

# JUMBO LOW PROFILE BALL INTAKE VALVE (BIV)

## INSTRUCTION FOR INSTALLATION, OPERATION, AND MAINTENANCE

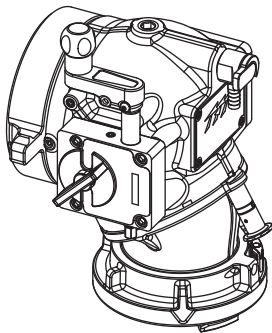
### ⚠ DANGER

Understand manual before use. Operation of this device without understanding the manual and receiving proper training is a misuse of this equipment. Obtain safety information at [tft.com/serial-number](http://tft.com/serial-number).

This equipment is intended for use by trained and qualified emergency services personnel for firefighting. All personnel using this equipment shall have completed a course of education approved by the Authority Having Jurisdiction (AHJ).

This instruction manual is intended to familiarize firefighters and maintenance personnel with the operation, servicing, and safety procedures associated with this product. This manual should be kept available to all operating and maintenance personnel.

### LEFT DRIVE

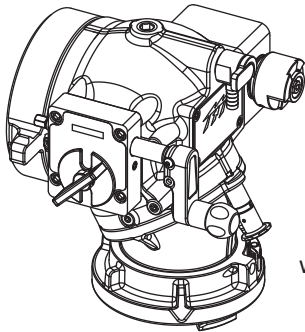


#### AXD1ST-NX-T

Jumbo Low Profile  
Ball Intake Valve  
Top Crank  
with Pressure Relief Valve  
(not shown)

#### AZD1ST-NX-T

without Pressure Relief Valve  
(pictured)

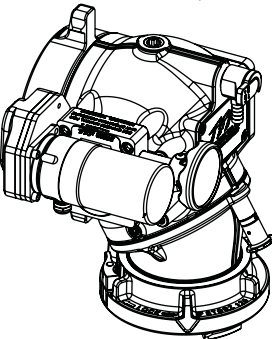


#### AXD1ST-NX-F

Jumbo Low Profile  
Ball Intake Valve  
Front Crank  
with Pressure Relief Valve  
(pictured)

#### AZD1ST-NX-F

without Pressure Relief Valve  
(not shown)



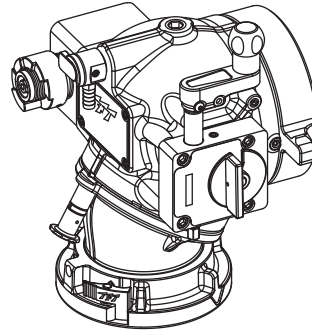
#### AXD1ST-NX-RC

Jumbo Low Profile  
Ball Intake Valve  
Electrically Actuated  
with Pressure Relief Valve  
(not shown)

#### AZD1ST-NX-RC

without Pressure Relief Valve  
(pictured)

### RIGHT DRIVE

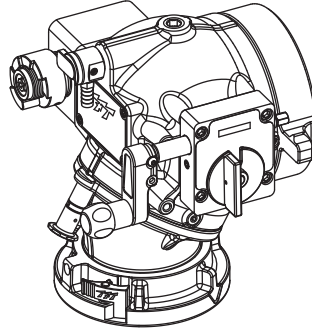


#### AXE1ST-NX-T

Jumbo Low Profile  
Ball Intake Valve  
Top Crank  
with Pressure Relief Valve  
(pictured)

#### AZE1ST-NX-T

without Pressure Relief Valve  
(not shown)

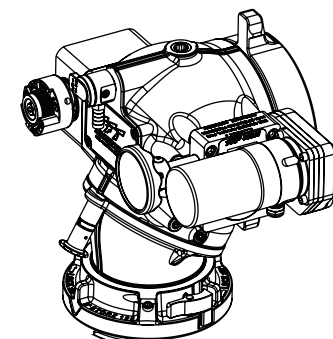


#### AXE1ST-NX-F

Jumbo Low Profile  
Ball Intake Valve  
Front Crank  
with Pressure Relief Valve  
(pictured)

#### AZE1ST-NX-F

without Pressure Relief Valve  
(not shown)



#### AXE1ST-NX-RC

Jumbo Low Profile  
Ball Intake Valve  
Electrically Actuated  
with Pressure Relief Valve  
(pictured)

# DANGER

## PERSONAL RESPONSIBILITY CODE

The member companies of FEMSA that provide emergency response equipment and services want responders to know and understand the following:

1. Firefighting and Emergency Response are inherently dangerous activities requiring proper training in their hazards and the use of extreme caution at all times.
2. **IT IS YOUR RESPONSIBILITY** to read and understand any user's instructions, including purpose and limitations, provided with any piece of equipment you may be called on to use.
3. **IT IS YOUR RESPONSIBILITY** to know that you have been properly trained in Firefighting and/or Emergency Response and in the use, precautions, and care of any equipment you may be called upon to use.
4. **IT IS YOUR RESPONSIBILITY** to be in proper physical condition and to maintain the personal skill level required to operate any equipment you may be called upon to use.
5. **IT IS YOUR RESPONSIBILITY** to know that your equipment is in operable condition and has been maintained in accordance with the manufacturer's instructions.
6. Failure to follow these guidelines may result in death, burns or other severe injury.

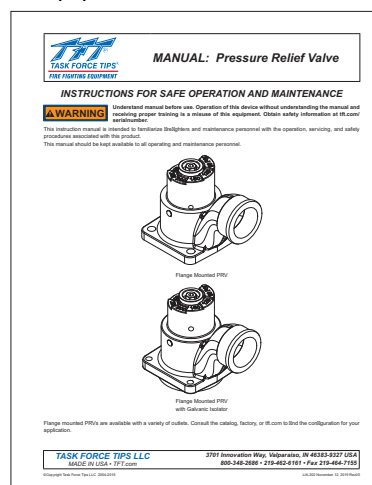
Fire and Emergency Manufacturers and Service Association, Inc.  
PO Box 147, Lynnfield, MA 01940 • [www.FEMSA.org](http://www.FEMSA.org)

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**FEMSA**

### SUPPORTING MATERIALS

The following document contains supporting safety and operating information pertaining to the equipment described in this manual.



LIA-202  
Pressure Relief Valve Manual

## TABLE OF CONTENTS

- 1.0 MEANING OF SAFETY SIGNAL WORDS
- 2.0 SAFETY
- 3.0 GENERAL INFORMATION
  - 3.1 SPECIFICATIONS
    - 3.1.1 MECHANICAL
    - 3.1.2 ELECTRICAL
  - 3.2 VARIOUS MODELS AND TERMS
  - 3.3 CORROSION
  - 3.4 USE WITH SALT WATER
- 4.0 OVERALL DIMENSIONS
- 5.0 INSTALLATION
  - 5.1 MOUNTING THE APPLIANCE
  - 5.2 MOUNTING THE DISPLAY ENCLOSURE
  - 5.3 ELECTRIC INSTALLATION AND WIRING
    - 5.3.1 TESTING THE ELECTRICAL INSTALLATION
  - 5.4 BIV RC MANUAL OVERRIDE
  - 5.5 CHANGING THE OFFSET OF THE CRANK HANDLE
  - 5.6 CHANGING COUPLING LOCK-OUT
  - 5.7 STORZ SUCTION GASKET REQUEST
- 6.0 USE
  - 6.1 ELBOW
  - 6.2 MANUAL VALVE OPERATION
  - 6.3 RC VALVE OPERATION
  - 6.4 AIR VENT AND WATER DRAIN
  - 6.5 PRESSURE RELIEF VALVE (PRV)
    - 6.5.1 RELIEF VALVE PRESSURE SETTING
  - 6.6 PRESSURE LOSS
  - 6.7 SUCTION SCREEN
- 7.0 WARRANTY
- 8.0 MAINTENANCE
  - 8.1 TROUBLESHOOTING
  - 8.2 SERVICE TESTING
  - 8.3 REPAIR
  - 8.4 CRANKSHAFT OVERRIDE AND REPLACEMENT
    - 8.4.1 EMERGENCY CRANKSHAFT OVERRIDE
    - 8.4.2 DIAGNOSING CRANKSHAFT FAILURE
    - 8.4.3 CRANKSHAFT REPLACEMENT
- 9.0 EXPLODED VIEW AND PARTS LISTS
- 10.0 OPERATION AND INSPECTION CHECKLIST
- 11.0 TEMPLATE
  - 11.1 DISPLAY ENCLOSURE
  - 11.2 QUICK CONNECT PLUG

## 1.0 MEANING OF SAFETY SIGNAL WORDS

A safety related message is identified by a safety alert symbol and a signal word to indicate the level of risk involved with a particular hazard. Per ANSI Z535.6, the definitions of the four signal words are as follows:



**DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.



**WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION** indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.



**NOTICE** is used to address practices not related to physical injury.

## 2.0 SAFETY



An inadequate supply of pressure and/or flow will cause an ineffective stream and can result in injury or death. Choose operating conditions to deliver adequate fire suppression.



This equipment is intended for use by trained personnel for firefighting. Use of this equipment for other purposes may involve hazards not addressed by this manual. Seek appropriate guidance and training to reduce risk of injury.



Equipment may be damaged if frozen while containing significant amounts of water. Such damage may be difficult to detect visually. Subsequent pressurization can lead to injury or death. Any time the equipment is subject to possible damage due to freezing, it must be tested and approved for use by qualified personnel before being considered safe for use.



Sudden changes in valve position can cause pressure spikes (water hammer) and could lead to hose or pipe failure or an out of control monitor. Open and close the valve slowly to avoid water hammer.



Interrupting flow to the device could cause injury or death. Avoid situations that may interrupt flow to the device such as: hose line kinks, traffic running over hose, and automatic doors or devices that can pinch the hose.



The electric drives are current limited but may still produce enough force to cause injury. To avoid injury from moving equipment:

- Be aware that equipment may be remotely operated
- Keep hands and fingers away from pinch points
- Never operate the manual override while electric controls are in operation



This equipment has current limiting capability which stops the motor if an obstruction is encountered. Equipment must be installed as instructed using the correct controls and electrical boxes. Failure to do so will result in damage to the electric motor and loss of current limiting controls.



To prevent mechanical damage, do not drop or throw equipment.

## 3.0 GENERAL INFORMATION

The Low Profile Jumbo Ball Intake Valve is intended for use on either the intake manifold of a fire engine or on a discharge port of a fire main. The valve is available in several versions to minimize interference with surrounding components. An adjustable pressure relief valve mounted on the valve opens to relieve any excess pressure that may damage the hose or the pump. The valve may be used for pressure or vacuum/drafting service.

