



# EF1™ RC MONITOR

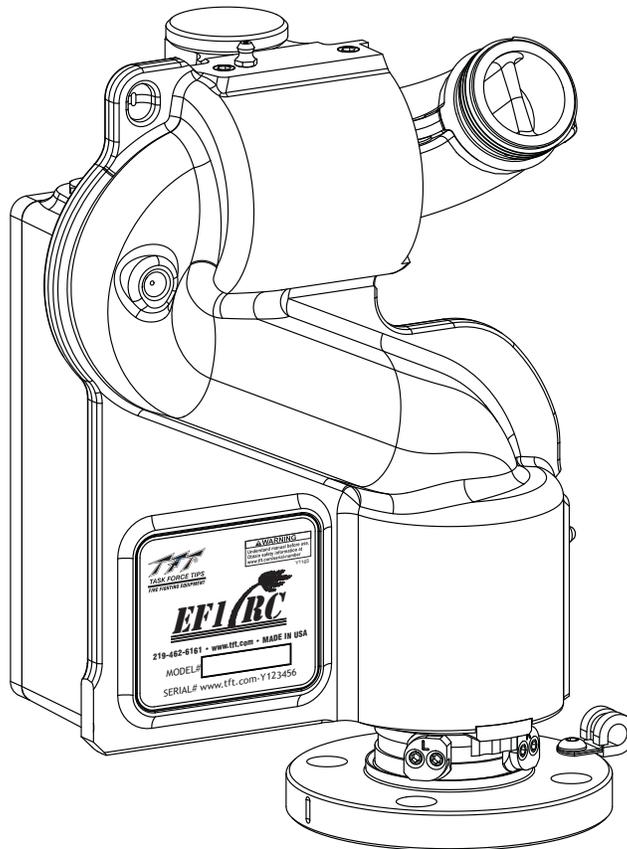
## INSTRUCTION FOR INSTALLATION, OPERATION, AND MAINTENANCE

### **⚠ 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.



[See section 3.2](#) for Flow/Pressure Operations Envelope

**TASK FORCE TIPS LLC**  
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# 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.

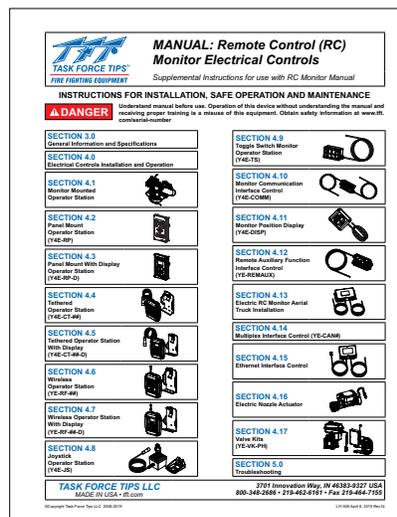
Fire and Emergency Manufacturers and Service Association, Inc.  
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### SUPPORTING MATERIALS

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



LIY-500 - Remote Control (RC) Monitor Electrical Controls

## TABLE OF CONTENTS

- 1.0 MEANING OF SAFETY SIGNAL WORDS
- 2.0 SAFETY
- 3.0 GENERAL INFORMATION
  - 3.1 SPECIFICATIONS
  - 3.2 OPERATING ENVELOPE
  - 3.3 USE WITH SALT WATER
  - 3.4 VARIOUS MODELS AND TERMS
  - 3.5 INLETS AND OUTLETS
    - 3.5.1 STANDARD CONNECTIONS
      - 3.5.1.1 ADDITIONAL HEIGHT FOR STANDARD CONNECTIONS
    - 3.5.2 QUICK CONNECT
      - 3.5.2.1 ADDITIONAL HEIGHT FOR QUICK CONNECT
  - 3.6 OVERALL DIMENSIONS
- 4.0 INSTALLATION
  - 4.1 ELECTRICAL INSTALLATION
  - 4.2 STRUCTURAL REQUIREMENTS
  - 4.3 TRAVEL RANGES
  - 4.4 TRAVEL STOPS
  - 4.5 QUICK CONNECT INSTALLATION
  - 4.6 NOZZLE INSTALLATION
  - 4.7 PRESSURE GAUGE PORT
  - 4.8 DRAINING RESIDUAL WATER
- 5.0 OPERATING INSTRUCTIONS
  - 5.1 RECOMMENDED PARK POSITION
  - 5.2 OVERRIDE HEX DRIVE
- 6.0 FLOW CHARACTERISTICS
  - 6.1 STACKED TIPS FLOW AND REACTION FORCE
  - 6.2 PRESSURE LOSS
- 7.0 WARRANTY
- 8.0 MAINTENANCE
  - 8.1 SERVICE TESTING
  - 8.2 LUBRICATION
  - 8.3 TROUBLE SHOOTING
  - 8.4 REPAIR
- 9.0 EXPLODED VIEWS AND PARTS LISTS
- 10.0 OPERATION AND INSPECTION CHECKLIST

## 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. See flow graphs.



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.



Injury or damage can occur from an inadequately supported monitor. The mounting must be capable of supporting the nozzle reaction force.



The stream exiting a nozzle is very powerful and capable of causing injury and property damage. Make sure the nozzle is securely attached and pointing in a safe direction before water is turned on. Do not direct water stream to cause injury or damage to persons or property.



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.



On many vehicle installations, the monitor is the highest point on the apparatus. Damage or injury could occur if there is not sufficient clearance to safely pass under doors or overhead obstructions. Always check stowed position of the monitor before moving.



