

SINGLE 36" GLASS FILTER & NHWB OPTION

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

Freecall 1800 656 771
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INSTALLATION RECORD

S-36-GF with optional No Hard Water Bypass (NHWB)

Please complete the following as a record for Warranty & Service purposes.

FILTER MODEL:

SERIAL NO.:

PURCHASED FROM:

PURCHASE DATE:

DATE INSTALLED:

INSTALLED BY:

COMPANY:

CONTACT:

This product is to be installed by suitably qualified personnel only. Please review this manual thoroughly before installing your sediment filter. For correct installation, follow the recommended steps and guidelines. If at any stage of installation you are unsure of how to proceed, please call our technical team on AU 1800 656 771 or NZ 0800 721 447 for further information.

ABOUT

AFM (Activated Filter Media) Glass Filter

AFM media is a highly processed recycled glass filter media. Due to its purity after the process it is perfectly suited for potable, food process and aquaculture applications. 3 micron particle sediment removal is standard but can be set up to achieve 1 micron particle removal. Please familiarise yourself with the components of your Sediment Glass filter below.

COMPONENTS OF THE GLASS FILTER

Control Valve

Clack Automatic 5 Cycle, this controls the cycles of the filter operation. Features safe 15-volt DC power supplied by a wall mounted transformer (supplied).

The valve is time-clock controlled which can be set to backwash anywhere from 1 – 28 days (7 days is a standard setting). This, in turn automatically initiates the backwashing of the filter media based on setting selected.

NOTE: These models use this valve in a side mount configuration.

(Optional differential pressure initiated backwash available. Contact Southland Filtration for further information.)

AFM Glass Media

Recycled and reprocessed with a 3 step activation process which modifies the structure and chemistry of the media.

Activated Filtered Media (AFM) is used for the removal of suspended particles. These include dirt, silt and the reduction of hydrophobic contaminants e.g. hydrocarbons, organics and microplastics suspended in the water.



Pressure Vessel (Media Tank)

Wave Cyber pressure vessels have a one-piece HDPE liner with a FRP filament winding outer shell.

The pressure vessel houses the filter media and the distributor system.

Anthracite Media

Anthracite filter media is used as a pre-filter layer for the removal of larger suspended particles. This layer extends the run time of the media bed between backwashes.

Underbed Support Media

A coarse grade of AFM is also used as the support media.

It also helps distribute an even water flow through the media bed to and from the distributor system during service/backwash.

How does your Glass Filter work?

SEDIMENT

Sediment affects the clarity of water. This is measured as NTU (Nephelometric Turbidity Units). Tap/Drinking water guidelines are 5 NTU or less. Based on aesthetic considerations, the turbidity should not exceed 5 NTU at the consumer's tap.

Sediment is made up of loose sand, clay, silt, and other soil particles that settle at the bottom of a body of water. Sediment can come from soil erosion or from the decomposition of plants and animals. Wind, water and ice help carry these particles to rivers, lakes and streams. Sediment is also washed off the roof and into the rainwater tanks.

Suspended sediment (SS) is primarily fine inorganic particles of clay and silt (typically less than 0.063 mm.) This may also include fine sand (0.63-0.250 mm) and particulate organic matter suspended in the water column. The smallest particle we can see with the naked eye is 0.040 mm (40 microns).

Sediment in the water supply will reduce the effectiveness of chlorine disinfection.

Note: Turbidity of less than 1 NTU is desirable for efficient disinfection.

FUNCTION OF A SEDIMENT WATER FILTER

The Activated Filter Media (AFM) utilises a tall cylinder to create a media bed depth sufficient to filter sediment as the water is passed through and over the media. When sized correctly it efficiently removes and retains the sediment and inorganic particles through what is regarded as mechanical filtration.

AFM is not just a passive filter media - the surface is activated by using a unique formula of chemicals and heat in a SolGel-like process. This is where the surface of each grain of media is altered to control the surface properties. This achieves a self-sterilizing surface resistant to bacterial growth. AFM has a 'hydrophobic neutral' surface charge which aids in the adsorption of organic substances including hydrocarbon and microplastic.

The size, structure, and surface of the AFM granules provide a low-pressure loss and a high sediment loading capability. When the media bed is loaded with sediment it will require backwashing. (A backwash should be initiated when an increased pressure loss of approximately 70-140 kPa is reached). This process simply reverses the flow through the media bed to fluidise and agitate the bed to release the collected sediment and flush it out to the drain. This is achieved without the loss of media.

