XTENDER™

Installation, Operating & Maintenance Instruction

9867200 Rev REL

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

ELKHART BRASS
A Clarience Technologies Company

CONTENTS

PRODUCT SAFETY **3**
SYSTEM FEATURES **4**
SYSTEM COMPONENT DESCRIPTIONS **5**
XTENDER 5
Controller 5
CONTROL SYSTEM SPECIFICATIONS **5**
MOUNTING STRUCTURE REQUIREMENTS **6**
Nozzle Reaction Formula 6
Calculating for Moment and Load on Mounting Structure 7
COMPATIBLE MONITOR AND NOZZLE LISTING: **8**
Monitors 8
Nozzles 8
INSTALLATION INSTRUCTIONS **12**
XTENDER Installation 12
Monitor Installation 12
Installing the Monitor to the Flange 12
XTENDER WIRING INSTRUCTIONS **13**
Warnings and General Considerations 13
Wiring Overview 14
Confirm Electronics Box Connections 15
CAN Bus Connection 18
Position Warning Indicator Connection 18
Power Connection 18
EXM2 WIRING **19**
OPERATING INSTRUCTIONS **19**
Using the “DEPLOY” button 20
Using the “STOW” button 20
USING the “EXT” button 20
MAINTENANCE AND INSPECTION **21**
XTENDER 21
TROUBLESHOOTING **21**

FIGURES

FIGURE 1. ..... **4**
FIGURE 2. ..... **7**
FIGURE 3. ..... **9**
FIGURE 4. ..... **10**
FIGURE 5. ..... **11**
FIGURE 6. XTENDER WIRING OVERVIEW **14**
FIGURE 7. XTENDER CONTROL BOX **15**
FIGURE 8. XTENDER CONTROL BOX HARNESS – 12 POSITION - 37592000 ..... **16**
FIGURE 9. XTENDER CONTROL BOX POWER HARNESS – 2 POSITION - 37591000 ..... **17**
FIGURE 10 ..... **19**

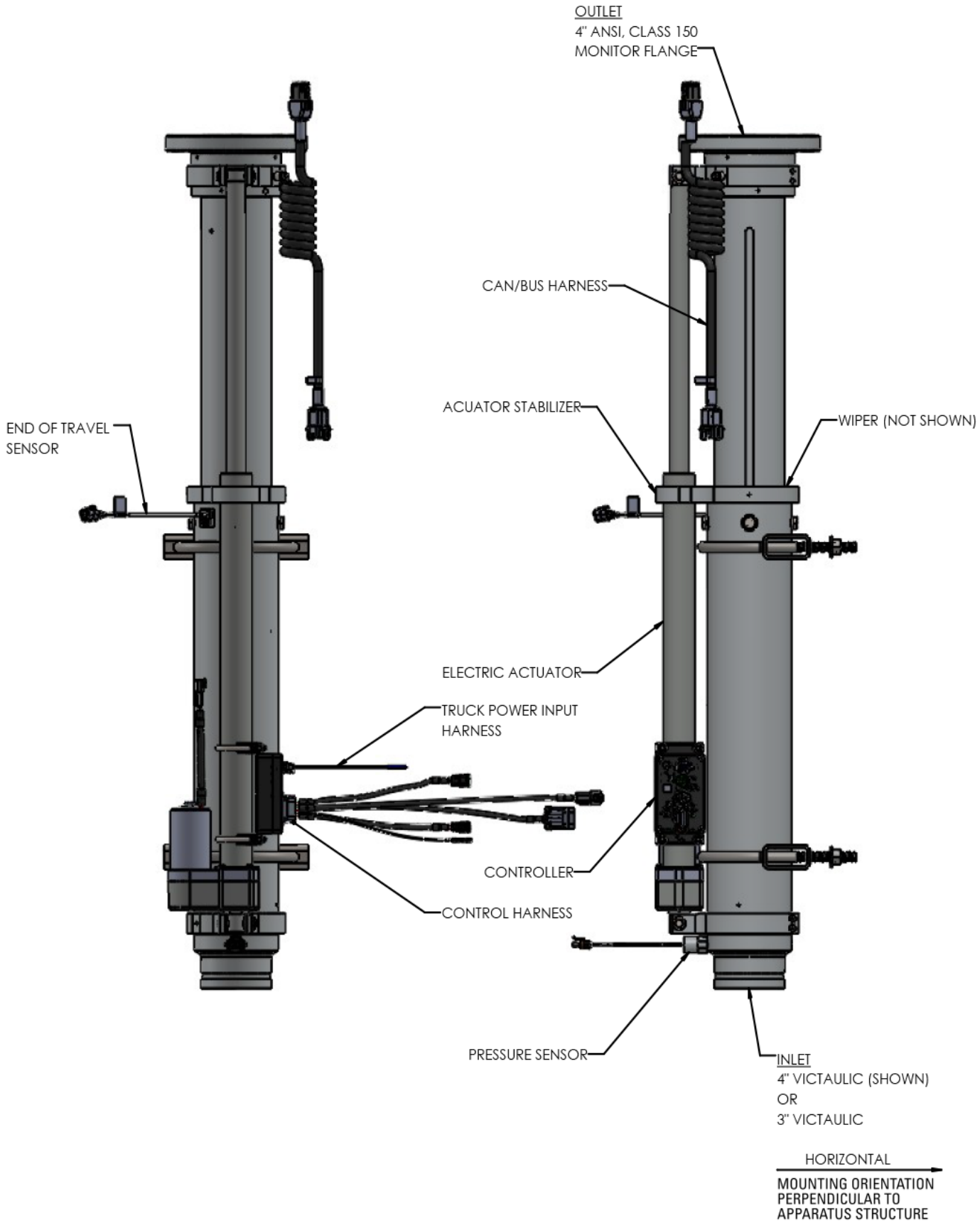
IMPORTANT:
Before installing and operating this equipment, read and study this manual thoroughly. Proper Installation is essential to safe operation. In addition, the following points should be adhered to ensure the safety of equipment and personnel.
All information below pertains to Elkhart Brass products, please contact Elkhart Brass technical support for compatibility with other products.

