	Standard setting.	
	Delay	The last two cycles can be delayed (Rinse & Fill) this delays untl the on line unit is	
		depleted to 10%.	
8a	PrE	A pre sinse can be set to rinse the next cylinder before going into service (1" 2" & 1" TT)	
9	PrE	A pre rinse can be set if required of up to 20 min duration.	

Programming the Valve (TC Only)

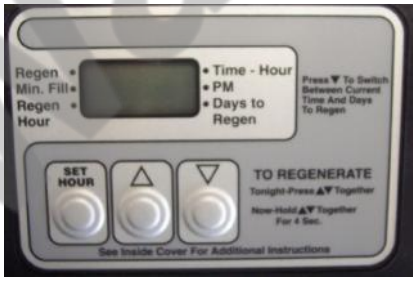
Quick Start.

Set Time of Day.

Press **SET HOUR** and adjust time using the **UP** or **DOWN** buttons.

Should the programming have been lost in transit the following instructions in conjunction with the 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 **SET HOUR** to continue.

Step 1: System Setup.

Press **SET HOUR + UP** button simultaneously for three seconds and release.

Then press **SET HOUR + UP** button simultaneously for three seconds and release.
Select the chosen program P7 to P9 (see setting sheet) two dashes with an arrow pointing towards Min Fill will display; press **SET HOUR** to continue.

99 with an arrow pointing to Days to Regen will now flash **select 99** and continue **SET HOUR**.

50 with three arrows each side will now flash **select 50** and continue **SET HOUR** this represents 50Hz frequency..

dp will now display; standard systems are not fitted with a dp switch and consequently this setting is ignored.

Step 2: Display Settings.

Press **SET HOUR + UP** button simultaneously for three seconds and release.

The **REGENERTION / BACKWASH** time is now showing; use the **UP** and **DOWN** buttons to adjust to the hour required (default 2am).

Days between **REGEN / BACKWASH** is now showing; use the **UP** and **DOWN** buttons to adjust to the days required (default 3).

The valve can be set to regenerate on specific days; information is supplied in the full valve manual (available on request)

The valves are supplied pre programmed. Listed below are the settings in case there is a need to re programme the unit.

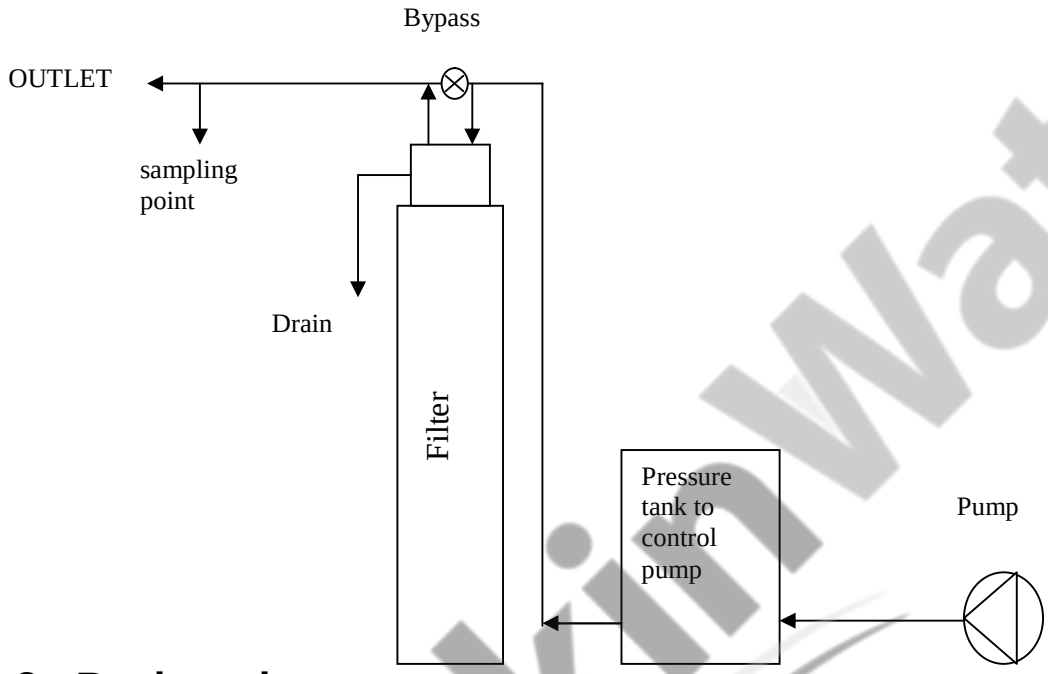
WS1 TC Filter Units. pH, Sand, Birm, Arsenic