WHAT CONTROLS THE BACKWASH?

The AFM Sediment filter has an automatic 'time clock' control valve that controls the service, backwash and rinse cycles. Once the controller is programmed and set it automatically initiates the backwash and cycles the valve through these cycles based on the programming (e.g. day, time of backwash and length of cycle times required).

This controller can also backwash the filter based on pressure loss by using a pressure switch wired to the pressure differential switch connection on the circuit board. (For details on this optional system, contact Southland Filtration).

WHAT ARE THE STAGES OF THE BACKWASH CYCLE?

1st Stage - Service Position

In this position the raw water is passed down through the media for the removal of the sediment supplying filtered (treated) water for usage.

Note: The filter is in this position prior to commencing the backwash cycle.

2nd Stage - Backwash Position

The water flow is reversed to lift and wash the filter media bed clean of entrapped sediment and particulate matter to waste.

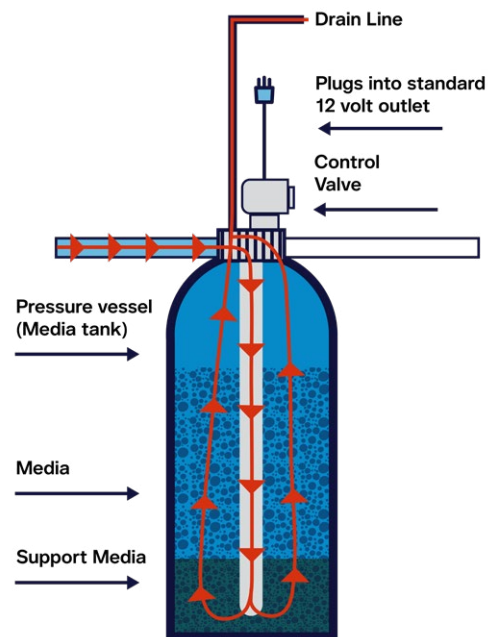
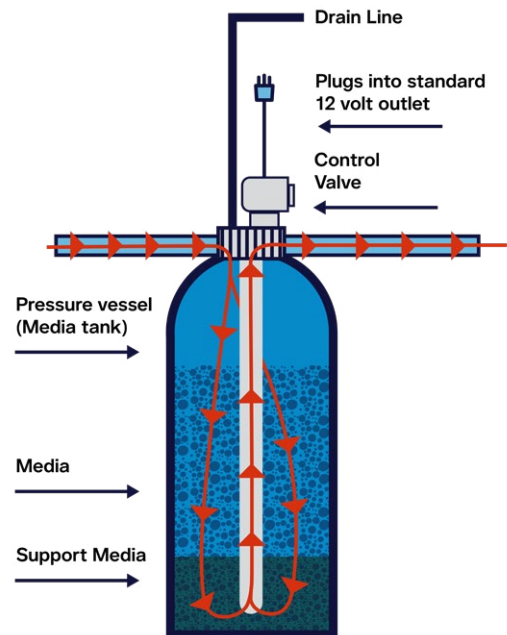
3th Stage - Fast Rinse Position

The water flow is passed down through the media to settle the media bed and flush any residual particles left in the media and control valve to waste before returning to service.

The backwash cycle is now complete.

Note: This controller has the ability to repeat the backwash and rinse cycles which is commonly used for a more efficient backwashing of the media.

All functions are fully automatic once the control valve has been programmed and set.



General Specifications

Minimum operating pressure	240 kPa (35psi)
Maximum operating pressure	700 kPa (100psi)
Maximum & maximum operating temperature	5°C to 43°C
Inlet & outlet connections	50mm BSPF
Valve drain fitting	50mm BSPF
Mains power requirement	240 Volt, 10 amp
Control valve power	24 Volt DC supplied by wall mount transformer
Transformer output current	800mA

MODEL	CONTINUOUS SERVICE FLOW RATE	PEAK SERVICE FLOW RATE	BACKWASH FLOW RATE
S-36-GF	219 lpm	328 lpm	328 lpm
S-36-GF-NHWP	219 lpm	328 lpm	328 lpm

INSTALLATION & OPERATING WARNINGS

CAUTION!

The Sediment filter is NOT designed to remove microbiologically unsafe contaminants from the water supply. If the water is for potable and/or food process use it should be disinfected prior to use.