PRODUCT SAFETY

1. All personnel who may be expected to use this equipment must be thoroughly trained in its safe and proper use.
2. Never exceed a moment of 1,476 ft-lbs at the outlet connection for the default recommended truck mount brace locations. (See section V. Mounting Structure Requirements).
3. Become thoroughly familiar with the hydraulic characteristics of this equipment and the pumping system used to supply it. To produce effective fire streams, operating personnel must be properly trained.
4. Whenever possible, this equipment should be operated from a remote location. Do not needlessly expose personnel to dangerous fire conditions.
5. Open the water valve supplying this equipment slowly, so that the piping fills slowly, thus preventing possible water hammer occurrence.
6. After each use, and on a scheduled basis, inspect equipment per instructions (see section VIII. Maintenance and Inspection)
7. Any modification to the controller's enclosure will destroy the IP rating and void warranty coverage of the enclosure and all components within.
8. Moving parts can crush and cut. Keep hands and body parts clear of moving parts.
9. Do not open the supply valve to the XTENDER when it is in an intermediate position between fully extended and fully retracted.
10. Never pressurize the XTENDER without the electric actuactor and CAM screw securely attached. This may cause the inner tube subassembly to become a projectile which may cause injury and/or damage.
11. Ensure that personnel and obstructions are clear prior to operating the XTENDER.
12. Do not alter the XTENDER or any associated equipment. Doing so will voild the warranty and may lead to injury or damage.

SYSTEM FEATURES

Figure 1.



SYSTEM COMPONENT DESCRIPTIONS

XTENDER

The XTENDER is an electric operated telescoping waterway. It is designed to elevate a deck monitor 18 inches so the stream path can clear obstructions like truck cab, lights, hose bed, etc. It is designed to be used in the fully extended position but can be configured to be used in the retracted position as well (refer to EXM2 system configuration manual). The water supply connection comes with a 4-inch Victaulic (optional 3-inch Victaulic). The discharge connection is a 4-inch ANSI class 150 flange.

The maximum flow capacity is 2000 gallons per minute. The maximum static inlet pressure is 200 psi. A pressure switch prevents the XTENDER from moving when internal pressure exceeds 10 psi to prevent damage to equipment or injury to personnel caused by unexpected changes in stream elevation.

Controller

The XTENDER's control circuit uses a state-of-the-art control logic to keep the controller size to a minimum. The controller utilizes the CANBUS network to control the deck gun elevator. The unit does not stop in mid position. An optional in-cab warning lamp (supplied by the OEM) shows if the XTENDER is not fully retracted.

CONTROL SYSTEM SPECIFICATIONS

Waterway Size	4 Inch
Maximum Flow	2000 GPM
Maximum Pressure (Static)	200 PSI
Lifting Capacity	65 lbs. when >= 12 VDC
Nominal Lifting Speed	10 seconds with 12VDC
Nominal Lowering Speed	10 seconds with 12VDC
Nominal Operating Voltage	12 or 24 VDC (Auto-Detection)
Voltage Range	10 - 32 VDC
Operating Temperature Range	Actuator -15F to 149F (-26C to 65C)
Storage Temperature Range	-40F to 185F (-40C to 85C)
Nominal Current Draw	9 Amps at 12 VDC
Maximum Current Draw	20 Amps at 12 VDC
Current Limit	14 Amps at 12 VDC
Travel	18 inches
Ingress Protection	IP67 (electrical) except pressure connector; IP66 (actuator) and pressure connector

MOUNTING STRUCTURE REQUIREMENTS

The mounting structure must be able to safely withstand the forces shown in Figure 2. For monitor and nozzle combinations other than Boa X2 2000 and SM-2000E consult Elkhart Brass engineering department or calculate moment at monitor inlet. Forces should not exceed 5,951 lbs. on the mounting structures.

Nozzle Reaction Formula

STRAIGHT BORE NOZZLES

$NR = 1.5\ d^2\ NP$

Where NR = Nozzle Reaction (Pounds)

d = Nozzle Diameter (inches)

NP = Nozzle Pressure (psi)

1.5 is constant

Example: 2.5 in Smooth BoreTip can flow 2033 GPM at 120 PSI:

$NR = 1.5 \times 2.5^2 \times 120$

NR = 1125 lbs.

COMBINATION FOG NOZZLES

$NR = 0.0505Q\sqrt{P}$

Where NR = Nozzle Reaction (Pounds)

Q = Flow (GPM)

P = Nozzle Pressure (psi at base of nozzle)

0.0505 is a constant

This formula is with nozzle set on straight stream. Reaction will decrease as pattern is widened to fog.

Example: X-Stream SM-2000 can flow 2000 GPM at 80 PSI:

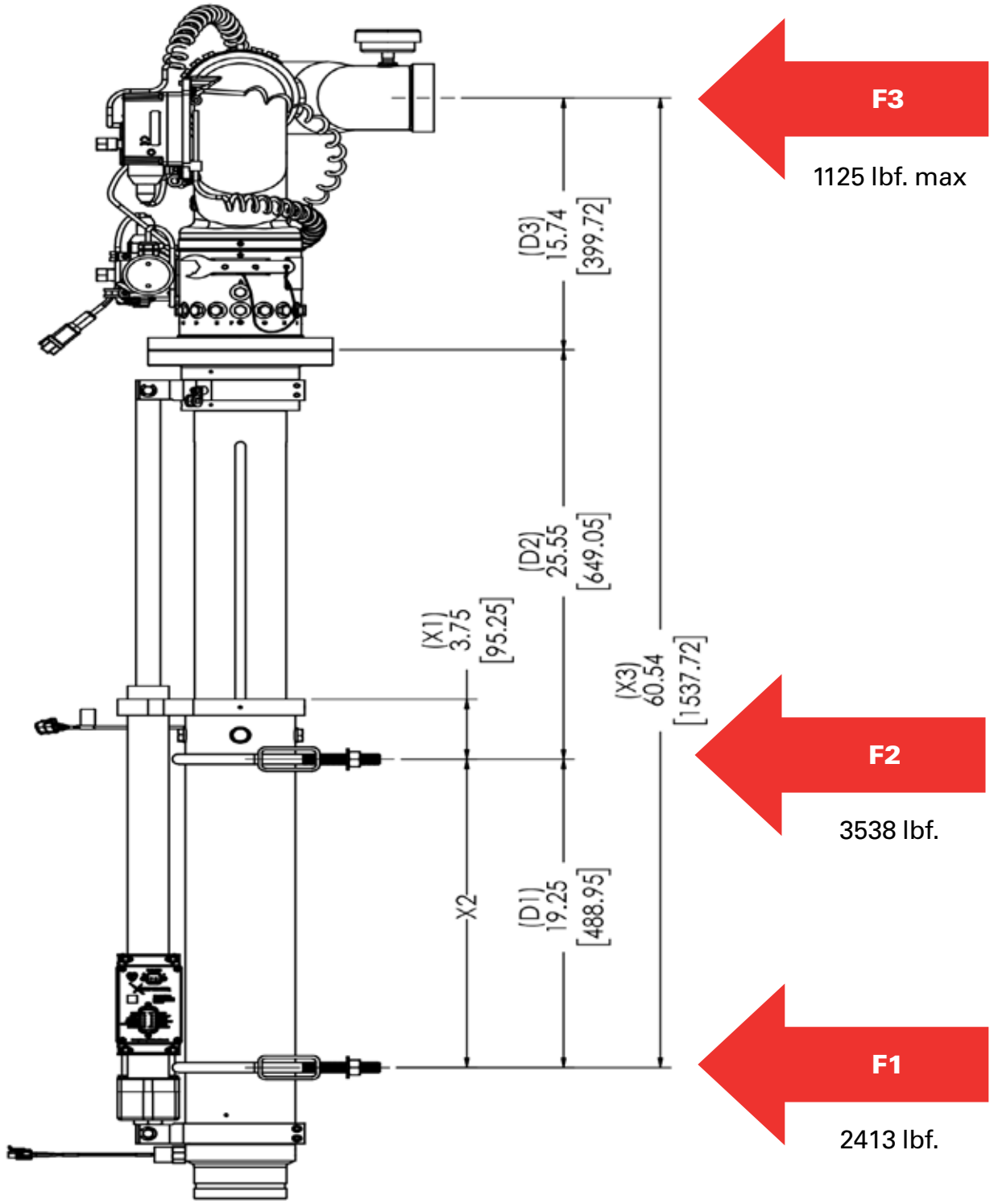
$NR = 0.0505(2000)\ \sqrt{80}$

NR=904 lbs.

IMPORTANT:
An improperly supported XTENDER can result in injury or damage.
The maximum allowable moment created by the nozzle reaction is 1,476 ft-lbs at the base of the monitor assembled on the outlet of the XTENDER. Do not create a condition that exceeds the maximum allowable moment.

Calculating for Moment and Load on Mounting Structure

Figure 2.



COMPATIBLE MONITOR AND NOZZLE LISTING:

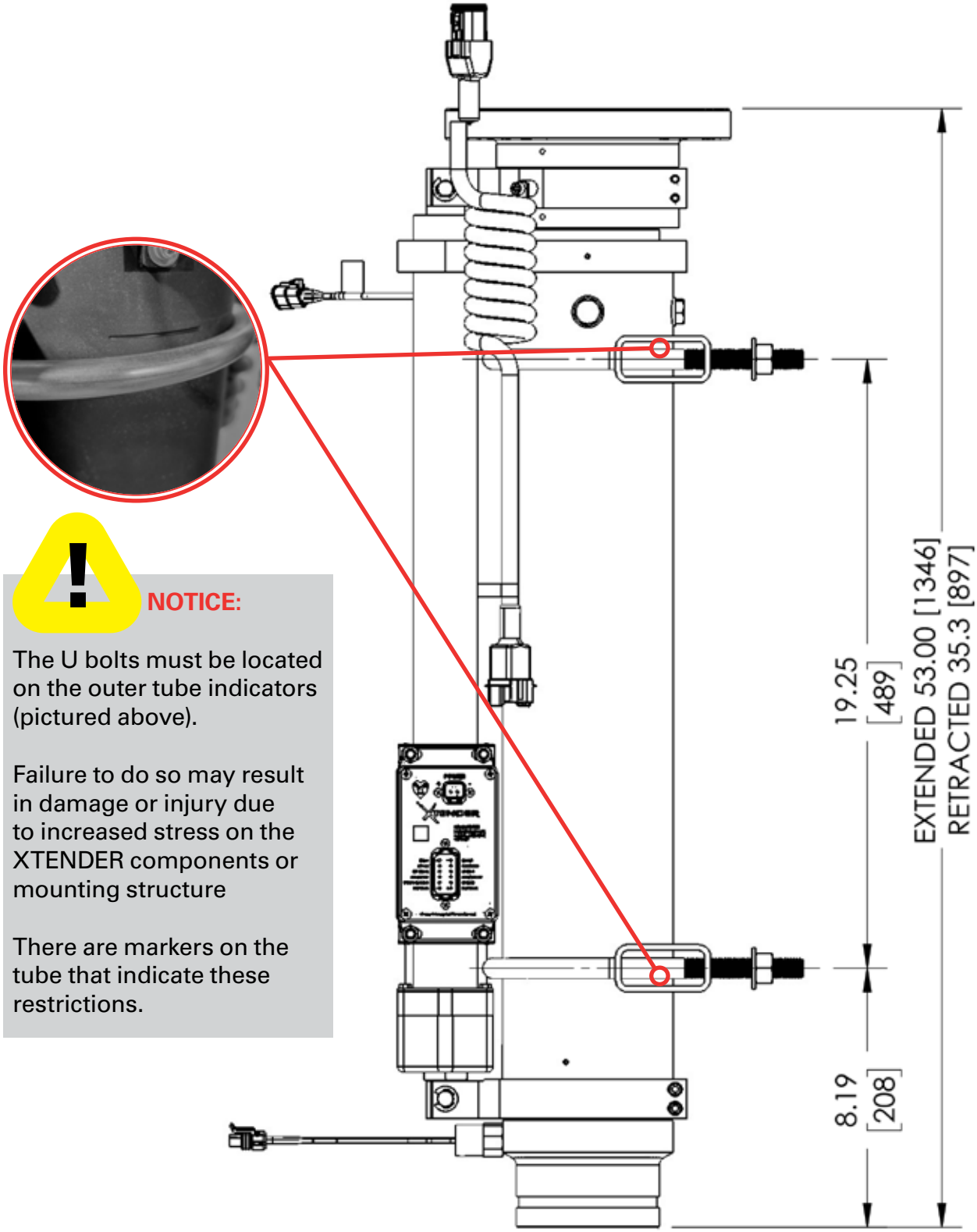
Monitors

Cobra EXM2, CobraMax, Boa X2 2000, Scorpion EXM2.