Vessel Size		1044	1054	1248	1354	1465	1665	1865	2160
Media Volume (litres) Birm/Arsenic		42.5	42.5	56.6	72	99	127	170	184
Media Vol (Kg) pH/Sand		32	32	32	64	80	96	144	250
All setting adjustments are made using the UP and DOWN buttons.									
SET HOUR moves you to the next stage.									
Step 1: System Setup									
Press SET HOUR and UP buttons simultaneously for 3 seconds, when the screen changes release.									
Press SET HOUR and UP buttons simultaneously for 3 seconds, when the screen shows P (0-9) release.									
Choose the required program from the list below that best meets your requirements.									
P 9 is our default program for Filter systems.									
Program	C1	C2	C3	C4	C5				
	1 st Backwash	Regenerate	2 nd Backwash	Rinse	Fill				
P7	6	Skipped	Skipped	4	Skipped				
P8	10	Skipped	Skipped	6	Skipped				
P9	14	Skipped	Skipped	8	Skipped				
If you have chosen any other setting please refer to the manufacturers manual for additional instructions.									
A flashing arrow with two dashes should display pointing towards Min Fill.									
99 or 7 will now be flashing on screen:				**Select 99**					
60 of 50 will now be flashing on screen:				**Select 50**					
dP will now be flashing on screen:			**Use the up & down buttons to make sure an arrow is pointing to Regen.**						
(This will ensure a delayed regen at the set time rather than an immediate regen)									
Step 2, Displays & Settings.									
If 99 selected in step 1.									
Press SET HOUR and UP simultaneously for 3 seconds then release.									
Regeneration Time			Factory Default **2** (24hr Clock)						
Days to REGEN			Factory default **3** (14 ***for Arsenic)***						
If 7 selected in step 1.									
Press SET HOUR and UP simultaneously for 3 seconds then release.									
Regeneration Time			Factory Default **2** (24hr Clock)						
Current Day of Week			d1 = Sun, d2 = Mon. d3 = Tues, d4 = Wed, d5 = Thur, d6 = Fri, d7 = Sat						
Select day/s to Regen			Scroll through the days and select which days you require regeneration by using the up and down buttons to put an arrow next to the regen for each day required (no arrow no regen)						
Step 3, Set time of Day.									
Press SET HOUR			Select time (24hr Clock closest hour)						
Notes:									
Normal display:	During operation one of two displays will be shown; use the up & down buttons to alternate.								
									10/104/2018

3. Commissioning the Filter

3.1 Introduction

With the system fully plumbed (see below) and the valve programmed commissioning can start.



3.2 Backwash

When the system is fully functional the backwash will happen at the pre-set time (see programming the valve section). However, running a manual backwash during commissioning is the best way of removing air from the system, bedding in the media and flushing the system.

Make sure the water inlet and outlet are closed. Press and hold the regeneration button for 5 seconds. The motor will turn and 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 backwash 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 short rinse cycle and then stop in the service position.

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

For TURBIDEX please see below.
Initial backwash instructions for Turbidex filtration media.
Due to the naturally occurring dust and fine particles found in zeolites it is important to thoroughly clean the new bed to prevent plugging of the distributor slots. Zeolite fines are crystalline in structure and may get wedged in the slots, becoming very difficult to remove.
Important: Throughout this procedure, do not place the unit into rinse or service until you are sure the bed has been cleaned of fines.
Always start the unit in backwash and slowly open the by-pass valve until the unit is full of water (as evidenced by a gradual flow to drain). Shut off the by-pass and allow the unit to

saturate for a minimum of one half hour for filters below 16”, one hour for 18” to 30”, 2 hours for 36” to 48” and a minimum of 3 hours for larger vessels.
After the media has been fully saturated, open the by-pass until the full backwash flow is reached. Inspect the water going to drain for evidence of the water being milky in colour. Once the water going to drain begins to run clear, close the by-pass and allow the unit to settle for 5 minutes.
Open the by-pass again and inspect the water going to drain, again you will notice a milky colour in the water.
Repeat this procedure until there is no longer any colour in the water going to drain.

At this point you may rinse the filter for 10 to 30 minutes depending on the size and then place the valve into the service position.

Note
Check the service and backwash flow rates (see technical information). If the service flow rates are exceeded or the backwash flow rate is not correct then the filter may not work correctly.