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



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

### 3.0 GENERAL INFORMATION

The EF1 RC monitor is extremely compact, yet has a large 1-½ inch waterway, capable of flowing up to 200 gpm, making it the ideal forestry bumper turret. Waterway with turning vane has only 15 psi (1.3 bar) friction loss at 200 gpm (760 l/min). Elevation range is 90° above horizontal to 45° below. Horizontal travel is 270° (135° either side of a center position). Field changeable horizontal travel stops are factory set to give 180° (90° either side of a center position). Designed for 12 VDC or 24 VDC operation, selection is automatic. The motor control circuits use position encoders and current limiting to protect the drive train at the ends of travel. Unit has waterproof factory installed plug on power wire for easy removal or reinstallation. Electric drives and control box are waterproof. Main waterway made from hardcoat anodized ANSI 356-T6 aluminum. Silver powder coat finish. Various inlets are available.

### 3.1 SPECIFICATIONS

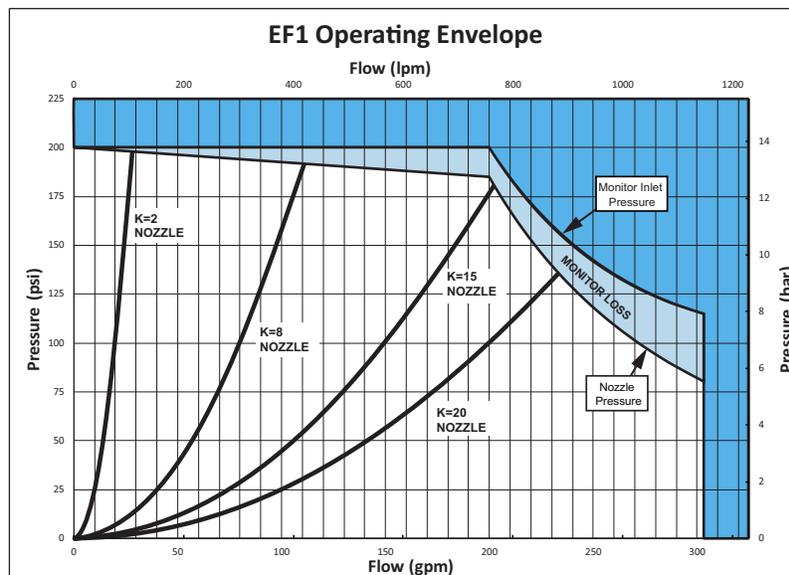
	US	METRIC
<b>Weight</b>	14.2 lbs	6.5 kg
<b>Minimum Flow Area (1.5" Inlet)</b>	1.77 in <sup>2</sup>	11.4 cm <sup>2</sup>
<b>Minimum Flow Area (2.0" Inlet)</b>	3.14 in <sup>2</sup>	20.3 cm <sup>2</sup>
<b>Maximum Flow</b>	200 gpm	760 L/min
<b>Maximum Operating Pressure</b>	200 psi	14 bar
<b>Nominal Operating Voltage</b>	12 or 24 VDC (auto sense)	
<b>Voltage Range (at the monitor, motors running)</b>	12 Volt System 9 VDC minimum 32 VDC maximum	
	24 Volt System 18 VDC minimum 32 VDC maximum	
<b>Operating Temperature Range of Fluid</b>	33°F to +120°F / 1°C to +50°C	
<b>Storage Temperature Range</b>	-40 to 150°F / -40 to 65°C	
<b>Maximum Torque (Elevation)</b>	26 ft·lbs	35 N·m
<b>Maximum Torque (Horizontal)</b>	26 ft·lbs	35 N·m
<b>Speed (Elevation)</b>	33 deg/sec	
<b>Speed (Horizontal)</b>	33 deg/sec	
<b>Materials</b>	ANSI A356.0-T6 Aluminum, Stainless	

Table 3.1

### 3.2 OPERATING ENVELOPE



**Damage or injury could result from operating the monitor beyond the safe operating envelope. Do not operate the monitor outside the envelope in the following graph(s).**



Nozzle A flows 20 gpm (80 l/min), at 100 psi (6 bar), K factor = 2  
 Nozzle B flows 80 gpm (300 l/min), at 100 PSI (6.9 bar), K factor = 8  
 Nozzle C flows 150 gpm (570 l/min), at 100 PSI (6.9 bar), K factor = 15  
 Nozzle D flows 200 gpm (760 l/min), at 100 PSI (6.9 bar), K factor = 20