An electric remote controlled (RC) model allows the valve to be operated from a remote location. A typical installation consists of the RC valve and a remote display operator station. Motor controls are designed to auto sense 12 VDC or 24 VDC operation. The motor control circuit utilizes a position encoder and current limiting to protect the drive train at the ends of travel. Unit is supplied with 2' of cable with a plug on RC valve and 15' of cable with a receptacle to minimize installation effort. Cable has only four conductors (two for power and two for communications) further easing installation effort. To complete the installation, the installer will need to mount and wire the remote display operator station. The display has 20' of cable. The power supply for the RC valve will need to be connected to a protected circuit from the truck's power distribution center.

### 3.1 SPECIFICATIONS

#### 3.1.1 MECHANICAL

	STANDARD	METRIC
LDH Waterway Size (at valve seat)	5.25"	133 mm
LDH Valve Meets NFPA Slow Close Requirement		
Maximum Operating Pressure	250 psi	17 bar
Minimum Pressure	Full Vacuum	
Hydrostatic Proof Test Pressure	900 psi	62 bar
Operating Temperature Range of Fluid	33° to 120°F	0° to 50°C
Storage Temperature Range*	-25° to 135°F	-32° to 57°C
Materials Used	Aluminum 6000 series hard anodized MIL8625 class 3 type 2, stainless steel 300 series	

\* For temperatures below 32° (0°C), valves must be drained after use to avoid damage.

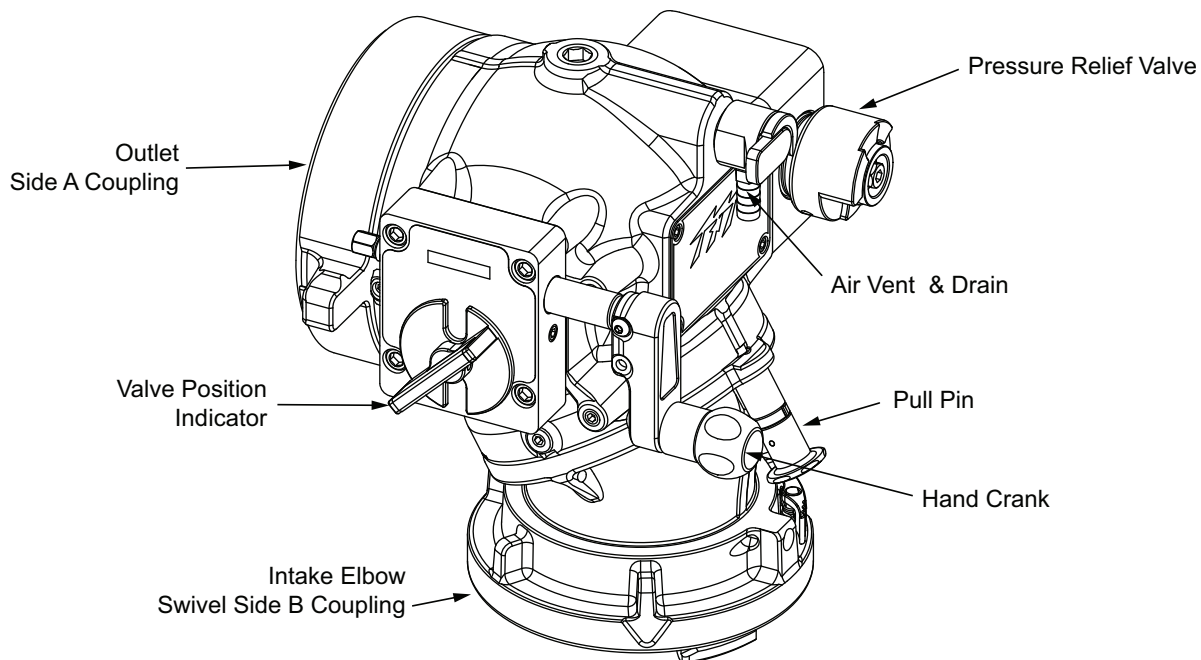
Table 3.1.1

#### 3.1.2 ELECTRICAL

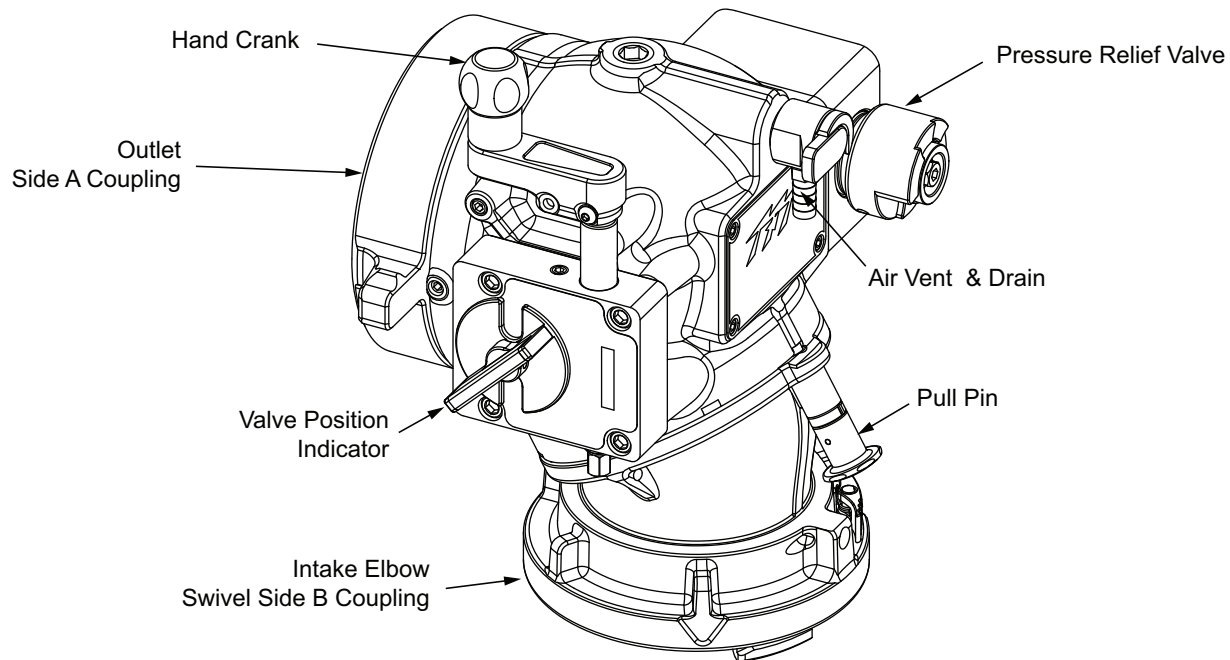
Voltage - Auto Sense	12 Volt	24 Volt
Motor Opening/Closing Speed	9 seconds	
Motor Current - Nominal	3 amp	1.5 amp
Motor Current - Limit	12 amp	6 amp
Recommended Fuse Size	20 amp	10 amp
Environmental Rating	All components designed to meet minimum rating of NEMA 4 (IP65)	

Table 3.1.2

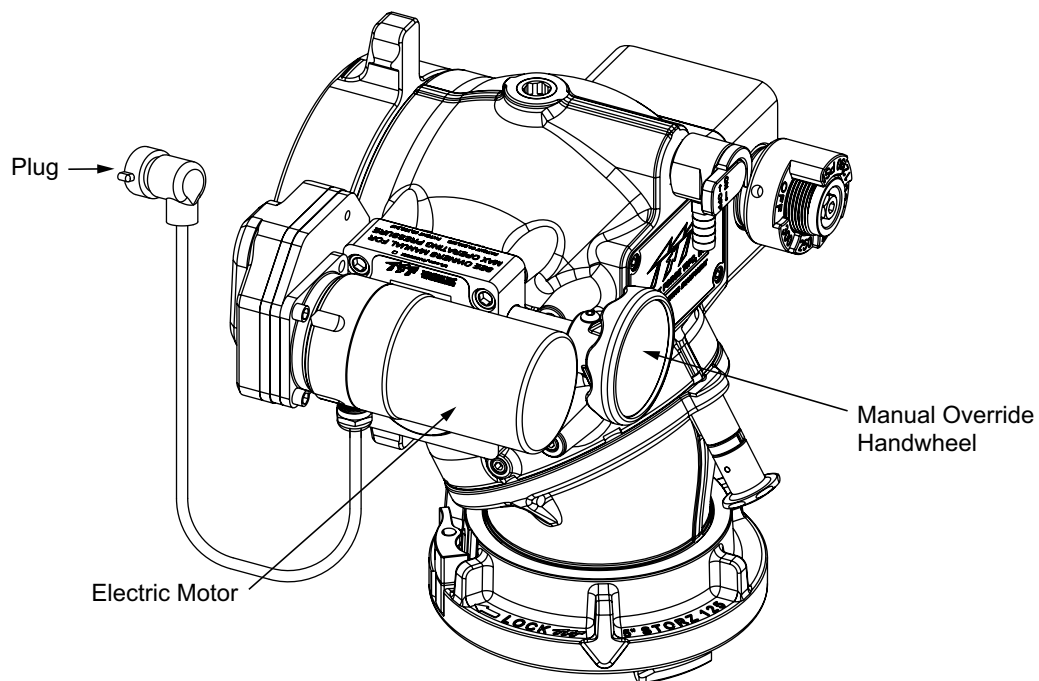
### 3.2 VARIOUS MODELS AND TERMS



**AXD1ST-NX-F**  
Left Drive Jumbo Low Profile  
Ball Intake Valve  
Front Crank  
with Pressure Relief Valve  
Figure 3.2A



**AXD1ST-NX-T**  
 Left Drive Jumbo Low Profile  
 Ball Intake Valve  
 Top Crank  
 with Pressure Relief Valve  
 Figure 3.2B



**AXD1ST-NX-RC**  
 Left Drive Jumbo Low Profile  
 Ball Intake Valve  
 Electrically Actuated  
 with Pressure Relief Valve  
 Figure 3.2C

