Installation, Operation
& Maintenance Guide

Filter Systems

Including Birm, Filox, pH, Sediment,

Carbon & Arsenic Removal Filters

Contents

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**:**

Valve — Inlet, Outlet and Drain & DLFC
Optional adaptor
Optional upper screen — Optional dome hole
Vessel
Riser tube — Filter Media
Lower screen — Gravel
Base
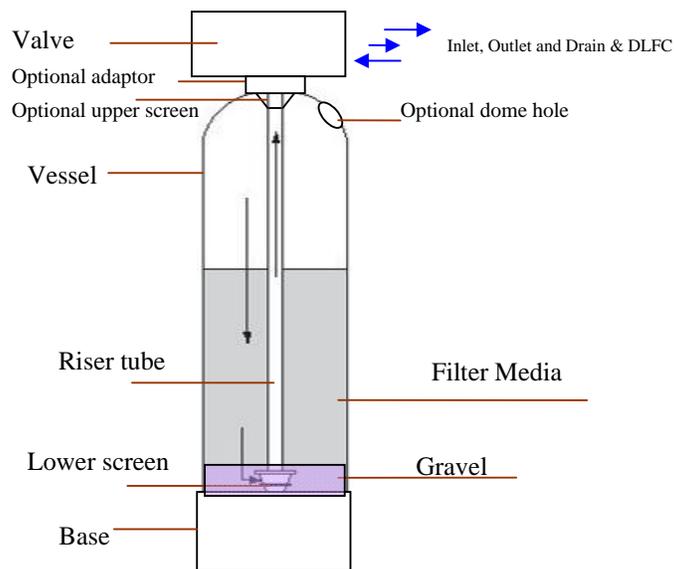
2.   Installation

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 at the back of 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 Bottom Distribution System

Fit the bottom distribution system into the vessel – the bottom screen should been pre glued to the riser tube(fig A.1). 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 6 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.

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 Hydraulic Connections

Attach the supplied tails before you connect to your pipe work to the valve (fig A.7). You can connect with fixed or flexible pipe work for the ¾ or 1" valve units and fixed pipe work for the 2" valve units. (Fig A.7)

Fig A.7

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2.6   Drain Line Flow Connections

Check the service and backwash flow rates (see technical information at the end of the manual). If the service flow rates are exceeded then the filter will not give good quality water. If the backwash flow rates are not available when backwashing there will not be sufficient water to lift the bed and wash away all the impurities – typically the backwash flow rate should be twice the service flow rate. The backwash flow rate should be limited by either internal or external drain line flow controls (DLFCs). If the DLFC is external then it should be listed on the packing documents and should be screwed on to the waste connection of the valve. A drain hose should then be attached which needs to terminate in an open drain (back pressure or a kinked waste tube will cause the system to malfunction). If the DLFC is internal it will be fitted inside the valve (normally used on vessels 10 inch diameter and smaller).

2.7   Electrical connection

All valves are low voltage valves with a 240V transformer. With the power off connect the transformer provided to 240V supply. With the power OFF plug the flying lead into the connecter on the controller (Fig A.9). If you have an in line transformer this need to be wired into a fused switch.
Ensure that the flying lead cannot get caught on the camshaft or any of the valves moving parts.

2.8 Programming The Valve

This programming relates to the Autotrol 74x and 76x logix series timers.

The valve should already have been set up with the basic settings in the factory. The only settings you should need to enter are the time of day and day of the week.
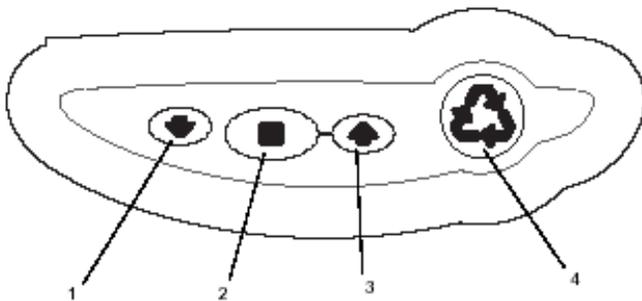
1. Down arrow. Used to scroll down or increment through a group of choices.
2. Set. Used to accept a setting to store in the memory.
3. Up arrow. Used to scroll up or increment up through a group of choices.
4. Regenerate. Used to command the controller to regenerate.