Figure 3.2

### 3.3 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.

### 3.4 VARIOUS MODELS AND TERMS

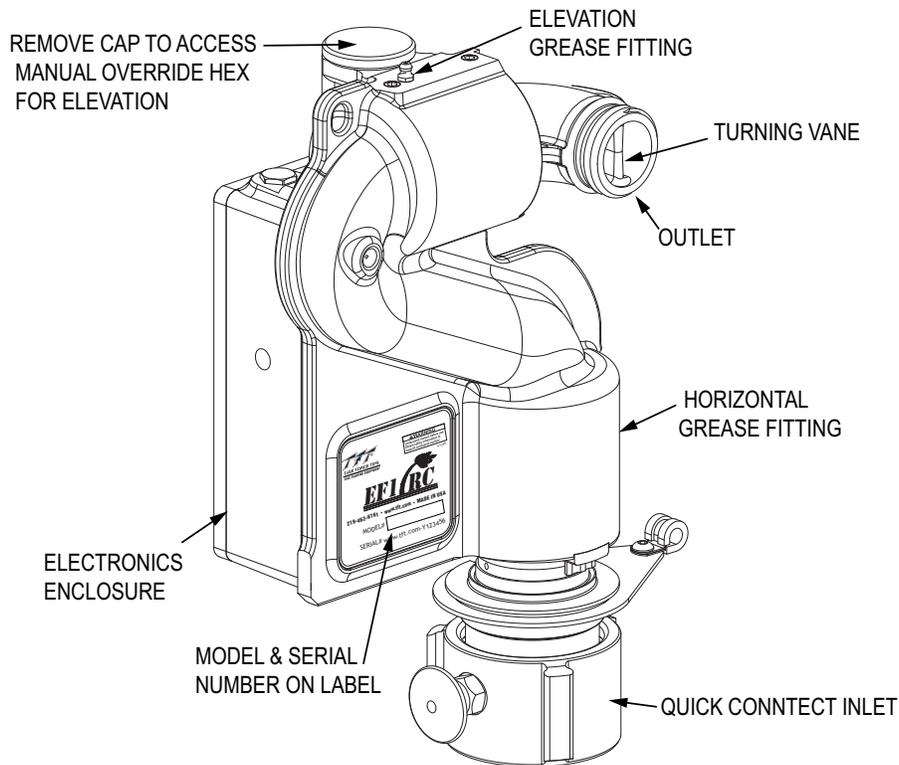
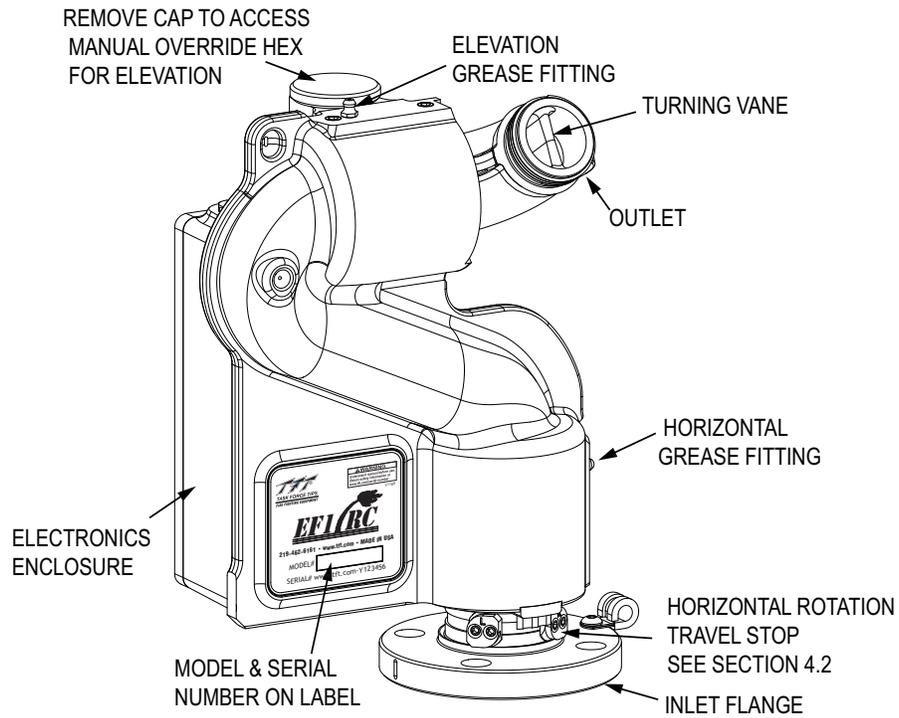


Figure 3.4A

### 3.5 INLETS AND OUTLETS

There are a wide variety of inlet and outlet options for the EF1 RC monitor. The overall height and weight of the monitor may differ slightly based on the inlet and outlet configuration.

Available inlets and outlets are shown below and should be specified at time of order.

#### 3.5.1 STANDARD CONNECTIONS

**NOTICE**

All flanged inlets include female 1.5" NPTF thread. The flange bolt circle may be used for structural mounting of the monitor when using hose or pipe to supply fluid to the NPT connection.

