AQUASTAR®
pool products

USER MANUAL

FLOWSTAR® VALVE ACTUATOR

INSTALLATION AND OPERATION MANUAL

SAVE THESE INSTRUCTIONS

Read, understand and follow all warning notices and instructions before installing, using, or servicing this valve actuator.

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AQUASTAR® pool products

1.0 INSTALLATION AND SAFETY NOTICE

⚠WARNING This product must be installed and serviced by a technician experienced in the installation and maintenance of pool and spa products. Before you begin the installation, thoroughly read the accompanying manual, and adhere to the instructions provided within. Always disconnect the electrical power prior to removing the cover for unit service, and ensure that all screws and covers are properly replaced before reconnecting the unit to electric power.

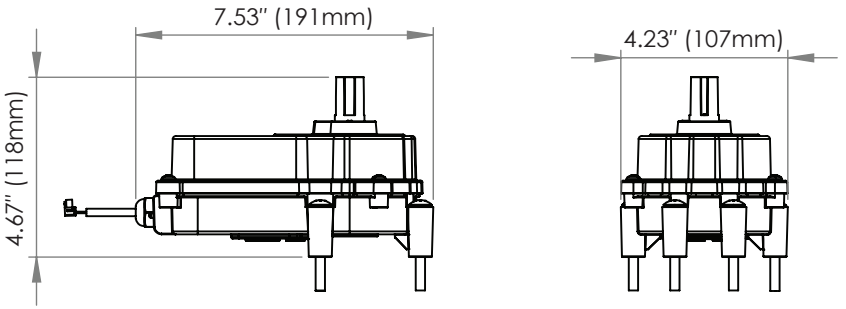
Improper installation or operation may result in severe injury, property damage, or even death. Children should not be allowed to use this product, as it can present a risk of injury. Failure to follow proper installation and operation procedures will also void the warranty.

2.0 VALVE ACTUATOR INTRODUCTION

The FlowStar Valve Actuator is a versatile device compatible with most major manufacturers' automatic controls and valves, designed to operate on 2-way and 3-way valves. Its adjustable cams offer precise positioning, and the slim design is housed in a corrosion-proof casing. When paired with new FlowStar 2-way and 3-way valves, it ensures dependable automation for valve control.

3.0 SPECIFICATIONS

PART #	MODEL	VOLTAGE	CYCLES	WIRE	CABLE LENGTH
AVA24	FlowStar Valve Actuator	24V AC	50/60Hz	3-conductor Black (Common) Red (Switch Leg) White (Switch Leg)	18ft (6m)



4.0 INSTALLATION & OPERATION

WARNING: Prior to installation, ensure that the pump is off and pressure has been relieved from the plumbing system.

Preparation: Remove the knob and handle from the valve to be controlled.

Configuration for 3-Way and 2-Way Vavles: Refer to Fig.1 below to determine your preferred mounting configuration. All four positions can be utilized by adjusting the internal cam settings but it is recommended to use the factor default of mounting configuration "A" with inlet at "Port 2". When mounting to a 2-way valve the actuator should always be in-line with the plumbing and either direction is acceptable, refer to Fig. 2.

Identifying Screws: Identify and remove the four screws noted with arrows in your configuration below.

NOTES:

- The arrows in the accompanying diagram indicate which screws need to be replaced with long screws.
- Water pressure should always be applied to the inside of the valve. The valve will not seal if attempting to block water from entering the valve.

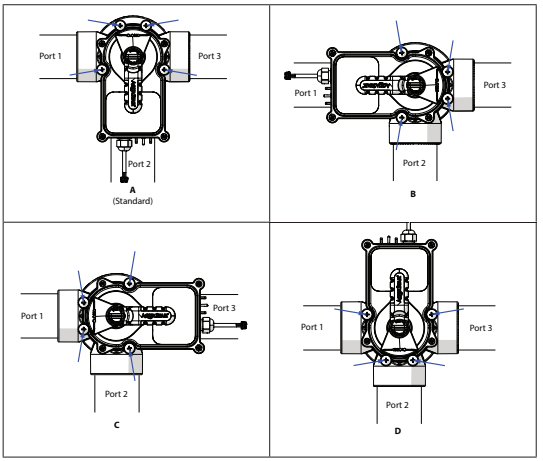


FIGURE 1 - Illustrates the four distinct positions for attaching the Valve Actuator to a 3-way valve.