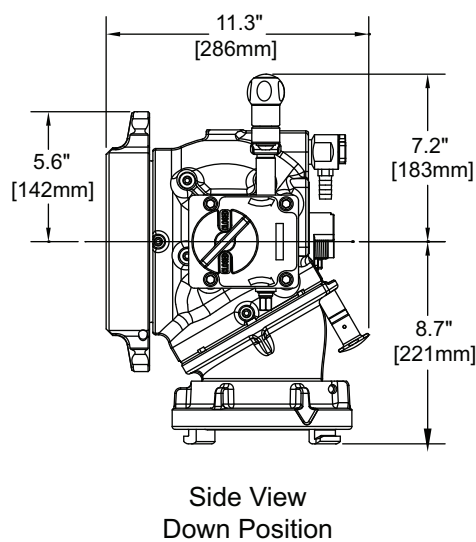
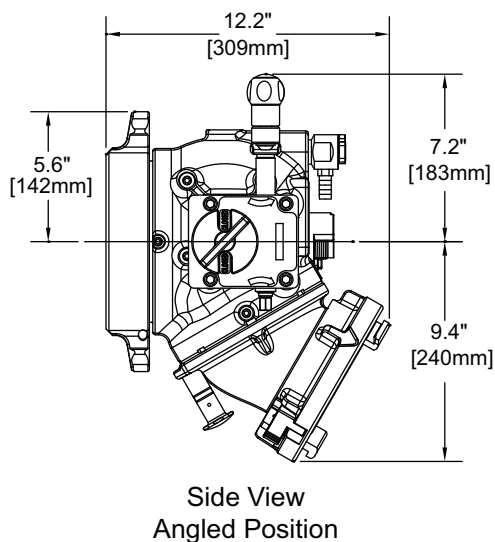
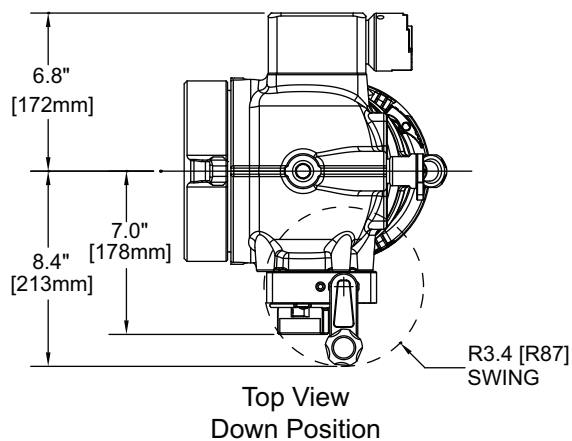
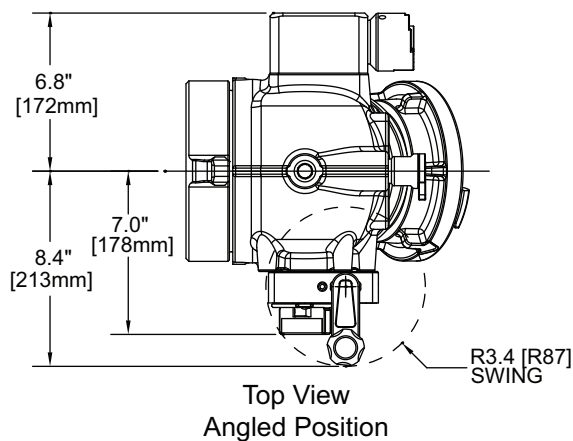
### 3.3 CORROSION

Aluminum parts are hard anodized. All castings are then powder coated inside and out to help prevent corrosion. Most hose couplings are attached using polymer bearing rings which provide electrical insulation to help prevent galvanic corrosion. The effects of corrosion can be minimized by good maintenance practice.

### 3.4 USE WITH SALT WATER

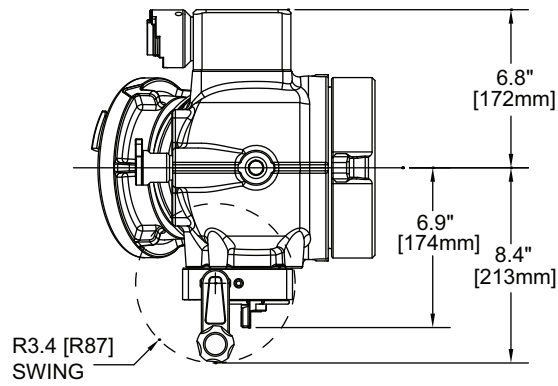
Use with salt water is permissible provided the equipment is thoroughly cleaned with fresh water after each use. The service life of the equipment may be shortened due to the effects of corrosion, and is not covered under warranty.

### 4.0 OVERALL DIMENSIONS

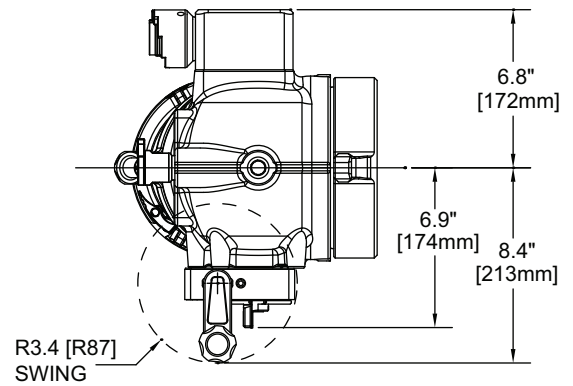


**AXD1ST-NX-T**  
Left Drive Jumbo Low Profile  
Ball Intake Valve  
Top Crank  
with Pressure Relief Valve  
Figure 4.0A

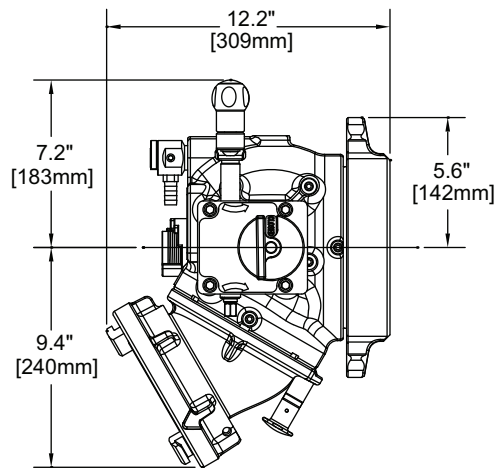




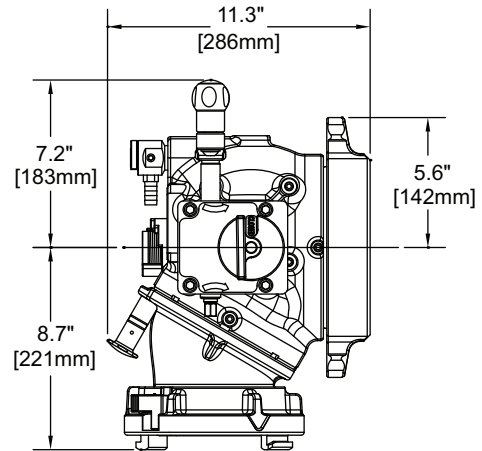
Top View  
Angled Position



Top View  
Down Position



Side View  
Angled Position

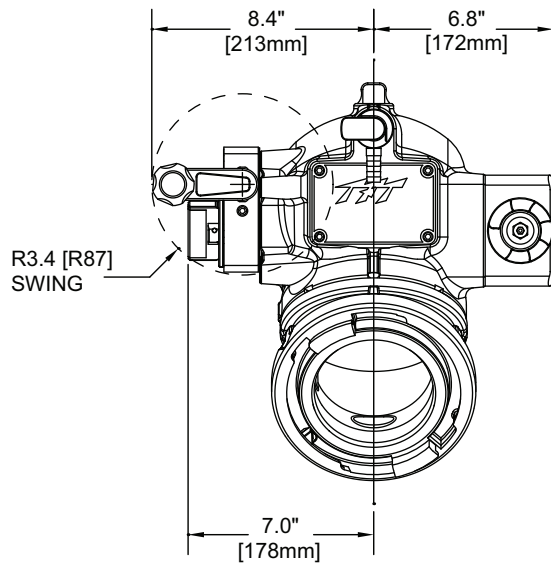


Side View  
Down Position

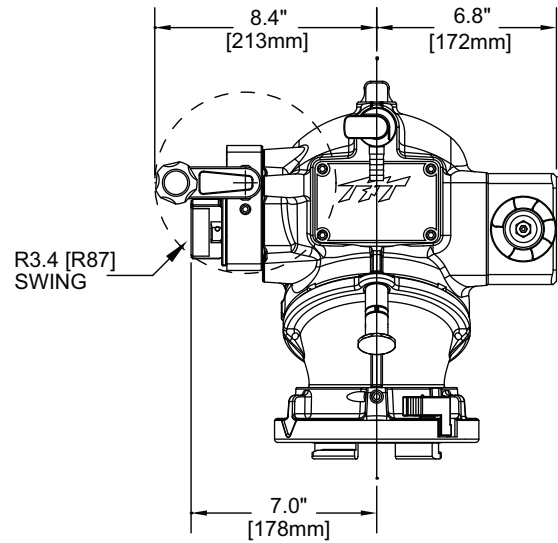
**AXE1ST-NX-T**  
Right Drive Jumbo Low Profile  
Ball Intake Valve  
Top Crank  
with Pressure Relief Valve