If during a backwash cycle you need to skip through the cycle this can be done in the following way. To skip to the next stage press the REGEN button.

3.3 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 contaminants are removed. The timer options are set to automatically self clean (backwash) and wash away any of the accumulated contaminants.

4.Routine Maintenance

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

Monthly
Check there is no sign of damage or leaks, check drain lines and power cables are still in good condition and not kinked.

Yearly
We recommend that a competent service engineer checks the system annually. The inlet and outlet pipes need to be rinsed, the drain line checked for degradation, and the system flushed through. The media should be checked, if pH it probably needs to be topped up.

The quality of the treated water needs to be checked regularly. How regularly depends on what the water is being used for eg drinking water or irrigation etc. If the water is being used for drinking water then it needs to be checked more regularly and the relevant Private Water regulations covers the sampling and testing routines for England this is “The Private Water Supplies Regulations 2009” No. 3101. However it is sensible to at least partially test the treated water every 3 months or so and certainly every 6 months to look for compliance. A competent water treatment company can help with this.

5. Technical Information

Note: Check the service and backwash flow rates (see technical information). If the service flow rates are exceeded or the backwash flow rate is not correct then the filter may not work correctly.

5.1 Process and Operating Data.

Birm

Vessel size	C1054	C1248	C1354	C1465	C1665	C1865	C2160	C2469	C3072	C3672
Service flow rate - m3/hr	0.6	0.9	1.0	1.2	1.6	2.0	2.7	3.6	5.6	8.0
Backwash flow rate - m3/hr	1.1	1.8	2.0	2.3	3.4	3.9	5.7	6.8	11.4	17.1

Birm can be used for iron and manganese removal by oxidation (up to 15ppm). It requires a pH of 7 or more for iron removal and pH 8 for manganese removal (it uses dissolved oxygen in the water to oxidise the metal). As it acts a catalyst it is not consumed so Birm doesn't require regenerating or topping up (does require backwashing). Birm also has the advantage of acting as a filter removing relatively high levels of turbidity. It is advised not to use Birm in combination with chlorination and the water should be free of oil, polyphosphates and hydrogen sulphide. Alkalinity should be greater than twice the sulphate and chloride level and the organic loading should be below 5ppm. If the pH of the water is too low pH correction maybe required by adding a pH correction media such as Juraperle or Corrosex. Birm requires a dissolved oxygen of at least 15% of the iron and manganese content to work.. Freeboard 30% to 50%

Filox

Vessel size	C1054	C1252	C1354	C1465	C1665	C1865	C2160
Service flow rate - m3/hr	2.0	2.7	3.3	4.0	5.3	5.7	6.1
Backwash flow rate - m3/hr	1.8	2.3	3.1	3.7	4.7	5.4	5.7

Filox can be used for iron and manganese and hydrogen sulphide removal by oxidation. It requires a pH of 7 or more for iron removal and pH 8 for manganese removal plus a dissolved oxygen level of at least 15% of the iron and manganese content. It needs a high backwash flow rate to remove the oxidised iron and manganese but can cope with high service flow rates. Filox can also cope with chlorinated water. NSF certified, Freeboard 30% to 50%

pH Media

Vessel size	C1054	C1248	C1354	C1465	C1665	C1865	C2160	C2469	C3072	C3672
Service flow rate - m3/hr	0.6	0.9	1.0	1.2	1.6	2.0	2.7	3.6	5.6	8.0
Backwash flow rate - m3/hr	1.1	1.8	2.0	2.3	3.4	3.9	5.7	6.8	11.4	17.1

Water with a pH below 7 is acidic and can damage copper pipe-work and heating systems. Raising the pH will neutralise the water stopping the corrosivity, removing the metallic taste. The pH is raised by passing the water through a vessel containing slowly dissolving calcium and magnesium salts. These salts slowly dissolve into the water 're-mineralising' the water and naturally raising the pH. Make sure that there is 30% freeboard.

> **Juraperle:** a granular media made up of 99.4% calcium carbonate. It has a superior performance to limestone due to its micro-crystalline structure and dissolves very slowly. Juraperle is consumed and from time to time new media should be added.

Corrosex: a highly magnesium oxide salt and is used most effectively where the pH correction is substantial or the flow rate is high. In reality for a pH of less than 6 a 25% Corrosex, 75% Juraperle mix is ideal.