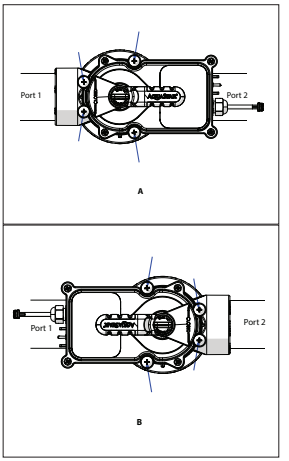


FIGURE 2 - Illustrates the two distinct positions for attaching the Valve Actuator to a 2-way valve.

4.1 MOUNTING PROCEDURE FOR THE ACTUATOR

Positioning the Handle: Place the valve handle on the actuator shaft and tighten the knob.

Aligning the Shafts: Align the smallest tooth on the actuator shaft with the smallest slot on the valve diverter, refer to Fig. 3.

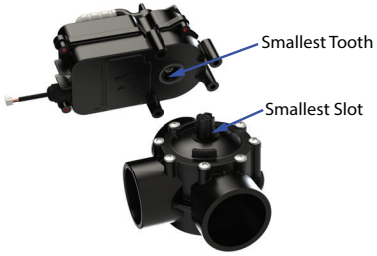


FIGURE 3

Rotating the Actuator: With the two shafts engaged, rotate the actuator until the holes on the actuator align with the screw holes on the cover.

Securing the Actuator: Use the 4 long screws (M6x55) provided to fasten it in place. Avoid over-tightening.

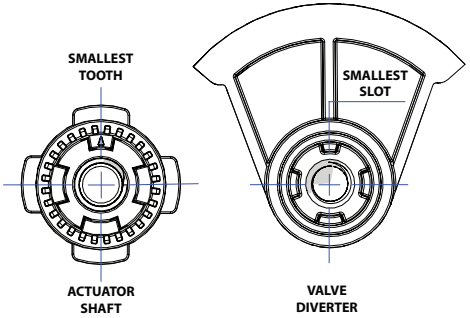


FIGURE 4

Note: The factory default is aligned with a standard mount. If the valve is connected in a standard installation, cam adjustment is unnecessary, refer to Fig. 4.

4.2 DEFAULT CAM SETTING FOR 3-WAY VALVES

Test Your Actuator:

Default Position: Both the upper and lower cam are aligned to the "12 o'clock" position, refer to Fig. 5. When mounted in the Standard "A" configuration with Inlet at "Port 2" no cam adjustments should be necessary.

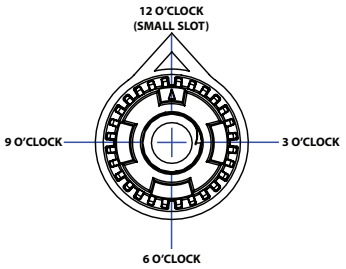


FIGURE 5

Making Adjustments:

If an adjustment is necessary, follow the steps below:

1. Connect your actuator to the control system.
2. Utilize manual mode to examine the arrow position. See section 4.6.
3. Refer to sections 4.3 and 4.4 for adjustment guidance.

4.3 TOGGLE SWITCH

The Toggle Switch is an essential component in the valve actuator system, responsible for manually controlling the diverter's rotation direction. It is carefully designed to interface with the actuator's motor control circuit, allowing for precise manipulation of the diverter's position. Below are the specific functions assigned to each toggle switch position, refer to Fig. 6:

FIGURE 6

Toggle Switch Functions:

ON1: Diverter rotates counter-clockwise
OFF: Stops rotation
ON2: Diverter rotates clockwise

4.4 CUSTOM CAM SETTING

Preparation: Move the toggle switch to the OFF (Center) position. Remove the knob and handle from the actuator shaft, and take out the four screws to open the actuator cover.