Figure 4.0B

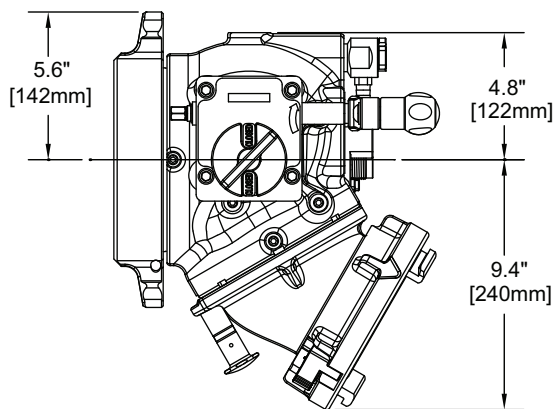




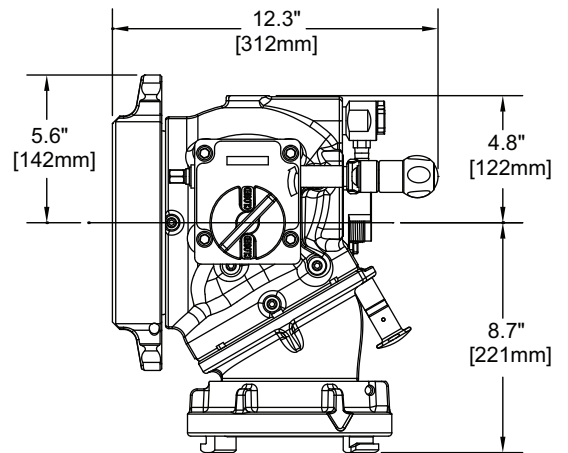
Front View  
Angled Position



Front View  
Down Position

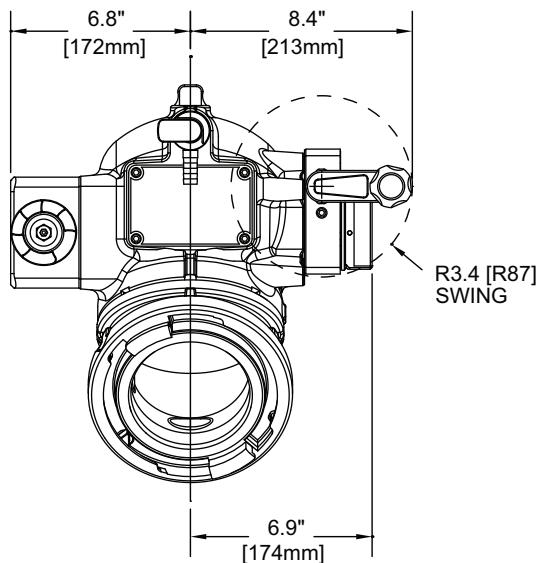


Side View  
Angled Position

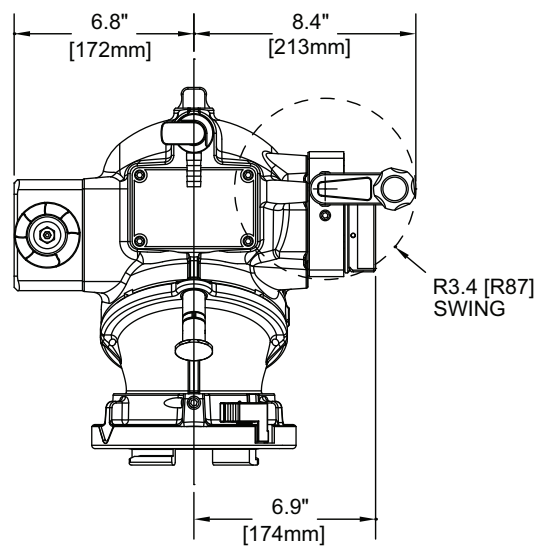


Side View  
Down Position

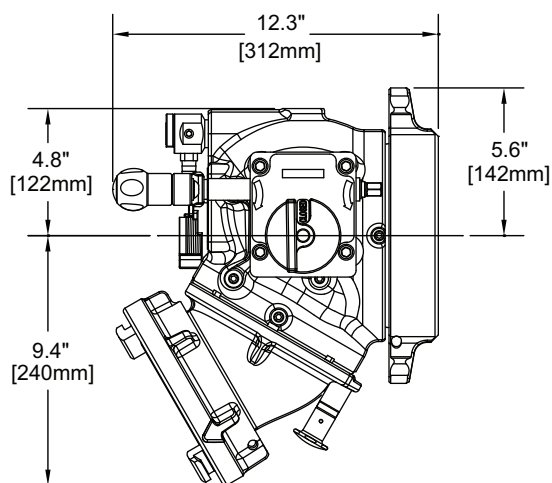
**AXD1ST-NX-F**  
Left Drive Jumbo Low Profile  
Ball Intake Valve  
Front Crank  
with Pressure Relief Valve  
Figure 4.0C



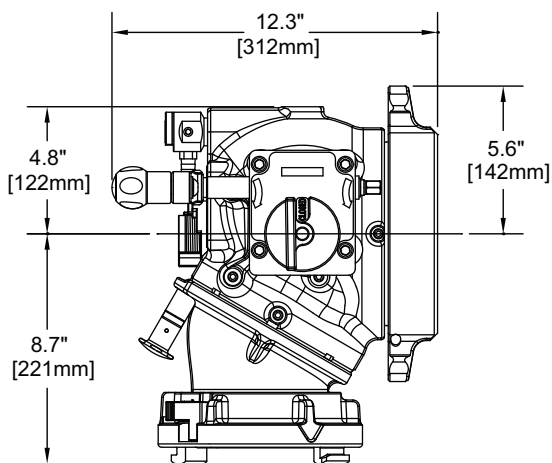
Front View  
Angled Position



Front View  
Down Position

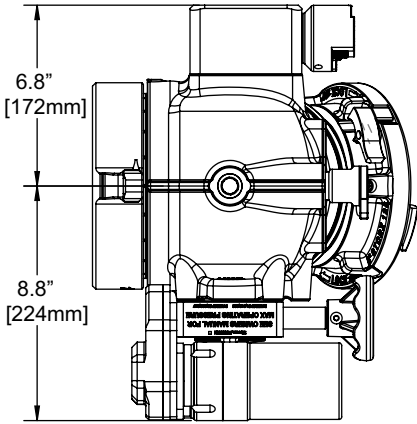


Side View  
Angled Position

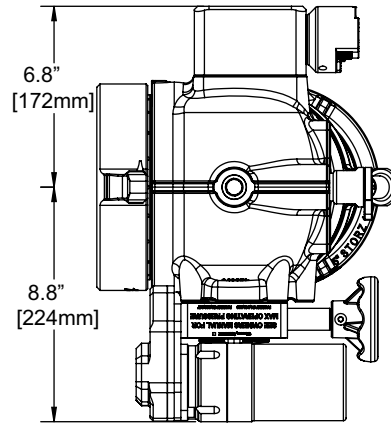


Side View  
Down Position

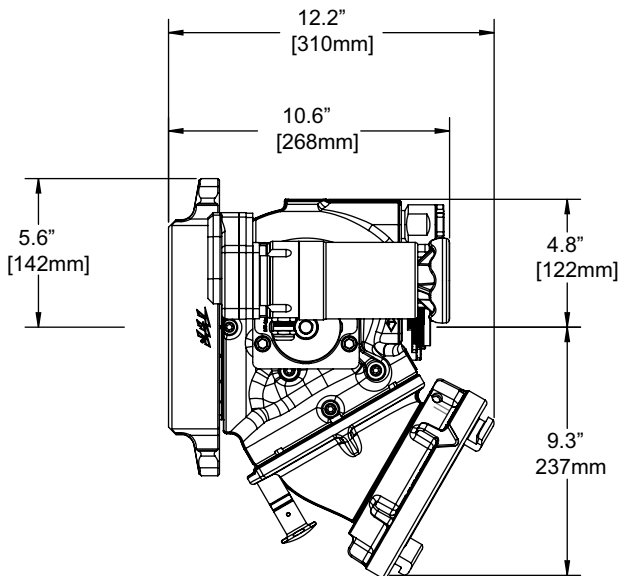
**AXE1ST-NX-F**  
Right Drive Jumbo Low Profile  
Ball Intake Valve  
Front Crank  
with Pressure Relief Valve  
Figure 4.0D