Initial Power Up.

Plug the transformer into the rear of the control panel; this is located to the left top corner of the panel if viewing from the front. Once the power is connected the display may briefly show the valve number for the system (742 or 762 versions). The valve type will be printed on the side of the valve and should also appear on the delivery documentation.

Note. During the set up process the display may revert to service mode (after 25 seconds).

By repeatedly pressing the set button you can scroll to the part of the set up programme you require.
If you receive an ERR3 message allow the cam shaft to turn for a few moments and this code should disappear. If the cam does not move check that the Cam Shaft is fitted correctly and that the optical sensor is in position.

Set Time

Press the set button. The TIME should now be flashing, use the up and down arrows to set the correct time of day (24hrs format). Once the correct time has been selected, press the set button to confirm. The following will then be displayed.

Set Day of the Week

Press the set button to display the screen shown. The display will flash, use the up and down buttons to advance the arrow to underneath the correct day. Once under the correct day press the set button to confirm. The following will then be displayed.
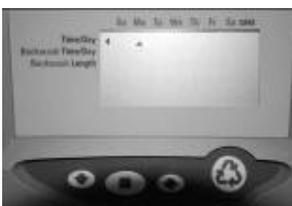
Calendar Override Days

The system should have this pre-programmed to a suggested number of days but this may need altering to suit your needs. This function allows the filter bed to backwash regardless of usage; this is to ensure that the filter bed remains fresh.

Press the set button to start the display flashing then alter the figure using the up and down arrows, then press the set button to confirm the setting.

The following will then be displayed.

Time when system Back Washes

This normally defaults to 2.00am but can easily be changed to a more suitable time if required by pressing the square set button to start the display flashing, adjusting the time using the up and down arrows then press the square set button to confirm. The following will then be displayed.

Back Wash Time

The back wash time will be pre-set but may need altering to suit your requirements. To amend this setting press the set button to start the display flashing, then alter the figure using the up and down arrows, then press the set button to confirm the setting.

See the technical section for settings (note after the backwash there is an automatic fast rinse process to resettle the system).

2.9   Resetting The Valve Programming

Occasionally it maybe necessary to reset the valve to factory defaults.

The programmed valve type (filter or softener) can be checked by pressing and holding the SET and DOWN buttons simultaneously for 5 seconds. H0 and the F (for filter mode) should be displayed H0 F. If H0 and a resin volume is displayed eg H0 100, the filter has been set as a softener and needs to be reset to a filter. If this is the case check the valve has the refill blocked as is configured as a filter valve – if in doubt speak to your supplier.

To reset the valve with H0 displayed, press and hold the SET for 5 seconds

> For 740/760 valves (black timer surround) three dashes will appear ---, use the up/down keys to select F and press SET.
>
> For 742/762 timers (light grey surround) the valve type will now be shown eg 255, 263. Choose the correct valve (255, 263, 273, 293) and press the SET button. F should now be displayed, press the SET button to confirm.

It will now be necessary to reset the time and the backwash setting as shown in the previous section.

3. Commissioning the Filter

3.1 Introduction

With the system fully plumbed 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 through.

Make sure the water inlet and outlet are closed. Press and hold the regeneration button for 5 seconds. The cam will rotate to the backwash position (C1). 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 rinse routine and then some pressure equalising cycles before stopping 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).

Note
Check the service and backwash flow rates (see technical information at the end of the manual). If the service flow rates are exceeded then the filter will not give good quality water.

To initiate a delayed backwash press the regeneration button once quickly to start the regen symbol flashing, this will start the backwash at the backwash pre-set time.

If during a backwash cycle you need to skip through the cycle this can be done in the following ways. To skip to the next stage press the square set button and up arrow together for a second. To skip to the end of the cycle press and hold the square set button and up arrow until the egg timer starts flashing.

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 out let pipes need to be rinsed, the drain line checked for degradation, and the system flushed through. The media should be checked, for 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

5.1 Identifying your System.

Your softener will have a identification label fixed to the outer carton and 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: Manufacturers part number.
Serial No: Serial No.
Id Code: System type identification code.
Configuration: Vessel size, Valve type & Controller type.

Identify the settings from the chart below by looking at the vessel size and controller type.