Locating and Adjusting Cams: The cams are found beneath the cover bushing and on the actuator shaft. Slide the cams off the shaft splines and rotate them to the preferred position. Refer to the Determining Custom Cam Setting below to determine the proper cam position.

Determining the Custom Cam Setting

For Actuators Mounted On 3-Way Valves

Use the provided chart, utilizing standard clock positions, to ascertain the correct custom cam setting. The illustration below outlines the cam settings specifically for 3-way valves.

MOUNTING OPTIONS	INLET (WATER ENTERS PORT)	CUSTOM CAM SETTING		PORT WHERE WATER EXITS	
		UPPER CAM	LOWER CAM	Port	Port
A (Standard)	1	9 o'clock	6 o'clock	2	3
	2 (Standard)	12 o'clock	12 o'clock	1	3
	3	6 o'clock	3 o'clock	1	2
B	1	12 o'clock	9 o'clock	2	3
	2	3 o'clock	3 o'clock	1	3
	3	9 o'clock	6 o'clock	1	2
C	1	6 o'clock	3 o'clock	2	3
	2	9 o'clock	9 o'clock	1	3
	3	3 o'clock	12 o'clock	1	2
D	1	3 o'clock	12 o'clock	2	3
	2	6 o'clock	6 o'clock	1	3
	3	12 o'clock	9 o'clock	1	2

4.4 CUSTOM CAM SETTING *CONTINUED*

For Actuators Mounted On 2-Way Valves

For actuators mounted on 2-way valves, the cam settings remain consistent. The accompanying chart illustrates the specific cam settings for 2-way valves.

ADVANCED CAM SETTING	
UPPER CAM	**LOWER CAM**
3 o'clock	**6 o'clock**

Advanced Customization: For specialized settings, the shaft has been segmented into 28 directions to allow customized water flow adjustments for your setup. Each direction is about 13 degrees apart from the next, refer to Fig. 7. Options include partial open, semi-open, partial close, etc. These specific settings are not outlined in the chart. The 12 o'clock position (small slot) serves as the reference for all settings. Note that the upper cam influences the clockwise stop point, while the lower cam affects the counter-clockwise stop point, refer to Fig. 8.

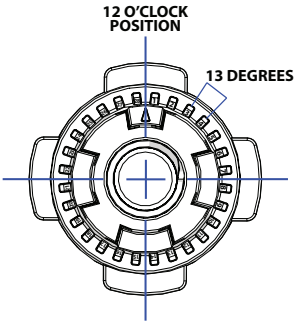


FIGURE 7

Verification: Utilize the toggle switch on the valve actuator's bottom to ensure the new adjustments are correct, toggling between ON1 and ON2 as needed.

Reassembly: Replace the cover and handle, and secure them with the screws and the locking knob.

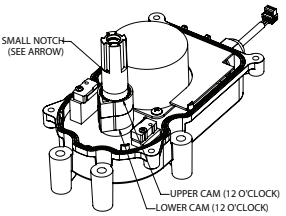


FIGURE 8

Finalizing Settings: Return the toggle switch to either the ON1 or ON2 position, as required.

This custom adjustment process allows for a high degree of control and customization, but it should be executed with care, following the instructions precisely.

Note: Custom cam setting adjustments should only be performed by a qualified pool technician.

4.5 SYNCHRONIZATION

In a typical pool with a spa having 3-6 diverter valves to manage water flow, if one rotates opposite to the others, the actuators must be synchronized. Simply flip the toggle switch of the Actuator between ON1 and ON2 to align them.

4.6 MANUAL OVERRIDE (MO)

Turn off power to all pumps before this action to minimize risk of injury or damage.

Manual adjustment of the valve position may be necessary, especially when the controller is inaccessible or following a power failure. Follow the above instructions in such cases.

1. Move the toggle switch to the OFF position.
2. Unscrew the knob counterclockwise for about one turn.
3. Press down the handle and knob to disengage the gear train, allowing the handle (and thus the diverter) to move freely.
4. After manual override, turn the actuator slightly clockwise or counter-clockwise until you feel the shaft engage the gear train again. Lock the handle by turning the knob clockwise.
5. Tighten the knob.
6. Return the toggle switch to its original position.

