Brush HAWK™ Monitor

Installation, Operating, & Maintenance Instructions

98611000 REV-C

1-574-295-8330
www.elkhartbrass.com

ELKHART BRASS
A Clarience Technologies Company

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PRODUCT SAFETY INFORMATION

- All personnel who may be expected to use this equipment must be thoroughly trained in its safe and proper use.
- Before flowing water from this device, check that all personnel are out of the stream path. Also, check to make sure stream direction will not cause avoidable property damage.
- Become thoroughly familiar with the hydraulic characteristics of this equipment, and the pumping system used to supply it. To produce effective streams, operating personnel must be properly trained.
- Whenever possible, this equipment should be operated from a remote location. Do not needlessly expose personnel to dangerous conditions.
- Open water valves supplying this equipment slowly so that piping fills slowly, thus preventing possible water hammer occurrence.
- After each use, and on a scheduled basis, inspect equipment per instructions in the Maintenance section.
- Any modifications to the system may destroy the NEMA 4 rating and void warranty coverage.
- Before moving the vehicle, center the monitor horizontally, lower the monitor vertically just below center but not against lower stop.
- Do not travel with the monitor against a magnetic stop.

Important: Before installing and operating provided equipment, read this manual thoroughly. Proper installation is essential to safe operation.

SYSTEM INFORMATION:

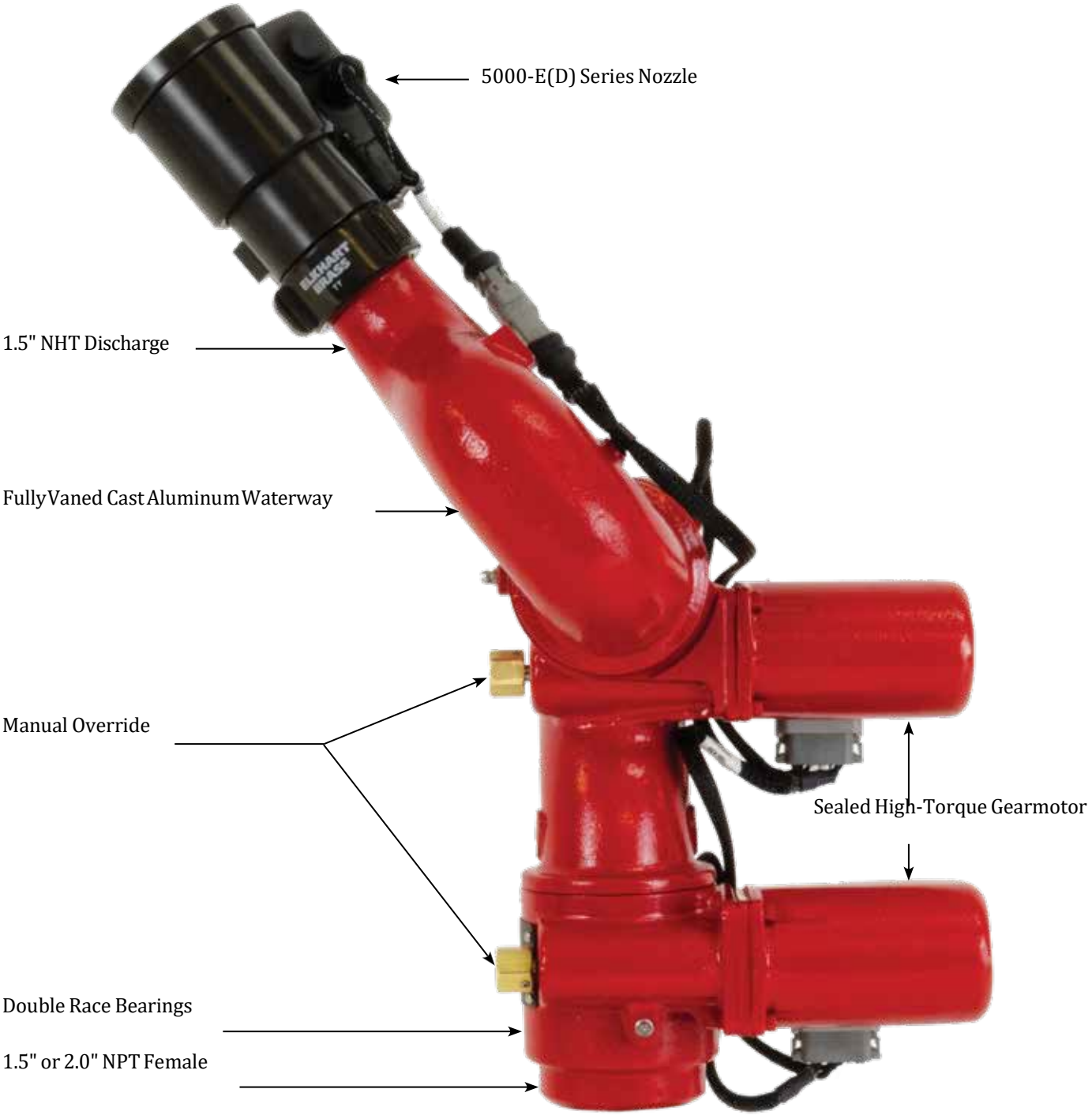
Monitor Serial Number: _____

Nozzle Serial Number: _____

Joystick Serial Number: _____

System Notes: (System Application, 12/24 VDC Operation, Valve Operations, Etc.):

BRUSHHAWK MONITOR FEATURE CALLOUTS



SYSTEM COMPONENTS

MONITOR

BrushHawk Monitor – 8495-01

The BrushHawk Electric Monitor, designed to mount on the front bumper of off-road or wildland firefighting apparatus utilizes a flow efficient 2.0" vaned waterway to minimize turbulence and provide superior nozzle streams. The 1.5" and 2.0" NPT monitor inlet options ensure the monitor fits multiple plumbing setups. Adjustable travel limits can be changed in the field as desired. The horizontal and vertical control circuitry is integrated into the monitor, eliminating the need for a separate control module – saving space and installation time. A proportional joystick with integrated controls for an optional valve provides simple, intuitive monitor control.

BrushHawk Monitor

NOZZLES

5000-E(D) Series Nozzles –

The 5000-E series nozzles are fixed-flow, electric nozzles designed for use with the BrushHawk monitor. Spinning teeth are standard, and the nozzle stream can be electronically adjusted from straight stream to full fog patterns by using the rocker switch on top of the BrushHawk joystick.