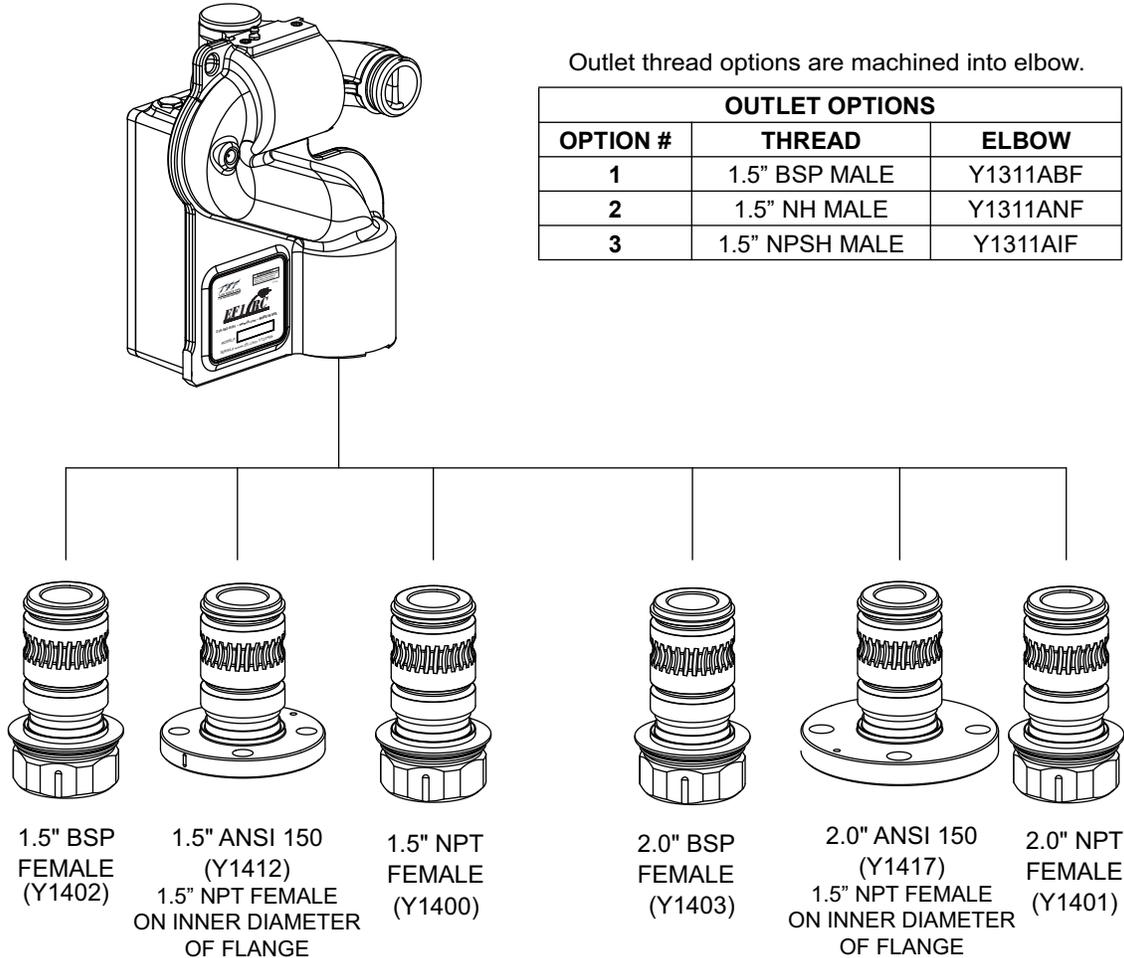


Figure 3.5.1

#### 3.5.1.1 ADDITIONAL HEIGHT FOR STANDARD CONNECTIONS

OPTION #	INLET OPTION FLANGE	ADDITIONAL OVERALL HEIGHT	
2	1.5" BSP FEMALE (Y1402)	2.70 in	69 mm
3	1.5" ANSI 150 (Y1412)	1.70 in	43 mm
4	1.5" NPT FEMALE (Y1400)	2.70 in	69 mm
6	2.0" BSP FEMALE (Y1403)	2.70 in	69 mm
7	2.0" ANSI 150 (Y1417)	1.80 in	45 mm
8	2.0" NPT FEMALE (Y1401)	2.70 in	69 mm

Table 3.5.1.1

### 3.5.2 QUICK CONNECT

Available inlets and outlets are shown below and should be specified at time of order.