IMPORTANT! FAILURE TO COMPLY COULD VOID WARRANTY

1. All plumbing must conform to Australian Standards guidelines and Local Council regulations.
2. For filters subjected to permanent hydrostatic pressure an integral non-testable backflow prevention device should be fitted in the inlet line. This should be in accordance with AS3500.1 and complying with AS 2845.1 Clauses 3.6.3, 3.6.4, 7.3.1 and 7.3.3
3. For filters subject to hydrostatic pressure greater than 700 kPa a suitable pressure control device should be fitted in the supply line.
4. Where the hot water system is a mains-pressure storage type, a cold water relief valve of suitable rating should be fitted (if not already installed), between the non-return valve and the cold water inlet of the hot water system.
5. For installations subject to excessive or prolonged water hammer, a water hammer arrestor should be fitted.
6. Waste connections should comply with minimum air gap requirements as per AS3500.1, Table 4.5.



IMPORTANT! FOR TANK FILLING OR OPEN-DISCHARGE APPLICATIONS ONLY

The automatic control valve must have a positive back pressure during the regeneration or backwash cycle to ensure effective operation and prevent untreated water going to service. If using the softener/filter to fill a storage tank (or any other open-discharge application) a 'No Hard Water Bypass' must be used.

(**Note:** Softener/Filter Models with 'NHWB' suffix include bypass option).



Fig. A No Hard Water Bypass valve (NHWB)

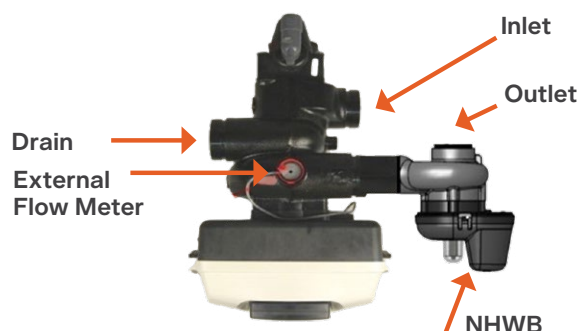


Fig. B Typical NHWB Plumbing

If there is any step or parts you are not sure of during installation please do not hesitate to contact Southland Filtration for clarification to avoid incorrect installation.

INSTALLATION & OPERATING CHECKLIST

Step One: Locate the Filter

1. It is advisable to locate the filter in a protected environment. If the unit is to be installed outside, or in the open, a protective shelter or shed is recommended.
2. The distance between the filter and a drain or waste outlet should be as short as possible.
3. Hot water can severely damage the filter. If installing near a hot water service ensure a minimum of 2 metres of piping between the outlet of the filter and inlet of the heater to help avoid heat transfer. Ensure a non-return valve on the inlet of the hot water system is present and functional.
4. Do NOT install filter where it or its connections (including drain and overflow lines) will be subjected to ambient temperatures under 1°C or over 49°C.
5. Do NOT install filter near chemicals or chemical fumes.
6. The filter will require a standard 3-pin 240-volt 10-amp grounded power outlet.
7. If the filter is to be installed outside or where the sunlight hits the POD (LCD display) it is recommended to cover, move or mount the POD out of the direct sunlight to protect the LCD display and electronics. (Refer Fig. C)
8. An approved inlet isolation valve (not supplied) is recommended to be installed on the inlet line.



Fig. C Waterproof cover

Step Two: Filter Assembly and Media Loading

- 1. Position the filter media tank (pressure vessel) in the selected location allowing room for servicing.
- 2. Place the distributor tube and basket assembly in the media tank (if not already installed). Ensure it is sitting in the recess in bottom of media tank. The top of the riser pipe (distributor tube) should be approximately 5 mm above the top of the flange adaptor. (Refer Fig. D)
- 3. Cover or plug the top of the riser pipe (distributor tube) with a cap or plastic bag (not supplied) to stop the media entering the riser pipe (distributor tube).
- 4. Fill the media tank (pressure vessel) approximately 1/3rd with water to prevent damage to the hub & lateral (distributor assembly) in the bottom of the tank when pouring in the gravel.



Fig. D



Fig. E Use a suitable funnel for pouring the media into the tank

Refer to Table 1 below for the amount of media required for your model. Check you have the correct quantities before commencing. While holding the distributor tube central to the neck of the media tank and applying light downward pressure to stop the tube from moving, pour in the underbed gravel first, followed by the carbon media.