- 5000-04E(D) – 15, 30 or 45 GPM
  - P/N's 05000047 through 05000049
- 5000-14E(D) – 60, 75, 95, 125, or 150 GPM
  - P/N's 05000050 through 05000054
- 5000-24E (D) – 175, 200, 250, 350, 400 or 475 GPM
  - P/N's 05000055 through 05000060

5000-E(D) Series Nozzle

6000-200E(D) Nozzle – 06000212

The 6000-200E(D) nozzle is a selectable gallonage, electric nozzle designed for use with the BrushHawk monitor. It offers an ultra-wide flow range with a quick-turn, locking, flow selector ring. It has a 1.5" NH inlet and is compatible with foam concentrate. The nozzle stream can be electronically adjusted from straight stream to full fog patterns by using the rocker switch on top of the BrushHawk joystick.

6000-200E(D) Nozzle

SM-10FE(D) Nozzle – 03817501

The SM-10FE nozzle is a fixed-flow and automatic, electric nozzle designed for use with the BrushHawk monitor. It is designed for the aircraft deicing industry and can be used with Type 1 Deicing, Type 2 Anti-icing, and Type 4 Anti-icing fluids. The nozzle is fixed-flow at pressures below 90 PSI and becomes automatic at 95 PSI. It delivers 20 GPM at 50 PSI and 30-120 GPM at 90-110 PSI. The nozzle stream can be electronically adjusted from straight stream to full fog patterns by using the rocker switch on top of the BrushHawk joystick.

SM-10FE(D) Nozzle

CONTROL

BrushHawk Joystick - 81899000

The BrushHawk utilizes a proportional joystick for controlling left/right/up/down movements of the monitor. The proportional feature allows the operator to control the speed of the monitor movements depending on how far the joystick is moved from the center position. The nozzle stream (fog/straight stream) is controlled by a rocker switch at the top of the joystick. The joystick also includes a toggle switch and trigger for manipulating the optional valve kit. The 3-position toggle switch functions as follows:

- CLOSED position – valve is closed (trigger is Deactivated)
- TRIGGER position - valve is closed until trigger is pulled – valve closes when trigger is released
- OPEN position – valve goes to a fully open position (trigger is deactivated) and remains open until the switch is moved to the closed or trigger position

ACCESSORIES

BrushHawk Harnesses – 375430XX

Plug-and-play CAN harnesses have been designed for use between the BrushHawk components. The harnesses have different lengths, but the same plug-and-play Deutsch CAN connections allowing them to be used interchangeably between the joystick, monitor and valve. The joystick, monitor, and valve all come with power and ground leads to allow for easy connection to an apparatus' existing power source.

- P/N 37543002 – 2-foot length harness
- P/N 37543010 – 10-foot length harness
- P/N 37543015 – 15-foot length harness
- P/N 37543020 – 20-foot length harness
- P/N 37543030 – 30-foot length harness
- P/N 37543040 – 40-foot length harness

Unibody Valve with E14X (E16X for EB6D) Electric Actuator

The Unibody water valve provides a convenient remote on/off and preset valve positioning control of the water supply This allows the operator complete control of the unit from the safety of the vehicle cab The water valve motor speed prevents water hammer, yet closes quickly enough to help preserve the limited on-board water supply. The electric actuated Unibody Valve may be powered with 12 or 24 Volts.

*Valve must be wired for CAN communication

BrushHawk Valves –

The optional BrushHawk stainless-steel ball valves come in sizes of 1.5", 2.0". An installed valve is controlled by a toggle switch on the BrushHawk joystick that can set the valve to fully open, fully closed, or trigger controlled.

- P/N 70212001 – 1.5" Valve
- P/N 70213001 – 2.0" Valve

BrushHawk Flange Adapter – 11646001

An optional 2.5" 150# ANSI flange by 2.0" MNPT adapter is offered to allow for installation of the BrushHawk monitor to a 2.5" ANSI flange connection on an apparatus.

BrushHawk Quick Connects – 08495011 & 08495012

The BrushHawk can be ordered with a preinstalled, 1.5" or 2.0" FNPT quick- connec to allow for quick connecting and de-connecting of the monitor to an apparatus.

- P/N 08495011 – Monitor with 1.5" FNPT Quick-Connect
- P/N 08495012 – Monitor with 2.0" FNPT Quick-Connect

INSTALLATION INSTRUCTIONS

Installation Overview:

Step 1 – Mount the System Components

Step 2 – Wire the System Components

Step 3 – Check Installation

Installation Step 1: Mount the System Components

BrushHawk Monitor –

- Before mounting the monitor, ensure that space allows for the monitor to be rotated fully. The BrushHawk monitor is capable of either 180 or 350-degrees horizontal travel and 90 or 120-degrees vertical travel depending on the sensor mounting location used.

Travel limit options

- 350° Horizontal (Left 175°/Right 175°) and 120° vertical (-30°/+90°)
- 180° Horizontal (Left 90°/Right 90°) and 120° vertical (-30°/+90°)
- 180° Horizontal (Left 90°/Right 90°) and 90° vertical (-45°/+45°)

Caution – if horizontal rotation is set to 350°, the vertical limit must be set to 120° (+90°/-30°) to prevent possible damage to the monitor.

- If using the BrushHawk Flange Adapter and if space permits, mount the adapter to the truck first and the monitor to the adapter second.
  - Mount the adapter to a mating 2.5" ANSI flange with four, 5/8-11 UNC grade 5 carbon steel or stainless-steel bolts and nuts. Seal flange joint with an appropriate gasket. Apply blue Loctite 242 or equivalent to bolt threads, thread on the nuts, and torque to 60-70 ft.-lbs.
  - Thread the monitor onto the adapter using Loctite 592 or equivalent thread sealant. Tighten using a strap wrench on the monitor base. Ensure the FRONT of the monitor is forward facing when fully mounted. The FRONT of the monitor is indicated by this symbol on the inlet body near the nameplate.
- If not using the BrushHawk Flange Adapter, thread the monitor onto a corresponding male 1.5" or 2.0" NPT thread using Loctite 592 or equivalent thread sealant. Tighten using a strap wrench on the monitor base. Ensure the FRONT of the monitor is forward facing when fully mounted. The FRONT of the monitor is indicated by this symbol on the inlet body near the nameplate.

5000-E(D) Series, 6000-200E(D) or SM-10FE(D) Nozzle –

- Ensure there is a gasket inside the nozzle swivel.
- Position the nozzle on the monitor with the actuator on the left when standing in front of and facing the monitor.
- Hand tighten the nozzle onto the monitor discharge, then tighten the nozzle swivel with a spanner wrench.
- Connect the nozzle Deutsch connector to the mating Deutsch connector of the monitor.