Sediment filters:

Sand, Filter Ag & Turbidex

Vessel size	C1054	C1248	C1354	C1465	C1665	C1865	C2160	C2469	C3072	C3672
Service flow rate - m3/hr	0.6	0.9	1.0	1.2	1.6	2.0	2.7	3.6	5.6	8.0
Backwash flow rate - m3/hr	1.1	1.8	2.0	2.3	3.4	3.9	5.7	6.8	11.4	17.1

Sediment filters are needed when the water supply is cloudy or turbid. The particles in the water will block plumbing systems, leave unsightly staining, may contain toxic chemicals or bacteria. The easiest way to remove the particles is by passing the water through a media where the particles get stuck and allowing clear water to flow through. The particles can be periodically 'backwashed' away to drain.

Sand: The grade of sand is tightly controlled so only highest quality; triple washed 0.5 to 1mm size water treatment grade sand is used. Particles above 40 micron are typically trapped.

Filter Ag: Has a high surface area and complex flow path for a more efficient removal of suspended matter. Filter Ag is also lighter in weight than sand which reduces backwash flow rate. Particles down to 20 micron can be trapped. Filter Ag should be soaked for 24 hours before use.

Turbidex

Vessel size	C844	C1054	C1248	C1354	C1465	C1665	C1865	C2160	C2469	C3072
Service flow rate - m3/hr	0.9	1.5	2.19	2.50	2.9	3.8	4.8	6.6	8.6	13
Backwash flow rate m3/hr	1.2	1.9	2.7	3.1	3.6	4.8	5.7	8.2	10.7	17.4

Turbidex: A natural ore that has a more irregular surface than sand. Giving more efficient removal of suspended matter and means the equipment can be smaller. Particles down to 5 micron are typically removed. Turbidex has a different commissioning process!

Arsenic Removal Media

Vessel size	C1054	C1248	C1354	C1465	C1665	C1865	C2160	C2469	C3072	C3672
Service flow rate - m3/hr	1.1	1.5	1.8	2.0	2.6	3.2	4.5	5.9	9.2	13.5
Backwash flow rate m3/hr	1.3	1.9	2.2	2.4	3.3	4.2	5.6	7.3	11.5	16.5

Severn Trent worked to develop an arsenic removal media formulated to give a high arsenic removal capacity. The media is strong, reliable and easy to handle. Arsenic is trapped within the media and held even when it is backwashed. Typical life time of the media depends on arsenic levels and the amount of water used. A 1054 system with 1 bag of media (15 Kg) can typically be expected to treat 1500m3 of water at 50ug/l Arsenic .For a family of 4 the media should last about 6 years.
Pre-treatment may be necessary as the raw water must contain: Iron <200ug/l, Manganese: <50ug/l, Silica (SiO_2) <40mg/l, Phosphate: <200ug/l, pH: 6.5 to 8.5, suspended solids:<10mg/l.
Backwash frequency 14-28 days.

Activated Carbon

Vessel size	C1054	C1248	C1354	C1465	C1665	C1865	C2160	C2469	C3072	C3672
Service flow rate - m3/hr	1.1	1.5	1.8	2.0	2.6	3.2	4.5	5.9	9.2	13.5
Backwash flow rate m3/hr	1.3	1.9	2.2	2.4	3.3	4.2	5.6	7.3	11.5	16.5

Activated carbon (GAC) works by absorbing soluble pollutants onto its surface and holding them. Eventually all the pores are filled and the carbon needs to be replaced. GAC is used to reduce chlorine, natural colours and odours from water.