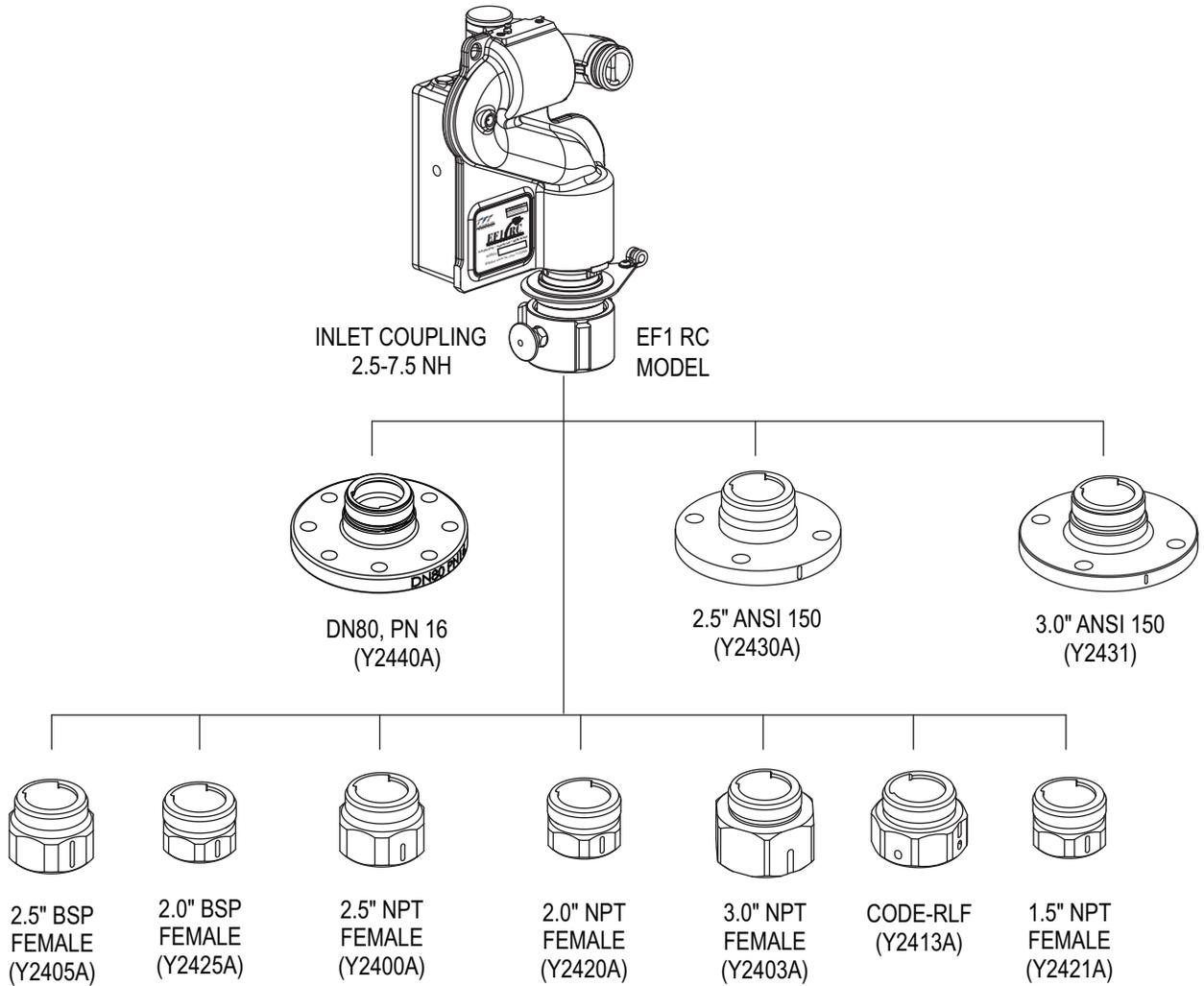


Figure 3.5.2

#### 3.5.2.1 ADDITIONAL HEIGHT FOR QUICK CONNECT

OPTION #	INLET OPTION QUICK CONNECT	ADDITIONAL OVERALL HEIGHT	
<b>B</b>	DN80, PN16	2.00 in	51mm
<b>C</b>	2.5" ANSI 150	2.00 in	51mm
<b>G</b>	3.0" ANSI 150	2.10 in	53mm
<b>9</b>	2.5" - 7.5 NH FEMALE (no inlet fitting)	0.00 in	0mm
<b>0</b>	2.5" - 11 BSPT FEMALE	2.00 in	51mm
<b>A</b>	2.0" - 11 BSPT FEMALE	1.50 in	38mm
<b>D</b>	2.5" - 8 NPT FEMALE	2.00 in	51mm
<b>E</b>	2.0" - 11.5 NPT FEMALE	1.50 in	38mm
<b>F</b>	3.0" - 8 NPT FEMALE	2.44 in	62mm
<b>H</b>	TFT CODE-RLF (fits Extend-A-Gun RC3)	2.00 in	51mm
<b>J</b>	1.5" - 11.5 NPT FEMALE	1.50 in	38mm

Table 3.5.2.1

### 3.6 OVERALL DIMENSIONS

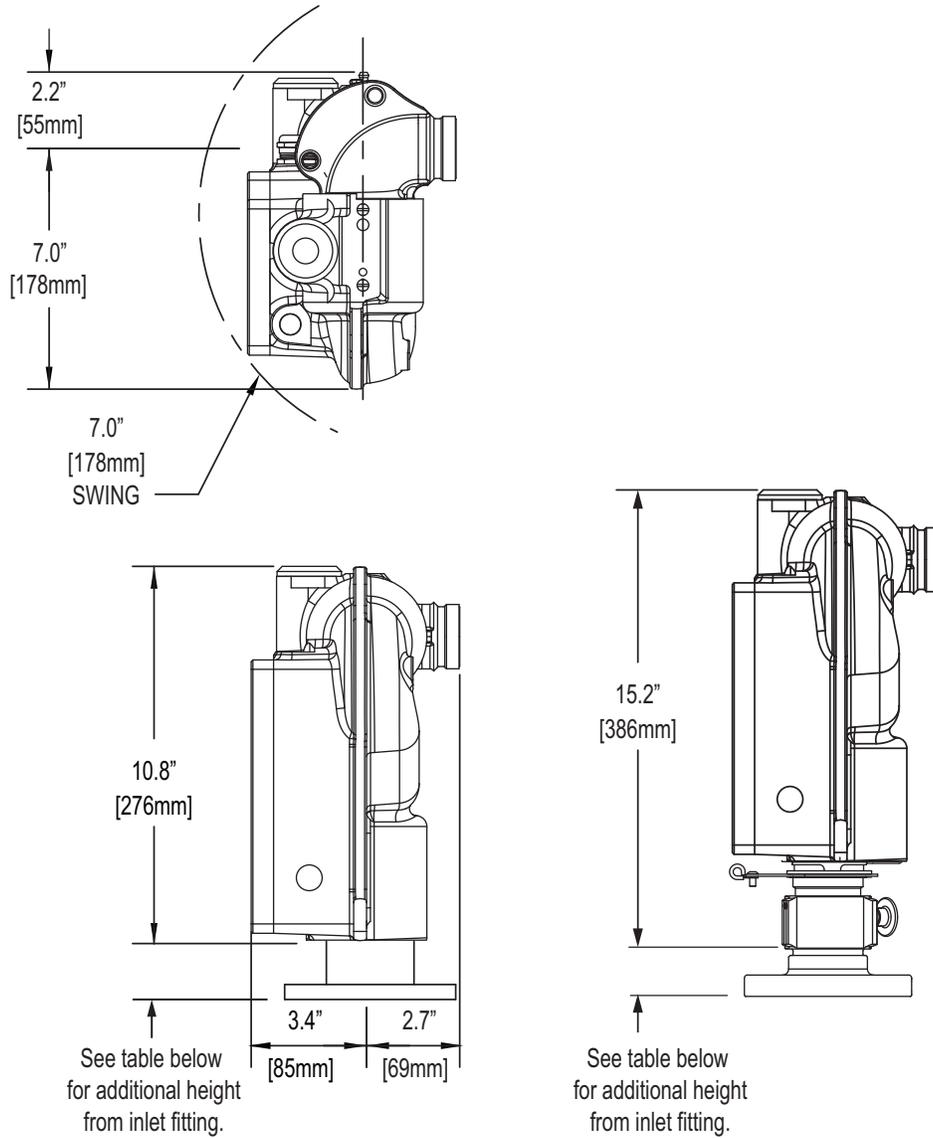


Figure 3.6A

### 4.0 INSTALLATION

#### 4.1 ELECTRICAL INSTALLATION

See Remote Control (RC) Monitor Electrical Controls Supplemental Instructions LIY-500.

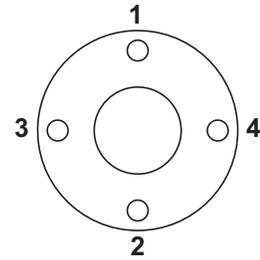
## 4.2 STRUCTURAL REQUIREMENTS



**WARNING** Injury or damage can occur from an inadequately supported monitor. The mounting must be capable of supporting the nozzle reaction force.

The structure that the EF1 RC Monitor is mounted to must withstand the internal pressure of the monitor as well as shear and bending forces due to nozzle reaction. Nozzle reaction can be as high as 150 lbs (70 kg) (200 gpm at 200 psi).

For flanged connections the use of flat flanges without raised faces is recommended. Use a ring gasket as defined in ASME 16.21 or ISO 7483. Tighten flange bolts in an alternating sequence. Tighten sequentially each bolt or stud three times with 30%, then 60%, and finally 100% of the specified torque. Tighten to 76-80 ft-lb (100-110 N-m).