BrushHawk Joystick

NOTE: The side of the joystick with the trigger lever is considered the front of the Joystick.

- Locate an appropriate mounting place for the BrushHawk Joystick. The BrushHawk Joystick is not a sealed component and should be mounted inside a cab or other compartment where it will not encounter water or other liquids.
- Remove the joystick lid by loosening the four Phillips screws holding it in place. Gently lift the joystick lid from the joystick base as the joystick is attached by wires to an internal circuit board in the base of the enclosure.
- Mount the joystick enclosure onto a flat surface using four appropriate length #8 or M4 fasteners in the intended mounting holes.
    - A mounting hole template for the joystick enclosure can be found in the last section of this manual.
- After attaching the joystick enclosure to the panel top, reattach the lid with the four Phillips screws.

BrushHawk Valve

- Mount the valve in line with the plumbing using the FNPT connections at both ends of the valve.

Warning: If the BrushHawk valve is moved manually, the valve may become uncalibrated as a result. Manual operation of the BrushHawk valve should only be done in emergency situations where power or control to the valve has been lost. If the BrushHawk valve has been moved manually and as a result operates unexpectedly through normal joystick control, see the valve calibration instructions to recalibrate the valve.
Do not use power tools to operate manual override nuts. Serious damage to motor gear heads will result.

Installation Step 2: Wire the System Components

BrushHawk Monitor –

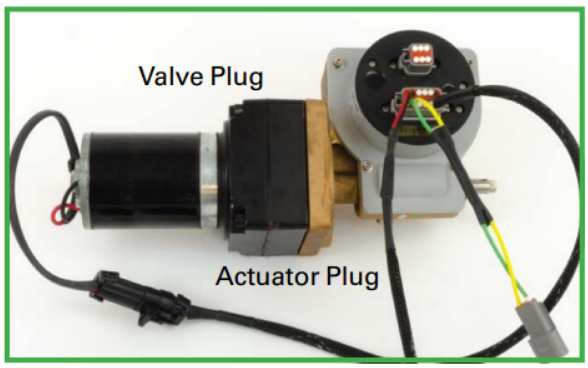
- Connect the black, 3-pin Deutsch plug of an Apex Harness to the gray, 3-pin Deutsch receptacle of the monitor. Connect the other end of the same Apex Harness to:
  - The gray, 3-pin Deutsch receptacle of the joystick if not using a BrushHawk valve.
  - The gray, 3-way Deutsch splitter connected to a valve if using a BrushHawk valve.
- Using the adhesive-lined butt splices, connect the red and black leads from the monitor to an appropriate power source.
  - Connect the red lead to either 12 or 24 VDC power. Connect the black lead to ground.
  - Use 16 AWG wire between the power source and the monitor leads.
  - Install a 10-Amp slow-blow fuse into the positive power lead for a 12 VDC system (5-Amp slow blow fuse for a 24 VDC system) to protect the BrushHawk monitor.

BrushHawk Joystick –

- Connect the black, 3-pin Deutsch plug of an Apex Harness to the gray, 3-pin Deutsch receptacle of the joystick. Connect the other end of the same Apex Harness to:
  - The gray, 3-pin Deutsch receptacle of the joystick if not using a BrushHawk valve.
  - The gray, 3-way Deutsch splitter connected to a valve if using a BrushHawk valve.
- Using the adhesive-lined butt splices, connect the red and black leads from the joystick to an appropriate power source.
  - Connect the red lead to either 12 or 24 VDC power. Connect the black lead to ground.
  - Use 20 AWG wire between the power source and the joystick leads.
  - Install a 1 Amp fuse into the positive power lead for a 12 VDC system (0.5 Amp fuse for a 24 VDC system) to protect the BrushHawk joystick.

Electric Actuated Unibody Valve – E14X/E16X

- Install the valve into the water supply line.
- Supply power to the valve by connecting the red and black leads coming from the valve -1 plug to an appropriate power source, red (+), black (-). Do not power valve until ready to calibrate it (see page 21).
- Install a 30 Amp fuse to the positive power lead of the valve for a 12V system (20 Amp for 24V system).
- Connect plug 2 to the appropriate CAN line.
- Termination requires no additional items as CAN lead contains termination. Non-termination requires CAN splitter (P/N 24196000, not included) and removal of terminated CAN lead and installation of unterminated lead. Unterminated lead and instructions are included with valve.



E14X (E16X for EB6D)

Valve Plug 1

DEUTSCH PLUG DT06-12SA-P012				
PIN NUMBER	WIRE SIZE	WIRE COLOR	FUNCTION	
1	14 AWG	RED	FUSED TRUCK POWER	-LABEL
2	14 AWG	BLACK	BATT NEG	-LABEL
3	PLUG			
4	PLUG			
5	PLUG			
6	14 AWG	BLACK	VALVE MOTOR NEG	
7	14 AWG	RED	VALVE MOTOR POS	
8	PLUG			
9	PLUG			
10	PLUG			
11	18 AWG	YELLOW	CAN HIGH	
12	18 AWG	GREEN	CAN LOW	

VIEW FROM WIRE SIDE
1 2 3 4 5 6
12 11 10 9 8 7
PIN 1 AND 2 ARE WIRES WITH 2M BUTT SHRINK (BLUE)

2

VIEW FROM WIRE SIDE	DEUTSCH PLUG DT06-3S-P012 NOTE 2		
	PIN LETTER	WIRE COLOR	FUNCTION
	A	YELLOW	CAN HI
	B	GREEN	CAN LO
	C	BLACK	SHIELD

BrushHawk Valve –

- Using the adhesive-lined butt splices, connect the red and black leads from the valve to an appropriate power source.
  - Connect the red lead to either 12 or 24 VDC power. Connect the black lead to ground.
  - Use 16 AWG wire between the power source and the valve leads.
  - Install a 10 Amp slow-blow fuse into the positive power lead for a 12 VDC system (5 Amp slow blow fuse for a 24 VDC system) to protect the BrushHawk Valve

Installation Step 3: Check Installation

Warning: If the BrushHawk valve is moved manually, the valve may become uncalibrated as a result. Manual operation of the BrushHawk valve should only be done in emergency situations where power or control to the valve has been lost. If the BrushHawk valve has been moved manually and as a result operates unexpectedly through normal joystick control, see the valve calibration instructions to recalibrate the valve.

Do not use power tools to operate manual override nuts. Serious damage to motor gear heads will result.

After mounting and wiring the BrushHawk System, check the installation of each component before powering on and operating the system.