5.2 Standard Hydraulic Connections (BSP).

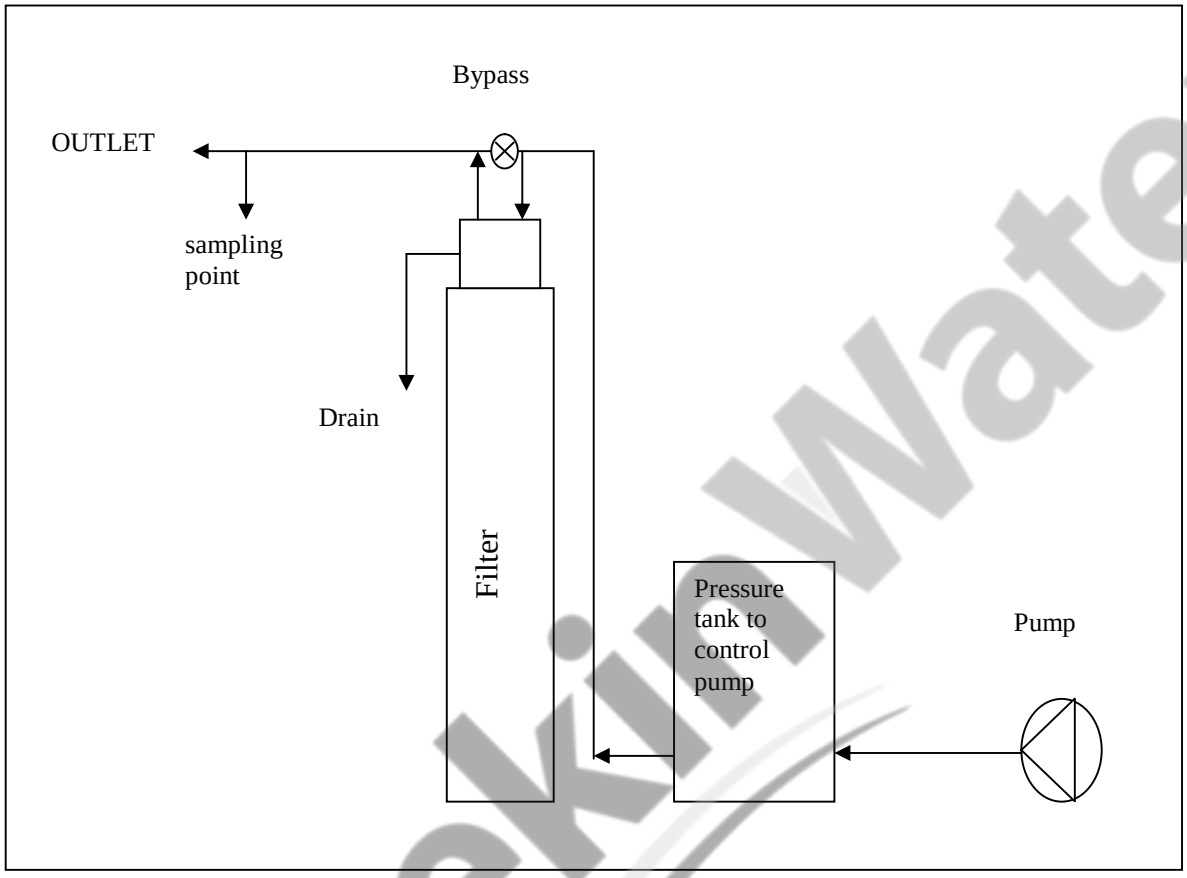
Valve	WS1 CI/TC	WS1.25 CI	WS1.5 CI	WS2 CI
Inlet	1”	1.25”	1.5”	2”
Outlet	1”	1.25”	1.5”	2”
Drain	.75”	.75”	.75”	1.5”

5.3 Approximate dimensions and weight for a single unit.

		Valve Fitted			
	WS1 TC	WS1 CI	WS1.25 CI	WS1.5 CI	WS2 CI
Vessel					
1044					
WxDxH cm	26x32x131				
Weight Kg	66				
1054					
WxDxH cm	26x32x156	26x32x156	26x32x156		
Weight Kg	68	68	68		
1248					
WxDxH cm	31x32x141	31x32x141	31x32x141	31x31x141	31x38x144
Weight Kg	77	77	77	85	218
1354					
WxDxH	33x33x156	33x33x156	33x33x156	33x33x156	33x38x159
Weight Kg	129	129	129	137	141
1465					
WxDxH cm	36x36x185	36x36x185	36x36x185	36x36x185	36x38x188
Weight Kg	170	170	170	178	182
1665					
WxDxH cm	41x41x186	41x41x186	41x41x186	41x41x186	41x41x189
Weight Kg	205	205	205	213	217

		Valve Fitted			
	WS1 TC	WS1 CI	WS1.25 CI	WS1.5 CI	WS2 CI
Vessel					
1865					
WxDxH cm	46x46x198	46x46x198	46x46x198	46x46x198	46x46x201
Weight Kg	312	312	312	320	324
2160					
WxDxH cm	54x54x182	54x54x182	54x54x182	54x54x182	54x54x185
Weight Kg	336	336	336	344	348
2469					
WxDxH cm			61x61x207	61x61x207	61x61x210
Weight Kg			498	506	510
3072					
WxDxH cm				76x76x223	76x76x226
Weight Kg				799	804
3672					
WxDxH cm				92x92x230	92x92x233
Weight Kg				1115	1121
Weight based on Sand as media					

5.4 Installation Layout



Troubleshooting

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.