Nozzles

6000 Series, SM-1000, SM-1250, SM-1500, SM-2000, smooth bore nozzles up to 2.5 inches.

Figure 3.



NOTICE:

The U bolts must be located on the outer tube indicators (pictured above).

Failure to do so may result in damage or injury due to increased stress on the XTENDER components or mounting structure

There are markers on the tube that indicate these restrictions.

Figure 4.

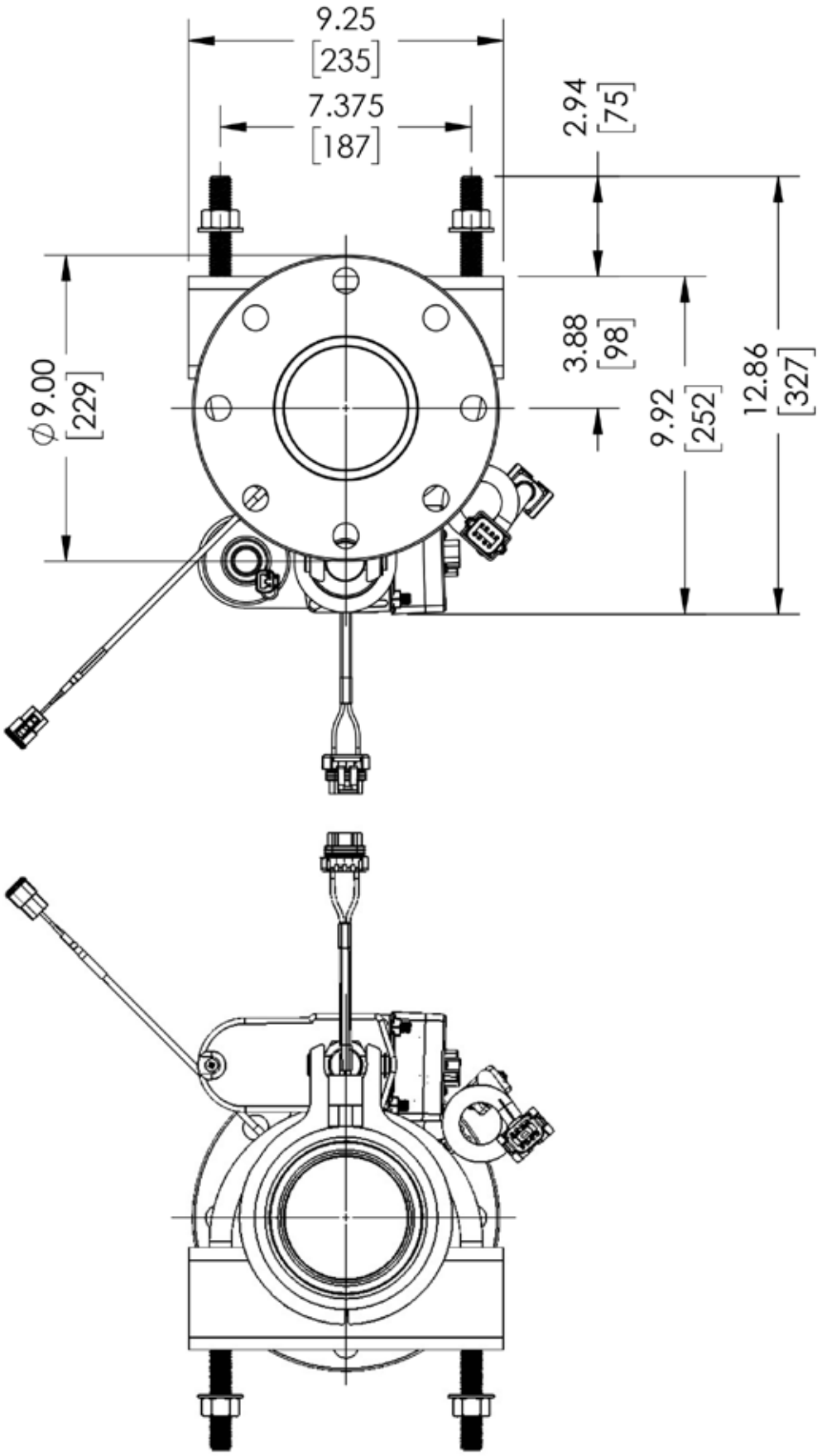
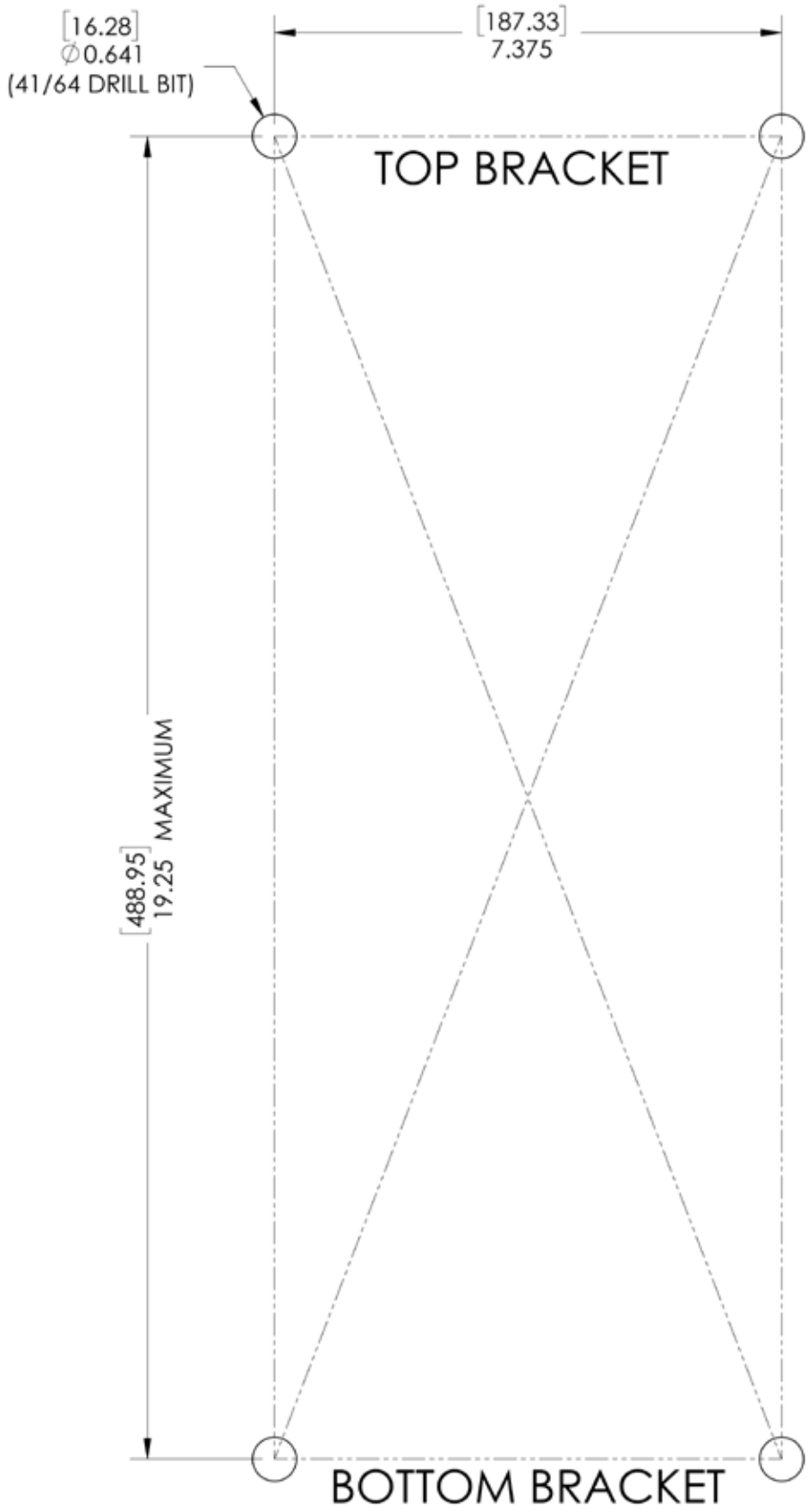