Tighten Sequentially Each Bolt Three Times to a Total of 76-80 ft-lb (100-110 N-m)

Figure 4.2

FLANGE TYPE	OUTSIDE DIAMETER		THICKNESS		BOLT HOLE CIRCLE		# OF BOLTS	SIZE OF BOLTS	
	in	mm	in	mm	in	mm		in	mm
2.5" ANSI 150	6.9	175	0.98	25	5.5	140	4	5/8	16
3" ANSI 125/150-DN80 PN20	7.5	190	0.75	20	6.0	152.5	4	5/8	16
DN80, PN16 Flange	7.9	200	0.87	22	6.3	160	8	5/8	16

Table 4.2

## 4.3 TRAVEL RANGES

The EF1 RC Monitor is available with various inlet fittings. These Inlet Adapters must be oriented upon installation so the EF1 RC will point in the desired direction. Travel ranges relative to the Straight Ahead Reference Mark are shown below.

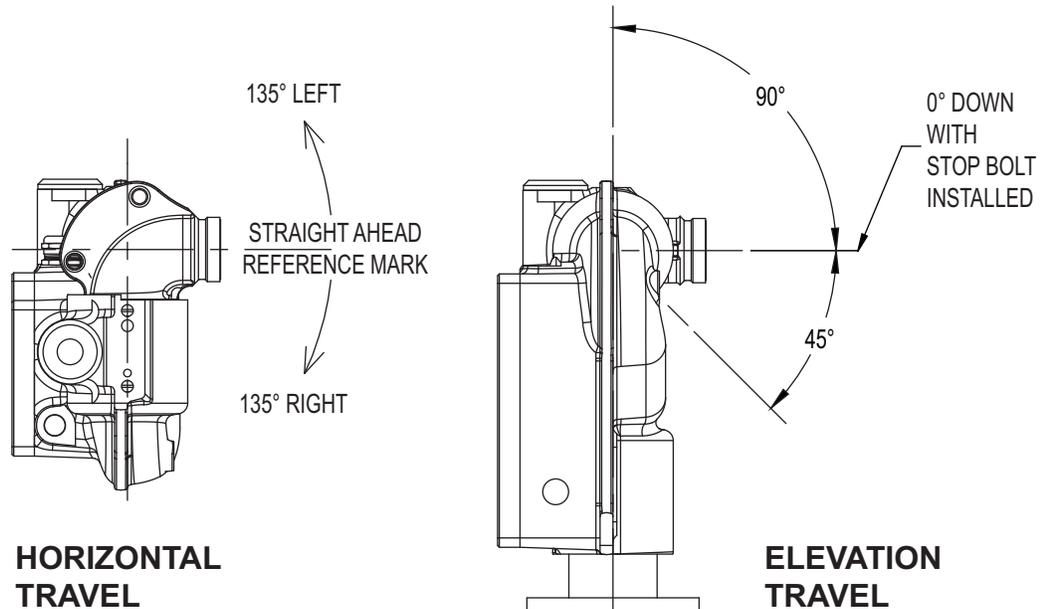


Figure 4.3

## 4.4 TRAVEL STOPS

Vertical Travel Stops can be limited by installing a Stop Bolt (Y4145) and adjustment disks (Y3146).

Travel is reduced by approximately 13 degrees for each disk installed.

To install horizontal travel stops:

1. Rotate the Travel Stop 90° and insert into the Coupling Track.
2. Rotate the Travel Stop 90° so that the letter (R or L) on the stop is located on top.
3. Move the monitor to the desired end of travel.
4. Position the Travel Stop next to the Stop Ear.
5. Tighten the set screws to lock the travel stop position.
6. Repeat steps for the other side.

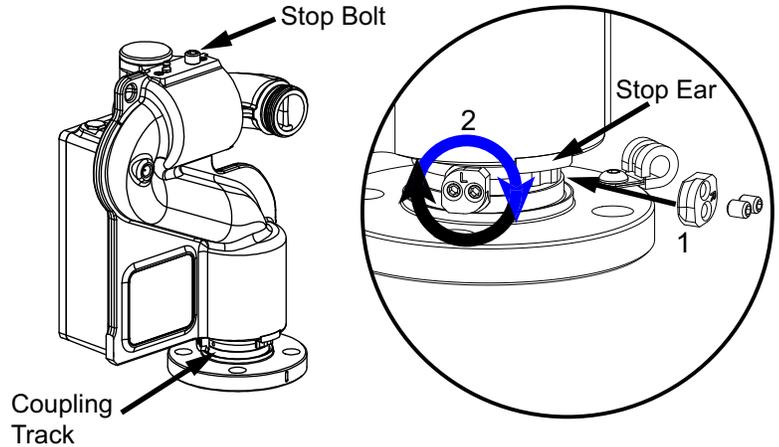


Figure 4.4

## 4.5 QUICK CONNECT INSTALLATION

A rotational lock is included on quick connect couplings. The locking pin also holds the coupling up and out of the way while orienting the monitor to engage the internal ear into the slot on the adapter.

To install the monitor with a quick connect:

1. Hold the Pull Pin out.
2. Push the coupling up and the release pin before installing monitor on the adapter.
3. Align the Locator Tongue on the monitor with the Slot in the inlet.
4. Align the monitor with the Straight Ahead Reference Mark on the adapter. Once the monitor is properly aligned on the adapter, hold the pin out while sliding the coupling down to the adapter.
5. Rotate the coupling until it is tight. The coupling may become sufficiently tight before reaching the next detent position. It is not necessary to over tighten the coupling if the pull pin is between detent positions.