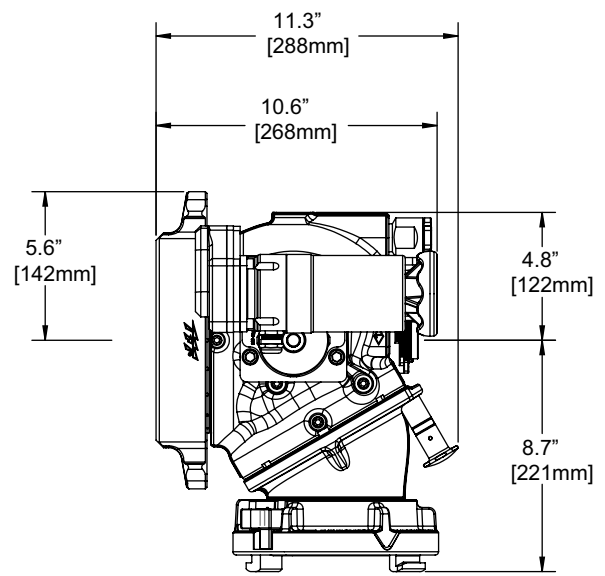
Top View  
Angled Position



Top View  
Down Position



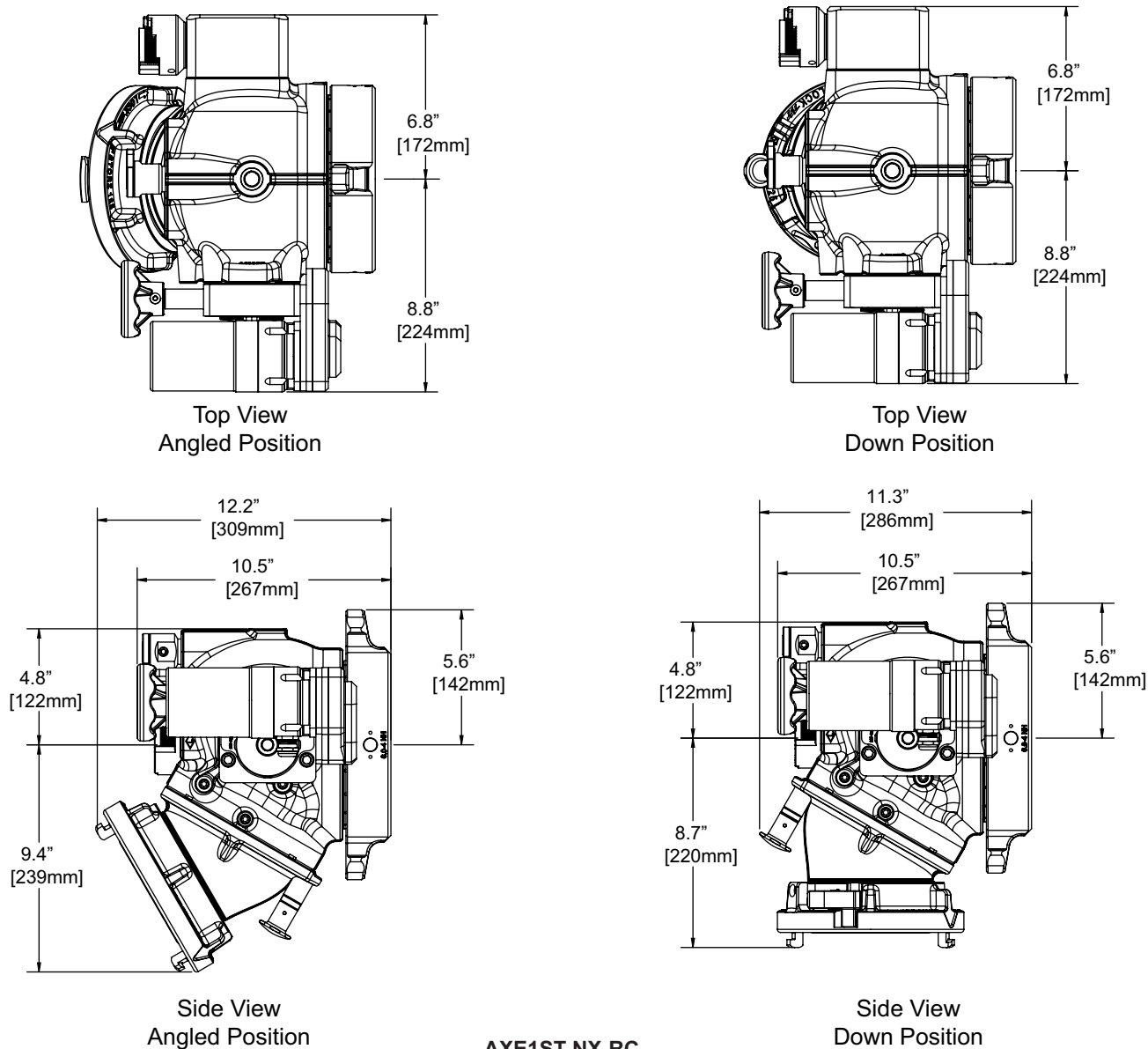
Side View  
Angled Position



Side View  
Down Position

**AXD1ST-NX-RC**  
Left Drive Jumbo Low Profile  
Ball Intake Valve  
Electrically Actuated  
with Pressure Relief Valve

Figure 4.0E



**AXE1ST-NX-RC**  
 Right Drive Jumbo Low Profile  
 Ball Intake Valve  
 Electrically Actuated  
 with Pressure Relief Valve

Figure 4.0F

## 5.0 INSTALLATION

### 5.1 MOUNTING THE APPLIANCE

Install the discharge side of the BIV to a pump manifold or fire water discharge port and tighten securely. The valve position indicator should be clearly visible, but does not need to be level.



**Mismatched or damaged waterway connections may cause equipment to leak or uncouple under pressure. Failure could result in injury. Equipment must be mated to matched connections.**



**Dissimilar metals coupled together can cause galvanic corrosion that can result in the inability to uncouple the connection, or complete loss of engagement over time. Failure could cause injury. Per NFPA 1930, if dissimilar metals are left coupled together, an anti-corrosive lubricant should be applied to the connection and the coupling should be disconnected and inspected at least quarterly.**

## 5.2 MOUNTING THE DISPLAY ENCLOSURE

Select proper location for display. A full size template is shown in 11.0 TEMPLATES.

## 5.3 ELECTRIC INSTALLATION AND WIRING



**WARNING** This device is not rated as ignition proof, explosion proof, or intrinsically safe. Use only in locations with adequate ventilation and no hazard of flammable vapor buildup.



**NOTICE** Red (+) and black (-) wires must be connected to a 12 or 24 VDC protected circuit from the truck's power distribution center.

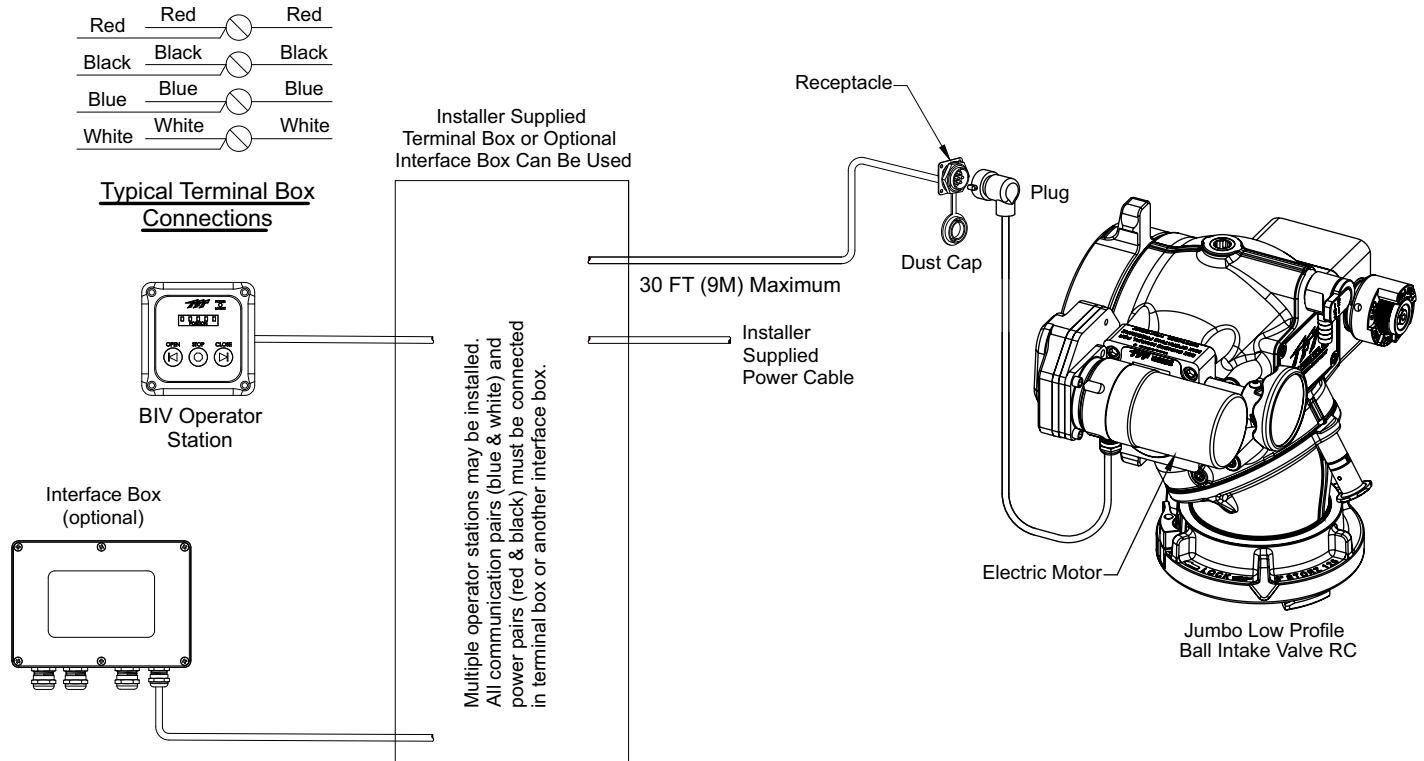


Figure 5.3



**NOTICE** Cable is gel filled to prevent moisture wicking into the enclosure. Gel is non-hazardous and should be wiped from conductors with a rag.



**NOTICE** To avoid excessive voltage drop at the valve motor, do not lengthen factory supplied receptacle cable. Power cable selection is critical. Voltage measured less than 10 volts at the valve motor while operating will produce erratic operation.

## 5.3.1 TESTING THE ELECTRICAL INSTALLATION

### VERIFY PROPER VOLTAGE

The TFT Ball Intake Valve RC has built in circuit protection to guard against a circumstance where the unit's movement is blocked before reaching its full travel limits. Without this circuitry the motor would stall, overheat, and could be permanently damaged.



**Inadequate voltage cause the valve to become damaged to the point of inability to properly open or close, resulting in inadequate water supply. Injury or death can occur. To reduce the risk of improper voltage:**

- Check wiring for proper gauge for the installed length, and for proper termination.
- Never lengthen factory supplied receptacle cable.
- Ensure that the power source supplying the BIV RC and the grounding are adequate (other electrical loads on a shared circuit with the BIV RC may cause a low-voltage situation).
- ALWAYS test for proper voltage after installation.

### VOLTAGE TEST

When mechanical installation and electrical connections are complete, perform the following test to verify voltage supply is adequate and the current limiting feature is functioning.

1. Apply power to Valve Control.
2. Press OPEN or CLOSE button and hold until valve reaches stop position. Continue to hold button down.
3. Once movement is stopped, manually turn override knob in opposite direction while continuing to hold button down. The override knob will only turn in one direction.
  - A. If knob can be turned, then voltage supply is adequate.
  - B. If knob can't be turned and motor continues to operate, the current limit was not reached because the voltage supply or wiring is not adequate.

### SET TRAVEL STOPS

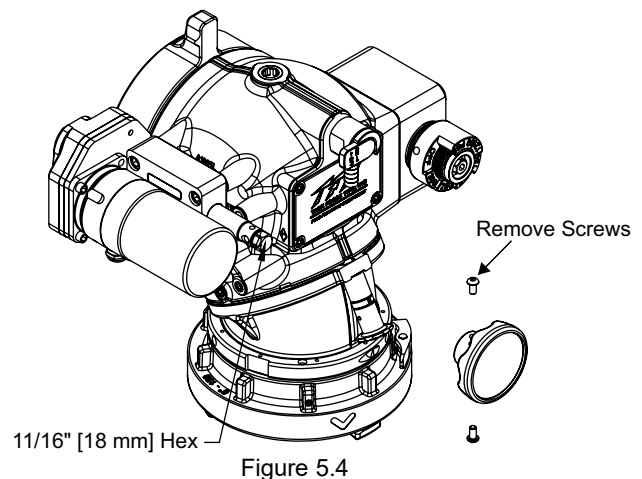
Once proper voltage is verified, perform the following to set the full travel limits:

1. Apply power to Valve Control.
2. Press CLOSE button and continue to hold until valve is fully closed. Motor must stop by current limit method.
  - A. If motor continues to operate, see proper voltage test above.
3. Press OPEN button and continue to hold until valve is fully open. Motor must stop by current limit method.
  - A. If motor continues to operate see proper voltage test above.
4. Position indicator lights will now track valve movement.

## 5.4 BIV RC MANUAL OVERRIDE

The Ball Intake Valve RC is motor driven but also has an override handwheel for operating the valve manually. The override handwheel may also be used in the event of power failure. If electrical power is supplied to the control panel, the LED valve position display will track the valve's position as the handwheel is moved. If the handwheel is moved while there is no power to the electric controls, the LED valve position display will be in error when the electric power is reconnected. The LED valve position indicator will self correct the first time the valve is cycled under electric control.