5.0 VALVE ACTUATOR MAINTENANCE

Lubricating the Seals

The valve actuator is equipped with two seals that need lubrication annually. Located at the top and bottom of the actuator where the shaft exits the housing, proper lubrication ensures smooth operation. Follow these steps to lubricate the seals:

FIGURE 9

Power Off: Start by turning off the actuator's power.
Accessing the Shaft: Remove the knob and handle to expose the actuator shaft.
Top Lubrication: Apply a small amount of silicone-based lubricant around the actuator shaft where it enters the cover , refer to Fig. 9.
Reassemble Top: Replace the handle and knob, taking care not to over-tighten.
Manual Override: Push down on the knob and handle to engage the actuator into manual override mode.
Bottom Lubrication: Apply a small amount of the same lubricant around the actuator shaft where it protrudes from the bottom of the actuator housing.
Spreading Lubricant: Rotate the handle once to distribute the lubricant evenly around the shaft.
Return to Automatic Mode: Pull up on the handle until it clicks into place, indicating the return to automatic mode.
Finalize: Tighten the knob to secure the settings.

5.0 VALVE ACTUATOR MAINTENANCE *CONTINUED*

This routine maintenance task ensures that the valve actuator remains in optimal working condition. Always use the recommended lubricant, and perform this process with care to prolong the life of the actuator.

6.0 WIRING DIAGRAM

Overview of the Internal Circuit of the Actuator

The actuator's internal circuit is designed to efficiently control the valve's turning motion. Here's a breakdown of the key components, refer to Fig. 10:

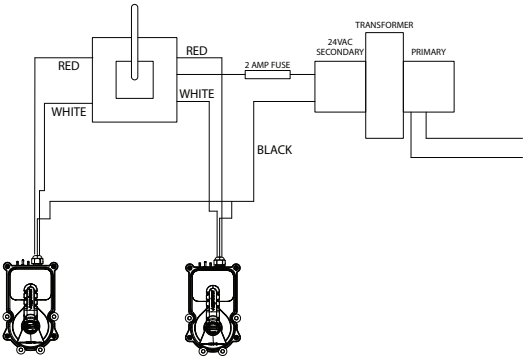


FIGURE 10

Motor: Drives the valve's turning motion, facilitating the opening and closing.

Limit Switches (2): These switches detect the two stop positions, ensuring that the valve does not turn beyond its intended range.

Capacitor: Utilized to manage potential peaks in the line, stabilizing the electrical flow and preventing sudden surges.

Switch: Controls the polarity of the red and white wires, determining the turning direction. The red wire causes the valve to turn one way, and the white wire makes it turn the other way.

This configuration enables precise control over the valve's position and turning speed, with built-in safeguards to prevent mechanical overstrain or electrical malfunctions. Care must be taken when servicing this internal circuit to understand the function of each component, as incorrect handling can lead to equipment failure or safety hazards.

WARNING

ELECTRIC SHOCK HAZARD - To eliminate the risk of electric shock that can lead to property damage, severe injury, or death, always disconnect power to the system at the main circuit breaker before performing any servicing. To minimize the risk of injury and to avoid potential damage to the equipment, use a properly sized, listed Class 2 transformer for connection to the power supply.

6.0 WIRING DIAGRAM *CONTINUED*

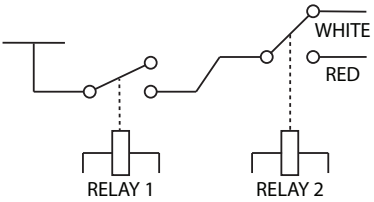


FIGURE 11

Relay1: This is the voltage control connection.

Relay2: This connection controls the turning mechanism.

Refer to Fig. 11 and Fig. 12 to understand how the connection of two actuators would be implemented. Note that for each connected actuator, the amperage will increase by approximately 1A, and it will be necessary to modify the fuse accordingly.