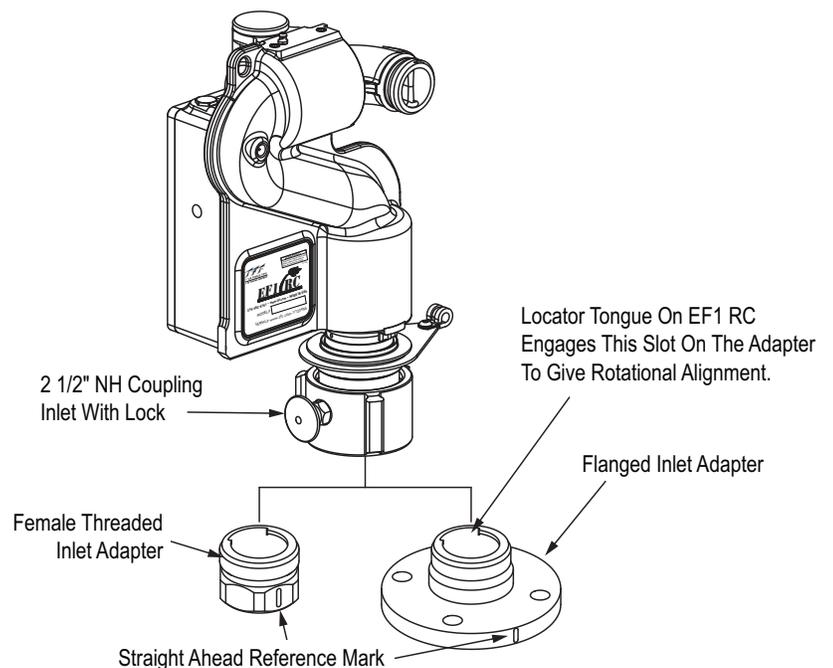


Figure 4.5

### NOTICE

Do not use the Pull Pin as a lever to tighten or loosen the coupling.

## 4.6 NOZZLE INSTALLATION

The nozzle is simply screwed onto the monitor's exit threads.

### CAUTION

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.

### CAUTION

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.

## 4.7 PRESSURE GAUGE PORT

There is a raised boss on the front of the monitor. This raised boss is not machined from the factory but may be drilled and tapped for ¼ NPT threads if a pressure gage is desired on the monitor.

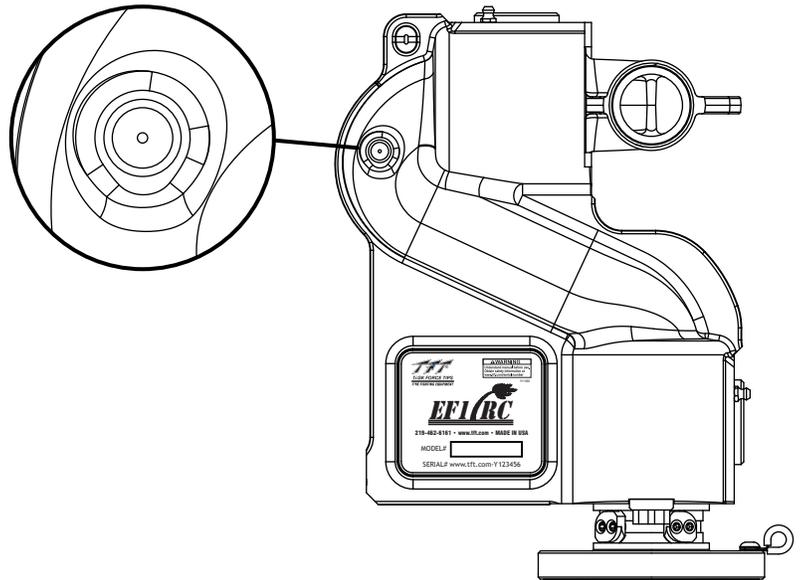


Figure 4.7

## 4.8 DRAINING RESIDUAL WATER

There is no drain on the EF1 RC monitor itself. A drain valve should be installed on the piping to which the monitor is attached.



**Monitors, valves, and piping may be damaged if frozen while containing sufficient amounts of water. Such damage may be difficult to detect visually and can lead to possible damage, injury, or death. Equipment that may be exposed to freezing conditions must be drained immediately following use to prevent damage.**



**Structural damage from corrosion can result from failure to drain appliance between uses. Damage from corrosion can cause injury due to equipment failure. Always drain appliance between uses.**

## 5.0 OPERATING INSTRUCTIONS

See Remote Control (RC) Monitor Electrical Controls Supplemental Instructions LIY-500 for operation of the Monsoon RC Monitors.

### 5.1 RECOMMENDED PARK POSITION

For truck mounted applications it is recommended that the monitor be parked in a position such that the monitor's nozzle rests against a bracket or support surface. If a support surface is not available, run the elevation against one of its travel stops to take some of the backlash out of the gear drive. This will minimize bouncing of the nozzle when the apparatus is traveling. See Remote Control (RC) Monitor Electrical Controls Supplemental Instructions (LIY-500) for information on programming OSCILLATE and PARK position of the EF1 RC monitor.



**On many vehicle installations, the monitor is the highest point on the apparatus. Damage or injury could occur if there is not sufficient clearance to safely pass under doors or overhead obstructions. Always check stowed position of the monitor before moving.**

## 5.2 OVERRIDE HEX DRIVE

In the event of electrical system failure on the monitor or fire truck, the EF1 RC Monitor is factory supplied with hex drives so a 1/4" hex wrench may be used for manual override.

Pry the dust caps off from the horizontal or vertical shafts to access the hex drives.