Sequence is first AFM Grade 3, next AFM Grade 2, next AFM Grade 1 then the Anthracite media.

Table 1

MODEL	UNDERBED AFM GRADE 3	UNDERBED AFM GRADE 2	AFM GRADE 1	ANTHRACITE 1.1 – 2.5MM
S-36-GF	168kg	231kg	525kg	110kg
S-36-GF & NHWB	168kg	231kg	525kg	110kg

5. Remove the cap/plug from the riser tube and clean the media from the media tank flange and the top of the distributor tube.

NOTE: Prevent any accidents and/or injury by cleaning up any spilt media on the ground around the media tank – this can get very slippery

6. Fill the media tank with water to approximately 150mm from the top.
7. Lightly smear silicon grease to the outside of the top of the distributor tube to approx. 50mm down from the top of the tube.
8. Place the automatic control valve over the riser pipe (distributor tube) and exerting slight downward pressure, push the valve onto the riser pipe (distributor tube) until the valve bottoms against the top of the flange adaptor.
9. Position the control valve to face the correct direction for plumbing connection.
10. Secure the valve by fitting the valve clamp and tightening the bolt. (Refer Fig. F)



Fig. F

Step Three: Water Line Connection

FOR FILTER MODELS: S-36-GF & S-36-GF-NHWB

1. Inlet and outlet pipework should be 50mm minimum. Isolation valves (not supplied) should be installed in the incoming and outgoing lines (NOT the Drain line). A full bypass line with isolation valves (not supplied) is recommended to ensure ongoing water supply during servicing and maintenance. (Refer Fig. G/H for valve connections).
2. Plumb the incoming untreated water (Raw Feed) line to the inlet of the valve (Fig. G/H) on the right hand side. Flow direction arrows are on the valve connections to show the correct flow.
3. For filters without the NHWB plumb the treated water (service) line to the outlet of the valve (Fig. G) on the right hand side. Flow direction arrows are on the valve connections to show the correct flow.

- For filters with the NHWB plumb the treated water (service) line to the outlet of the NHWB (Fig. H) on the right hand side. Flow direction arrows are on the valve connections to show the correct flow. The NHWB (Fig. I) may already be fitted. If not then fit as per (Fig. H).

Step Four: Drain & Overflow Line Connection

- If ideally located, the filter will be above, and not more than 6 metres, from the drain. The drain line must be a minimum pipe size of 50mm PVC pipe. It is recommended to have a piece of clear PVC pipe (approximately 500mm) incorporated in the drain line to observe the clarity of the wastewater going to drain. (Fig. G/K)
- Connect the drain line to the outlet of the DLFC (Fig. J) which is fitted in the drain outlet on the left hand side of the valve. (Fig. G/H)

CAUTION: DO NOT plumb the drain line direct into a drain, sewer line or trap. Always allow an air gap between the drain line and the wastewater (Fig. K) to prevent the possibility of a vacuum in the pressure vessel or sewage being back-siphoned into the pressure vessel.

- If the filter is located where the drain lines must be elevated, you may elevate the lines up to 2 meters providing the run does not exceed 5 metres and the water pressure at the softener is not less than 280kPa. You can elevate an additional 610mm for each additional 70kPa pressure.

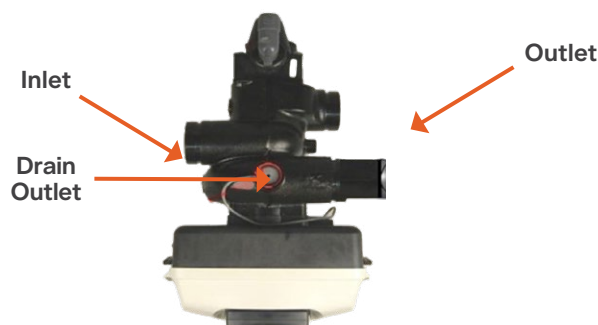


Fig. G Control Valve

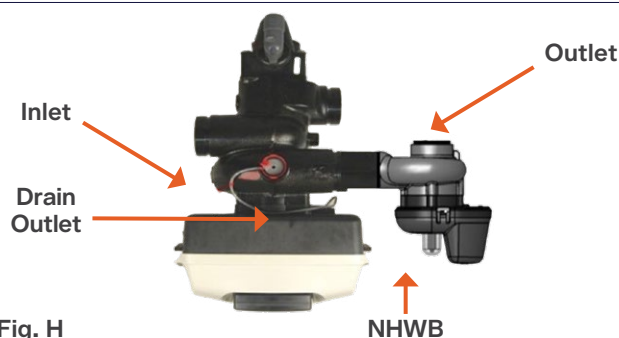


Fig. H



Fig. I NHWB (No Hard Water Bypass)