- Ensure that all components have been mounted securely.
- Ensure that the components have been wired together correctly.
- Ensure the operator can see the monitor.
- Ensure that a fuse has been installed in the positive power lead of the system for optional valves.

Power on and operate the system to check for correct functionality.

- Ensure that the monitor and nozzle do not contact or interfere with other objects mounted nearby.
  - **NOTE:** See travel limits section on page 8.
- Ensure that the directional movement of both the monitor and nozzle are correct.
- If using a BrushHawk valve, ensure the valve opens and closes when using the trigger lever control, when the toggle switch is in the “OPEN” position, and when the toggle switch is in the “CLOSED” position.

OPERATING INSTRUCTIONS

Joystick Functions

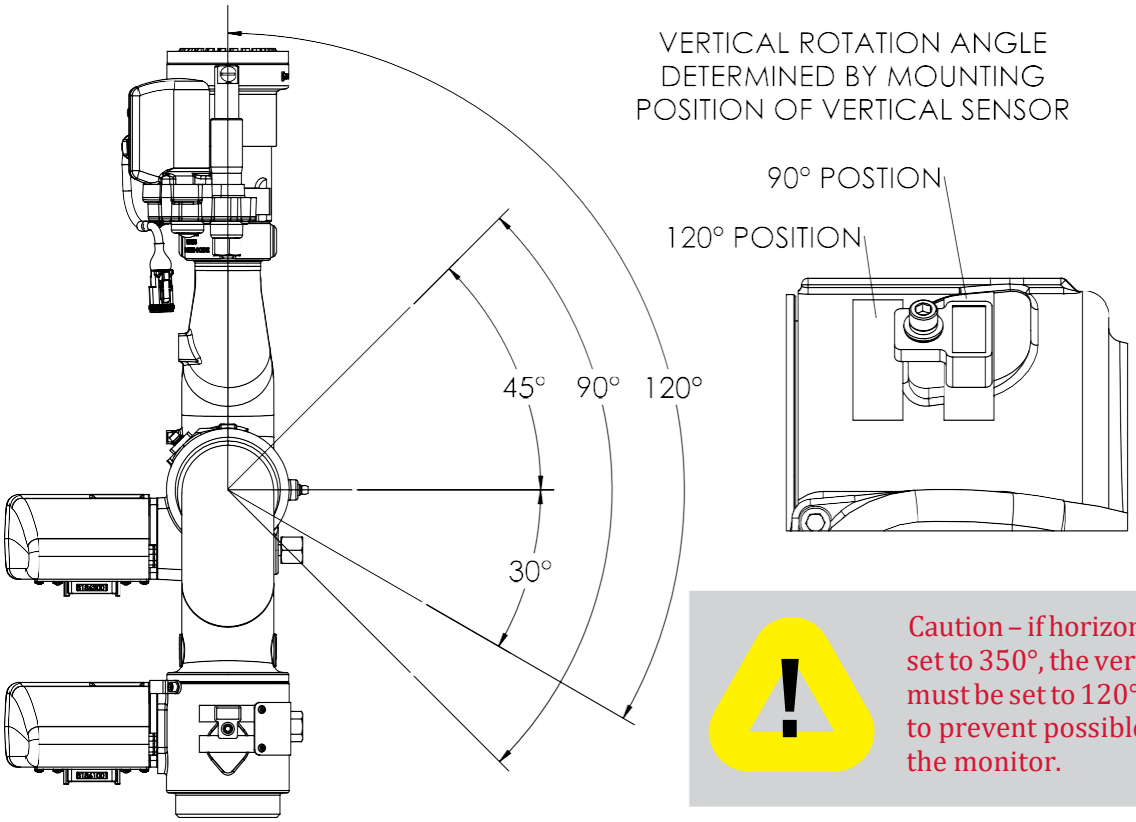
The joystick is a proportional joystick which means the farther the joystick is moved from its center position, the faster the monitor moves. The side of the joystick with the trigger lever is considered the front of the joystick handle. For diagonal monitor movement, simply perform the two directional movements at the same time.

- UP Monitor Movement – Pull back on the joystick handle
- DOWN Monitor Movement – Push forward on the joystick handle
- RIGHT Monitor Movement – Pull the joystick handle to the right
- LEFT Monitor Movement – Pull the joystick handle to the left
- TO STREAM Nozzle Movement – Press and hold the right rocker switch
- TO FOG Nozzle Movement – Press and hold the left rocker switch
- OPEN Valve fully and stay open – Flip toggle switch to right side labeled "OPEN"
- CLOSE Valve fully and stay closed – Flip toggle switch to left side labeled "CLOSED"
- TRIGGER Control Valve – Flip toggle switch to center labeled "TRIGGER". Press and release the trigger lever on the joystick handle to open and close the valve respectively.

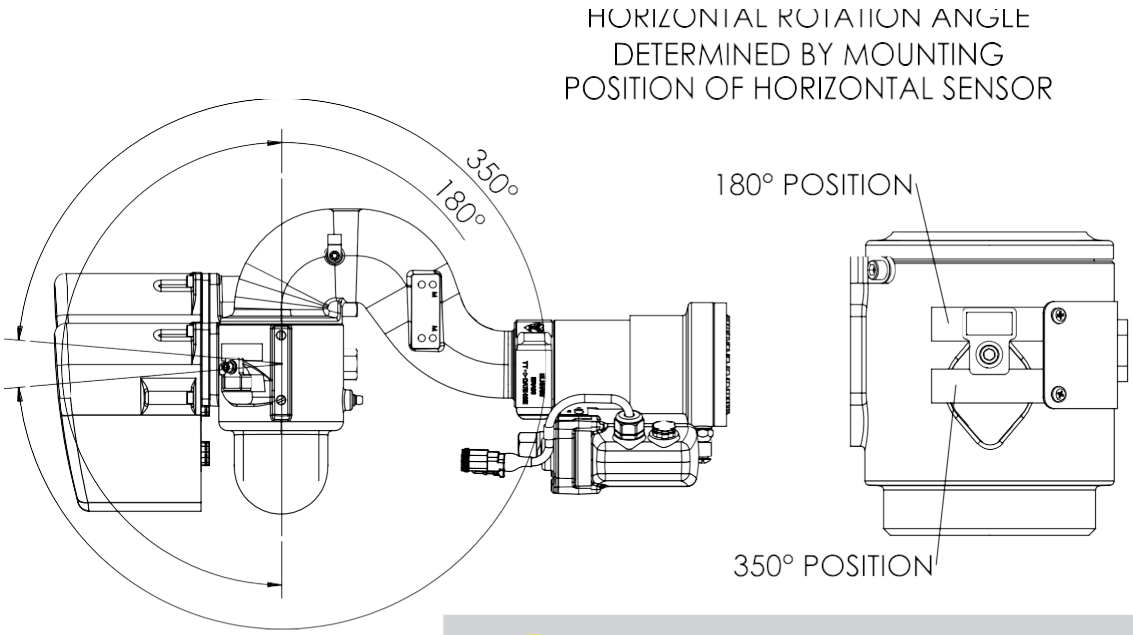
Note: *The toggle switch and trigger lever provide no functionality unless the joystick is connected to a BrushHawk valve.*

Monitor Rotation Limits

The BrushHawk monitor is capable of either 90° or 120° vertical rotation at 180° horizontal rotation or 120° vertical rotation at 350° horizontal rotation, depending on sensor mounting locations as described below.