If more compactness is desired, the override handwheel may be removed. The drive shaft has a hex so a wrench or socket may be used for manual override. If the manual override handwheel is removed, assure that the correct size wrench or socket is available in the event of power failure.



## 5.5 CHANGING THE OFFSET OF THE CRANK HANDLE

When equipped with a crank handle, two offset positions are available to adjust the swing radius of the crank and knob. The longer offset position offers reduced effort to operate the valve. The shorter offset is available to avoid interference with other equipment on the apparatus.

To change the offset:

1. Remove two 1/4"-20 x 1/2" button head cap screws from the crank.
2. Place crank in desired position.
3. Apply blue Loctite thread locking compound to all screw threads, and replace screws.

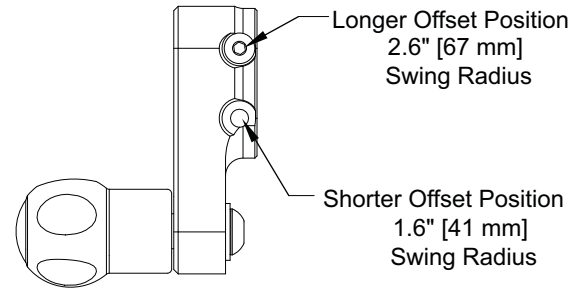


Figure 5.5

## 5.6 CHANGING COUPLING LOCK-OUT

To change a coupling **from rigid to full time swivel**, use a 7/32" hex driver to back out the lockout screw until the coupling moves freely.

To change a coupling **from full time swivel to rigid**:

1. Align the pull pin in the elbow to vertical.
2. Rotate the coupling until the lockout screw is aligned with the pull pin.
3. Use a 7/32" hex driver to tighten the lockout screw into the lockout divot in the elbow until it bottoms out, then back off 1/4-turn.  
A. Do not tighten the screw onto the polymer bearing strip.

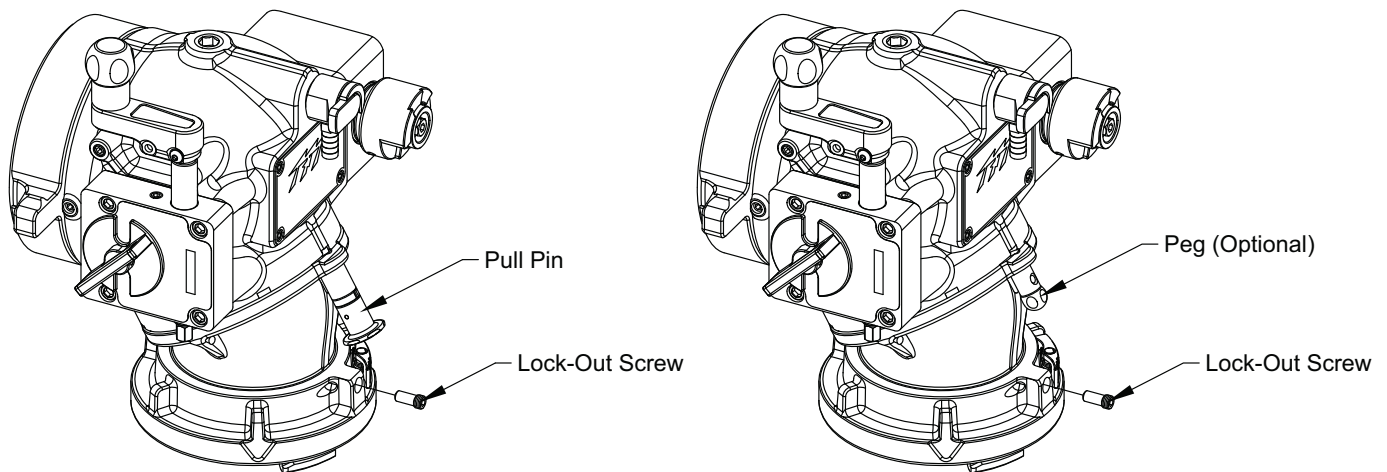


Figure 5.6

## 5.7 STORZ SUCTION GASKET REQUEST

If your application of this product requires drafting, you may need a suction gasket.

Please call 1-800-348-2686 to receive a free suction gasket by mail.

Part Numbers: 4" Storz- item #A4216-KIT, 5" Storz - item #A4221-KIT, 6" Storz - item #A4273



## 6.0 USE

### 6.1 ELBOW

The elbow swivels 360 degrees to help prevent hose kinks, and make connection of suction lines easier. The elbow can be turned forward or backward to help make connections in tight places if the water supply is in front of or behind the truck. To turn the elbow, pull the shot pin knob on top of the elbow. The elbow will lock into a detent every 45 degrees. There is a hole on the side of the elbow that can be used to attach the lanyard or chain of a cap by use of a key ring.

### 6.2 MANUAL VALVE OPERATION

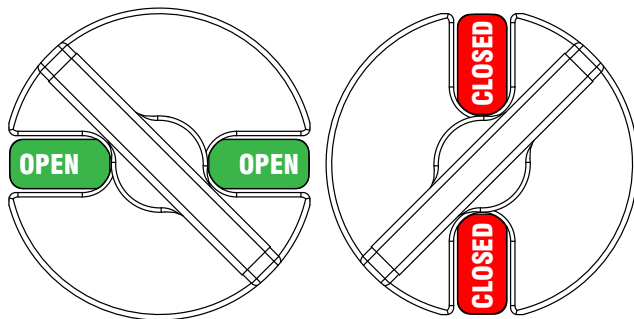
The valve is kept closed while the water supply from a hydrant or another pumper to the engine is being established. This prevents the pump from sucking air through the intake manifold and losing its prime. Once the supply hose is filled and under pressure, and the air has been vented from the hose, the valve may be opened to connect the pump to the water supply.

The valves covered by this manual utilize positive stops at the OPEN and CLOSED positions. Attempting to close a valve further than the positive stops will not result in a tighter seal between the ball and valve seat. All valves include markings to indicate the direction of handle rotation to open the valve.

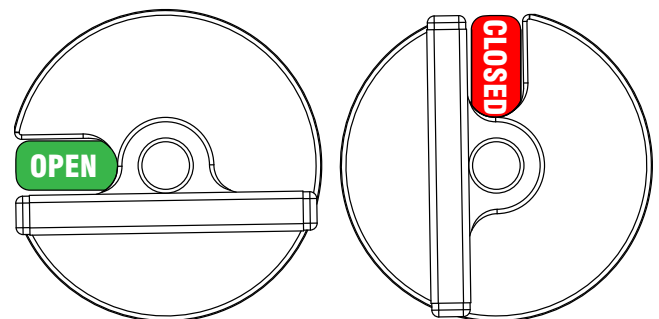
Valves with hand cranks include a valve position indicator. To open the valve, turn the hand crank until the valve position indicator shows OPEN. To close the valve, turn the hand crank the opposite way until the valve position indicator shows CLOSED.

#### NOTICE

Due to the orientation of the gearbox on some models, the direction to turn the crank to open and close the valve may be opposite of the traditional fire standard. In all cases, the position indicator will show the correct valve position.



AXD\* Finished Goods  
Valve Position Indicator



AXE\* Finished Goods  
Valve Position Indicator

Figure 6.2

#### NOTICE

Up to the maximum rated pressure, operating torque should never exceed the values in the table below. Requiring greater torque than listed to operate the valve is an indication that the valve requires maintenance.

- Exceeding 30 ft-lb / 41 N·m torque may damage the appliance.
- Kicking or standing on the valve controls is considered misuse of the appliance.

Valve Seat Bore Size		Maximum Acceptable Torque		Maximum Acceptable Force on Knob	
5.25"	133 mm	30 ft-lb	41 N·m	137 lb	62 kg

Table 6.2

#### NOTICE

For valves with worm drive gearboxes, exceeding 45 ft-lb will cause one side of the crank shaft to shear off. This is intentional to prevent further damage to the gearbox. If the shaft shears off, the valve can be operated temporarily using a wrench on the 1/2" hex on the opposite side of the crankshaft. For repair instructions, see section 8.3.3 CRANKSHAFT REPLACEMENT.

## 6.3 RC VALVE OPERATION

### Power LED:

- LED will be solid green when power is present

### Position Indicator:

- 5 LEDs indicate valve position. One for full close (red at far right), one for full open (green at far left), three yellow for 25%, 50%, and 75% open. Two LEDs will light when position is between two percentages.
- The position indicator will lose position if the manual override is used while the power is off. Position location is restored after the first cycle of electric operation.
- All 5 position LED's blinking indicates a fault with the motors encoder.

### Control Buttons:

#### Manual Mode

- When OPEN or CLOSE button is pressed, valve opens or closes until button is released.

#### Automatic Mode

- When OPEN or CLOSE button is momentarily pressed, valve opens or closes fully.
- During valve movement if STOP or the other direction is momentarily pressed the motor will stop.

#### Changing Modes (Unit is shipped from factory in the Auto Mode)

- Press CLOSE and STOP buttons together and hold for 3 seconds to change to Automatic Mode.
- Press OPEN and STOP buttons together and hold for 3 seconds to change to manual mode.

#### To Reverse Polarity (direction) of the Motor

- Press OPEN and CLOSE buttons together and hold for 15 seconds.

## 6.4 AIR VENT AND WATER DRAIN

### CAUTION

Loss of prime can interrupt water flow and cause injury or death. Always bleed out air with air vent/drain to prevent possible loss of prime.

This device is equipped with an air vent/drain on the front of the unit which will allow the air to escape from the valve when the hose is charged. The air vent/drain is opened by turning the knob counter-clockwise and closed by turning it clockwise.

There is a second plugged port on the top of the valve. To use a different port position, relocate the factory supplied Air Vent/Drain Valve or install an additional Air Vent/Drain Valve. If the Air Vent/Drain Valve is being relocated, use a  $\frac{3}{4}$ " NPT plug to seal the empty port.