Fig. J DLFC (Drain Line Flow Control)

4. Where the drain line is elevated but empties into a drain below the level of the control valve, form a 180mm loop at the far end of the line so that the bottom of the loop is level with the valve drain line connection. This will provide an adequate siphon trap.
5. Where a drain empties into an overhead sewer line, a sink-type trap must be used.

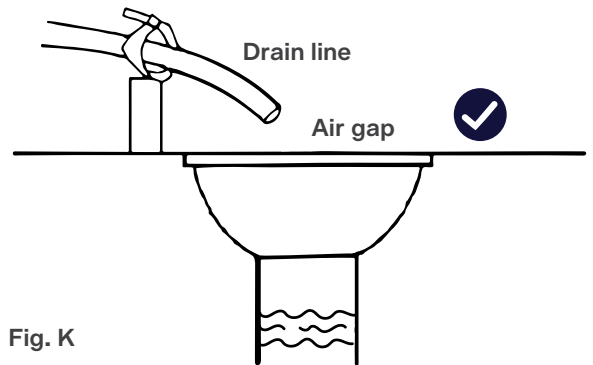
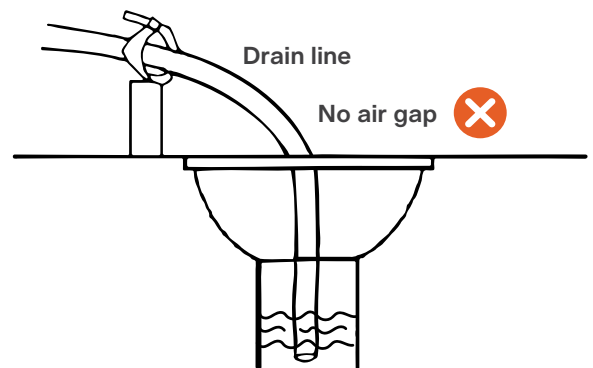


Fig. K



Control Board Connections

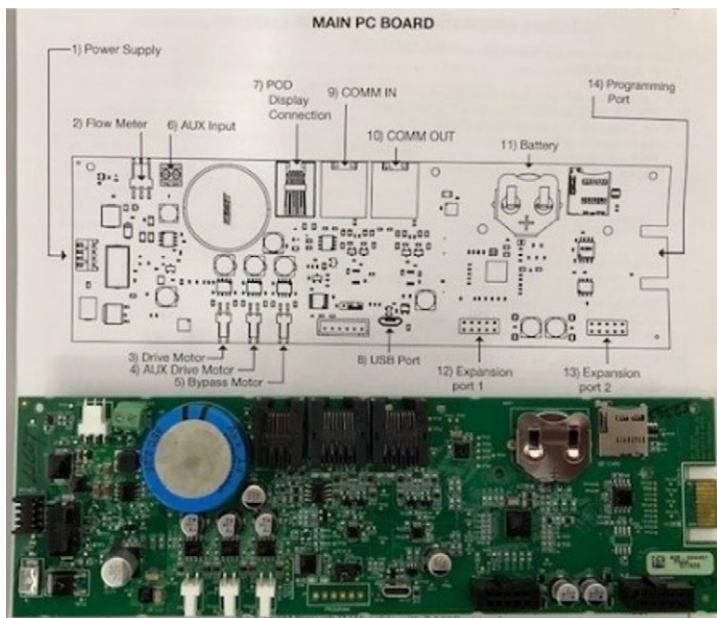


Fig L

Button Function and Programming Key Sequence

●
STANDBY

Standby LED

- Signals that a unit is not in service, or regen
- Flashes to alert status conditions
 - 1 per second indicates flow had been detected while the unit was offline

●
ON LINE

Online LED

- Signals that a unit is currently in service

●
REGEN

Regen LED

- Signals that a unit is currently in regen



Set clock from User Screens

Exit and save from setup or program screens



Move to the next display



Change variable being displayed



Toggles scheduled regen time on/off.

Holding for >3 sec. starts Immediate regen (Immediate regen is the only option if set to Immediately regenerate upon 0 gallons).