Caution – if horizontal rotation is set to 350°, the vertical limit must be set to 120° (+90°/-30°) to prevent possible damage to the monitor.



Caution – if horizontal rotation is set to 350°, the vertical limit must be set to 120° (+90°/-30°) to prevent possible damage to the monitor.

Changing the rotation limits of the monitor:

- Locate the sensor and remove the 8-32 screw, lock washer, and washer holding it in place.
- Reposition the sensor into the desired rotation track.
- Reattach the sensor to the monitor body with the same 8-32 screw, lock washer, and washer.
- Tighten the screws to 20 in-lbs.

Caution: Over tightening of the screws may damage the sensor.

Before resuming operation of the monitor, ensure both sensors are securely fastened to the monitor. DO NOT operate the monitor if one or both sensors are not securely fastened to the monitor.

MAINTENANCE INSTRUCTIONS

Preventive Maintenance

The complete BrushHawk System should be inspected during each apparatus check and at least once a month on a scheduled basis. Careful inspection for damage to the monitor and nozzle is especially important.

- Visually inspect each BrushHawk System component including the Monitor, Nozzle, Joystick, Valve and Wire Harnesses.
    - Look for signs of excessive wear or abnormal damage.
    - Look for loose mounting or wiring connections.
- Operate the system as outlined in the installation section to ensure that all intended operation of the system is correct.
- Flow water to check the nozzle pattern
    - If the pattern is disrupted, clear the debris
    - If the obstruction still remains, remove the nozzle and check for debris lodged between the nozzle stem and monitor or in the nozzle stream shapers
- During the nozzle flow test, inspect monitor swivel joints for leaks
- Inspect all exposed wiring for signs of damage

Note: Grease fittings are provided for the up-down and left-right gear cases. Routine greasing should be done. It is recommended that Chevron Starplex EP2 grease be used to lubricate the monitor gearing. Grease every 30 degrees of travel through entire range of motion vertically and horizontally. Input grease until fresh grease comes out, then move 30 degrees and repeat. Once full travel range is covered, wipe off excess grease.

Caution: DO NOT use high pressure spray to clean the BrushHawk. Using high pressure spray can damage seals and lead to serious damage of electrical components.

TROUBLESHOOTING GUIDE

At times the BrushHawk System may not provide the intended or expected operation. The following section is meant as a guide to the end user to help alleviate issues and improve the overall customer experience. Although Elkhart Brass is always willing and ready to address customer concerns, the customer is urged to refer to this troubleshooting guide before contacting Elkhart Brass for further support to ensure that system downtime is minimized as much as possible. If a solution cannot be found, please feel free to contact Elkhart Brass for further support.

Caution: Before attempting to view or adjust system wiring, disconnect the system from its power source.

Monitor & Nozzle will not function:

- Check to see if the fuse in the positive power lead to the BrushHawk System is blown. If this is the case, investigate incoming power of the chosen supply before replacing the fuse and attempting to operate the BrushHawk System again.
- Check that all wiring is connected as described in the installation section of this manual and that proper power and ground connections have been made to an appropriate power source.
- Inspect all system wiring for damage and for unseated pins or sockets in the Deutsch connections.
- Check that the power being supplied from the Power source is above 10.0 VDC. A supply voltage less than this at the BrushHawk Module will not successfully power the system on.

Nozzle will not move/moves intermittently:

View the nozzle while attempting to actuate the nozzle. If the actuator moves (3/4" override nut spins), but the nozzle tip does not move, there may be a problem with the nozzle actuator.

- Repair or replace nozzle actuator.

If the nozzle actuator does not move when attempting to move the nozzle there could be an issue with the nozzle wiring or with the actuator motor.

- Inspect the nozzle actuator and monitor nozzle wires for damage. If any of these wires are damaged, the nozzle may not be receiving power.
- Check the gray, 2-pin Deutsch connection between the nozzle actuator and the monitor nozzle wire. Check the pins and sockets of this connection to ensure they have not become unseated, thus preventing them from making a proper connection.
- Check the two, gray, 12-pin Deutsch connectors under the monitor motor covers. Check the pins and sockets of these connections to ensure they have not become unseated, thus preventing them from making a proper connection to the motors or sensors.

Monitor will not move / moves intermittently / moves only in one axis:

- Operate the monitor manually to determine if there is a physical obstruction in the monitor gearing that could be preventing monitor movement.
- Inspect the monitor motor wires for damage. If any of these wires is damaged, the motors may not be receiving power.
- Inspect the sensor wires for damage. If any of these wires are damaged, the sensors may not be receiving power or correctly reporting to the BrushHawk control boards. If a sensor is disconnected in any way or not reporting to the BrushHawk control boards correctly, the BrushHawk System is programmed to shut down motion in that direction to prevent further damage to the system.
- Check the two, gray, 12-pin Deutsch connectors under the monitor motor covers. Check the pins and sockets of these connections to ensure they have not become unseated, thus preventing them from making a proper connection to the motors or sensors.

Nozzle is not flowing proper flow at rated pressure:

- Remove the nozzle from the monitor assembly and look inside to see if there is any debris lodged in the nozzle that would affect its flow. Remove any such obstructions.

Valve is not operating or is operating unexpectedly:

- Recalibrate the valve

BrushHawk Valve Calibration

Warning: Never place objects, hand, fingers or other body parts inside the valve during

troubleshooting and/or calibration routines!

Warning: During valve recalibration, care must be taken to not place hand, fingers, or other body parts

in the moving gears and other parts of the valve actuator!