By adhering to these guidelines, you ensure both personal safety and the proper functioning of the actuators. Consult the specific technical documentation and adhere to all local electrical codes for additional guidance and information.

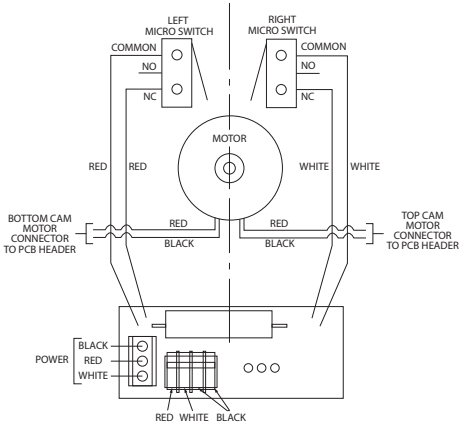


FIGURE 12

7.0 TROUBLESHOOTING

In this section, you'll find solutions to common problems encountered with the valve actuator system. Follow the diagnostic procedures and recommendations to quickly resolve any issues and maintain optimal performance.

PROBLEM	CAUSE	SOLUTION
Oscillation of the Actuator Handle	Insufficient valve seal lubrication or valve obstruction	Lubricate the valve according to "Maintenance" guidelines
Actuator Motor Functions but Diverter Fails to Rotate	Shaft within the actuator is broken	Contact AquaStar Pool Products
	Manual positioning of actuator engaged	Elevate and rotate the handle
	Damage to the internal gear train	Contact AquaStar Pool Products
Inactivity of Actuator Motor	Lack of power to the actuator unit	Confirm voltage between common and switch wires (red, white)
	Toggle switch set to the off position	Move toggle switch to either ON 1 or ON 2 settings
	Motor within actuator has failed	Contact AquaStar Pool Products
	Micro switch dysfunction	Contact AquaStar Pool Products
	Both cams in contact with micro switches	Refer to cam settings and make necessary adjustments

7.0 TROUBLESHOOTING *CONTINUED*

Actuator Only Rotates in a Single Direction	Micro switch damage or breakage	Contact AquaStar Pool Products
	Connection problems within the system	Inspect and rectify all connection faults
	Malfunctioning control relay switch	Contact AquaStar Pool Products
	Interruption in wire continuity	Evaluate and mend or replace red and white wires
Presence of Water Inside the Valve Actuator	Wear or damage to the actuator seals	Replace the compromised seals

8.0 TERMS AND CONDITIONS

Warranty

As the original purchaser of this equipment, having purchased from AquaStar Pool Products Inc., through an Authorized Distributor or Dealer, AquaStar warrants its products free from defects in materials and workmanship under normal use during the warranty period. The warranty period begins on the day of purchase and extends only to the original purchaser. It is not transferable to anyone who subsequently purchases the product from you. It excludes all expendable parts.

This 1-year warranty extends only to products purchased from AquaStar authorized resellers. This Limited Warranty does not extend to any product that has been damaged or rendered defective:

(a) as a result of an accident, misuse, or abuse;
(b) as a result of an act of God;
(c) by operation outside the usage parameters stated herein;
(d) by the use of parts not manufactured or sold by AquaStar;
(e) by modification of the product;
(f) as a result of service by anyone other than AquaStar authorized reseller or authorized agent.

Limited Lifetime Warranty

In addition to the above, AquaStar offers a limited lifetime warranty specifically on the casing of the valve actuator. This lifetime warranty is applicable to the original purchaser and is not transferable. It warrants the casing of the actuator to be free from defects in materials and workmanship under normal use for the lifetime of the product.

EXCEPT AS EXPRESSLY SET FORTH IN THIS WARRANTY, AQUASTAR MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. AQUASTAR EXPRESSLY DISCLAIMS ALL WARRANTIES NOT STATED IN THIS LIMITED WARRANTY. ANY IMPLIED WARRANTIES THAT MAY BE IMPOSED BY LAW ARE LIMITED TO THE TERMS OF THIS EXPRESS LIMITED WARRANTY.

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