Moves back one display while in program mode.



Reset

Holding for >3 sec. initiates a reset.

The software version is shown and the piston returns to the "home" position, re-synchronizing the valve.

System Start-up

The final steps before putting the filter into service:

- Set the actual time of day and date into the control valve.
- Backwash the filter.

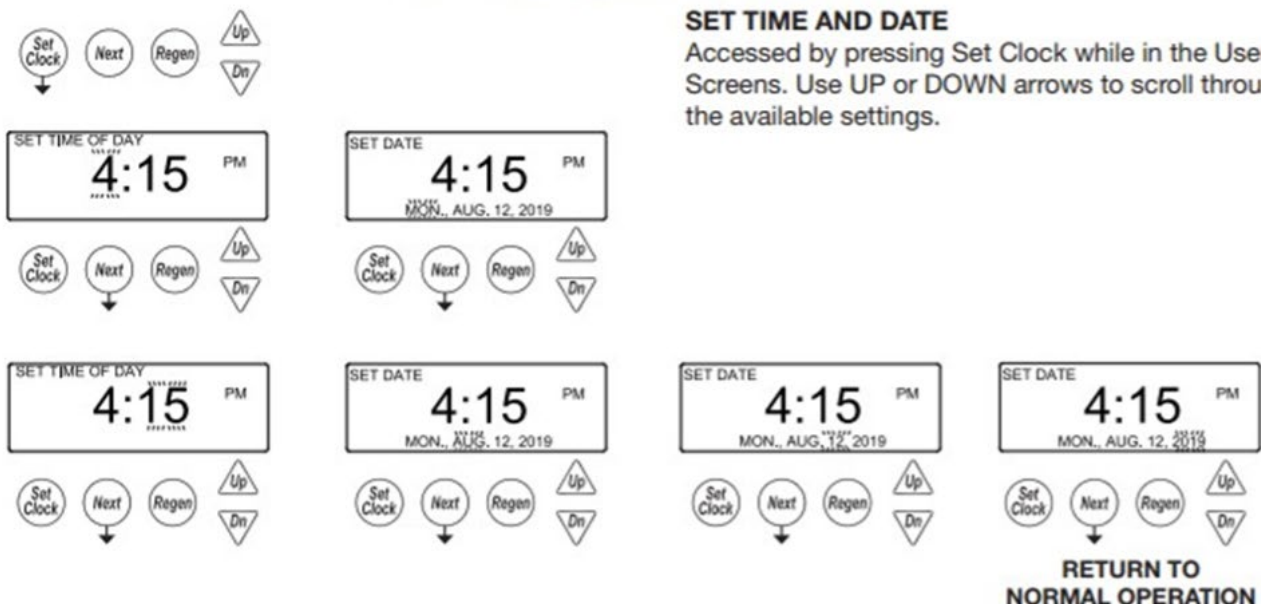
Step Five: Setting Time of Day

1. Close the inlet isolation valve.
2. Plug in the transformer and turn on the power point. The valve will automatically drive to the service position. If a NHWB is fitted it will sync with the valve and drive to the service position.
3. Set Time of Day and Date by following the instructions below

SETTING TIME OF DAY AND DATE

SET TIME AND DATE

Accessed by pressing Set Clock while in the User Screens. Use UP or DOWN arrows to scroll through the available settings.



4. Time of Day should only need to be set after power outages lasting more than 8 hours, if the battery has been depleted and a power outage occurs, or when daylight savings time begins or ends. If a power outage lasting more than 8 hours occurs, the time of day will flash on and off which indicates the time of day should be reset. If a power outage lasts less than 8 hours and the time of day flashes on and off, the time of day should be reset and the battery (Refer Fig. L) replaced.

Step Six: Initial Start Up

1. Make sure the inlet isolation valve is closed.
2. If a bypass system is installed, close the bypass valve and the outlet valve.
3. Press and hold the REGEN button (Fig. M) for three seconds until the drive motor starts.
4. When the drive stops the valve will be in the backwash position, next turn the power OFF.
5. Open the inlet water supply valve very slowly to allow water to fill the media tank to expel the trapped air. CAUTION: If water flows too rapidly, there could be a loss of media to the drain. (Ideally once the water is running to drain shut the inlet valve and let the media soak overnight.)
6. When the water is flowing steadily to drain without the presence of air, fully open the inlet valve and turn the power back ON to let the controller finish the backwash cycle.
7. When the backwash cycle is finished the valve will forward to (and start) the fast rinse cycle.
8. When the fast rinse cycle is finished the valve will forward to (and start) the 2nd backwash cycle. This will ensure that all the manufacturing dust and fines are flushed out of the system.
9. 9. When the 2nd backwash cycle is finished the valve will forward to (and start) the 2nd fast rinse cycle.
10. When the 2nd fast rinse cycle is finished the valve will forward to the Service position.
11. Put the bypass valve into the service position and/or open the outlet isolation valve.