5.2 Programming details.

740 / 742 Filter Units. pH, Sand, Birm, Arsenic

Parameter	Code	1044	1054	1248	1354	1465	1665	1865	2160	2469	3072	3672
Vessel Size		1044	1054	1248	1354	1465	1665	1865	2160	2469	3072	3672
Media Volume (litres) Birm/Arsenic		42.5	42.5	56.6	72	99	127	170	184	255	425	566
Media Vol (Kg) pH/Sand		32	32	32	64	80	96	144	250	400	650	925
Controller		740	740	740	740	740	742	742	742	742	742	742
Select type of valve (? & ? then ?)		F	F	F	F	F	Valve type should be preset on built units.					
Set Volume F (740)		740	740	740	740	740	742	742	742	742	742	742
Select valve and F (742)		F	F	F	F	263 F	263 F	263 F	293 F	293 F	293 F	293 F
Parameter												
Time of day (HH:MM)	P1	Set on site										
Day of week (DAY)	P2	Set on site										
Time of regeneration (HH:MM)	P3	Set on site / Factory default 2,00am										
Calendar override days	P4 *	14	14	14	14	14	14	14	14	14	14	14
Set at 3 days for Arsenic		3 for As	3 for As	3 for As	3 for As	3 for As	3 for As	3 for As	3 for As	3 for As	3 for As	3 for As
Backwash Time	P6	14	14	14	14	14	14	14	14	14	14	14
Level 2 Parameters (? & ?)												
Unit of measure (1 = metric)	P9	1	1	1	1	1	1	1	1	1	1	1
Clock mode (0=12h ; 1=24h)	P10	1	1	1	1	1	1	1	1	1	1	1
Service Interval (742 only)	P11	For information only - Normally preset										
Remote Regen sw Delay (742 only)	P12	60	60	60	60	60	60	60	60	60	60	60
Level 3 Parameters (? & ?)		For information only - Normally preset										
Backwash time	C1	N/A	N/A	N/A	N/A	N/A	14	14	14	14	14	14
Brine draw time (cannot be changed)	C2	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0
Slow Rinse	C3	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0
Repressurise	C4	N/A	N/A	N/A	N/A	N/A	3	3	3	3	3	3
Fast rinse 1	C5	N/A	N/A	N/A	N/A	N/A	10	10	10	10	10	10
Backwash 2	C6	N/A	N/A	N/A	N/A	N/A	1	1	1	1	1	1
Fast rinse 2	C7	N/A	N/A	N/A	N/A	N/A	1	1	1	1	1	1
Refill (cannot be changed)	C8	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0

Notes

740 controller set to F (no media quantity input on this controller)

P1 24hr Clock

P3 Regeneration time (Factory default 2,00am)

P4 Number of days between regenerations (ensures a regeneration after a given number of days even if capacity is not exhausted)

P5 Not applicable

P9 Set to 1 = m3

P10 Set to 1 = 24hr clock

5.3 Process and Operating Data

Birm/pH media/Sand/Filter Ag/Carbon

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.

> **Juaperle:** 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 and Filter Ag

Vessel size Ø x h (inches)	1054	1248	1354	1465	1665	1865	2160	2469	3072	3672
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

Filter Ag Plus

Vessel size Ø x h (inches)	844	1054	1248	1354	1465	1665	1865	2160	2469	3072
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

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 be soaked for 24 hours before use.

Filter Ag Plus: 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. Filter Ag Plus is must be soaked for 24 hours before use.

Arsenic Removal Media

Vessel size Ø x h (inches)	1054	1248	1354	1465	1665	1865	2160	2469	3072	3672
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 Ø x h (inches)	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 it's 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.

5.4 Hydraulic connection sizes and overall dimensions

Measurements are approximate and hydraulic connections may vary for individual set-ups.

Vessel size Ø x h (inches)	C1054	C1248	C1354	C1465	C1665	C1865	C2160	C2469	C3072	C3672
Valve type	263	263	263	263	273	273	293	293	293	293
Inlet/out let sizes (inches)	1	1	1	1	1	1	2	2	2	2
Drain size (inches)	3/4	3/4	3/4	3/4	3/4	3/4	2	2	2	2
Approx height (mm)	1526	1377	1520	1799	1804	1926	1850	2100	2260	2290
Approx diameter (mm)	254	305	330	356	406	457	534	610	762	914

5.5 Installation Layout

Manual 006.4