Warning: Proper eye protection must be worn when performing troubleshooting or recalibration

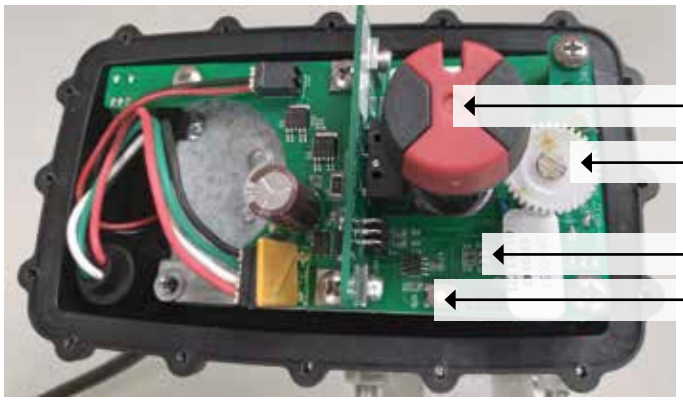
routines on the valve.

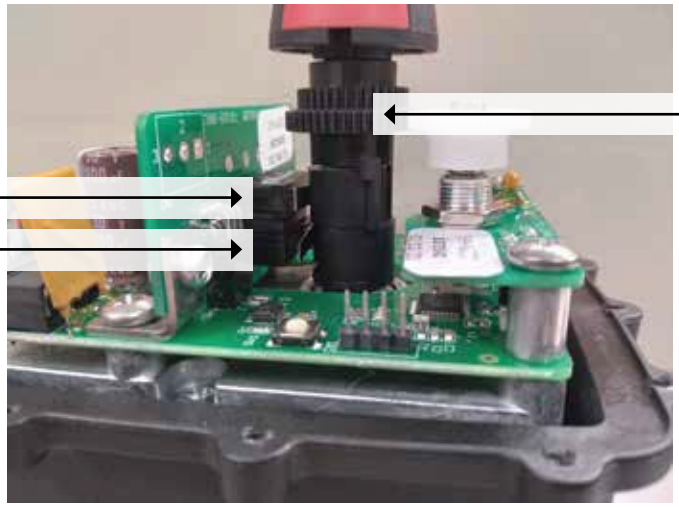
Step 1 – Open the Actuator

Open the valve by removing the (16) Torx-head screws in the locations shown. Save the screws and actuator cover, they will be needed to reassemble the actuator.

Step 2 – Identify Actuator Parts

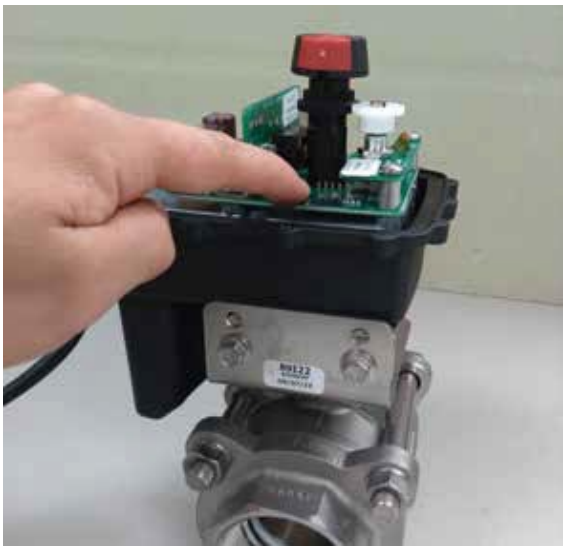
Visually inspect the actuator circuit board and gears and locate and identify the parts shown below.





Step 3 – Verify Correct Directional Travel of the Valve

With the valve powered on, press the calibration button (1) time to enter calibration mode. Press and hold the button a 2nd time. The valve gear should move counterclockwise. Release the button and verify the valve gear rotates clockwise on its own.



Step 4 – Begin Calibration Routine

Press and hold the calibration button till the valve moves fully open, continue holding the button once motion has stopped. (The bottom limit switch should be depressed in this position.) While still holding down the calibration button, manually depress the top limit switch with a small flat screwdriver. Release the limit switch and calibration button at the same time. The valve will rotate to the close position on its own.

Step 5 – Reposition Potentiometer Gear

Lift the Valve Gear so that the Potentiometer Gear can rotate freely. Rotate the Potentiometer Gear until the Green & Red LEDS light up at the same time. Push the Valve Gear down again to mesh with the Potentiometer Gear. Both Red and Green LEDS should still be lit.

Step 6 – Teach Travel Limits

Press the calibration button one time. Both Red and Green LEDs should begin flashing in an alternating pattern. With the Red and Green LEDs flashing, press the calibration button again. The valve will move to the open position. Press the calibration button a 3rd time. The valve will move to the closed position.

Step 7 – Close Actuator and Test Valve Operation

The valve should now be calibrated. Using the joystick controller, operate the valve and ensure the correct operation of the valve. Then, close the actuator by re attaching the cover with the (16) Torx-head screws previously removed from the actuator.

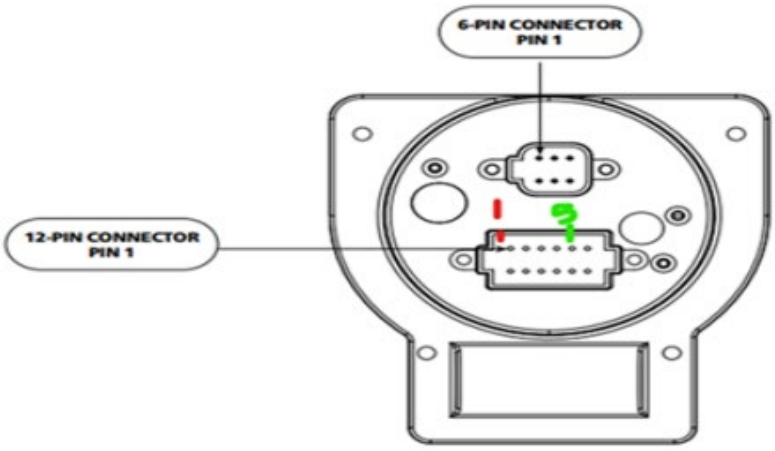
Step 1 – Unibody E14X Valve Calibration

NOTE: The valve should be partially open before starting valve position calibrationl.

The automatic calibration routine has been added to further simplify the calibration of the open and closed positions of the valve. After initiating the calibration routine, the valve will automatically travel completely closed. After setting the closed position, the valve will automatically travel completely open. The valve is then returned to the completely closed position at the end of the routine.

The automatic calibration routine can be activated without the use of any controller. This can be accomplished by supplying a 12 or 24 VDC signal to PIN 5 on the 12-pin connector for 10 seconds.