12. The Filter is now in service and ready to supply Filtered (treated) water.

NOTE: If the media was not soaked overnight a complete second backwash should be initiated the following day to flush any residual released after soaking.

IMMEDIATE BACKWASH FEATURE

An immediate backwash can be initiated at any time by pressing and holding the REGEN button for 3 seconds. (Refer Fig. N)

A backwash can be set to be initiated at the pre-programmed time by pressing the REGEN button once and letting go. (Refer Fig. N)



Fig. N

Backwash
Button
(REGEN)

INSTALLATION IS NOW COMPLETE

Owner Operator Screen Displays

TYPICAL USER SCREENS



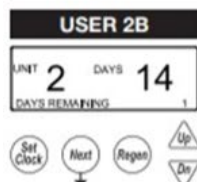
USER 1 - Capacity Remaining

- Displays the units current capacity remaining
- This screen does not display on units with volumetric capacity turned off
- Can be manually decremented by holding the down arrow



USER 2 - Days Remaining, Single Unit

- Displays a single units days until a regeneration, based on the day override setting
- This screen does not display on units with day override turned off
- On systems the LEAD unit displays the days remaining on the lead unit
- Days can be manually reduced by holding the down arrow



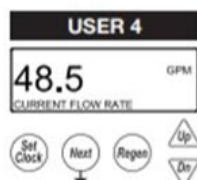
USER 2B - Days Remaining, System

- The LEAD in a system displays the days until a regeneration, based on the day override settings.
- The displays also indicates which unit the day over ride is currently pertaining to
 - Series regen systems do not display a unit as they will regenerate all units sequentially



USER 3 - Time

- Displays the current date and time of day



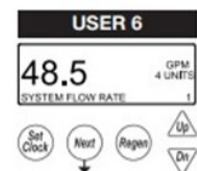
USER 4 - Flow Rate, Unit

- Displays that units current flow rate



USER 5 - Volume Totalizer, Unit

- Displays the total volume since install / reset
- Re-settable to zero, while in this screen, by holding the "Set Clock" & "Regen" buttons



USER 6 - Flow Rate, System

- Displays the current combined flow rate of all the units in the system
- This screen does not display on single tank units, or systems with volumetric capacity turned off



USER 7 - Volume Totalizer, System

- Displays the total volume of the system since install / reset
- Re-settable to zero, while in this screen, by holding the "Set Clock" & "Regen" buttons
- This screen does not display on single tank units

TO USER 1

MAINTENANCE

FAQs and Troubleshooting

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

PROBLEM	POSSIBLE CAUSE	SOLUTION
1. Timer does not display time of day.	a. Power Adapter unplugged	a. Connect power
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Defective Power Adapter	c. Replace Power Adapter
	d. Defective PC board	d. Replace PC board
2. Timer does not display correct time of day	a. Switched outlet	a. Use uninterrupted outlet
	b. Power outage	b. Reset time of day. If battery is present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	c. Defective PC board.	c. Replace PC board
3. Display does not indicate water is flowing. Refer to user instructions for how the display indicates water is flowing.	a. Bypass valve in bypass position	a. Put bypass valve in service position
	b. Meter connection disconnected	b. Connect meter to PC board
	c. Restricted/stalled meter turbine	c. Remove meter and check for rotation or foreign material
	d. Defective meter	d. Replace meter
	e. Defective PC board	e. Replace PC board
	f. Meter not installed	f. Install meter
	g. PC board incorrectly programmed	g. Refer to programming instructions
4. Control valve regenerates at wrong time of day	a. Power outages	a. Reset time of day. If battery is 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 incorrect	c. Reset regeneration time
	d. Control valve set at "on 0" (immediate regeneration)	d. Check control valve set-up procedure regeneration time option
	e. Control valve set at NORMAL + on 0 (delay + immediate regeneration)	e. Check control valve set-up procedure regeneration time option