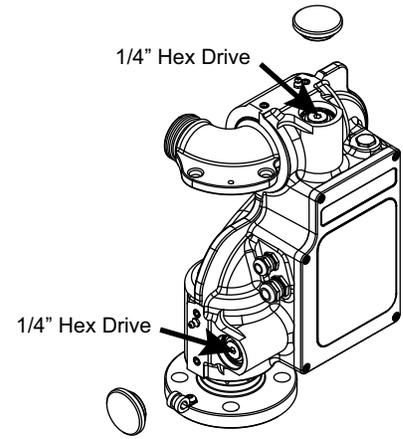


Figure 5.2

## 6.0 FLOW CHARACTERISTICS

### 6.1 STACKED TIPS FLOW AND REACTION FORCE

NOZZLE DIAMETER	NOZZLE INLET PRESSURE									
	50 PSI		80 PSI		1000 PSI		150 PSI		175 PSI	
	FLOW (GPM)	REACTION (LBS)	FLOW (GPM)	REACTION (LBS)	FLOW (GPM)	REACTION (LBS)	FLOW (GPM)	REACTION (LBS)	FLOW (GPM)	REACTION (LBS)
1/2 inch	53	20	66	31	74	39	91	59	98	69
5/8 inch	82	31	104	49	116	61	142	92	153	107
3/4 inch	118	44	149	71	167	88	205	132	221	155

NOZZLE DIAMETER	NOZZLE INLET PRESSURE									
	4 BAR		6 BAR		8 BAR		10 BAR		12 BAR	
	FLOW (L/min)	REACTION (KG)	FLOW (L/min)	REACTION (KG)	FLOW (L/min)	REACTION (KG)	FLOW (L/min)	REACTION (KG)	FLOW (L/min)	REACTION (KG)
12 mm	190	9	230	14	270	18	300	23	330	28
16 mm	340	16	420	25	480	33	540	41	590	49
19 mm	480	23	590	35	680	46	760	58	830	69

Table 6.1

### 6.2 PRESSURE LOSS

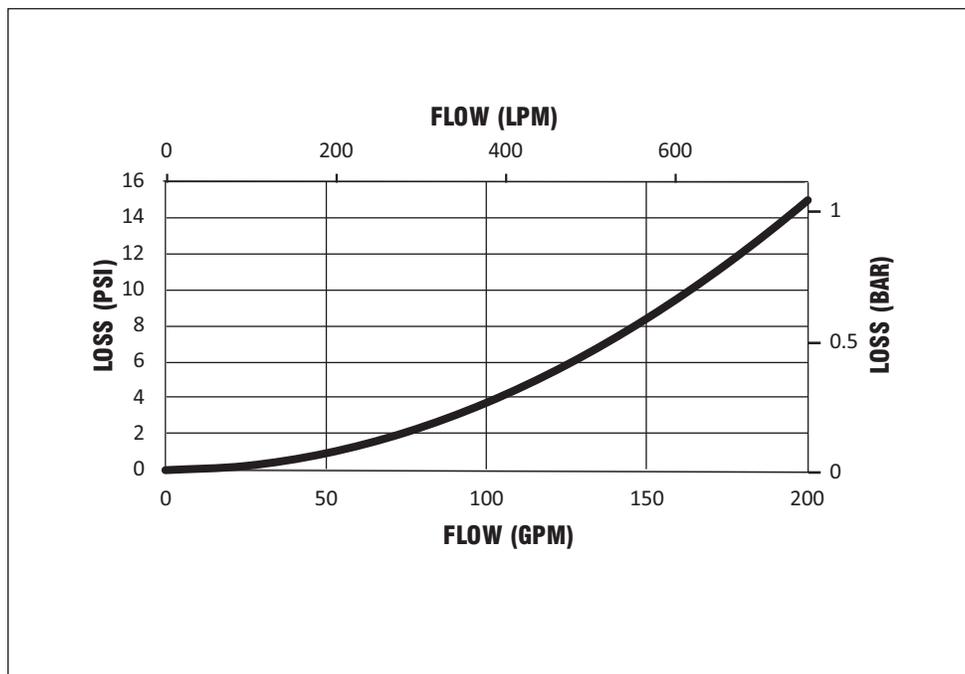


Figure 6.2

## 7.0 WARRANTY

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

### 8.2 LUBRICATION

The EF1 monitor generally should not require greasing. In the event that the operation becomes stiff grease may be applied to the horizontal rotation and elevation worm gears. For grease port locations ([see Figure 3.4](#)). Use medium viscosity automotive chassis grease. Apply only enough grease to restore normal operation. If normal operation is not restored by greasing then inspect for other causes of stiff operation.

## NOTICE

**Do not over pump grease. The monitor's greased areas lead to large chambers that could trap several pounds of grease before becoming visible.**

### 8.3 TROUBLE SHOOTING

SYMPTOM	POSSIBLE CAUSE	REMEDY
Leaks	Debris or damage in the seal area	Clean out debris or replace damaged parts
Elevation Binding	Debris or damage to the elevation drive parts	Clean out debris or replace damaged parts
	Lack of lubricant	Grease, <a href="#">See section 8.2</a>
	May be electrical related	See TROUBLE SHOOTING section of Electronics Manual LIY-500
Horizontal Rotation Binding	Debris or damage to the horizontal drive parts	Clean out debris or replace damaged parts
	Lack of lubricant	Grease, <a href="#">See section 8.2</a>
	May be electrical related	See TROUBLE SHOOTING section of Electronics Manual LIY-500

## 8.4 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.

### **⚠ WARNING**

**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).**

### **⚠ CAUTION**

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

### **NOTICE**

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

## 9.0 EXPLODED VIEWS AND PARTS LISTS

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

## 10.0 OPERATION AND INSPECTION CHECKLIST

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

1. All valves (if so equipped) 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 repair
7. There is no obvious damage such as missing, broken or loose parts
8. There is no damage to the appliance that could impair safe operation (e.g. dents, cracks, corrosion, or other defects)
9. All swiveling elements rotate freely
10. Nozzle is securely attached

**BEFORE BEING PLACED BACK IN SERVICE**, appliances must be inspected to this checklist:

1. All valves (if so equipped) 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 of the relief valve, if any, 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 that could impair safe operation (e.g. dents, cracks, corrosion, or other defects)
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.**