Figure 8. Valve Actuator Wiring



Actuator 6-Pin Connector	
Pin	Signal Description
1	Pressure Sensor 5 VDC
2	Pressure Sensor Ground
3	Pressure Sensor Signal
4	Flow Sensor 5 VDC
5	Flow Sensor Ground
6	Flow Sensor Signal

Actuator 12-Pin Connector	
Pin	Signal Description
1	Power 12/24 VDC
2	Ground
3	Valve Closed Signal
4	Valve OPEN Signal
5	Valve Calibration
6	Valve Control (–)

SYSTEM SPECIFICATIONS

BrushHawk Monitor

Max Flow Rating	500 GPM
Max Operating Pressure	200 PSI
Inlet Size	1.5" or 2.0" NPT Female
Outlet Size	1.5" NHT Male
Travel	350° Horizontal (Left 175°/Right 175°) and 120° vertical (-30°/+90°) 180° Horizontal (Left 90°/Right 90°) and 120° vertical (-30°/+90°) 180° Horizontal (Left 90°/Right 90°) and 90° vertical (-45°/+45°)
Weight	13.9 Lbs.
Operating temperature range	-40°F to +185°F (-40°C to +85°C)
Environmental Rating	NEMA 4 (Motors, Sensors, Wiring)

BrushHawk Motor Spec

Motor (12 VDC)	Left/Right	Up/Down	Nozzle
Run Current	1.2 A	1.2 A	0.5 A
Stall Current	10 A	10 A	NA
Current Trip Point	4 A	4 A	3 A

Table 1: Motor Current Specifications

BrushHawk Joystick –

- Weight: 1.7 Lbs.
- Environmental Rating: Not Sealed, intended for in-cab use ONLY

BrushHawk Harnesses–

- P/N 37543002 – 2-foot length harness; 0.130 lbs.
- P/N 37543010 – 10-foot length harness; 0.435 lbs.
- P/N 37543015 – 15-foot length harness; 0.625 lbs.
- P/N 37543020 – 20-foot length harness; 0.815 lbs.
- P/N 37543030 – 30-foot length harness; 1.195 lbs.
- P/N 37543040 – 40-foot length harness; 1.580 lbs.

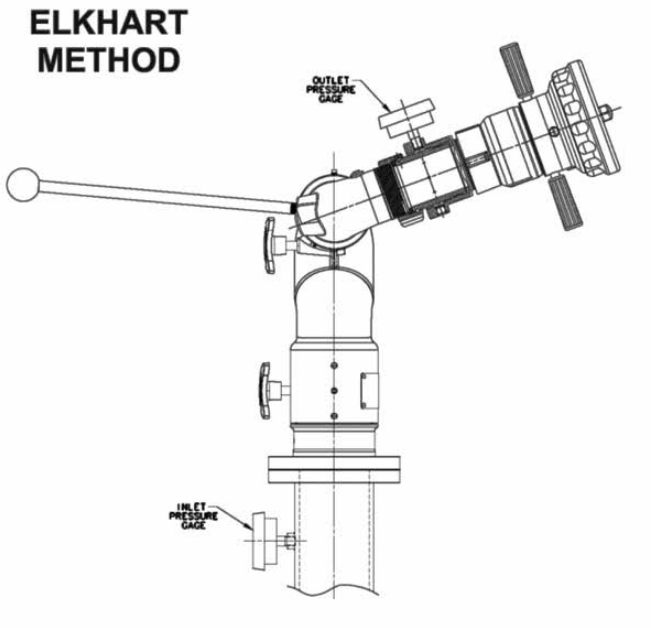
BrushHawk Valves–

- P/N 08815BHV –Unibody Valve 1.5" MNPT; 29.1 lbs
- P/N 08820BHV– Unibody Valve 2.0" MNPT; 29.2 lbs
- P/N 70212001 – 1.5" MNPT; 10.43 lbs.
- P/N 70213001 – 2.0" MNPT; 10.25 lbs.

MONITOR AND NOZZLE HYDRAULIC DATA

Interpreting Flow Data

The following graphs offer the pressure losses for the monitor (and other devices) in terms of Total Static Pressure Drop. This Total Static Pressure Drop can be found by measuring the difference between the static inlet pressure and the static outlet pressure. The static pressure at either of these points can be found using a simple pressure gauge. An illustration of this method can be seen below.



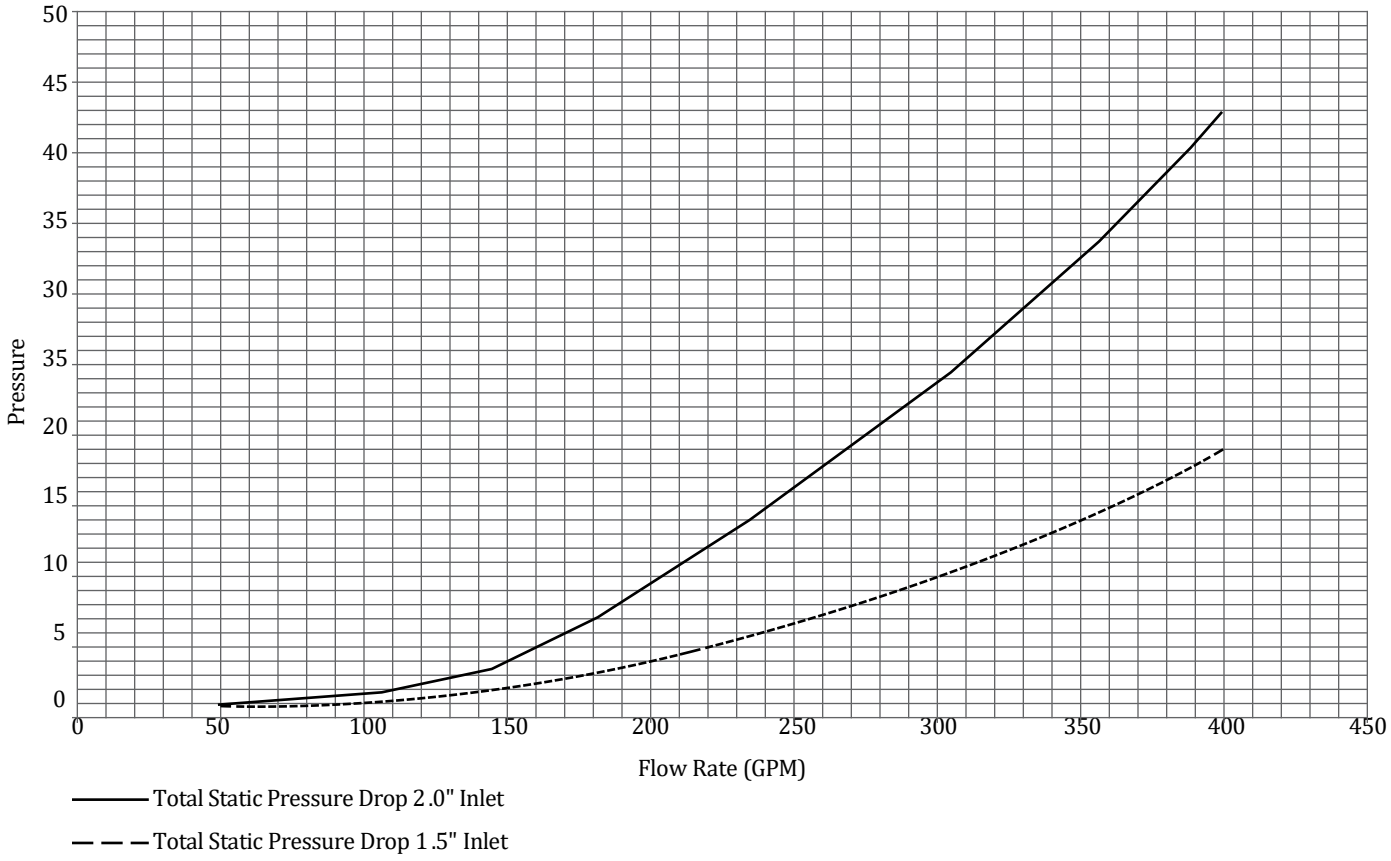
In mathematical terms, the Total Static Pressure Drop is the change in Velocity Pressure plus Friction Loss. The change in Velocity Pressure results from the change in velocity of water caused by the change in the cross section of a waterway. Friction Loss results from the drag and sidewall interference of the water through a device. A simple equation can be seen below.