## 6.5 PRESSURE RELIEF VALVE (PRV)

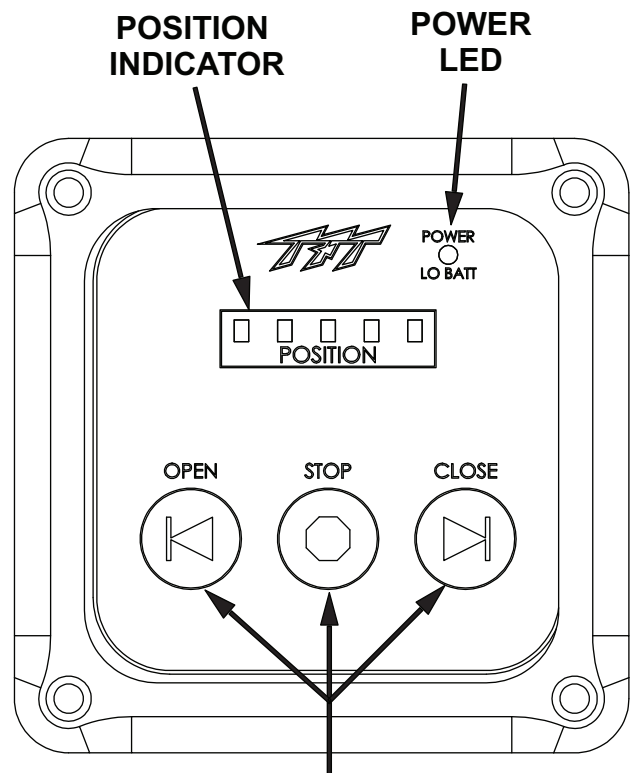
### WARNING

The Pressure Relief Valve is disabled in the OFF position and offers no system protection against over-pressurization. Avoid water hammer or other pressure spikes during pump tests. Ensure PRV is returned to its normal pressure setting following pump testing.

LDH valved appliances may be equipped with a pressure relief valve that can be set to any pressure between 90 and 300 psi. Its function is to protect the pump and supply hose from excess pressure.

An optional threaded outlet is available for connecting a hose to discharge opening to direct water away from valve. Contact the factory to order.

See LIA-202 Pressure Relief Valve Instructions for Safe Operation and Maintenance.



CONTROL BUTTONS

Figure 6.3

### 6.5.1 RELIEF VALVE PRESSURE SETTING

To set the relief valve pressure turn the adjusting screw on the relief valve housing until the surface of the screw is even with the desired pressure. A 9/16" (14 mm) socket or a 1/4" hex key may be used to turn the adjusting screw. The Pressure relief valve should not be disabled (IE: capped, plugged, or set to the OFF position) for normal service conditions. Disabling the relief valve may result in system damage or hose rupture if the system exceeds operating limits. The pressure relief valve meets the requirements of NFPA 1900.

Adjusting Screw

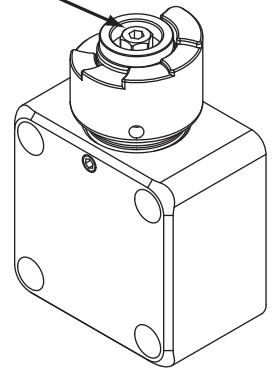


Figure 6.5.1

### 6.6 PRESSURE LOSS

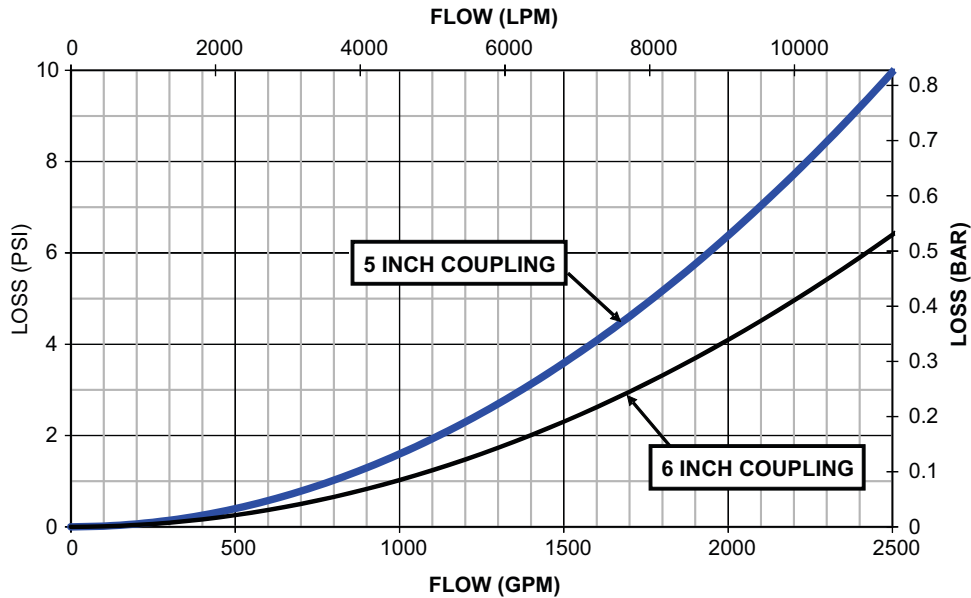


Figure 6.6

### 6.7 SUCTION SCREEN

This device may be equipped with a suction screen to catch debris larger than 3/8" diameter in the waterway. See the chart to determine additional loss caused by the screen. To add or replace a suction screen, order TFT part #A1410-KIT.

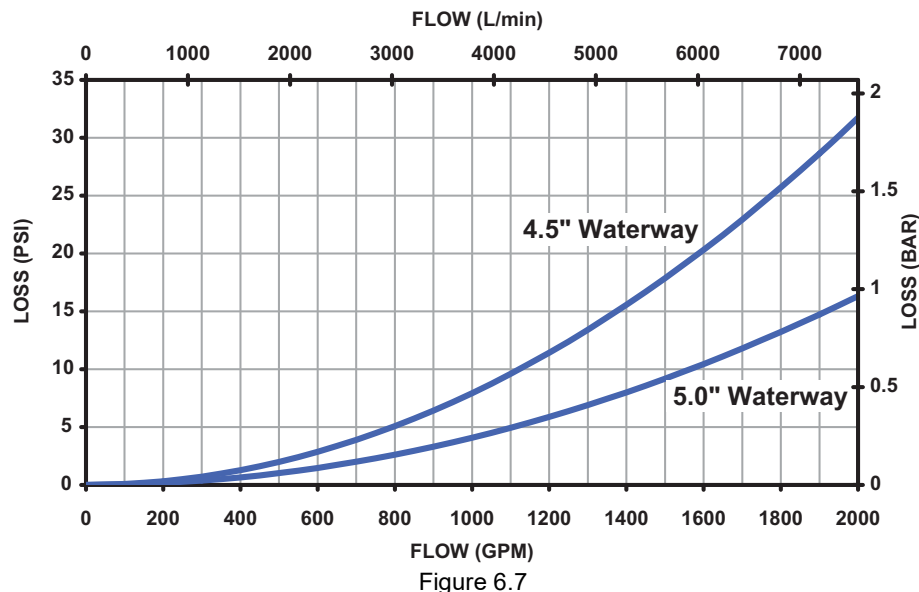


Figure 6.7

## 7.0 WARRANTY

Go to [tft.com](http://tft.com) for warranty information.

## 8.0 MAINTENANCE

TFT products are designed and manufactured to be damage resistant and require minimal maintenance. However, as the primary firefighting tool upon which your life depends, it should be treated accordingly. The unit should be kept clean and free of dirt by rinsing with water after each use. Any inoperable or damaged parts should be repaired or replaced before placing the unit in service. To help prevent mechanical damage, do not drop or throw equipment.

In applications where appliances are left continuously connected to the apparatus or other devices or are used where water is trapped inside the appliance, the appliance must be flushed with fresh water following each use and inspected for damage.

This appliance should be disconnected, cleaned and visually inspected inside and out at least quarterly, or as water quality and use may require. Moving parts such as handles, valve ball and couplings should be checked for smooth and free operation. Seals shall be greased as needed with Silicone based grease such as Molykote 112. Any scrapes that expose bare aluminum should be cleaned and touched up with enamel paint such as Rust-Oleum. Replace any missing or damaged parts before returning to service.

Any equipment taken out of service due to failure should be returned to the factory for repair or replacement. If you have any questions regarding the testing or maintenance of your valve, please call Task Force Tips at 800-348-2686.

## 8.1 TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	REMEDY
Leaks	Debris or damage in seal area	Clean out debris and/or replace damaged parts
Binding, Erratic Operation	Low voltage (see below)	See Below
Power LED on but no operation	Low voltage due to: <ul style="list-style-type: none"><li>• wire gauge too small</li><li>• wire length too long</li><li>• poor connection</li><li>• inadequate apparatus electrical system</li></ul>	Check connections and wiring See Section 5.3.1 on page 14.
LED D6 on motor board blinks rapidly when button is pressed	Loose encoder connection	Replace motor subassembly
	Bad motor encoder	Replace motor subassembly
No power LED	Polarity reversed or poor connection	Check wiring and correct polarity
OPEN & CLOSE LED blink every 4 seconds	No communication with Valve Motor	Check Blue and White communication wiring

Table 8.1

## 8.2 SERVICE TESTING

In accordance with NFPA 1930, equipment must be tested a minimum of annually. Units failing any part of this test must be removed from service, repaired and retested upon completion of the repair.

## 8.3 REPAIR

Factory service is available. Factory serviced equipment is repaired by experienced technicians, wet tested to original specifications, and promptly returned. Call TFT service department at 1-800-348-2686 to troubleshoot and, if needed, directions for return. A return for service form can also be obtained at [tft.com/Support/Returning-an-Item-for-Service](http://tft.com/Support/Returning-an-Item-for-Service).

Repair parts and service procedures are available for those wishing to perform their own repairs. Task Force Tips assumes no liability for damage to equipment or injury to personnel that is a result of user service. Contact the factory or visit the web site at [tft.com](http://tft.com) for parts lists, exploded views, test procedures and troubleshooting guides.

Performance tests shall be conducted on the equipment after a repair, or anytime a problem is reported to verify operation in accordance with TFT test procedures. Consult factory for the procedure that corresponds to the model and serial number of the equipment. Any equipment which fails the related test criteria should be removed from service immediately. Troubleshooting guides are available with each test procedure or equipment can be returned to the factory for service and testing.



**It is the responsibility of service technicians to ensure the use of appropriate protective clothing and equipment. The chosen protective clothing and equipment must provide protection from potential hazards users may encounter while servicing equipment. Requirements for protective clothing and equipment are determined by the Authority Having Jurisdiction (AHJ).**



**Any alterations to the product or its markings could diminish safety and constitutes a misuse of this product.**



**All replacement parts must be obtained from the manufacturer to assure proper performance and operation of the device.**

## 8.4 CRANKSHAFT OVERRIDE AND REPLACEMENT

The crankshaft includes an intentional shear joint to protect the gear train from overload, costly repairs, and loss of service. The magnitude of torque required to shear the crankshaft is several times greater than the torque typically needed to operate the valve at maximum operating pressure. If the crankshaft breaks during use, this is an indication that either there is something obstructing the half ball internally, or the crank shaft has been abused (e.g. used as a step for climbing).