Figure 5.


[16.28]
∅0.641
(41/64 DRILL BIT)
[187.33]
7.375
TOP BRACKET
[488.95]
19.25 MAXIMUM
BOTTOM BRACKET

INSTALLATION INSTRUCTIONS

XTENDER Installation

1. Remove nuts on the 5/16" U bolts holding on the controller box and adjust the location of the controller box as needed. Then apply blue Loctite 243 or equivalent and reinstall the nuts and torque to 119-127 in-lbs.
2. Remove nuts and washers on the 5/8" U bolts and position unit onto support structure. Apply blue Loctite 243 or equivalent and reinstall the nuts and torque to 83-90 ft-lbs.
3. Minimize stress to the mounting system by connecting the inlet to water supply with flexible hose.
4. Do not remove the actuator stabilizer.
5. See the wiring instructions section for connection instructions and fusing requirements.

Monitor Installation

Installing the Monitor to the Flange

1. Before mounting the monitor, ensure that space allows the monitor to move through the intended range of motion. Disconnect all electrical connections.
   a. The horizontal center of the monitor is marked by the center of the nameplate. The monitor is factory calibrated to move equally to the left and right from this center point.
2. Mount the monitor onto an appropriate flat face flange with eight (8) 5/8"-11 UNC grade 5, carbon steel or stainless-steel bolts & nuts. Seal flange joint with an appropriate full-face gasket. Install eight (8) 5/8" flat washers onto the monitor flange side of the connection. Torque bolts uniformly (20 ft-lbs. at a time in a crisscross pattern) to 83-90 ft-lbs. Apply blue Loctite 243 or equivalent to the threads.
3. See the wiring instructions section for connection instructions and fusing requirements.
4. Please refer to the manual for the specific monitor for additional information if necessary.

XTENDER WIRING INSTRUCTIONS

Warnings and General Considerations

Recommended electrical requirements for the XTENDER.

- Typical Power and Ground Wiring (Refer to applicable electrical codes for specifics: NEC, NFPA, etc.):

Distance Ft.(m)	Minimum Diameter Wire Gauge (AWG)
100(30.5) – 150(45.7)	6
50(15.2) < 100(30.5)	8
25(7.62) < 50(15.2)	10
< 25(7.62)	14-16

- Power and Ground wire type: Cross Link or equivalent (Must meet or exceed NFPA 1901 Section 13)
- Maximum XTENDER amperage draw: 20A at 12VDC, 15A at 24VDC.
- CAN wire gauge and length:
- Main Line: 131 ft. (40 m) – 18-20 AWG (Must meet J1939 specification)
- Monitor is terminated and must be at the end of the main CAN line
- CAN wire type and shielding: Twisted shielded pair - 105°C 150V (Belden 9841 series or equivalent)
- Shield Drain: Connect shield/drain to pin C of J1939 connector

WARNING:

Turn off system power before connecting or disconnecting an electrical component!

CANTermination Points

When using CAN lines for communication there must be 2 termination points within the system.The EXM2 monitor should be considered one of these terminating points and located at one end of the main CAN line.

In order to maximize the efficiency of communication in your CAN network, you must terminate the component located at the opposite end of the main CAN line.This should be taken into consideration as you set up your system. Each additional CAN component that requires connection to the main CAN communication line between the two end components will require the use of CAN Splitter (P/N 24196000).