$$\Delta P_S = H_F + \Delta P_V$$

ΔP_S = Total Static Pressure Drop
H_F = Friction Loss
ΔP_V = Velocity Pressure Loss

In the firefighting industry, the terms Total Static Pressure Drop and Friction Loss tend to be used interchangeably. However, these are significantly different measurements. This misconception could ultimately lead to lower than anticipated performance from equipment. When designing a system and determining performance, Total Static Pressure Drop is the value that should always be used. The Friction Loss curve is also supplied in order to make a comparison with competitor products that may only supply Friction Loss curves. If there are any further questions regarding this matter, please contact Elkhart Brass.

BrushHawk Monitor Pressure Drop (1.5" or 2.0" Inlet, 1.5" Outlet)

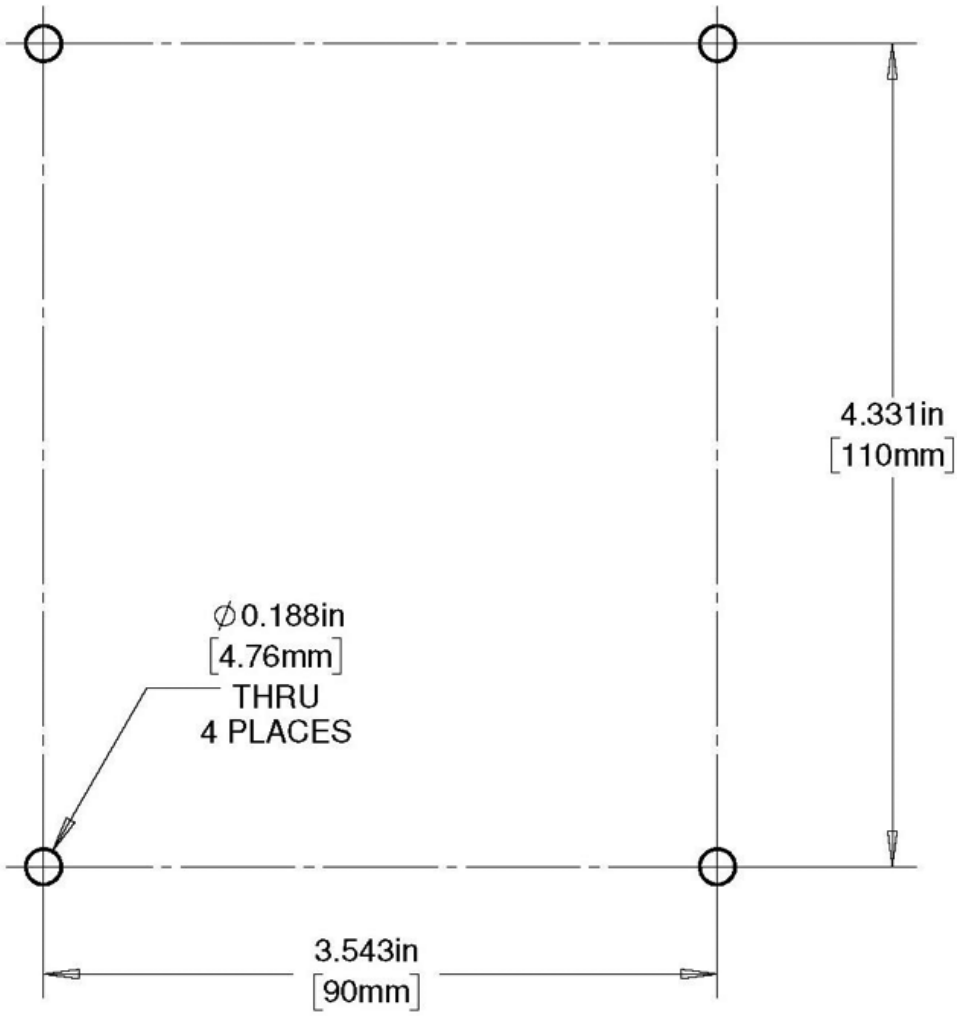


COMPONENT MOUNTING TEMPLATES

NOTE: Pages must NOT be scaled during printing or template size will be scaled incorrectly.

BrushHawk Joystick – (Panel top mounting, with enclosure)

JOYSTICK FRONT (TRIGGER
AND WIRE SIDE)



ELKHART BRASS
A Clarience Technologies Company

Elkhart Brass Manufacturing Co., Inc.

1302 W. Beardsley Avenue Elkhart, IN

46514 Tel. (574) 295-8330

Toll Free (800) 346-0250

Fax (574) 293-9914

www.elkhartbrass.com

Email:

eb.info@elkhartbrass.com

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