PROBLEM	POSSIBLE CAUSE	SOLUTION
5. Control valve stalled in regeneration	a. Motor not operating	a. Replace motor
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Defective Power Adapter	c. Replace Power Adapter
	d. Defective PC board	d. Replace PC board
	e. Broken drive gear or drive cap assembly	e. Replace drive gear or cap assembly
	f. Broken piston retainer	f. Replace drive cap assembly
	g. Broken main or regenerant piston	g. Replace main or regenerant piston
6. Control valve does not regenerate automatically when the correct button(s) is depressed and held. For TC valves the buttons are UP and DOWN. For all other valves the button is REGEN.	a. Power Adapter unplugged	a. Connect Power Adapter
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Broken drive gear or drive cap assembly	c. Replace drive gear or drive cap assembly
	d. Defective PC board	d. Replace 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 UP and DOWN. For all other valves the button is REGEN.	a. Bypass valve in bypass position	a. Put bypass valve in normal operation position
	b. Meter connection disconnected	b. Connect meter to PC board
	c. Restricted/stalled meter turbine	c. Remove meter and check for rotation or foreign matter
	d. Defective meter	d. Replace meter
	e. Defective PC board	e. Replace PC board
	f. Set-up error	f. Check control valve set-up procedure
8. Time of day flashes 'On and Off'	a. Power outage	a. Reset time of day. If battery is present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.

PROBLEM	POSSIBLE CAUSE	SOLUTION
9. Error Codes 101, 1001 or E1 – Unable to recognise start of regeneration 102, 1002 or E2 – Unexpected stall 103, 1003 or E3 – Motor ran to long, timed out trying to reach next cycle position 104, 1004 or E3 – Motor ran to long, timed out trying to reach home position If other error codes display contact the factory	a. Control valve has just been serviced	a. Unplug power source jack from the printed circuit board (black wire) and plug back in or press button sequence to reset valves: TC valves (three buttons) press and hold SET and DOWN buttons for 3 seconds. (Cover button may have other names like “SET HOUR “, “CLOCK” or “SET CLOCK” but the circuit board is labeled with SET.) All other valves press and hold NEXT and REGEN buttons for 3 seconds.
	b. Foreign matter is lodged in control valve	b. Check piston and spacer stack assembly for foreign matter
	c. High drive forces on piston	c. Replace piston(s) and spacer stack assembly
	d. Control valve piston not in home position	d. Unplug power source jack from the printed circuit board (black wire) and plug back in or press button sequence to reset valves: TC valves (three buttons) press and hold SET and DOWN buttons for 3 seconds. (Cover button may have other names like “SET HOUR “, “CLOCK” or “SET CLOCK” but the circuit board is labeled with SET.) All other valves press and hold NEXT and REGEN buttons for 3 seconds.
	e. Motor not inserted fully to engage pinion, motor wires broken or disconnected, motor failure	e. Check motor and wiring. Replace motor if necessary
	f. Drive gear label dirty or damaged, missing or broken gear	f. Replace or clean drive gear
	g. Drive bracket incorrectly aligned to back plate	g. Reseat drive bracket properly
	h. PC board is damaged or defective	h. Replace PC board
	i. PC board incorrectly aligned to drive bracket	i. Ensure PC board is correctly snapped on to drive bracket

PROBLEM	POSSIBLE CAUSE	SOLUTION
10. Error Codes for MAV and NHWB	a. Foreign matter is lodged in MAV/ NHWB	a. Check MAV/NHNB piston and spacer stack assembly for foreign matter
106 or 1006 – MAV/NHNB unable to find proper park position, motor ran too long.	b. High drive forces on MAV/ NHNB piston	b. Replace MAV/NHNB piston and spacer stack assembly
107 or 1007 – MAV/NHNB motor ran too short (stalled) while looking for proper park position	c. MAV/NHNB motor not inserted fully to engage pinion, motor wires broken or disconnected, motor failure	c. Check MAV/NHNB motor and wiring. Check interconnect wiring to both PC boards. Replace motor or wiring if necessary.
	d. MAV/NHNB drive gear damaged, missing or broken gear	d. Replace MAV/NHNB drive cap.
If other error codes display contact the factory	e. MAV/NHNB main gear cover assembly incorrectly aligned to drive assembly.	e. Reseat MAV/NHNB main gear cover assembly properly
	f. PC board is damaged or defective	f. Replace PC board

**Talk to
an expert**

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