The maximum length of wire from the main CAN line is 3 ft. and would be considered a branch (node) off the main CAN line. A CAN termination plug (P/N 24197000) and CAN splitter (P/N 24196000) may be required to terminate the component at the end of the CAN line.

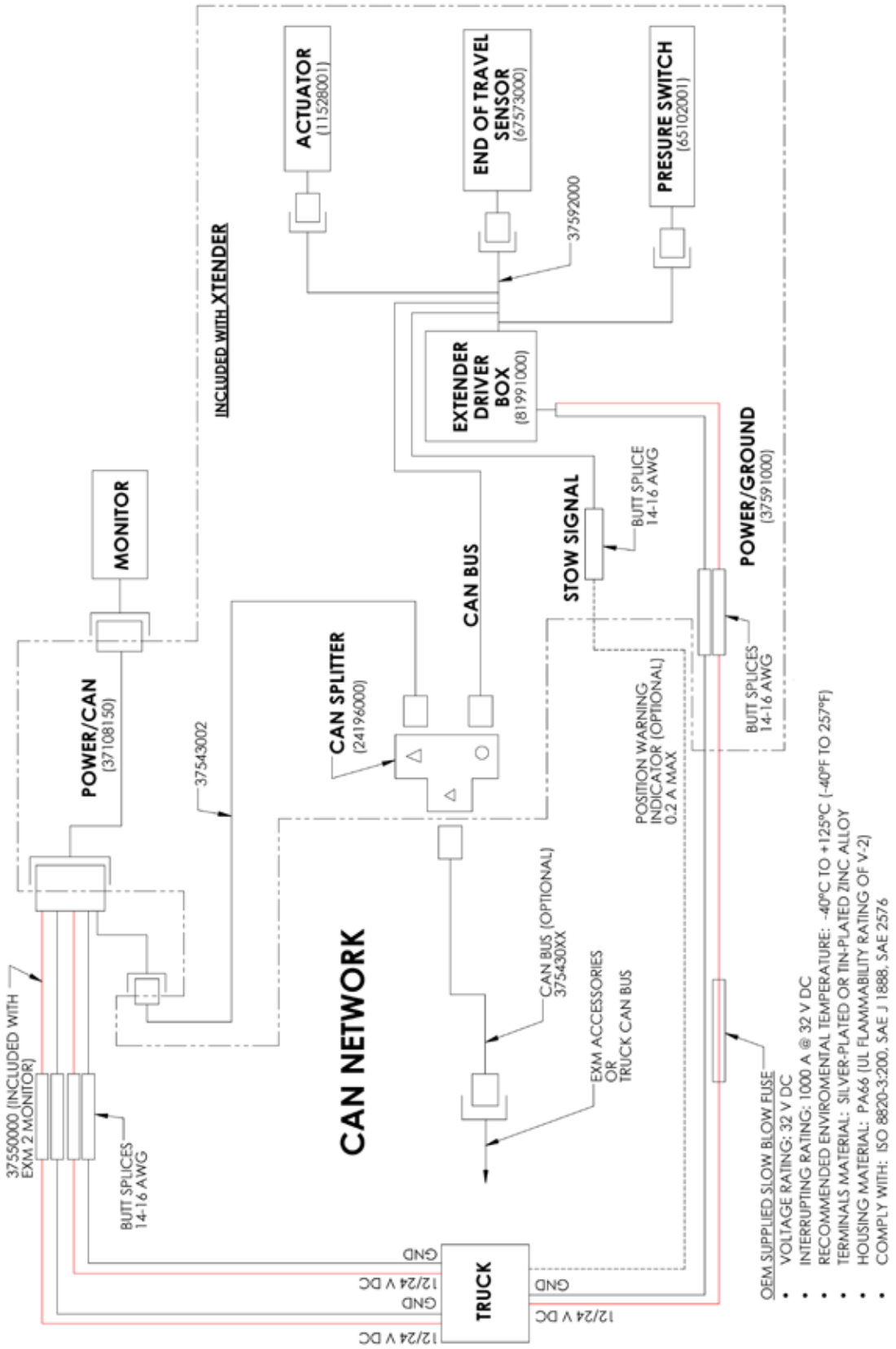
CAUTION:

Route wires away from sharp objects and heat sources. Support with ties as needed to reduce stress on connectors and/or motor and sensor leads. When an EXM2 monitor is mounted on the XTENDER, the CAN wire length due to the monitor and additional coiled cable (P/N 37108150) exceed 3 ft that it needs to be considered on a CAN branch. It is therefore the CAN component at one end of the main CAN line and therefore must be set for termination.

Wiring Overview

A general wiring diagram is shown in Figure 6.