### 8.4.1 EMERGENCY CRANKSHAFT OVERRIDE

In an emergency, the opposite side of the crankshaft can be turned using a 1/2" wrench or hex socket. This allows the valve to be open or closed until the crankshaft is replaced. To prevent loss of the 1/8" square key on the crankshaft, do not allow the crankshaft to slide out of gearbox until a replacement crankshaft is on hand. It is important not to rely on the emergency override as a long-term method of operation.

### 8.4.2 DIAGNOSING CRANKSHAFT FAILURE

To determine the cause of a crankshaft to failure, complete the following steps:

1. Close upstream water supply. If possible, relieve pressure leading up to valve.
2. Locate 1/2" hex where crankshaft protrudes from opposite side of gearbox.
3. Gently turn crank shaft away from travel stop using a 1/2" hex wrench. Do not attempt to shock crankshaft free and do not exceed 50 ft-lb (68 Nm) of torque.
4. **If crankshaft will not rotate**, half ball is likely obstructed. Only after relieving pressure on flanged joint, unbolt valve. Clear any obstructions and evaluate whether repair is needed before returning to service.
5. **If crankshaft is able to rotate**, cycle the valve several times from open to closed to determine whether the crankshaft binds at any place between the travel stops. If crankshaft binds, consult Task Force Tips Service Department to determine the appropriate repairs.
6. **If crankshaft rotates freely after clearing any obstructions**, a replacement crank shaft may be ordered from Task Force Tips and replaced as described below.

### 8.4.3 CRANKSHAFT REPLACEMENT

A broken crankshaft can be replaced at any time by completing the following steps, regardless of whether or not the upstream water supply is pressurized. Referring to item numbers shown in the exploded view available at [TFT.com/serial-number](http://TFT.com/serial-number), follow the steps below:

1. Remove external retaining ring (item 118) adjacent to 1/2" hex on crankshaft. Do not over-expand the retaining ring.
2. Using a punch or Phillips head screwdriver at least 6" in length, gently push on dimple in 1/2" hex end of crankshaft (item 131). Continue to push crankshaft through until it protrudes from opposite side of gearbox.
3. Grab broken end of crankshaft and pull out of gearbox. As crankshaft is withdrawn, grasp small key (item 119) on shaft so it does not get lost.
  - B. If 1/8" square x 1" long key is not visible in shaft, it has likely fallen into gearbox bore and must be removed before installing new crankshaft. If square key is visible in gearbox bore, slide it out of bore. Needle-nose pliers may be helpful depending on position of key in bore.
4. Verify polymer bushings (item 117 and 120) are still seated in bores on each side of gearbox. If not, locate and reinstall bushings.
5. Look through gearbox bore and note approximate orientation of square keyway in worm (item 115). Verify round notch in thrust washer (item 116) is aligned with square keyway in worm.
6. Prepare new crankshaft by applying small dab of grease to keyway and seating 1/8" square x 1" long key into keyway. Grease will keep key in place during assembly.
7. Slide shaft into gearbox with key orientation the same as keyway in worm.
8. Rotate shaft slightly in alternating directions until key finds keyway, then push shaft in until it stops. Retaining ring groove and 1/2" hex should be protruding through opposite side of gearbox.
  - A. If hex is not visible, it may be necessary to slide polymer bushing back into gearbox bore.
9. Install retaining ring (item 118) onto shaft. Do not over-expand the retaining ring.

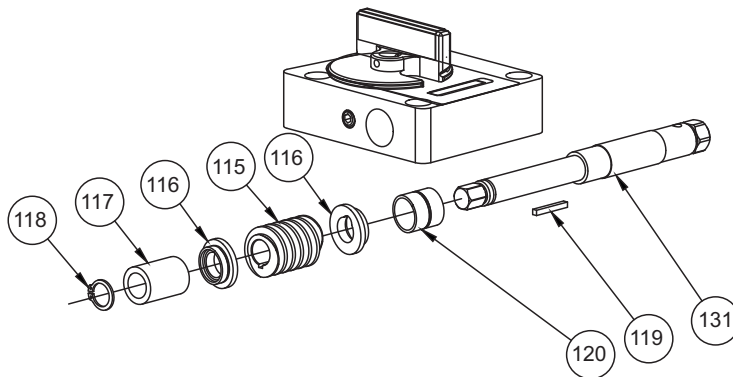


Figure 8.4.3

## 9.0 EXPLODED VIEW AND PARTS LISTS

Exploded views and part lists are available at [tft.com/serial-number](http://tft.com/serial-number).

## 10.0 OPERATION AND INSPECTION CHECKLIST

**BEFORE EACH USE**, equipment must be inspected to this checklist:

1. All valves open and close fully and smoothly.
2. Waterway is clear of obstructions.
3. There is no damage to any thread or other connection.
4. All locks and hold-down devices work properly.
5. The pressure setting on the relief valve (if so equipped) is set correctly.
6. Gaskets are in good condition.
7. There is no obvious damage such as missing, broken or loose parts.
8. There is no damage to the appliance (e.g. dents, cracks, corrosion, or other defects that could impair operation).
9. All swiveling elements rotate freely.
10. There is no corrosion on any surface.
11. There are no missing, worn out or broken lugs on couplings.
12. Hose is securely attached.

**BEFORE BEING PLACED BACK IN SERVICE**, equipment must be inspected to this list:

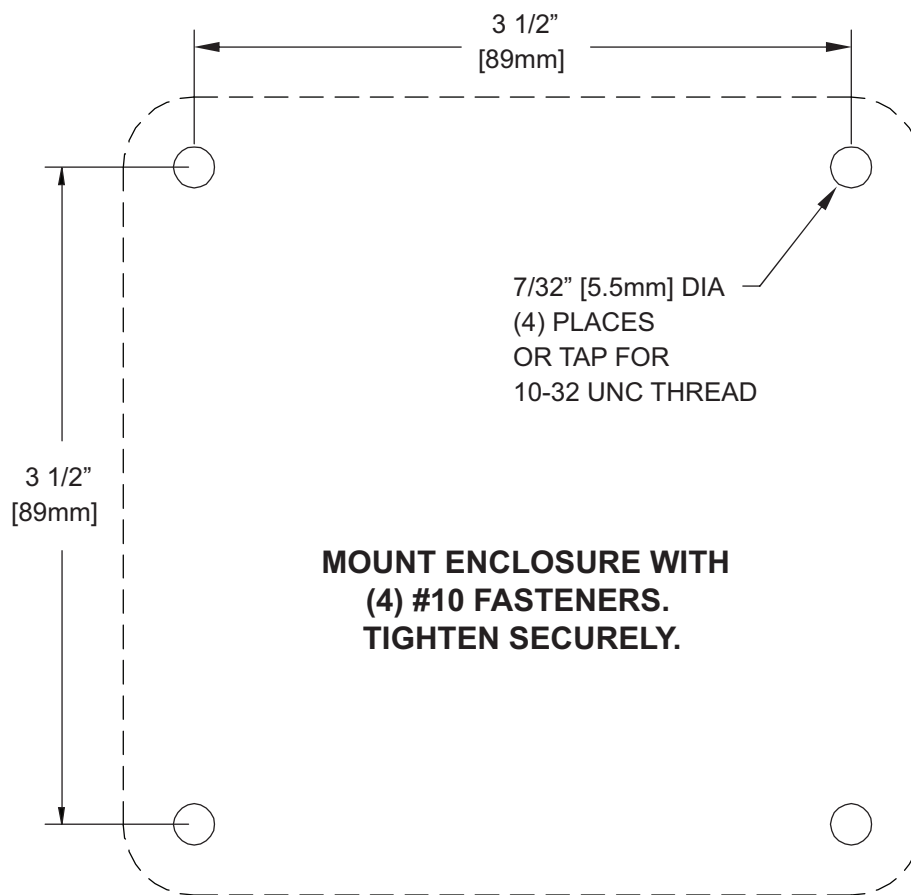
1. All valves open and close smoothly and fully.
2. The waterway is clear of obstructions.
3. There is no damage to any thread or other type connection.
4. The pressure setting on the relief valve (if so equipped) is set correctly.
5. All locks and hold-down devices work properly.
6. Internal gaskets are in good condition
7. There is no damage to the appliance (e.g., dents, cracks, corrosion, or other defects that could impair operation).
8. All swiveling connections rotate freely.
9. There are no missing parts or components.
10. The marking for maximum operating pressure is visible.
11. There are no missing, broken, or worn lugs on couplings.



**Equipment failing any part of the checklist is unsafe for use and must have the problem corrected before use or being placed back into service. Operating equipment that has failed the checklist is a misuse of this equipment.**

## 11.0 TEMPLATE

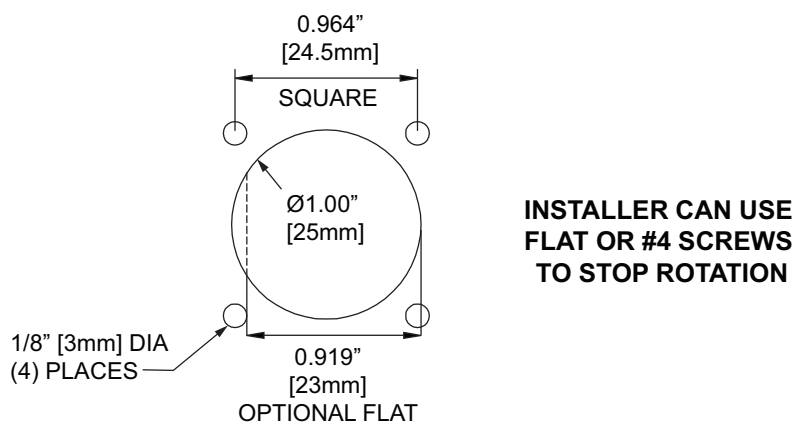
### 11.1 DISPLAY ENCLOSURE



HOLE LOCATIONS FOR BIV RC POSITION DISPLAY

Figure 11.1

### 11.2 QUICK CONNECT PLUG



HOLE LOCATIONS FOR QUICK CONNECT PLUG

Figure 11.2