Figure 6. XTENDER Wiring Overview

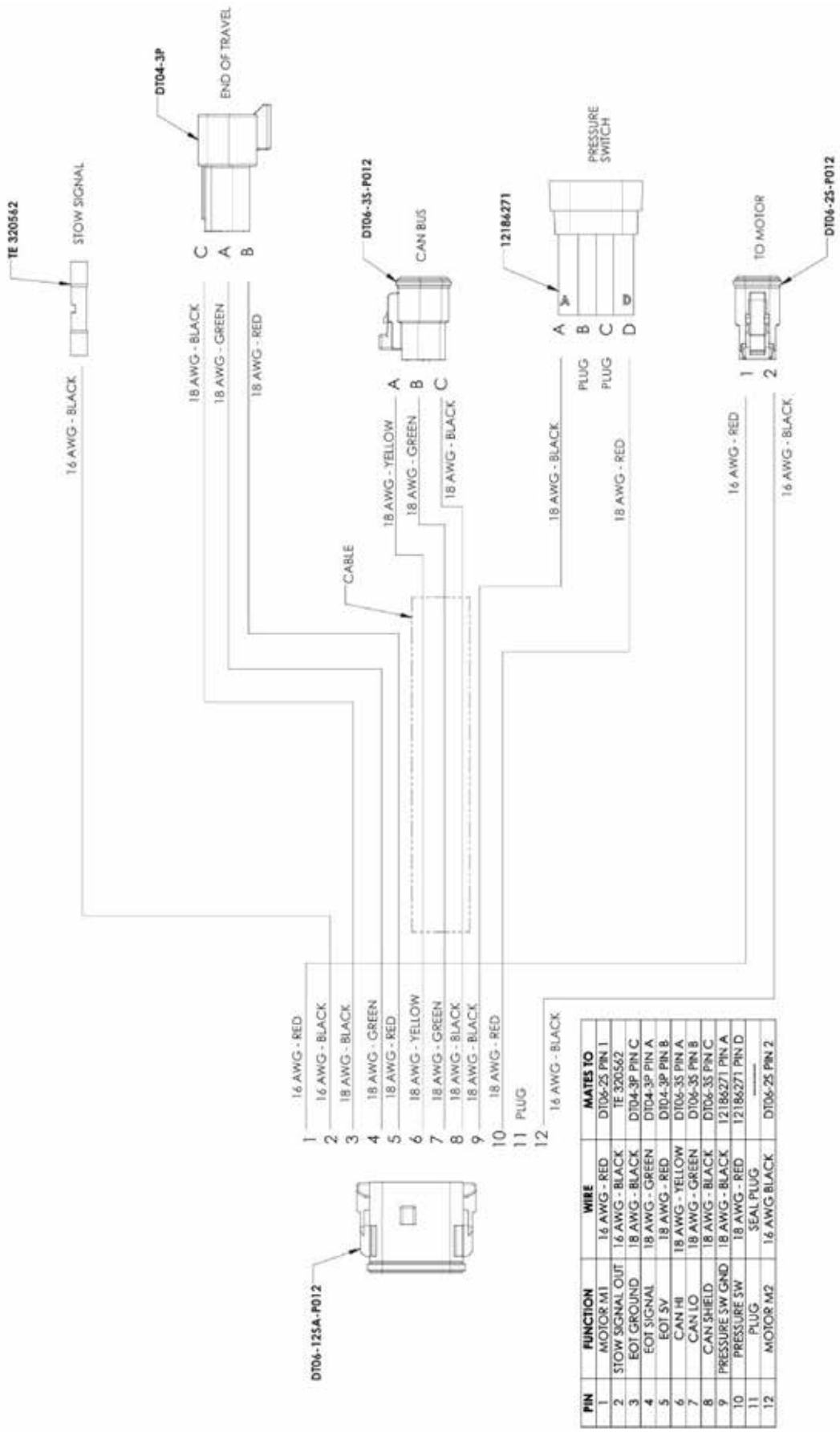


Confirm Electronics Box Connections

Confirm that the two harnesses, 37592000 and 37591000, are connected to the XTENDER electronics box. The XTENDER Control Box is shown in Figure 7. Control Box Harness 37592000 is shown in Figure 8 and Control Box Power Harness 37591000 is shown in Figure 9.

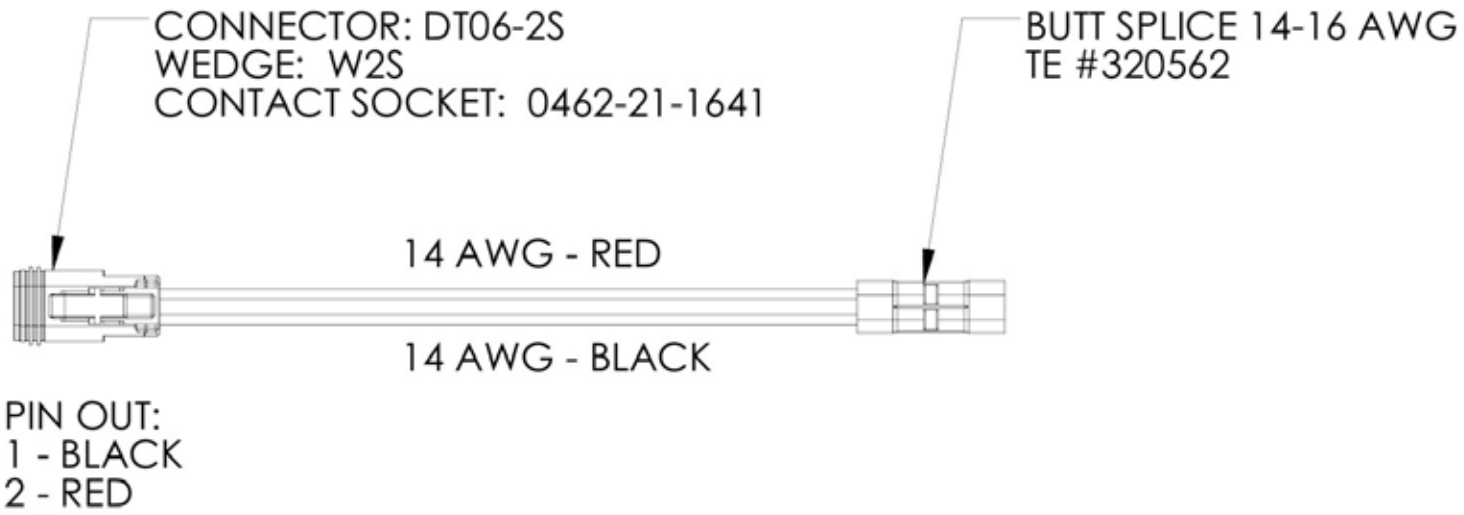
Figure 7. XTENDER Control Box.

Figure 8. XTENDER Control Box Harness – 12 position - 37592000.



PIN	FUNCTION	WIRE	MATES TO
1	MOTOR M1	16 AWG - RED	DT06-2S PIN 1
2	STOW SIGNAL OUT	16 AWG - BLACK	TE 320562
3	EOT GROUND	18 AWG - BLACK	DT04-3P PIN C
4	EOT SIGNAL	18 AWG - GREEN	DT04-3P PIN A
5	EOT 5V	18 AWG - RED	DT04-3P PIN B
6	CAN HI	18 AWG - YELLOW	DT06-3S PIN A
7	CAN LO	18 AWG - GREEN	DT06-3S PIN B
8	CAN SHIELD	18 AWG - BLACK	DT06-3S PIN C
9	PRESSURE SW GND	18 AWG - BLACK	12184271 PIN A
10	PRESSURE SW	18 AWG - RED	12184271 PIN D
11	PLUG	SEAL PLUG	——
12	MOTOR M2	16 AWG BLACK	DT06-2S PIN 2

Figure 9. XTENDER Control Box Power Harness – 2 position - 37591000.



Confirm the following are connected:

- Connect the End-of-Travel (EOT) sensor, 6757300, cable from the top of the XTENDER to the Deutsch-style, 3 pin, DT04-3P connector on the 37592000 XTENDER harness.
- Connect the pressure sensor cable from the bottom of the XTENDER to the Delphi-style, 2-pin, 12186271 connector on the on the 37592000 XTENDER harness.
- Connect the motor cable from the bottom of the XTENDER to the Deutsch-style, 2 position, DT06-2S connector on the 37592000 XTENDER harness.

CAN Bus Connection

1. Connect the CAN bus, Deutsch-style, 3 position, DT06-3S connector of the 37592000 XTENDER harness to the system's CAN bus backbone. The XTENDER does not have an internal CAN termination.
2. Be sure the CAN bus is properly terminated at each end.

Position Warning Indicator Connection

1. Whenever the XTENDER is NOT fully retracted (down), a ground is switched on so that an optional position warning indicator, provided by the OEM, will come on. The ground is capable of sinking 200mA of current, which is sufficient to drive an LED or relay coil. The ground is only available when the unit is NOT in the fully retracted position. In the fully retracted (down) position, the ground is switched off.
2. Wire the black lead from the 12-position, 37592000 XTENDER harness to the OEM-supplied warning indicator circuit.
3. Seal the lead if a position warning indicator is not connected.

Power Connection

1. Supply power to the XTENDER by connecting the red and black leads from the 2-position, 37591000 XTENDER harness to an appropriate power source.
2. Install one 20 Amp fuse in line to the positive power lead for a 12V system (15 Amp for 24V system) to protect the monitor electrical components.
3. Be sure the wire gauge is large enough to prevent a voltage drop under load.
4. The voltage at the XTENDER needs to be 10V or higher during operation. It's recommended that the voltage be 12V or higher for the best XTENDER performance.
5. Be sure the final wire size is appropriate for the connector. An OEM-supplied waterproof junction box or splice installed close to the XTENDER may be needed to reduce wire size prior to making the final connections. Refer to recommended electrical requirements in XTENDER Wiring Instructions.

EXM2 WIRING

An EXM2 Panel Mount or EXM2 Wireless Handheld can be used to control the XTENDER. These controllers are also used to control the EXM2 Monitor that is recommended for use with the XTENDER.

Refer to the EXM2 monitor series Installation, Operation, and Maintenance instruction manual for how to wire the EXM2 Monitor, EXM2 Panel Mount, EXM2 Wireless Handheld.

An EXM2-compatible coiled extension cable, part number 37108150 (included), should be used to extend the EXM2's monitor cable to the base of the XTENDER. EXM2 monitor wiring can be done from the end of this extension cable.

OPERATING INSTRUCTIONS.

NOTE:

The XTENDER cannot be operated with water pressure above 10 PSI

The XTENDER is the perfect accessory for monitors used on pumpers where the monitor needs to clear an obstruction. The XTENDER is a continuous motion elevator that once engaged will travel the full distance (18") either up or down, without user intervention. The unit can be controlled using the EXM2 panel mount controller 7010X2 and wireless handheld controller 7015X2.

Figure 10

There are 3 methods of controlling the XTENDER on the EXM2 controller: DEPLOY, STOW and EXT.

Using the "DEPLOY" button.

1. Push and hold for at least 3 seconds to initiate.
2. The XTENDER will raise to the full up position and once the XTENDER reaches full up, the EXT LED will light up.
3. Monitor will move to programmed DEPLOY position. (Default factory position = monitor discharge at 45 degrees elevation – 0 degrees horizontal.
4. If the XTENDER is already raised and monitor is not in DEPLOY position, then the monitor will move to programmed DEPLOY position.

Using the "STOW" button.

1. Push and hold for at least 3 seconds to initiate.
2. If the monitor is not in STOW position, the monitor will move to STOW and then the XTENDER will retract down to full down position.
3. If the monitor is already in STOW position, then the XTENDER will retract down to full down position.
4. No action will occur if the monitor is stowed and the XTENDER is already in the retracted position.

USING the "EXT" button.

1. Push and hold for at least 3 seconds to initiate.
2. The EXT button functions as a position toggle just for the XTENDER and does not affect the monitor.
   a. If the XTENDER is in full up position, then it will retract to full down position.
   b. If the XTENDER is in full down position, then it will extend to full up position.

MAINTENANCE AND INSPECTION

XTENDER

The complete XTENDER system should be inspected during each apparatus check. Careful inspection for damage to the XTENDER is especially important after use in emergency operations.

1. Operate each function (Up-Down) with the controlling mechanism.
2. Inspect cam screws.
3. Inspect all exposed wiring for signs of damage and loose connections.
4. Inspect the EOT sensor and the pressure sensor for signs of damage.
5. Inspect nuts and bolts for signs of damage.
6. Inspect for leaks and repair/replace seals as required.
7. Put the XTENDER in the extended position and wipe down the cam screw grooves on the inner tube to prevent any buildup of debris to ensure smooth operation.

TROUBLESHOOTING

1. Blinking LED above the “EXT” button on the EXM2 controller.
    a. Refer to the EXM2 System Configuration Manual (https://elkhartbrass.com/wp-content/uploads/98612001revREL_EXM2_System_Config.pdf)

NOTES:

NOTES:

Elkhart Brass Manufacturing Co., Inc.

1302 W. Beardsley Avenue Elkhart, IN 46514

Tel. +1 574-295-8330

Fax +1 574-293-9914

www.elkhartbrass.com

Email: eb.info@safefleet.net

98672000 Rev REL

05-28-26